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**SCS – SWISS COLLEGE OF SURGEONS
ANNUAL MEETING 2024**

BALANCING TRADITION AND FUTURE

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ABSTRACTS

SCS – SWISS COLLEGE OF SURGEONS ANNUAL MEETING 2024

Dear colleagues & guests,

The present special edition of SWISS/KNIFE is offered online.

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On behalf of the editorial board of SWISS/KNIFE we wish you a highly active annual meeting of the Swiss College of Surgeons 2024 in Davos!

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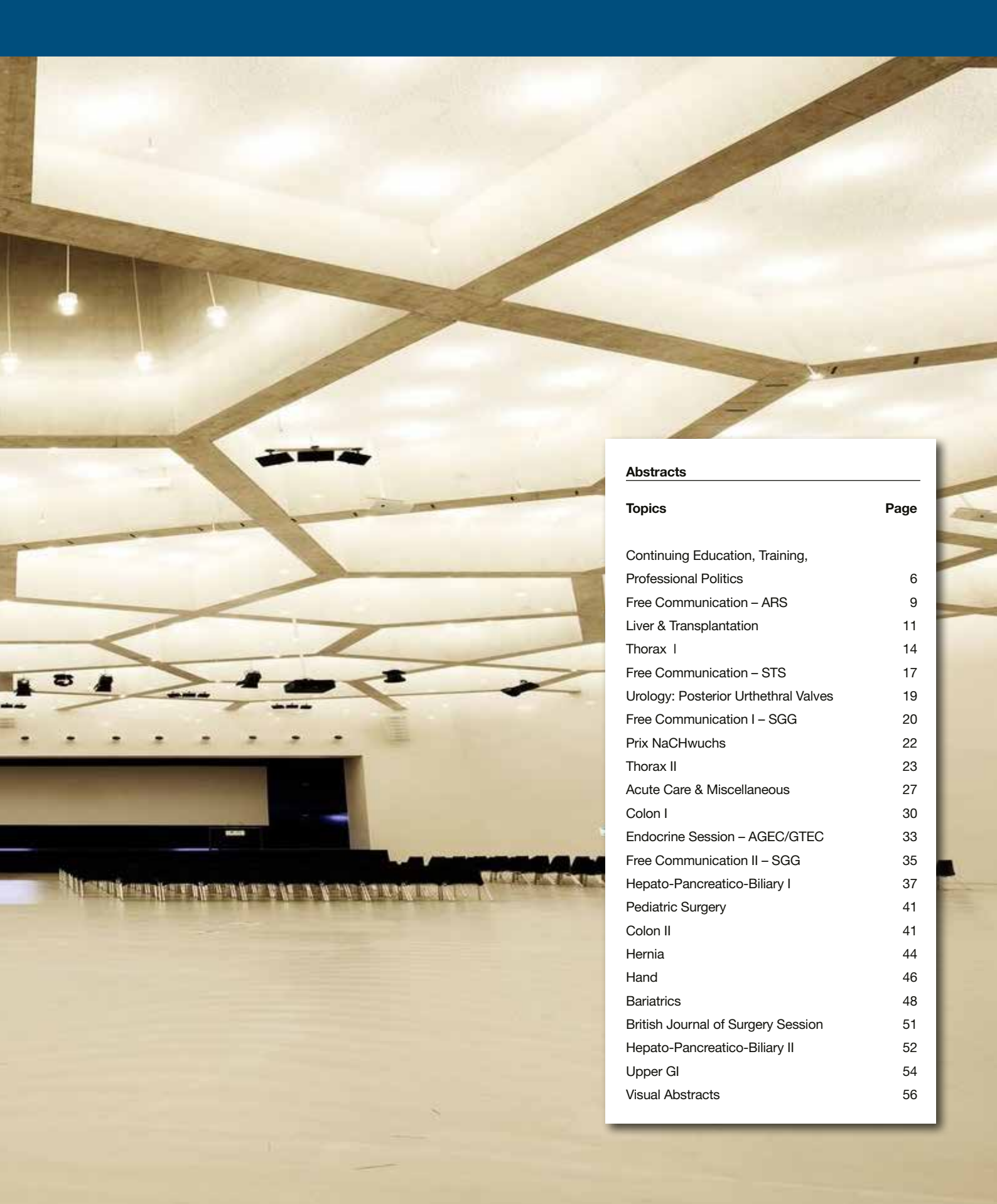


Swiss College
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Impressum

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Continuing Education, Training, Professional Politics

Proficiency and Depth of Surgical Education in Switzerland is Heading in the Wrong Direction

T. Schöb, I. Klein (Department of General Surgery, Cantonal Hospital Graubünden, Chur)

Background: In Switzerland, surgical resident training has become increasingly difficult over the past decades for numerous reasons. While the number of surgical residents has doubled over twenty years, the average workweek dropped from 70 to 50 hours. At the same time, the surgical case-load increased only marginally as opposed to the proportion of administrative responsibilities, resulting in a substantial decrease of intraoperative exposure in surgical residency training.

Aims: To assess the surgical exposure of our residents.

Methods: This study is a review of all performed surgical procedures in the field of general, abdominal, thoracic, vascular and trauma surgery at a category-A Cantonal hospital in Switzerland, performed from September 1st 2021 to August, 31st 2023. The primary outcome was surgical exposure of residents as primary, secondary and assisting surgeons. Secondary outcomes were case-distribution during daytime workhours as opposed to on-call hours per resident.

Results: The surgical exposure of a surgical resident at our cantonal hospital as primary and secondary surgeon was 41.19 and 39.06 minutes respectively per week. This surgical exposure as was paired with a total of 127.46 minutes as assisting surgeons per week. On average this results in 1.34 operations per week and 60.3 cases per year per surgical resident. 73.51% of these cases are performed during daytime work hours and 26.49% during on-call hours.

Conclusion: To fulfill the minimal number of 510 cases in the mandatory FMH surgical catalogue of becoming a general surgeon, a total residency period of 8.46 years would become necessary to take the exam based on the average number of operative cases in this category-A teaching hospital which is considerably longer compared to residency training 20 years ago. While surgical procedures and techniques continue to become more complex, the need to exploit ways to maintain a sufficient level of surgical exposure inside and outside the OR is eminent.

Music Therapy in Patients Undergoing Ambulatory Surgery: A Single-Blind Randomized Trial

F. Mongelli^{1,2}, T. Doria¹, G. la Regina¹, C. A. Cammalleri¹, F. Sabbatini¹, D. la Regina^{1,2} (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano)

Background: Day surgery procedures constitute an essential part of surgical practices in hospitals worldwide. However, outpatients may experience anxiety, fear, and stress negatively impacting patients' ability to follow the established ambulatory surgery pathway. While medications are generally administered to reduce perioperative stress, there are several measures to avoid their use. Music therapy (MT) can be used as a complementary, drug-free, safe, and cost-effective intervention.

Aims: The purpose of our study was to evaluate the impact of MT on perioperative stress and patient satisfaction in patients undergoing ambulatory surgery.

Methods: We conducted a randomized study in patients undergoing ambulatory surgery. The MT group listened to relaxing music for the whole hospital stay, while the control group received the standard treatment. Both groups were managed in the pre- and postoperative periods according to current clinical practice and ultimately received the Leiden Perioperative care Patient Satisfaction (LPPS) questionnaire before hospital discharge.

Results: During the study period, 33 patients were included, 16 randomized to the MT arm and 17 to the control arm. The average age of the patients was 51.1±16.2 years, and 10 (31.2%) patients were women. The postoperative period was uneventful for almost all patients (95.8%), and we observed a high level of satisfaction. No patient required medication for anxiety treatment in the postoperative period. Pre- and postoperative vital signs were similar in both arms. A slightly higher LPPS score was noted in the MT group (179±8 vs. 171±20 pts, p=0.174).

Conclusion: Despite limitations, our study demonstrated that MT in patients undergoing ambulatory surgery might be advantageous in reducing perioperative stress, potentially increasing satisfaction, and enhancing patients' perception of being cared for in a multidisciplinary manner, without neglecting the emotional aspect.

Surgeon-Scientists Going Extinct - Last Call for Action!

M. Pfister^{1,2}, Z. Li³, F. Huwyler⁴, M. W. Tibbitt⁴, P. A. Clavien^{2,5} (¹University Hospital Zurich, Zürich; ²Wyss Zurich Translational Center, ETH Zurich and University of Zurich, Zurich; ³HPB & Multi-Organ Transplant Program, University Health Network, Toronto; ⁴Macromolecular Engineering Laboratory, Department of Mechanical and Process Engineering, ETH Zurich, Zurich; ⁵Department of Surgery and Transplantation, University of Zurich, Zurich)

Background: Surgeons who carry out research in addition to clinical activities are referred to as "Surgeon-Scientists". While their value remains undisputed, numbers have been plunging. Reasons for this decline have been partially identified and countermeasures proposed, but actions taken have failed to mitigate this trend.

Aims: This study aims to explore the perspective of future surgeon-scientists, and to call for urgent measures to save this breed from extinction.

Methods: We first completed a systematic literature review adhering to PRISMA guidelines covering all aspects of surgeon scientists' decline. Second, we performed a comprehensive

online survey targeting the academic surgical youth globally.

Results: Reasons for decline both in the literature and survey responses included a foremost priority on clinical duties and a lack of structural support and recognition for research. The proposed requirements to achieve surgeon-scientist sustainability are summarized in Figure 1. Consequent measures failed to affect the academic surgeon pipeline, as they are hardly implemented in the real world (no mentorship: 33%; no protected time: 45%; no extramural funding: 72%; no structured curriculum: 37%). Of 140 respondents (26 centers, 15 countries, 3 continents) 67% still identified as surgeon-scientist, and 93% agreed on the need to preserve this breed. Main motivational drivers were interest in research (78%) and career progression (63%), and 80% would do it again if given the chance.

Conclusion: This is the first report on global perspectives of future surgeon-scientists about measures to ensure their survival. Their status as "endangered species" is clear, yet the countermeasures are grossly not implemented. To rescue surgeon-scientists, consciousness beyond the academic world with a call for revolution in academic surgery to meet the demands of our time is needed. Thus, we propose major structural changes (Figure 2).

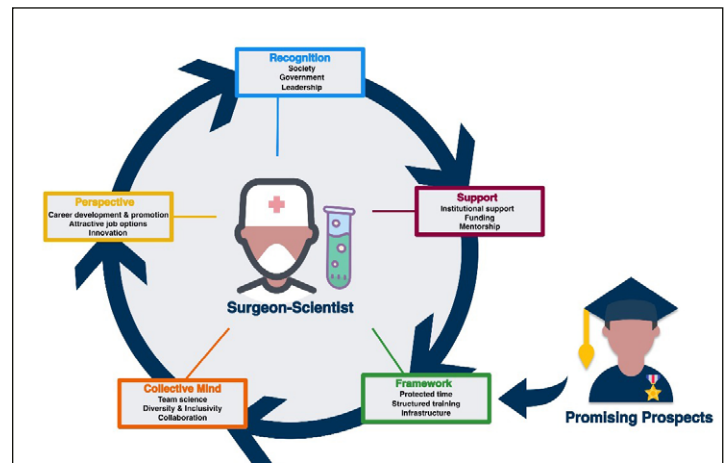


Figure 1. Hallmarks of the sustainable surgeon-scientist

These «Big Five» hallmarks of the sustainable surgeon-scientist represent consensus of the literature and survey. Consciousness and recognition beyond the academic world lay the groundwork for institutional and financial support to establish the required framework to ensure protected time and training. Promising prospects are offered to undergo 2-3 years of dedicated research training (optionally as part of a higher degree), which will serve as foundation for later success. Division of tasks and expertise in a diverse and inclusive environment enables collaboration and gives future surgeon-scientists together with attractive job offers enough perspective to boost innovation and progress, which in turn again enhances recognition in society.

Figure 1

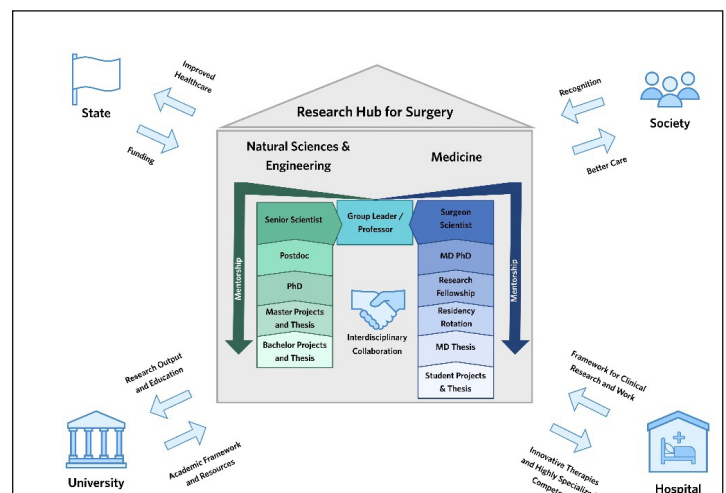


Figure 2. Rescue package for surgeon-scientists

The identified hallmarks of the sustainable surgeon-scientist are merged in a comprehensive research platform enabling the required change by implementing these measures in the real world. By providing the space and opportunity to bring together expertise in a diverse and inclusive environment, interdisciplinary collaboration of various specialties and subsequent breakthrough innovation is facilitated. We propose early involvement of promising prospects to leverage career progression and create a sustainable program where mentees eventually become mentors and fill the shoes of current surgeon-scientists. A close relationship with all stakeholders ensures adequate recognition, framework, support, and funding to successfully implement structural changes towards a bright future for academic surgery.

Figure 2

Discrepancies in Lecturer and Student Perspectives on Sex- and Gender-Based Medicine in the Medical Curriculum

L. Zingg¹, C. Magyar¹, B. Özdemir², D. Candinas¹, P. Frey³, V. Banz¹ (¹Department of Visceral Surgery and Medicine, Inselspital, Bern University Hospital, Bern; ²Department of Medical Oncology, Inselspital Bern, University Hospital, Bern; ³Medical Faculty, University Bern, Bern)

Background: Sex- and gender-based medicine (SGBM) addresses differences between male/men and female/women with regard to clinical manifestation, diagnostics, treatment and outcomes of diseases. The implementation of SGBM in the medical curriculum varies and data on the knowledge and perception of lecturers and students in SGBM is scarce.

Aims: The purpose of this study is to assess the current state of SGBM at a Medical Faculty in Switzerland. Further, we aim to evaluate the self-perceived importance and knowledge of SGBM in lecturers and students.

Methods: All lecturers and students at a Medical Faculty in Switzerland were invited to participate in a survey. An adapted questionnaire was developed and quantitative assessment using a Likert Scale. Statistical analysis was performed with Kruskal-Wallis rank sum test.

Results: 114 (34.1%) lecturers and 903 (41.4%) students participated in the survey. In both the lecturers' and students' subgroups, women perceived the teaching of SGBM to be more important compared to men (lecturer women vs. men median 6.0 vs. 5.0, $p = 0.025$; student 6.0 vs. 5.0, $p < 0.001$) (Figure 1). No significant difference was found between genders regarding self-reported knowledge of SGBM (lecturer median 4.0 vs. 4.0, $p = 0.710$; students 3.0 vs. 4.0, $p = 0.841$). A significant difference between lecturers and students in the perception of the amount of incorporated information actively addressing SGBM in the current curriculum was found (59.4% vs 28.8%, $p < 0.001$).

Conclusion: Women lecturers and students consider teaching of SGBM during medical curriculum to be more important than men. Lecturers perceived the amount of SGBM taught to be higher compared to students. These different expectations and perceptions need to be taken into account when striving for change and implementing SGBM within the medical curriculum.

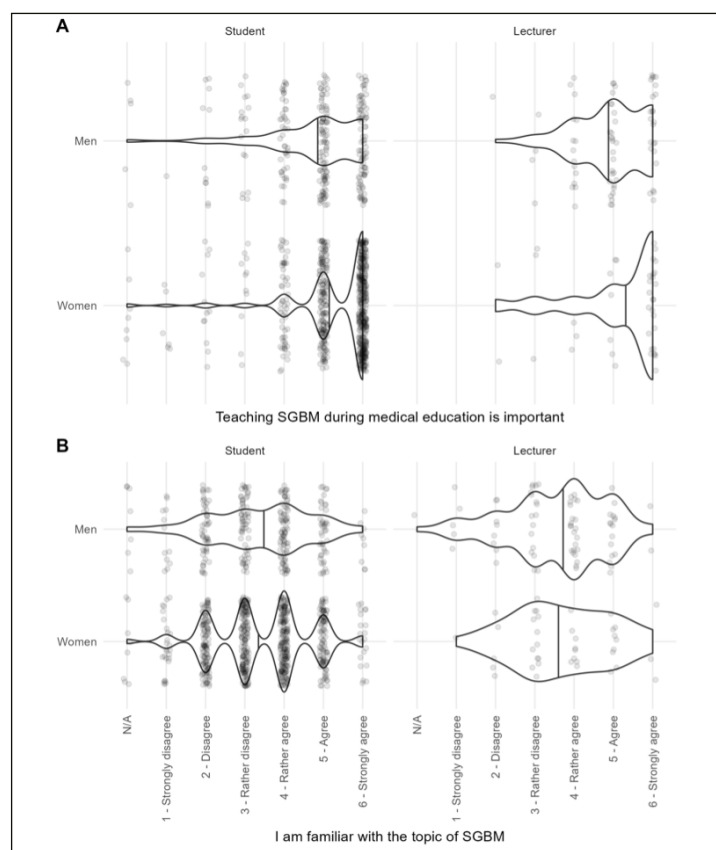


Figure 1. Perceived importance and knowledge of sex- and gender-based medicine in students and lecturers. Violin plot showing density of responded questions as determined by the Likert Scale. Vertical line representing median values for each group respectively; Abbreviations: N/A, no answer; SGBM, sex- and gender-based medicine

Contextual Challenges in Reintroducing Giant Goiter Surgery in Central Africa: Retrospective Review of 10 Years of Teaching Missions

P. Kuczma^{1,2}, C. Trésallet¹, L. Dumont^{3,4}, B. Gold⁵, M. Poussier⁶, A. Longombe⁷, L. Mutanda Basoni⁷ (¹Bariatric, Digestive and Endocrine Surgery, Avicenne University Hospital, Bobigny; ²Endocrine and Thoracic Surgery, Geneva University Hospitals/Université de Genève, Geneva; ³Department of Anesthesiology, Geneva University Hospitals, Geneva; ⁴NGO, Association 2nd Chance, Geneva; ⁵Department of Surgery, Clinique des Grangettes, Geneva; ⁶Department of Surgery, Kennedy Clinic, Montelimar; ⁷Department of Surgery, Kisangani University Hospital, Kisangani)

Background: Eastern Democratic Republic of Congo is an endemic zone of giant goiters (Fig. 1) that are a significant public health challenge in that region. Political instability led to deteriora-

tion of surgical care and inaccessibility of safe anesthesia. Thyroidectomies were performed only occasionally, with a high complication rate. In 2012, the Swiss NGO 2nd Chance initiated a training program for local surgeons and anesthesiologists.

Aims: The aim of the program was to reintroduce a safe practice of thyroid surgery and general anesthesia among local actors to respond to the needs of the local population.

Methods: We retrospectively assessed the outcomes of patients enrolled in the program between 2013 and 2023 in Eastern DRC. The progression of the participating surgeons was evaluated.

Results: 38 teaching missions were conducted between 2013 and 2023 in 8 different localities of Eastern DRC, during which 559 patients underwent thyroid surgery (Fig. 2). The short-term follow-up rate was nearly 100% and the long term 36%. The complications included: hematoma requiring reintervention (2.4%), recurrent nerve palsy (1.2%), wound infection (2.75%). Out of the initial cohort of 20 local surgeons enrolled in the program, 10 are now certified as independent operators and 3 have the status of trainers. Two participants organise goiter campaigns on their own, in different region of the DRC.

Conclusion: Although the interventions were performed in rural conditions with basic equipment (Fig. 3) and on giant goiters approaching 1.5-2 kg, the complication rates was acceptable. The thyroid teaching program helped to improve the surgical skills in the management of other pathologies. The missions permitted to create a network of independent endocrine surgeons. The skills are being diffused now autonomously by local actors, maintaining the surgical expertise in the long term. This project demonstrates the feasibility of performing and teaching a complex procedure in an unstable socio-economic context in a limited resources setting.



Figure 1. Giant goiter



Figure 2. Teaching thyroid surgery in the OR



Figure 3. Rural instrument sterilisation facility

How to Deal with Errors in Surgery: A Content Analysis of Morbidity and Mortality Conferences from Trainees' Perspective

H. Gros, A. Poljo, J. Dublin, B. Müller, J. M. Klasen (Klinik für Viszeralchirurgie, Clarunis – Universitäres Bauchzentrum Basel, Basel)

Background: Surgery, while often lifesaving, inherently carries risks of errors. Therefore, Morbidity and Mortality conferences (MMCs) are crucial in hospitals, providing a space for discussion and allowing professionals to learn from past actions. MMCs cover various domains, including clinical knowledge and skills, reasoning, system knowledge and change, sharing experiences, as well as illustrating errors. However, the extent to which residents and medical students as learners benefit from MMCs remains unclear.

Aims: This research aimed to analyze if MMCs fulfill abovementioned goals for surgical trainees and medical students. We also seek to understand their MMCs' perception.

Methods: This analysis involved three steps: First, observation of 18 MMCs in three surgical teaching hospitals between 02-07/2023. Second, field interviews of 32 volunteering participants in training (15 residents, 17 medical students). The developed semi-structured interview guide covered expectations from MMCs, learning experiences, MMCs' role in surgical education, emotional reactions to complications, and need for emotional support. Third, software-aided qualitative data analysis, following Elo and Kyngäs' process, which involves data familiarization, coding, and categorization. Field notes from the observation and interviews provided context and deepened the analysis. Regular research team meetings supported the rigorous process.

Results: Participants perceived MMCs as a valuable platform to learn from errors, with most medical students being unfamiliar with MMCs prior to first participation. MMCs' formats and case selection criteria varied among the participating surgical departments. Participants wished increased discussion time and reduced superiors' monologues. Residents' silence despite a "no blame, no shame"-culture led to medical students expressing uncertainty about learners' role. Participants valued MMCs' fact-based atmosphere for addressing emotionally-charged topics.

Conclusion: While explored MMCs met their goals, improvements are still needed from learners' perspectives. MMCs' settings vary across hospitals, leaving room for implementation of an (inter)national standard. Early thematization and increased interactivity could transform surgical trainees from spectators to actors, ultimately inspiring medical students.

Impact of Virtual Reality Distraction on Pain and Anxiety for Bedside Abdominal VAC Dressing Change (VIRPA) – A Randomized Controlled Clinical Trial

B. Barberá Carbonell, M. Hübner, F. Grass, R. Djafarzian (Lausanne University Hospital (CHUV), Lausanne)

Background: Virtual reality (VR) distraction techniques are promising adjuncts to reduce pain and anxiety.

Aims: This study assessed the impact of VR distraction during bedside change of vacuum assisted closure (VAC) dressings.

Methods: In this non-blinded randomized superiority trial, patients scheduled for bedside change of a subcutaneous VAC dressing were allocated to receive distraction through VR masks in addition to a standardized pain protocol (intervention) or pain protocol alone (control). Primary endpoints were pain scores assessed by a visual analogue scale (VAS:0-10), secondary outcomes were anxiety (State Trait Anxiety Inventory (STAI-Y:20-80), VAS:0-10), hemodynamic parameters and satisfaction (VAS:0-10).

Results: Nineteen and twenty-one patients were randomized to receive intervention and control, respectively. Baseline characteristics were well balanced including age (61 ± 11 vs. 62 ± 17), sex (female: 9 vs. 13), American Society of Anesthesiologists (ASA) scores (≥ 3 : 18 vs. 18, all non-significant). Pre- and postoperative pain levels were 2.2 ± 2.2 vs. 2.0 ± 2.1 ($p=0.38$) for the intervention group compared with 2.6 ± 2.1 vs. 2.2 ± 1.6 ($p=0.26$), with no significant difference between the groups ($p=0.38$). Similar findings for blood pressure and heart rates. Anxiety was reduced in both groups post VAC change in the intervention and control group: STAI 40 ± 12

pre-VAC vs. 30 ± 8 post VAC and 45 ± 14 pre-VAC vs. 32 ± 9 post VAC (both $p<0.01$), Δ VAS -2 (interquartile range IQR 0, -3) vs. -2 (IQR 0, -5), both $p<0.01$. Postinterventional satisfaction was 8.3 ± 1.9 (intervention) vs. 7.5 ± 2.4 ($p=0.11$).

Conclusion: In this study, pain and anxiety were well managed with a standardized pain protocol with or without adjunct VR distraction. Further studies will focus on patients with insufficient control of pain and anxiety with a standard protocol.

Milestones in Surgical Complication Reporting – Twenty years of Clavien-Dindo Classification & Ten Years of Comprehensive Complication Index (CCI®)

F. Abbassi¹, M. Pfister², A. Domenghino³, K. L. Lucas⁴, M. A. Puhan⁵, P. A. Clavien⁶ (¹Abdominal Surgery and Transplantation, University Hospital Zurich and University of Zurich, Zurich; ²Wyss Zurich Translational Center, ETH Zurich and University of Zurich, Zurich; ³Department of Abdominal Surgery and Transplantation, University Hospital Zurich, Zurich; ⁴Department of Visceral, Thoracic, Vascular Surgery and Angiology, City Hospital Triemli, Zurich; ⁵Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Zurich; ⁶Wyss Translation Center, University of Zurich, and Swiss Medical Network, Zurich)

Background: Standardized outcome reporting is key for proper assessment of surgical procedures. A recent consensus conference recommended the Clavien-Dindo classification (CDC) and the Comprehensive Complication Index (CCI®) for assessing postoperative morbidity. However, their use in randomized controlled trials (RCTs) has not been assessed, and several challenging scenarios for grading complications require consensus-based guidance.

Aims: The aim of this study was to assess the use of the CDC and CCI® in RCTs and to provide guidance on their standardized and consistent application.

Methods: We identified all RCTs that used the CDC or CCI® as a primary or secondary outcome. In addition, we asked 163 international surgeons to independently grade complications of 20 clinical cases covering seven challenging scenarios. Finally, a core group of five experts used this information to develop consistent recommendations.

Results: Up to July 2023, 1424 RCTs used the CDC or CCI® to assess postoperative morbidity. Annual use was steadily increasing with now over 200 new RCTs per year (Figure 1). Eighty-nine (55%) surgeons completed the survey. Table 1 summarizes the seven difficult scenarios and recommendations on how to grade those complications. Complications requiring multiple interventions, complications of complications, complications occurring prior to referral, and expected and unrelated complications should all be counted as separate complications and included in the CCI®. Invasive diagnostics without findings should not be considered as a complication since purely diagnostic.

Conclusion: We observed an extensive and steadily increasing use of CDC and CCI® in RCTs, highlighting the importance of their consistent application. Provided by the original developers of the CDC and CCI® and based on an international survey of their frequent users, the current consensus offers much-needed guidance for challenging scenarios. This will further improve the consistency and accuracy of complication reporting, leading to higher quality RCTs, improved cost estimations, and better quality control, ultimately benefiting all stakeholders.

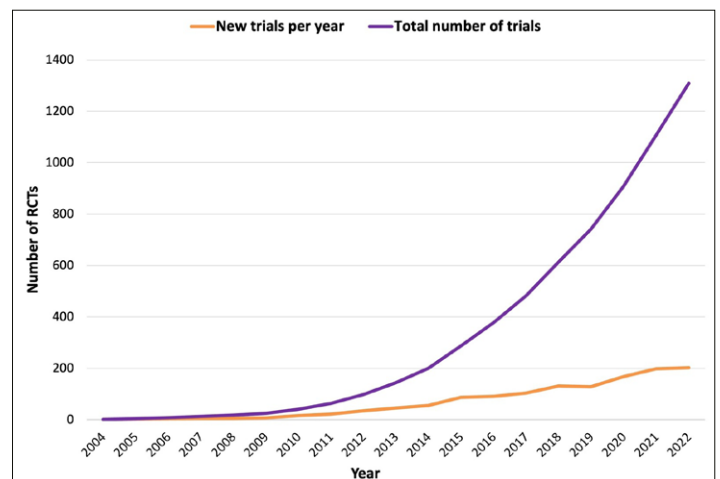


Figure 1. Use of Clavien-Dindo Classification and Comprehensive Complication Index in RCTs

for PM. Our findings emphasise the importance of the PM secretome in advancing our understanding of mesothelioma biology and discovering novel cell-free biomarkers. Further in-depth analyses are currently underway.

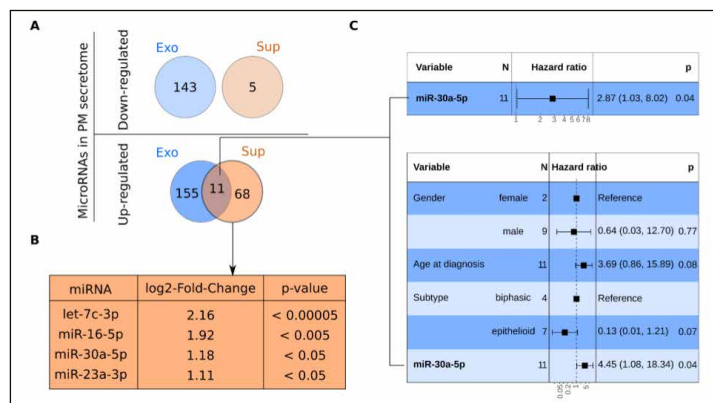


Figure 1. An overview of the results. **A.** The number of miRNAs significantly up- and down-regulated in pleural mesothelioma exosomes (Exo) and supernatant (Sup) samples. **B.** The top up-regulated miRNAs in pleural mesothelioma supernatant samples. **C.** Results o

Spatial Transcriptomics Reveals Interaction of Injury-Derived Osteopontin with Mesothelial Cells in Serosal Scarring

J. Bayer¹, B. Slade¹, T. Yarahmadov¹, D. Sanchez-Taltavull¹, V. Purvanov², Y. Borbély¹, D. Candinas¹, D. Legler^{2,3}, P. Kubes⁴, D. Stroka¹, J. Zindel¹ (¹Department of Visceral Surgery and Medicine, Inselspital, Bern University Hospital, University of Bern, Bern; ²Biotechnology Institute Thurgau (BITg), University of Konstanz, Kreuzlingen; ³Theodor Kocher Institute, University of Bern, Bern; ⁴Department of Pharmacology and Physiology and Snyder Institute for Chronic Diseases and Department of Microbiology, Immunology & Infectious Diseases, Cumming School of Medicine, University of Calgary, Calgary)

Background: Abdominal surgeries are often life-saving procedures. However, surgical interventions in the peritoneal cavity can cause the formation of post-surgical adhesions. These irreversible scar bands can trigger severe complications, such as chronic pelvic pain, small bowel obstruction, and infertility in women. Unfortunately, no effective treatment options for adhesion patients exist. On a cellular level, mesothelium-derived mesenchymal myofibroblasts have been identified as key pro-fibrotic players in adhesion formation.

Aims: Our aim is to study the molecular mechanisms of mesothelial cell recruitment in serosal repair and scarring, and thereby to identify potential targets for specific pharmacological anti-adhesion treatments.

Methods: We used a mesothelial cell reporter mouse system (Wt1CreERT2xRosa26tdTomato) and experimental injury models to study the differences of mesothelial cell recruitment to sites of adhesion formation in comparison to wound sites healing scar-free. To answer how injury zones affect the accumulation of mesothelial cells, we used untargeted spatial transcriptomics, identifying candidate molecules that were i) upregulated in adhesion formation sites, ii) not highly expressed in scar-free wound sites, and iii) had the potential to interact with mesothelial cells.

Results: We observed strong spatiotemporal correlation between accumulation of tdTomato+ cells and consecutive scarring. Spatial deconstruction of scar-specific signaling identified the candidate molecule Secreted phosphoprotein 1; an inflammatory zone-specific gene that encodes Osteopontin (OPN). After confirming increased OPN protein levels 7d post-surgery, we investigated its effect on adhesion formation using Spp1^{-/-} mice. Indeed, Spp1-deficient mice showed significantly lower adhesion scores compared to control mice. Mechanistically, recombinant OPN had no chemotactic effect on primary human mesothelial cells, however triggered the upregulation of transcription factors associated with mesothelial-to-mesenchymal transition.

Conclusion: Together, these findings suggest a pivotal role for OPN in linking inflammation at injury sites with mesothelial cell recruitment in post-surgical serosal scarring. Therefore, OPN represents a potential target for novel pharmacological strategies to specifically inhibit scarring without affecting normal wound repair.

Co-delivery of Recombinant Super-Affinity VEGF and PDGF-BB Accelerates Diabetic Wound Healing by Improving Angiogenesis, Arteriogenesis and Blood Flow

R. D'amico^{1,2}, P. Bicker², A. Uccelli², J. Hubbel³, L. Gürke¹, T. Wolff¹, E. Mujagic¹, R. Gianni Barrera², A. Banfi² (¹Vascular surgery, Universitätsspital Basel, Basel; ²Cell and gene therapy lab – Department of Biomedicine, University of Basel, Basel; ³Pritzker School of molecular engineering, University of Chicago, Chicago)

Background: Diabetic ulcers are characterized by local ischemia, usually without macroangiopathy. We have previously found that the combination of VEGF and PDGF-BB in a fibrin matrix is effective in stimulating arterial growth to diabetic wounds.

Aims: We developed modified forms of VEGF and PDGF-BB to bear super-affinity for the extracellular matrix (SA-VP), in order to decorate the wound tissue without the need for a biomaterial. We investigated the dose-dependent effects on local blood flow and wound healing, by applying the treatment either to the healthy tissue around the wound or to the damaged wound bed.

Methods: Full thickness wounds were created on the dorsal skin of diabetic (db/db) mice. SA-VP or saline were applied to the wound bed or divided into 4 injections around the wound edge. Wound closure and blood flow were measured on days 4 and 8 after treatment and tissues were harvested for histology on day 8. Data were analysed by Anova with Tukey's post-hoc test for multiple comparisons

Results: Wound healing was improved dose-dependently by SA-VP by both delivery routes. Histologically, angiogenic areas and total amount of angiogenesis were significantly increased by the highest SA-VP dose, again independent of delivery route (p= 0.034). However, the total amount of recruited arterioles was significantly increased only in the healthy tissue around the wound and only by intradermal injections of SA-VP (p= 0.008). In agreement with the arteriogenic effect, the blood flow at day 4 was significantly increased only by injections of the highest SA-VP dose around the wound (p= 0.018)

Conclusion: SA-VP treatment significantly accelerates wound healing in a diabetic murine model with a clear dose-dependent effect. Targeting the undamaged tissue around the wound by injections induces more effective arteriogenesis. However, direct treatment of the wound bed is equally effective for healing. These results support further development for a potential clinical use

Investigating the Effect of Liver Regeneration on Tumor Growth: Development of a Mouse Model with Orthotopic Implantation of Patient-derived HCC Organoids

P. Sedlacek¹, F. Haak¹, N. L. E. Aegerter¹, P. Müller¹, S. Piscuoglio², M. Coto-Llerena², S. D. Soysal³, G. F. Hess¹, O. Kollmar¹ (¹Viszeralchirurgie, University Center of Gastrointestinal and Liver Diseases, Basel; ²Biomedicine, Universität Basel, Basel; ³Medizin, Universität Basel, Basel)

Background: Recurrence after hepatocellular carcinoma (HCC) treatment is a significant problem. It affects more than 70% of patients undergoing liver resection. Recurrence can arise from undetected micro metastasis or de novo cancer. Clinical and experimental studies suggest that liver regeneration ensuing surgical resection may activate occult micro-metastasis leading to regeneration induced tumor recurrence. However, in vivo patient-derived organoid (PDO) HCC models that are translatable to patient tumors are sparse.

Aims: Here, we aim to establish a new in vivo model to understand the impact of liver regeneration on HCC tumor growth.

Methods: PDOs were generated from HCC tissue obtained from patients undergoing liver resection at the Clarunis University Digestive Health and Care Center and transduced with firefly luciferase. Implantation was performed via laparotomy and orthotopic injection of the organoids in the right superior liver lobe. Tumor growth is monitored by in vivo bioluminescence imaging until the endpoint of the experiment. As a primary endpoint tumor growth two weeks after liver resection was defined. Experimental groups underwent either minor (30%) or major (65%) hepatectomy of tumor-free liver, whereas the control group received a re-laparotomy with subsequent closure of the abdomen. Normal liver and tumor tissue were characterized using immunohistochemistry.

Results: Two HCC-PDO lines were successfully implanted. Compared to the control, after minor and major liver resection the mean weight increased significantly to 0.82% (p < 0.0001) respectively 0.99% (p < 0.0001). Preliminary data about the tumor volume have yet to be concluded. Histology and immunohistochemistry staining for HCC confirmed the origin of the PDOs from the original patient tumor.

Conclusion: The establishment of an orthotopic xenograft mouse model for HCC PDO was successful. Through liver resection, a regenerative environment could be achieved, to investigate the molecular behavior of HCC recurrence after surgery. This offers the basis to study potential new targets and mechanisms to improve HCC-treatment

Aquaporin 1 Expression Patterns in Hirschsprung's Disease: Implications for Disease Localization and Possible Risk of Enterocolitis

R. Angresius¹, Z. Hou¹, J. Bielanska¹, E. Madörin^{2,3}, N. Whitehead^{2,4}, N. Study Group, S. Holland-Cunz¹, S. J. Gros¹ (¹Pediatric surgery, UKBB Universitätskinderhospital beider Basel, Basel; ²Department of Pediatric Surgery, University Children's Hospital Basel, Basel; ³University of Basel, Department of Clinical Research, Basel AU; ⁴Department of Clinical Research, University of Basel, Basel)

Background: Hirschsprung's Disease (HD) is a congenital intestinal disorder characterized by a variable length of distal colonic aganglionosis. It is caused by aberrant processes of the enteric neural crest-derived cells that could include proliferation, migration, differentiation, and survival. Enterocolitis is a potentially life-threatening complication. Aquaporin 1 (AQP1) is physiologically expressed in several parts of the intestine including mucosa, submucosal lamina, the capillary endothelial cells and in the enteric nervous system. Its function in each anatomical structure remains not clearly defined.

Aims: The aim of the study was to characterize the AQP1 expression in Hirschsprung's Disease and correlate its expression with severity of disease including the risk for enterocolitis.

Methods: Tissue samples from 48 patients with Hirschsprung's disease were examined by immunohistochemical and immunofluorescence staining and compared with control tissue. Co-staining against AQP1, B3 tubulin and AChE was carried out. Whole slide scanning was performed and AQP1, B3 tubulin and AChE expression was analysed visually regarding its anatomical expression pattern and by threshold image analysis.

Results: An increase of AQP1 expression was recognized in the distal part of the affected colon tissue in Hirschsprung patients compared with control tissue in correlation with B3 tubulin and AChE expression. While AQP1 is known to be physiologically expressed in vascular endothelial cells and in ganglia of the enteric nervous system, in these patients this particular localization is missing, however we found an increased expression in the mucosa.

Conclusion: A distinct pattern of AQP1 expression could be observed in the colon of patients with Hirschsprung’s Disease, suggesting an imbalance in membrane water permeability, which might directly impact on development of enterocolitis, as well as hinting towards a regulatory role of AQP1 in the enteric nervous system.

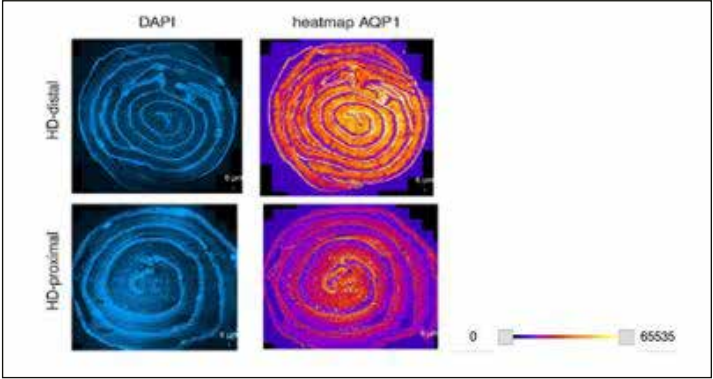


Figure 1. Immunofluorescence staining in Hirschsprung's disease patients

Liver & Transplantation

Long-term ex situ Normothermic Kidney Perfusion

R. X. Sousa Da Silva^{1,2}, J. Binz^{2,3}, F. Huwyler^{2,3}, B. M. Helmchen⁴, L. Mancina^{1,2}, K. Wernlé^{1,2}, Y. Kalbas⁵, M. Müller¹, M. Hefti², D. Becker², M. Weisskopf⁶, M. W. Tibbitt^{2,3}, P. Dutkowski^{1,2}, P. A. Clavien^{1,2}, P. Kron¹ (¹Swiss HPB and Transplant Center Zurich, Department of Surgery and Transplantation, University Hospital Zurich, Zurich; ²Liver4Life Wyss Zurich, Wyss Translational Translational Center, Wyss Zurich, ETH Zurich and University of Zurich, Zurich; ³Macromolecular Engineering Laboratory, Department of Mechanical and Process Engineering, ETH Zurich, Zurich; ⁴Department of Pathology and Molecular Pathology, and Institute of Molecular Cancer Research (IMCR), University Hospital Zurich, Zurich; ⁵Department of Traumatology, University Hospital Zurich, Zurich; ⁶Center for Surgical Research & Central Biological Laboratory, University Hospital Zurich, Zurich)

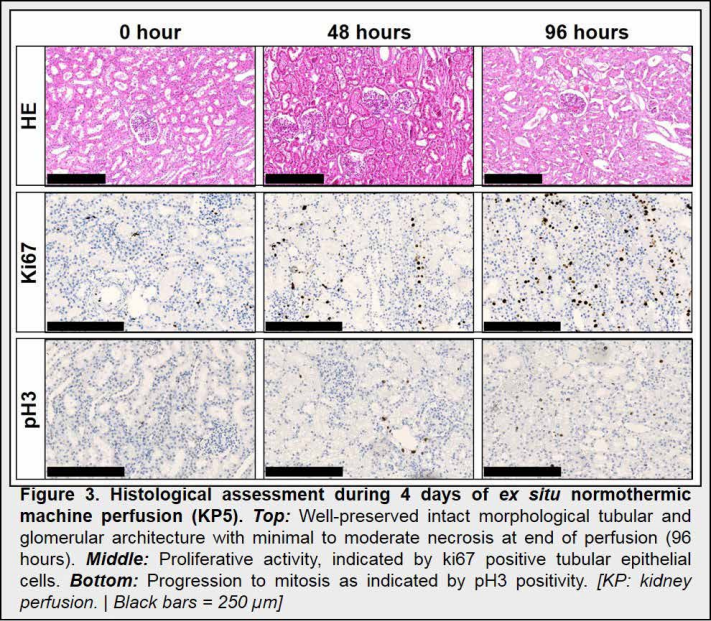
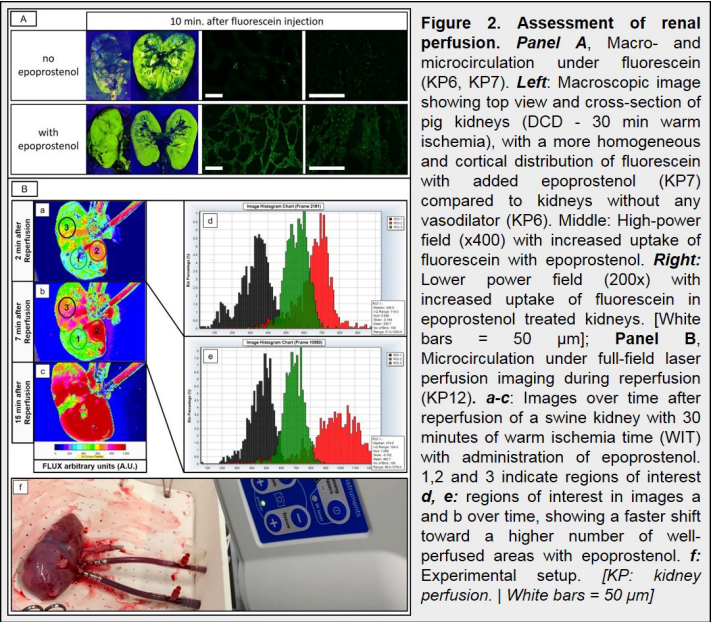
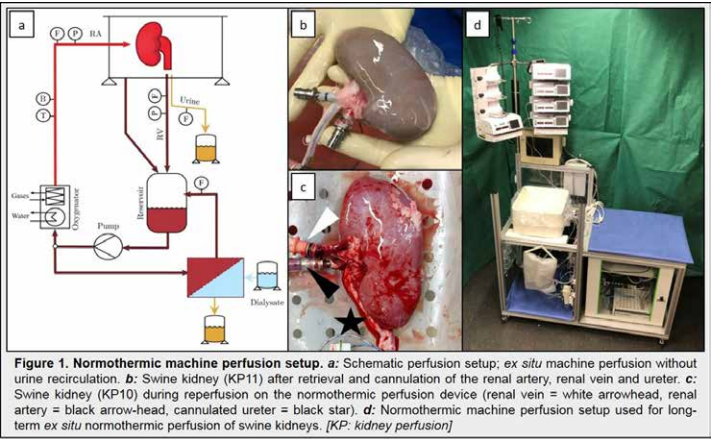
Background: Marginal grafts are increasingly considered for transplantation due to the widening gap of available donor grafts and waiting recipients. Graft assessment and repair prior to implantation are therefore essential to minimize the risk of failure. Normothermic perfusion has not been widely evaluated for kidney grafts, with existing perfusions limited to 2 days.

Aims: The aim of this study was to develop a long-term (>3 days) normothermic ex situ swine perfusion model in kidney grafts, while maintaining organ viability. We also wanted to investigate possible regenerative processes of the kidney during this period outside the donor animal.

Methods: Swine kidneys were retrieved with minimal injury. After cannulation, organs were perfused at 37°C for up to several days in a newly designed normothermic ex situ device with automated blood gas and glucose regulation, addition of nutrition, antibiotics, and vasodilators. Kidney biopsies, urine and perfusate samples were taken daily for analysis as well as markers of viability.

Results: In total 17 kidneys were perfused. Four kidneys were perfused for 3 or more days. Viability was maintained up to 4 days without histological evidence of glomerular and minimal to moderate tubular necrosis. We observed upregulation of ki67 and pH3 in tubular cells with mean values of up to 14.2% and 2.2% respectively. This expression of ki67, a proliferation associated protein, correlated with the duration of ex situ perfusion.

Conclusion: This is the first report of normothermic kidney perfusion for up to 4 days with unprecedented observation of upregulated ki67 and pH3 after multiple days of perfusion. These preclinical results open the door for development of long-term perfusion protocols for discarded human grafts while also hinting at limitations and challenges.



Immune Checkpoint Inhibitors Before Liver Transplantation May Increase the Risk of Rejection: A Meta-Analysis
B. Moeckli¹, C. Toso¹, C. H. Wassmer¹, S. El Hajji¹, R. Kumar¹, S. Lacotte², P. Compagnon¹ (¹Département de chirurgie, Hôpitaux Universitaires de Genève, Geneva; ²Transplantation and Hepatology Laboratory, Université de Genève, Geneva)

Background: Immune checkpoint inhibitors (ICI) represent a major breakthrough in cancer immunotherapy. Several molecules have shown efficacy in HCC and are increasingly used as a bridging therapy before liver transplantation. Initial reports have raised concern about severe rejections in patients following ICI therapy.

Aims: This meta-analysis assesses the risk of neoadjuvant ICI therapy before liver transplantation.

Methods: We systematically searched MEDLINE, Web of Science and Embase for studies including all patients treated with ICI therapy before liver transplantation from a given center. A random-effects model was applied to pooled results with a priori determined subgroup analyses.

Results: Eight studies published during the past three years fulfilled all inclusion criteria. All studies are noncomparative case series, one prospective and seven retrospective. Studies included 52 patients who received various PD1 inhibitors between 1 and 253 days prior to liver transplantation. Patients treated with an ICI ahead of transplantation demonstrated an overall relative risk (RR) of 2.5 [95% CI: 1.4-3.8] for an acute rejection event. Furthermore, a subgroup analysis showed that patients who received PD1 inhibitors up to 30 days (RR 7.2 [95% CI: 4.9-10.5]) or between 30 and 60 days (RR 7.2 [95% CI: 5.1-10.3]) prior to liver transplantation suffered a higher rejection risk than patients with a "washout period" beyond 60 days (RR 1.8 [95% CI: 0.6-4.9]). The ICI, age, and underlying etiology were insignificant for RR in their subgroup analysis.

Conclusion: PD1 inhibitors within two months of liver transplantation may significantly elevate rejection risk. This meta-analysis provides valuable insights to inform clinical decision-making. Nevertheless, future trials remain imperative to establish definitive guidelines.

Impact of Transjugular Intrahepatic Portosystemic Shunt on Hepatocellular Carcinoma: Prospective Cohort of Liver Transplant Candidates' Analysis

S. El Hajji¹, C. Toso², B. Möckli², P. Compagnon², S. Lacotte³, F. Cauchy² (¹Hôpitaux universitaires de Genève, Geneva; ²Surgery, Hôpitaux universitaires de Genève, Geneva; ³Surgery, Université de Genève, Geneva)

Background: Transjugular intrahepatic portosystemic shunt (TIPS) is used to mitigate the side effects of portal hypertension. However, its impact on hepatocellular carcinoma (HCC) remains unclear.

Aims: We aimed to evaluate its effect on HCC dynamics and patients survival.

Methods: We analysed 43'734 liver transplant candidates diagnosed with HCC from the prospective Scientific Registry of Transplant Recipients database (1985-2022). A total 7'404 patients with and without TIPS were propensity score matched 1:3. We assessed wait-list changes in total tumor volume, HCC count, and alpha-fetoprotein levels. We examined survival rates from time of listing and post-transplantation, as well as the incidence of HCC recurrence post-transplantation.

Results: Pre-matching, TIPS patients exhibited poorer liver function and less advanced HCCs. Post-matching, TIPS correlated with a decrease in HCC nodules count (-0.24 vs 0.11, p = 0.008) over a median waiting period of 225 days (IQR 94; 441) and better overall survival rate from listing (93.0% vs 89.1% at one year, p = 0.0003). TIPS was not associated with altered changes in waitlist tumor volume (0.26 vs -0.07 cm³/month, p = 0.26) and AFP (14.62 vs 12.67 ng/mL, p = 0.79) compared to the non-TIPS group. Post-transplant survival rates (91.8% vs 91.7% at one year, p = 0.25) and HCC recurrence (5.2% vs 5.4% at 5 years, p = 0.73) were similar, with a median follow-up of 5.6 years (IQR 2.7; 9.6)

Conclusion: TIPS improved waitlist survival and is associated with decreased HCC nodule count, potentially due to a better efficacy in HCC treatment. However, TIPS did not have a measurable impact on HCC growth or aggressiveness.

Dual and Pediatric En-Bloc Compared to Living Donor Kidney Transplant: A Single Center Retrospective Review

T. Schöb¹, T. Robinson², C. Ensslin¹, A. Demirag³, J. Oberholzer⁴ (¹Division of General Surgery, Cantonal Hospital Graubünden, Chur; ²Division of Transplant, University of Virginia Health System, Charlottesville; ³Division of Transplant Surgery, University of Florida, Florida; ⁴Department of Visceral Surgery and Transplantation, University of Zürich, Zürich)

Background: Extending the organ donor criteria to reduce the waitlists number and mortality with dual and pediatric en bloc kidney transplantation is not yet fully exploited.

Aims: To assess whether pediatric en bloc (PEB) and dual kidney transplants (DKT) have comparable results to living donor kidney transplants (LDKT).

Methods: The study was performed as a retrospective analysis of 39 LDKT compared to 13 DKT and 24 PEB transplantations all performed from 2011 to 2019 at the University of Virginia. The living donor kidney transplants were all performed in 2017 to provide 5-year outcome data. Primary outcomes were serum creatinine and glomerular filtration rate at 12 and 24 months postoperatively, whereas secondary outcomes were patient and graft survival.

Results: The PEB group showed lower 1-year creatinine (mg/dl) levels (median 0.9, IQR 0.8-1.4) compared to the DKT (median 1.4, IQR 1.2-1.5) and LDKT (median 1.3, IQR 1.1-1.5) groups (p<0.001). Similarly, the 2-year creatinine levels were lower in the PEB group (median 0.8, IQR 0.7-1.08) compared to the DKT (median 1.3, IQR 1.1-1.5) and LDKT (median 1.3, IQR 1.0-1.5) groups (p<0.001). Glomerular filtration rates showed comparable outcomes. Graft survival rates at 1-, 3-, and 5-years were 100/100/90, 100/92/69, and 96/96/91 for LDKT, DKT, and PEB, respectively (p=0.27). Patient survival rates at 1-, 3-, and 5-years were 100/100/90, 100/100/88, and 100/100/95 for LDKT, DKT, and PEB, respectively (p=0.78).

Conclusion: Dual kidney and pediatric en bloc transplantation are two, not just alternative, but also safe techniques to expand the donor pool. Overall, the technically most demanding procedure of pediatric en bloc transplantation provides the best long term graft function.

Donor characteristics	LDKT (n=39)	DKT (n=13)	PEB (n=24)	p	Post Hoc tests
Age in years (Median IQR)	45 (3-51)	58 (55-67)	1 (1-2)	<0.001	Pairwise comparisons (Bonferroni correction): En-bloc vs Living p=<0.001; En-Bloc vs Dual p=<0.001; Living vs Dual p=0.094
Gender					
Female	29 (74.4)	7 (53.8)	11 (45.8)		
Male	8 (20.5)	6 (46.2)	13 (54.2)	0.026	
Ethnicity					
White/ Caucasian	32 (82.1)	10 (76.9)	17 (70.8)		
Other	3 (7.7)	3 (23.1)	7 (29.2)	0.11	
Donor Terminal Creatinine, mg/dL (Median IQR)	NA	1.10 (0.77-1.77)	0.30 (0.20-0.47)	<0.001	
Donor BMI, kg/m ² (Median IQR)	28.0 (24.0-31.0)	26.0 (24.5-37.5)	18 (16-19)	<0.001	Pairwise comparisons (Bonferroni correction): En-bloc vs dual p=<0.001; En-bloc vs Living p=<0.001; Dual vs Living p=1.00
Donor Weight (kg) (Median IQR)	80 (69-89)	74 (65-116.5)	13 (9.2-15.0)	<0.001	Pairwise comparisons (Bonferroni correction): En-bloc vs dual p=<0.001; En-bloc vs Living p=<0.001; Dual vs Living p=1.00
Pumped (yes)	NA	6 (46.2)	0	<0.001	
Donor type					
DBD	NA	8 (61.5)	21 (87.5)		
DCD	NA	5 (38.5)	3 (12.5)	0.81	
Donor KDPI (mean SD)	NA	88.2 (+- 13.4)	71.6 (+-8.8)	<0.001	
Warm ischemia time (min) (Median IQR)	36 (32-47)	41 (27-52)	32.5 (27.2-44.7)		
Cold ischemia time (min) (Median IQR)	38 (27-69)	1369 (1174-2014)	1282 (1086-1509)	<0.001	Pairwise comparisons (Bonferroni correction): Dual vs Living p=<0.001; Dual vs En-bloc p=1.0, Living vs En-bloc p=<0.001

Table 1. Donor Characteristics. LDKT, living donor kidney transplant. DKT, dual kidney transplant. PEB, pediatric en-bloc. IQR, interquartile range. BMI, body mass index. cPRA, calculated panel of reactive antibodies. DBD, donation after brain death. DCD

Recipient characteristics	LDKT (n=39)	DKT (n=13)	PEB (n=24)	p	Post Hoc tests
Age, years (mean SD)	50 (+-13.9)	65.2 (+- 7.4)	46.7 (+-11.7)	<0.001	One-way ANOVA (F(2,73) = 9.95, p = <0.001). Tukey post hoc: Living vs En-bloc p=0.57; Living vs Dual p=<0.001; En-bloc vs Dual p=<0.001
Gender					
Female	10 (25.6)	7 (53.8)	16 (66.7)		
Male	29 (74.4)	6 (46.2)	8 (33.3)	0.004	
Ethnicity					
White/Caucasian	31 (79.5)	7 (53.8)	7 (29.2)		
Other	8 (20.5)	6 (46.2)	17 (70.8)	<0.001	
Weight, kg (Median IQR)	79 (68-95)	75.0 (58.7-83.6)	71.7 (59.9-75.6)	0.049	Pairwise comparisons (Bonferroni correction): En-bloc vs Dual p=1.0; En-bloc vs living p=0.053; Dual vs Living p=0.55
BMI, kg/m ² (mean SD)	27.3 (+-5.7)	27.6 (+-4.3)	27.0 (+-4.4)	0.94	
cPRA (Median IQR)	0 (0-0)	0 (0-0.5)	0 (0-31)	0.26	
Primary organ failure:				0.46	
Hypertension	9 (23.1)	5 (38.5)	5 (20.8)		
Nephrotic syndrome	5 (12.8)	2 (15.4)	0		
Nephritic syndrome	1 (2.6)	1 (7.7)	4 (16.7)		
PCKD	6 (15.4)	1 (7.7)	3 (12.5)		
Lupus	1 (2.6)	0	3 (12.5)		
Diabetic nephropathy (DM1, DM2)	8 (20.5)	2 (15.4)	6 (25)		
Congenital/ hereditary	3 (7.7)	1 (7.7)	1 (4.2)		
Other/Unknown	6 (15.4)	1 (7.7)	2 (8.3)		
Wait time (Median IQR)	507 (291-953)	465 (162-1059)	1019 (533-1396)	0.02	Pairwise comparisons (Bonferroni correction): Dual vs Living p=1.0; Dual vs En-bloc p=0.06; Living vs En-bloc p=0.049

Table 2. Recipient Characteristics. LDKT, living donor kidney transplant. DKT, dual kidney transplant. PEB, pediatric en-bloc. SD, standard deviation. IQR, interquartile range. BMI, body mass index. cPRA, calculated panel of reactive antibodies. PCKD, pol

Outcomes	Living (n=39)	Dual Kidney (n=13)	En-Bloc (n=24)	p	Post Hoc tests
Length of stay, days (Median IQR)	3 (3-3)	5 (4-7)	4 (3-4)	<0.001	Pairwise comparisons (Bonferroni correction): Living vs En-bloc p=0.003; Living vs Dual<0.001; En-bloc vs Dual: p=0.13
Dialysis duration days (Median IQR)	178 (0-660)	635 (337-1179)	1471 (777-1781)	<0.001	Pairwise comparisons (Bonferroni correction): Living vs Dual p=0.22; Living vs En-bloc p<0.001; Dual vs En-bloc p=0.15
Dialysis free	39 (100)	11 (84.6)	23 (95.8)	0.048	
Number of Readmissions in 1st year (Median IQR)	0 (0-2)	1 (0-2)	0.5 (0-1)	0.59	
Readmissions in 1st year (yes)	15 (38.5)	8 (61.5)	12 (50)	0.31	
1-year creatinine, mg/dL (Median IQR)	1.3 (1.1-1.5)	1.4 (1.2-1.5)	0.9 (0.8-1.14)	<0.001	Pairwise comparisons (Bonferroni correction): En-bloc vs Living p=0.004; En-bloc vs Dual p=0.002; Living vs Dual p=0.87
2-year creatinine, mg/dL (Median IQR)	1.3 (1.0-1.5)	1.3 (1.1-1.5)	0.8 (0.7-1.08)	<0.001	Pairwise comparisons (Bonferroni correction): En-bloc vs Living p=0.001; En-bloc vs Dual p=0.002; Living vs Dual p=1.0
1-year GFR, mL/dL/1.73m² (Median IQR)	60 (49-67)	43.0 (35.5-51.5)	78 (61-97)	<0.001	Pairwise comparisons (Bonferroni correction): Dual vs Living p=0.06; Dual vs En-bloc p<0.001; Living vs En-bloc p=0.01
2-year GFR, mL/dL/1.73m² (Median IQR)	59 (48-73)	51 (40-62)	89 (67-109)	<0.001	Pairwise comparisons (Bonferroni correction): Dual vs Living p=0.52; Dual vs En-bloc p<0.001; Living vs En-bloc p<0.001
DGF	0	6 (46.2)	5 (20.8)		
Patient status					
Dead	4 (10.3)	1 (7.7)	4 (16.7)	0.65	
Patient deceased with functioning graft	4/4 (100)	1/1 (100)	3/4 (75)	0.49	
Alive	35 (89.7)	12 (92.3)	20 (83.3)	0.65	
Patient alive with functioning graft	35/35 (100)	10/12 (83.3)	19/20 (95)	0.054	
Patient alive with non-functioning graft	0/35 (0)	2/12 (16.7)	1/20 (5)		
Graft failure (death OR non-functioning graft)	4 (10.3)	3 (23.1)	5 (20.8)	0.39	
Graft survival 1-3-5-year	100/100/90	100/92/69	96/96/91	0.27	
Patient survival 1-3-5-year	100/100/90	100/100/88	100/100/95	0.78	

Table 3. Outcomes. IQR, interquartile range. GFR, glomerular filtration rate. DGF, delayed graft function

Preoperative MRCP is not Associated with Lower Complication Rates but Shorter Hospital Stay in Laparoscopic Cholecystectomy

J. Zeindler¹, G. F. Hess¹, P. Sedlacek¹, S. Muenst², M. Bolli¹, O. Kollmar¹, S. D. Soysal³ (¹Abdominal Surgery, Clarunis - University Centre for Gastrointestinal and Liver Diseases, Basel; ²Institute of Medical Genetics and Pathology, University Hospital Basel, Basel; ³Faculty of Medicine, University of Basel, Basel)

Background: Laparoscopic cholecystectomy is a very common procedure and while preoperative magnetic resonance cholangiopancreatography (pMRCP) is widely used for detection of choledocholithiasis and preoperative planning, the benefits in patients with normal preoperative cholestatic parameters remain unclear.

Aims: We aimed to investigate a large cohort of patients after laparoscopic cholecystectomy to analyse the impact of pMRCP on complication rates.

Methods: This retrospective cohort study consecutively includes all patients receiving elective or acute laparoscopic cholecystectomy between 2010 and 2020. Exclusion criteria were conversion to open cholecystectomy and preoperatively elevated cholestatic parameters. Complication rates were recorded and patients stratified depending on the use of pMRCP for preoperative planning.

Results: 3163 patients underwent laparoscopic cholecystectomy between 2010 and 2020, 2568 of which showed normal cholestatic parameters preoperatively. Of these patients, 684/2568 (27%) were male and 1884/2568 (73%) female. The most frequent indications for laparoscopic cholecystectomy were cholecystolithiasis in 72% (1845/2568) of cases, followed by cholecystitis in 18% (465/2568). The majority of patients (2267/2568, 88%) indeed received pMRCP, while the remaining 301/2568 patients did not. Postoperative complication rates did not significantly differ between the two groups (396/2267 (17%) in the pMRCP group and 58/301 (19%) without pMRCP, p=0.469). One case of pancreatitis occurred in the pMRCP group, versus two reported cases in the other group. Interestingly, the length of hospital stay after cholecystectomy was significantly shorter in the group with pMRCP versus without (4 days (range 1-61 days) versus 7 days (range 1 – 66 days), respectively, p = 0.023).

Conclusion: Preoperative MRCP seems to not prevent complications in laparoscopic cholecystectomy, since postoperative complication rates were comparable between the two patient groups with and without pMRCP. However, postoperative hospital stay was significantly shorter in patients undergoing pMRCP compared to patients without pMRCP.

Clinical Presentation and Risk Factors of Acalculous Cholecystitis in Outpatients, a Literature Review and Retrospective Study

C. Dogny¹, I. Fournier, S. Sgardello² (¹CHVR, Sion; ²General Surgery, CHVR, Sion)

Background: Acute acalculous cholecystitis in healthy patients is relatively understudied. It is usually described in patients within the intensive care unit, where it is associated with high mortality rates reaching 30%-50% in the literature

Aims: To review patients who have developed AAC in outpatient or non-ICU settings, identify risk factors and clinical presentation, and compare these data with those in the literature

Methods: We first performed a literature review. We then determined the inclusion criteria: acalculous cholecystitis confirmed by either an ultrasound, or CT scan, at pathology and intraoperatively. We excluded all patients hospitalized within the ICU or who developed AAC because of multiorgan failure or patients without histopathological evidence. We performed a 5-year search in our institution's database with the terms "cholecystitis" and "acalculous cholecystitis".

Results: 23 patients were included in our study based on histopathology. The most frequent co-morbidities were cardiovascular and metabolic syndrome. The most common complaint was abdominal pain, ten patients (50%) presented to the emergency department with an increase of at least two of three biological markers (CRP, bilirubine and leucocytosis). We had no mortality reported at 30 days.

Conclusion: Epidemiologically, our population's characteristics correspond to those of other studies, with most patients being male. The majority of patients were ASA III suggesting that this disease concerns more polymorbid patients despite a high percentage of healthy patients. Right upper quadrant pain, whether associated with leukocytosis or not, seems to be the main factor leading to further investigation. Abdominal US is considered the diagnostic technique of choice. However, most patients in our study underwent US and CT. We found that acalculous cholecystitis in outpatients, does not have the high mortality rate that was previously attributed to it, but is more frequent in polymorbid patients with cardiovascular risk factors.

General data					
Ages (years)	48-87	(mean 75)			
	N	%		N	%
Male	18	78%	Female	5	22%
Outpatients	19	83%	Inpatients	4	17%
Co-morbidities					
ASA	II: 7	30%	III: 13	57%	IV:3 13%
	N	%		N	%
Arterial hypertension	11	48%	No comorbidities	4	17%
Hypercholesterolemia	10	43%	OSA	4	17%
Ischemic heart disease	8	35%	History of stroke	2	9%
Diabetes	7	30%	Pulmonary fibrosis	1	4%
Obesity	4	17%	CRF	1	4%
Atrial fibrillation	3	13%	Pancreatic neoplasia	1	4%
Valvular heart disease	2	9%			
PAD	2	9%			

Table 1. Patients' co-morbidities OSA: obstructive sleep apnea, CRF: chronic renal failure, PAD: peripheral arterial disease

Authors	Savoca et al.	Ganpathi et al.	Ryu et al.	Nikfarjam et al.
Publication	1989	2006	2002	2012
N	47	11	22	35
Ratio (M/W)	36 :11	9 :2	15 :7	18 :17
% (male)	77%	82%	68%	51%
Ages	65.5 (27-89)	52.4 (30-69)	63 (40-85)	69 (45-94)
Origine :	unknown			
Outpatients	36	11	20	
Inpatients	4		2	
ICU	7 ICU			
Presentation	unknown			
RUQ pain	83%	73%		25%
Fever	55%	27%		46%
Leukocytosis	96%	81%		34%
Co-morbidities				
No-comorbidities	unknown	36%	60%	unknown
Hypertension	HTA 56 %	45%	25%	unknown
Diabetes	DM 15%	18%	20%	23%
CV risk factors	72%	unknown	35%	unknown
Diagnostic				
US (n)	18.	10		
CT (n)	3	2		
HIDA scan (n)	36.			
Histopathology				
Necrotic (%)	28%	36%	63%	37%
Perforated (%)			13%	
Mortality				
	3/47 (ICU patients)	0%	0%	0%

Table 2. Summary of results from previous studies. RUQ: right upper quadrant, CV: cardiovascular

Learning Curves of Laparoscopic and Robotic Liver Surgery: A Systematic Review with a Proposal of Standardization

B. Müller¹, C. Kuemmerli², J. M. Toti³, F. Haak², A. T. Billeter⁴, J. Lavanchy², P. Dutkowski⁴, O. Kollmar⁴, B. P. Müller-Stich⁴ (¹Clarunis – University Centre for Gastrointestinal and Hepatopancreatobiliary Diseases, Basel, Switzerland, Basel; ²Department of Surgery, Clarunis – University Centre for Gastrointestinal and Hepatopancreatobiliary Diseases, Basel; ³Department of Surgery, Regional Hospital of Bellinzona e Valli, Bellinzona; ⁴Department of Surgery, Clarunis – University Centre for Gastrointestinal and Hepatopancreatobiliary Diseases, Basel, Switzerland, Basel)

Background: Minimal invasive liver surgery (MILS) offers several benefits compared to open resections. For a safe introduction of MILS, formal training is required. However, definitions of learning curves vary greatly and are lacking international standardization.

Aims: The aim of this systematic review was to analyze the learning curves associated with both laparoscopic- (LLS) and robotic liver surgery (RLS).

Methods: A systematic review on PubMed, Web of Science, and CENTRAL databases identified

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Results: 62 articles with 13'005 patients and 102 learning curve analyses were included. The laparoscopic and robotic approach was evaluated in 70 and 18 analyses, while both approaches were assessed in 14 analyses. Sixty-one analyses (60%) based the learning curve on statistical calculations. The most often used parameters to define learning curves were operative time (n=64), blood loss (n=54), conversion (n=42) and postoperative complications (n=38). Overall, the number of procedures to surpass the first phase of the learning curve was 25 (10-106) for laparoscopic minor- compared to 19 (15-109) for robotic minor resections (p=0.903) and 19 (8-50) for laparoscopic major- compared to 40 (22-57) for robotic major resections (P=0.007). In a three-phase model (Figure 1), intraoperative parameters improved earlier (1st to 2nd phase: operating time -13%, blood loss -33%) whereas postoperative parameters improved later (2nd to 3rd phase: complications -29%, conversion rate -29%). Studies with larger sample sizes showed higher numbers of procedures needed to overcome the learning curve ($\rho=0.64$, $P<0.001$).

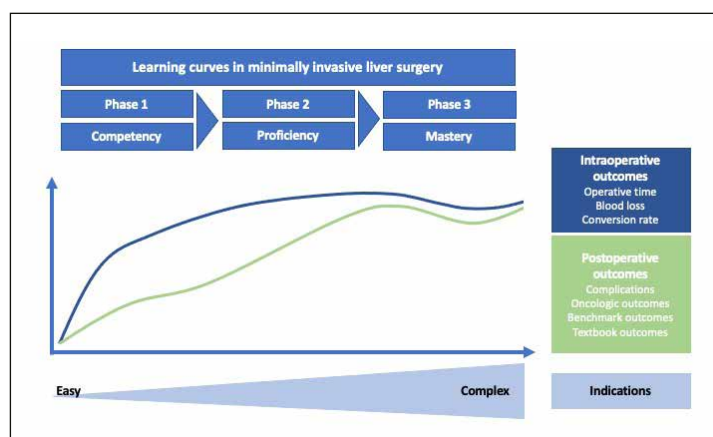
A. Donlagic, E. Zanfrini, E. Abdelnour-Berchtold, J.Y. Perentes, T. Krueger, C. Forster, M. Gonzalez
(Thoracic surgery, Lausanne University Hospital (CHUV), Lausanne)

Aims: The aim of the study is to evaluate the association between surgical margin and the risk of recurrence, as well as overall survival, after pulmonary segmentectomy.

Conclusion: This study summarizes the best available evidence on learning curves in laparoscopic- and robotic liver surgery taking into account different definitions, analysis methods, and confounding factors. A standardized three-phase reporting of learning phases (competency, proficiency, mastery) is proposed and should be followed.

Conclusion: Our preliminary data indicates that local recurrence is infrequent after pulmonary segmentectomy for cT1N0 NSCLC, even with a limited surgical margin.

A. Hojski¹, A. Hojski², M. Mallaeve², M. Hassan², N. Tsvetkov², M. Wiese², B. Gahl^{3,4}, D. Lardinois²
(¹University Hospital Basel, Basel; ²Division of Thoracic Surgery, Department of Surgery, University Hospital Basel, Basel; ³Surgical Outcome Research Center, University Hospital Basel, Basel; ⁴Department of Clinical Research, University of Basel, Basel)



Perioperative Outcomes of Minimally Invasive Distal Pancreatectomy: A Propensity-Score Matched Comparative Analysis

Background: Minimally invasive pancreatic surgery (MIPS) is increasingly utilized in expert centers.

Methods: From 2014 to 2023, all consecutive distal pancreatectomies treated at a single center in Switzerland were included. MIPS was compared to open surgery and propensity-score matching by the nearest-neighbor method was used to reduce confounding.

Major complications occurred in 18% (MIPS) and 10% of patients ($p = 0.383$), respectively. The mortality was zero. No grade C pancreatic fistula (POPF) occurred, 4 patients in the MIPS group (19%) and 13 in the open group (39%) developed grade B POPF. The number of intra-abdominal infections was one after MIPS (5%) and 7 (24%) after open resections ($p = 0.165$). The median Comprehensive Complication Index was lower after MIPS compared to open surgery (0 [0, 20.9] and 20.9 [20.9, 29.6], $p = 0.002$) and the length of hospital stay was shorter (7 days [IQR 6-10] and 24 [IQR 15-30], $p < 0.001$). After conclusion of the learning curve and improvement of the robotic technique with Liangmentum Teres-Patch, the fistula rate was $<10\%$.

Background: Video-assisted segmentectomies are challenging operations and potentially associated with serious complications.

Methods: We retrospectively collected data from 100 consecutive patients who signed the general research consent and received minimally invasive segmentectomies from 2019-2022. The operative outcomes (type of segmentectomy, conversion to thoracotomy, chest tube duration, intensive care unit stay) and complications of the surgeries planned with 3D-reconstructions were compared to the results of those performed without. The data was analyzed using propensity modelling and inverse probability of treatment weighting (IPTW).

In addition, planning surgery with 3D-reconstruction software leads to a reduction in the number of segments removed (1.7 ± 0.8 vs. 1.9 ± 1.0) ($p = 0.402$) and the average duration of the chest tube remaining from 3.0 days (2.0–4.0) to 2.0 days (1.0–3.0) ($p = 0.06$). The stay in the intensive care unit/HDU also was shortened. See Table 1.

proceeding with the care planning or compliance changes.

	Total (n = 100)	without 3D (n = 63)	3D (n = 37)	p
Complex surgery n (%)		24 (38%)	33 (89%)	<0.001
Number of removed segments n		1.9±1.0	1.7±0.8	0.402
BMI [kg/m ²]		25.7±5.0	27.9±4.8	0.032
Conversion	12 (12%)	12 (19%)	0 (0.00%)	0.003
Duration of surgery [min]	221±56	209±53	243±54	0.002
Duration ICU/HDU [days]				0.23
0	3 (3.0%)	3 (4.8%)	0 (0.00%)	
1	87 (87%)	51 (81%)	36 (97%)	
2	4 (4.0%)	4 (6.3%)	0 (0.00%)	
3	5 (5.0%)	4 (6.3%)	1 (2.7%)	
5	1 (1.0%)	1 (1.6%)	0 (0.00%)	
Chest tube duration [days]	3.0 (2.0 to 4.0)	3.0 (2.0 to 4.0)	2.0 (1.0 to 3.0)	0.06
Complication C-D grade				0.57
0	61 (61%)	38 (60%)	23 (62%)	
I	16 (16%)	9 (14%)	7 (19%)	
II	14 (14%)	8 (13%)	6 (16%)	
III	8 (8.0%)	7 (11%)	1 (2.7%)	
IV	1 (1.0%)	1 (1.6%)	0 (0.00%)	
(I-IV)	39 (39%)	25 (40%)	14 (38%)	1.00
III or IV	9 (9.0%)	8 (13%)	1 (2.7%)	0.15
IPTW C-D grade III or IV		Before	After	
Odds Ratio (95% CI)		0.19 (0.02 to 1.59) p=0.13	0.10 (0.01 to 0.87) p=0.037	

Surgical procedures and postoperative outcomes after surgical planning without and with 3D-reconstruction software Visible Patient™ and their complications (Clavien-Dindo (C-D) grade). In our cohort no complication C-D grade V occurred. Focusing on severe complications, e.g. C-D grade III or IV, odds ratio was lower, indicating that 3-D reconstructions group is associated with lower risk of severe complications. Before IPTW, 3D did not show an association with severe complication which might be interpreted as substantial confounding by (pre)operative factors.

Table 1: Descriptive Statistics and Analyses of Outcomes of 100 Segmentectomies

Minimally-Invasive Single-Port Segmentectomy Versus Lobectomy in Stage IA Lung Cancer
B. Kostovski, K. Gioutsos, M. Galanis, F. Binelli, T. L. Nguyen, Ö. Senbaklavaci, P. Dorn (Universitätsklinik für Thoraxchirurgie, Inselspital – Universitätsspital Bern, Bern)

Background: The indication for anatomic sublobar resection in solid or predominantly solid stage IA non-small cell lung cancer is still debated despite recently published prospective randomized trials.

Aims: Our aim was to evaluate the long-term oncologic outcome after these two surgical approaches and assess clinical and histopathologic parameters influencing overall mortality and recurrence rate.

Methods: Retrospective analysis of all patients who underwent uniportal anatomic segmentectomy or lobectomy for pathologic stage IA lung cancer (8th edition) from January 2015 to December 2021. Data up to December 31, 2023 were included for oncological follow-up. The primary endpoints were overall survival and recurrence. Univariate and multivariate logistic regression were used to predict indicators for mortality and recurrence.

Results: A total of 232 consecutive patients were included in the analysis. A segmentectomy was performed in 160 patients and a lobectomy in 72 patients. The distribution of histological subtypes was comparable, with adenocarcinoma being the most common histology (67.6%). The mean tumor size in the segmentectomy and lobectomy groups was 1.59 ± 0.63 and 1.71 ± 0.61, respectively. The mean number of resected lymph nodes was 10.38 ± 7.43 in 4.66 ± 1.99 lymph node stations in the segmentectomy group and 14.07 ± 8.69 in 5.04 ± 1.58 lymph node stations in the lobectomy group. The 5-year overall survival rate were 76.9% in the segmentectomy group compared to 87.5% in the lobectomy group (Figure 1). A statistically non-significant difference. Multivariate analysis showed that men (OR = 3.21; CI: 1.33 to 7.75) and patients with lymphatic invasion (L) (OR = 4.60; CI: 1.27 to 16.66) had a higher risk of death (Table 1). The probability of recurrence was higher in patients with a larger number of removed lymph node stations (OR = 1.93; CI: 1.01 to 1.92).

Conclusion: Our results support anatomic sublobar resection as an acceptable alternative to lobectomy with comparable oncologic results.

	Univariate analysis			Multivariate analysis		
	OR	95% CI	p	OR	95% CI	p
Type of operation, Segmentectomy	1.61	(0.79-3.30)	0.192	2.09	(0.72-6.08)	0.176
Gender, Male	2.43	(1.24-4.74)	0.009	2.99	(1.29-6.93)	0.011
Age	1.04	(1.00-1.08)	0.032	1.04	(0.99-1.09)	0.089
Side, Right	0.69	(0.37-1.30)	0.251	0.58	(0.25-1.35)	0.208
Lobe, L	1.51	(0.40-5.63)	0.542	0.34	(0.05-2.20)	0.258
Lobe, U	1.80	(0.49-6.61)	0.376	0.48	(0.08-2.91)	0.426
Diameter (cm)	1.38	(0.84-2.28)	0.205	1.02	(0.53-1.96)	0.962
Nod Stations	0.97	(0.82-1.15)	0.748	1.16	(0.88-1.51)	0.290
Nodes	0.96	(0.92-1.01)	0.112	0.97	(0.90-1.03)	0.316
Postoperative Histology, Squamous	2.14	(1.05-4.35)	0.035	1.85	(0.76-4.48)	0.174
Postoperative Histology, Neuroendocrine	0.26	(0.03-2.04)	0.201	1.47	(0.11-19.57)	0.768
Postoperative Histology, Other	0.39	(0.05-3.16)	0.378	0.32	(0.02-5.39)	0.432
L, Yes	2.91	(1.15-7.36)	0.024	3.51	(1.04-11.86)	0.043
V, Yes	2.01	(0.98-4.13)	0.056	1.62	(0.64-4.10)	0.311
Grading, Grade 1	0.36	(0.11-1.19)	0.093	0.47	(0.10-2.24)	0.341
Grading, Grade 2	0.71	(0.34-1.45)	0.344	0.62	(0.26-1.49)	0.284
Radio Distance to Pleura (mm)	0.99	(0.97-1.02)	0.917	1.00	(0.97-1.03)	0.986

OR=Odds Ratio; CI=Confidence Interval

Table 1. Result of logistic regression models summarizing the association of prognostic factors with mortality

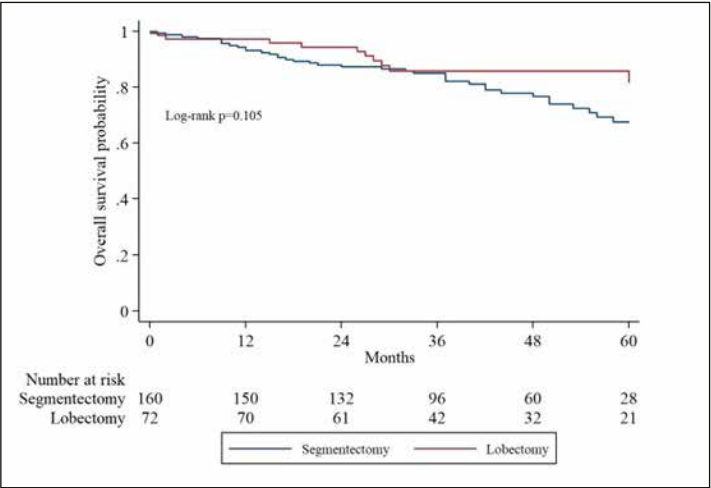


Figure 1. Kaplan-Meier analyses of overall survival (OS) by operation group

Survival Outcomes of Stage III Managed by Surgery or Definitive Radiation Therapy in the Era of Immunotherapy

L. E. Chiqui¹, E. Abdelnour-Berchtold¹, C. Forster¹, L. Zermatten¹, A. Hasenauer², S. Papadopoulos³, N. Mederos³, H. Bouchaab³, M. Christodoulou², M. Gonzalez², T. Krueger¹, S. Peters³, J. Y. Perentes¹ (¹Thoracic Surgery, University Hospital of Lausanne, Lausanne; ²Thoracic Surgery, Valais Hospital, Sion; ³Medical Oncology, University Hospital of Lausanne, Lausanne)

Background: The introduction of immunotherapy in the management of locally advanced non-small cell lung cancers (NSCLCs) has significantly improved patient outcomes. In 2017, our center evaluated immunotherapy for stage III NSCLC as follows: induction chemo- immunotherapy followed by surgery for potentially resectable and chemo-radiation therapy followed by immunotherapy for non-resectable NSCLCs.

Aims: We report and compare the outcomes of 75 stage III NSCLCs (51 single N2 and 24 bulky N2 or N3) managed by multimodal therapy including immunotherapy and surgery or radiation therapy.

Methods: Using our prospectively collected database, we reviewed all stage III NSCLC patients treated in our institution and in Valais Hospital between 2017 and 2023 with chemo- immunotherapy and surgery or radiation therapy. We recorded clinico-pathological characteristics, perioperative complications, and long-term outcomes. We compared groups using Stata®.

Results: Thirty-nine patients (32 single N2 and 7 bulky N2/N3) underwent surgery and 36 (19 single N2 and 17 bulky N2/N3) underwent radiation therapy. Patients were significantly older (73 vs 63 years old, p<0.05) and had worst lung diffusion capacity (45% vs 76% of predicted value, p<0.05) in the radiation group. Tumor stages were equilibrated between both groups. All potentially resectable patients had surgery after induction chemo-immunotherapy. Pulmonary and cardiac morbidity were comparable between surgery and radiation groups (38% vs 33% and 18 vs 14%, p>0.05). No 30-day mortality occurred. Complete pathological response (CPR) occurred in 11 patients (10 of 32 single N2 and 1 of 7 bulky N2/N3). Overall survival was significantly higher in the surgery group and was the best in patients with CPR (Figure 1).

Conclusion: The inclusion of immunotherapy in neoadjuvant protocols has improved tumor

response and allowed to consider potentially resectable bulky N2/N3 NSCLCs for surgery with good outcomes. Careful patient selection within multidisciplinary tumor boards remains mandatory and further studies are required.

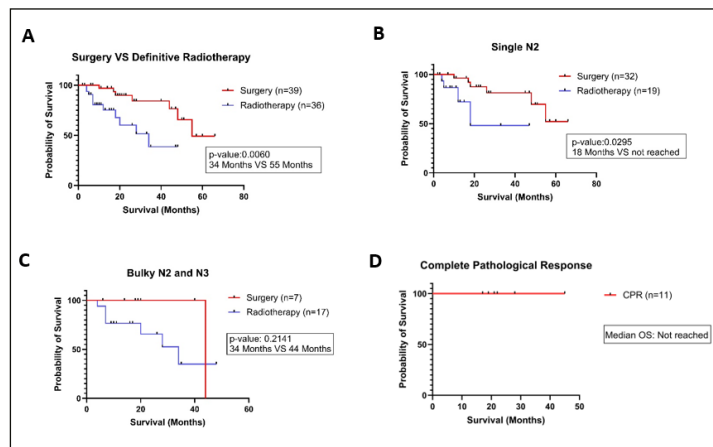


Figure 1. Kaplan-Meier analysis comparing overall survival in months (OS) between A) surgery and radiotherapy, B) single N2 patients, C) bulky N2 and N3 patients. D) Kaplan-Meier analysis of surgical patients with complete pathological response. Median OS are reported for radiation and surgery groups respectively.

Surgical Complexity of Anatomical Lung Resections after Induction Immunotherapy for Locally Advanced or Metastatic Non-Small Cell Lung Cancer

R. S. Werner, K. Chiffi, D. Schneider, S. Hillinger, O. Lauk, I. Opitz (Department of Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Neoadjuvant immunotherapy has become an integral part of the multimodal treatment in advanced NSCLC. However, an increasing procedural complexity after neoadjuvant immunotherapy is described by many surgeons. We therefore aim to score the surgical complexity of anatomical resections after induction immunotherapy.

Aims: We aimed to score the surgical complexity of anatomical lung resections after induction immunotherapy.

Methods: We performed a single-institutional retrospective review of patients with clinical stage IIIA-IVB NSCLC who underwent anatomical lung resection and mediastinal lymphadenectomy after neoadjuvant immunotherapy. Surgical complexity and hilar fibrosis were scored according to the proposed scoring system by Rusch et al. (<https://doi.org/10.1016/j.jtcvs.2022.10.007>).

Results: 25 patients met the inclusion criteria, among which 4 (16%) were treated with neoadjuvant immunotherapy alone, 18 (72%) with neoadjuvant immunotherapy and 3 (12%) with neoadjuvant immunotherapy and chemoradiotherapy. Clinical UICC-stages were IIIA in 8 (32%), IIIB in 2 (8%), IVA in 9 (36%) and IVB in 6 patients (24%). Surgical access was primarily open in 13 (52%), RATS in 5 (20%) and VATS in 7 patients (28%). Resections included 15 lobectomies, 4 bilobectomies, 5 pneumonectomies and 1 segmentectomy. Conversion from minimally invasive to open approach was required in 5 patients (2 VATS and 3 RATS cases), all due to extensive hilar fibrosis. A hilar fibrosis score of 2 was present in 15 cases and a score of 0 was only seen in 4 patients. The presence of a high fibrosis score was not associated with an increased risk for perioperative complications ($p=0.66$), but patients with a fibrosis score of 2 showed a longer median length of hospital stay (9.4 ± 3.9 versus 6.7 ± 1.8 days), although not statistically significant ($p=0.056$).

Conclusion: Surgical complexity after neoadjuvant immunotherapy for advanced NSCLC can be objectified by a hilar fibrosis score. The prognostic relevance of the hilar fibrosis score for early outcomes such as perioperative complications and length of stay needs to be assessed in larger prospective cohorts.

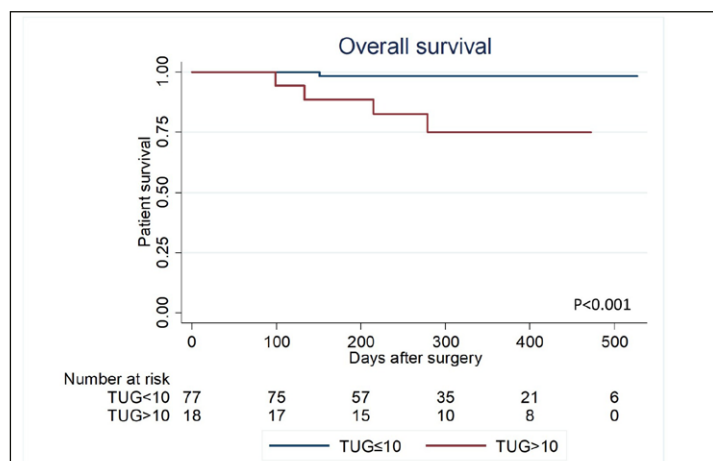


Figure 1. Patients with a fibrosis score of 2 showed a longer median length of hospital stay (9.4 ± 3.9 versus 6.7 ± 1.8 days), although not statistically significant ($p=0.056$).

Association Between the Preoperative Timed Up and Go Test and Short- and Long-Term Survival after Anatomical Pulmonary Resection

B. Bédat¹, A. Petit¹, M. S. Demarchi¹, F. Triponez¹, W. Karenovics¹, I. Guerreiro² (¹Division of thoracic and endocrine surgery, University Hospitals of Geneva, Geneva; ²Division of pneumology, University Hospitals of Geneva, Geneva)

Background: The Timed Up and Go (TUG) test is an easy-to-administer tool measuring motor functions with prognostic value in elderly.

Aims: The aim of this study was to investigate the association between the TUG test and the short- and long-term outcomes after anatomical pulmonary resection.

Methods: We retrospectively reviewed records of patients who underwent anatomical pulmonary resection from 2021 to 2023. A TUG test taking more than 10 seconds was considered to be impaired. We compared cardiopulmonary complications at 30 days and long-term overall survival according to the TUG tests. Logistic regression was employed to analyze complications and the survival proportions were estimated using Kaplan-Meier curves. Hazard ratios were estimated using Cox proportional hazard models.

Results: A total of 95 patients were included in the analysis, including 19% of patients with a TUG > 10 seconds. Mean age was 68.9 ± 9.8 years. Lung cancer was the surgical indication in 81% of patients. A majority of patients underwent resection by VATS (90.5%), and a majority underwent segmentectomy (61.1%). The mean follow-up duration was 304 ± 124 days. An impaired TUG didn't predict an increased risk of cardiopulmonary complications at 30 days. In the long term, an impaired TUG was associated with a shorter overall survival ($P < 0.001$) (Figure). Multivariate analysis confirmed that an impaired TUG and age older than 80 years old were independent predictors of patient death in the long-term (hazard ratio, 1.17; $P=0.030$ and hazard ratio, 7.9; $P=0.028$, respectively).

Conclusion: An impaired TUG is associated with a shorter overall survival after anatomical pulmonary resection. It requires further investigation and whether interventions improving TUG such as rehabilitation could enhance long-term outcomes.

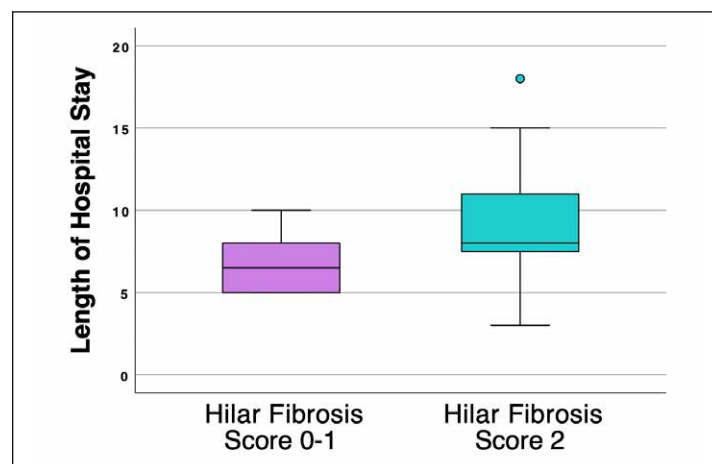


Figure 1. Kaplan-Meier curves of patient survival after anatomical pulmonary resection according to the TUG test

Functional Assessment of Chest Wall Integrity after Codubix®Ribs Reconstruction

M. Appel¹, D. Lardinois¹, M. Wiese¹, M. Pradella², Z. Djakovic¹ (¹Thoracic Surgery, University Hospital of Basel, Basel; ²Clinic of Radiology and Nuclear Medicine, University Hospital of Basel, Basel)

Background: Chest wall resection may be necessary for various reasons. Reconstruction is warranted for large defects of the chest wall and sternum to prevent paradoxical, insufficient breathing, to protect underlying structures, and to offer a good functional result. Codubix®Ribs (Tricomed) is a prosthesis made of polyester and polypropylene yarn recently introduced for reconstruction.

Aims: Patients with resection of the chest wall and/or the sternum followed by reconstruction with Codubix®Ribs were prospectively enrolled to assess chest wall integrity and pain.

Methods: Eleven patients (mean age 53 ± 20.5 , three female) who underwent thoracic wall reconstruction with Codubix®Ribs were enrolled between 2019 and 2023. Pain was assessed by using a numeric rating scale (NRS, 0 no pain, 10 strongest pain). Functionality was measured by clinical examination, by assessment of upper extremity mobility (quickDASH questionnaire; 0 the best, 100 the worst), and by cine-magnetic resonance imaging (MRI).

Results: Indication for resection consisted of tumors ($n = 9$) and osteomyelitis ($n = 2$) in an anterolateral ($n = 10$) and posterolateral ($n = 1$) location. The sternum was involved in three patients. Complication of the procedure was observed in one patient with dislocation of an undersized prosthesis; following an uneventful reoperation. Functional assessment was performed in nine patients at a mean follow-up time of 23.3 ± 20.1 months. Chest wall was stable in all patients and dynamic MRI imaging showed symmetric movement of the chest wall in all but one patient, but without paradoxical motion. NRS pain score had a mean value of 1.7 ± 2.2 and the quickDASH score showed a median value of 6.8.

Conclusion: We observed excellent functional results using Codubix®Ribs for chest wall reconstruction, suggesting high stability and low complication rates. However, further studies involving larger number of patients are required to confirm our initial results.

Correlation of Self-Assessed Manual Dexterity and Actual Performance in Surgical Simulation – One Year Follow Up

S. Hillinger¹, T. Brunn¹, I. Opitz¹, U. Held², L. Hofer², N. Zellweger¹, B. Battilana¹, R. Werner¹ (¹Thoracic Surgery, University Hospital Zürich, Zürich; ²Institute of Epidemiology, Biostatistics and Prevention, University of Zürich, Zürich)

Background: Simulation training has proved to be beneficial in many fields of professions including medicine and might be included already during medical school.

Aims: We evaluated if medical students rate their manual dexterity as good or above average and if this self-assessment (SA) correlates with the actual performance in a surgical simulation.

Methods: Basic surgical tasks have been performed by medical students in the 3rd and 4th year for a total of 4 rounds on 2 identical Lap-Sim[®] surgical simulators. Three questionnaires, before and after the simulation as well as follow up after 1 year had to be answered.

Descriptive statistics stratified by career goal (surgical/ undecided/ nonsurgical) for outcomes of simulation parameters are reported. Associations between surgical career goal and SA of manual dexterity with three performance parameters (tissue damage, time and path length) are estimated in linear regression models.

Results: Out of 102 participating students 41 stated surgery as their career goal, 18 a nonsurgical field, and 43 were undecided. 87.8% of the surgical group rated their dexterity as good or above average (86.1% in the undecided group), 88.9% of the nonsurgical group as below average or good. An positive association of SA with tissue damage has been found statistically significant ($p=0.033$). The figure shows the influence of surgical simulation on SA of manual dexterity.

One year after the simulation ($n=97$) 13.4% changed their career goal from undecided to surgical, whereas 8.2% changed from undecided to non-surgical. 92.7% wanted to have simulation training integrated into the curriculum.

Conclusion: A correlation of self-assessed manual dexterity has been found in the surgical group for tissue damage, but not for time and path length. Simulation training might help students in decision making for a surgical field and therefore recruit future surgeons, which could be shown in the one year follow-up.

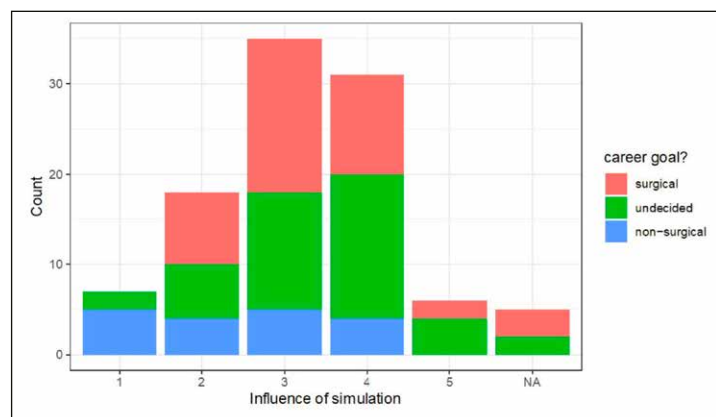


Figure 1. Influence of simulation on self-assessed manual dexterity from 1 (little) to 5 (very)

Long-term Outcome After Removal of Rib Stabilization Hardware

M. B. Svec, H. Bachmann, A. Hojski, D. Lardinois (Department of Thoracic Surgery, University Hospital Basel, Basel)

Background: There is currently a lack of data on the indications for hardware removal (HR) following surgical stabilization of rib fracture (SSRF). Many of the symptoms are thought to be mostly a direct consequence of the blunt trauma itself.

Aims: To analyze the indications for HR and the long-term results in terms of improvement of the symptoms and satisfaction of the patients.

Methods: Single centre retrospective study with one prospective follow-up visit including 28 patients who underwent HR after SSRF between September 2017 and September 2023. A prospective follow-up visit was performed 29 (range 3-73) months after HR. Evolution of the symptoms and QoL were assessed in 82% of the patients by use of an adapted EQ-5D-5L questionnaire.

Results: The mean age of the patients was 59 (range 29-83) years. The median number of fractures per patient was 10.5 (range 1-39) and the median number of implants used was 4 (1-11). Indications for HR after SSRF were persistent pain (36%), discomfort (25%), chest tightness (21%), dislocation of hardware (11%) and infection (7%). HR was performed after a mean time interval of 18 months (range 5 days-105 months) after initial SSRF. Patients with chest tightness showed the highest improvement rate of the symptoms (74%) followed by the group hardware infection (69%). In the 3 other indications groups, the improvement rate was 60%. All the patients with chest tightness, dislocation of hardware and hardware infection were satisfied and would undergo HR again.

Conclusion: Our preliminary results suggest that removal of hardware after rib stabilization leads to a significant relief of the symptoms and improvement of the quality of life in about two thirds of the patients. Consequently, HR might be more liberally performed and earlier if symptoms are disabling.

Free Communication – STS

Cement Augmentation for Proximal Humerus Fractures: A Meta-Analysis of Randomized Trials and Observational Studies

Y. Lecoultré^{1,2}, F. Beeres^{1,2}, B. van de Wall^{1,2}, B. C. Link¹, F. Tillmann¹, F. Pretz¹, R. Babst^{1,2} (¹Department of Orthopedic and Trauma Surgery, LUKS Luzern, Luzern; ²Faculty of Health Sciences and Medicine, University of Lucerne, Luzern)

Background: It is unclear if elderly patients treated with plate osteosynthesis for proximal humerus fractures benefit from cement augmentation.

Aims: This meta-analysis aims to compare cement augmentation to no augmentation regarding healing, complications, and functional results.

Methods: PubMed, Embase and Cochrane Central Register of Controlled Trials were searched for randomized clinical trials and observational studies. Effect estimates were pooled across studies using random effects models. The primary outcome is overall complication rate. Stratified analyses were performed for types of complication (implant related or systemic). Secondary outcomes include re-interventions, hospital stay, operation time, functional scores, and general quality of life.

Results: Five observational studies and one randomized controlled trial with a total of 541 patients were included. The overall complication rate was significantly lower in the augmented group (15.6% versus 25.4%, OR 0.54 (95%CI 0.33–0.87)). This was caused by a reduction of implant related complications (10.4% vs 19.9%, OR 0.49 (95%CI 0.28, 0.88)). No difference in humeral head necrosis was found. Data on re-intervention, hospital stay, and operation time was limited but did not show significant differences. No impact on functional scores and general quality of life was detected.

Conclusion: This meta-analysis shows that cement augmentation may reduce overall complications, mainly by preventing implant related complications. No difference was detected regarding need for reintervention, functional scores, general quality of life and hospital stay. This is the first meta-analysis on this topic. It remains to be seen whether conclusions will hold when more and better-quality data becomes available.

Let's Agree to Disagree on Operative versus Nonoperative (LADON) Treatment for Proximal Humerus Fractures: A Multicenter International Prospective Cohort Study

I. R. Buentner¹, R. J. Hoepelman², F. J. Beeres¹, B. J. M. van de Wall¹, C. Michelitsch³, R. Babst⁴, C. Sommer⁵, E. J. M. M. Verleisdonk⁶, D. van der Velde⁶, R. M. Houwert², R. H. Groenwold⁷, M. van Heijl⁸ (¹Department of Orthopedic and Trauma Surgery, Luzerner Kantonsspital, Luzern; ²Department of Trauma Surgery, University Medical Center Utrecht, Utrecht; ³Department of Trauma Surgery, Kantonsspital Graubünden, Chur; ⁴Department of Health sciences and Medicine, University of Lucerne, Luzern; ⁵Department of Trauma Surgery, Diaconessenhuis, Utrecht; ⁶Department of Trauma Surgery, St. Antonius Hospital, Nieuwegein; ⁷Department of Clinical Epidemiology, Leiden University Medical Center, Leiden)

Background: Internationally, the optimal treatment strategy of proximal humerus fractures remains much debated.

Aims: The aim was to investigate whether operative treatment of displaced proximal humerus fractures is superior to nonoperative treatment.

Methods: The study design was prospective natural experiment (prospective cohort study) based on geographical randomization and clinical equipoise. The setting was an international multicenter cohort study in the Netherlands and Switzerland. In total 226 patients with acute (<3 weeks) displaced proximal humerus fractures presenting from July 2020 until March 2022 were included after expert panel evaluation based on clinical equipoise. Patients were followed up for one year, and 191 (84%) had complete follow-up data. Operative treatment included plate fixation, intramedullary nailing and reverse shoulder arthroplasty at the discretion of the treating surgeon. Nonoperative treatment was sling immobilization. All patients received standardized outpatient rehabilitation and physiotherapy. The primary outcome was QuickDASH after one year. Secondary outcomes included QuickDASH at six weeks and EuroQoL5D (EQ5D), Subjective shoulder value (SSV), numeric rating scale for pain (NRS) at six weeks and one year.

Results: No difference in QuickDASH score after one year (16.3 vs. 17.5, $p=0.836$) was found. At six weeks, operative treatment resulted in lower NRS (4.2 vs 3.0, $p<0.001$), higher EQ5D (0.59 vs. 0.68, $p=0.015$) and higher SSV (41.8 vs. 53.6, $p=0.002$). At one year operative treatment resulted in higher SSV (70.9 vs. 83.5, $p<0.001$). Increase in SSV was similar between groups (29.1 vs. 29.9, $p=0.234$) and EQ5D was comparable after one year (0.87 vs. 0.86, $p=0.980$).

Conclusion: No differences were observed in functional outcomes after one year. However, operative treatment resulted in lower NRS and higher EQ5D at six weeks. The SSV was better for the operative group at both six weeks and one year. Therefore, operative treatment might be beneficial in the short term for selected patients.

Analysis of Eligibility of the S1 Corridor for the Trans-Sacral Screw Placement in Geriatric Patients

M. Polt¹, C. Zindel-Geisseler¹, C. Sommer¹, P. Stillhard¹, D. A. Müller², Y. P. Acklin¹, C. Michelitsch¹ (¹Chirurgie, Kantonsspital Graubünden, Chur; ²Radiologie, Kantonsspital Graubünden, Chur)

Background: Minimal-invasive placement of a trans-sacral screw represents an increasingly popular method of fixation for Fragility Fractures of the Pelvis (FFP), with variable upper sa-

cral anatomy representing the main challenge. Little is known about the variability of sacral anatomy in the geriatric population and the potential effect of osteoporosis on the upper sacral anatomy and thus S1 corridor morphology.

Aims: To examine the eligibility (>12 mm) of the S1 corridor for the trans-sacral screw placement in a geriatric population and to analyse what pelvic dysmorphism signs might serve as predictors for an ineligible S1 corridor.

Methods: We analysed S1 corridor in pelvic CT scans of 107 geriatric patients without history of fracture or other pelvic pathology. First, the eligibility for the trans-sacral screw placement was determined by measuring the width and the height of the central portion of the S1 corridor. Then, pelvises were examined for signs of dysmorphism. The correlation of these signs with the ineligible S1 corridor was analysed.

Results: In our geriatric population with average age of 79.55 ± 8.79 years (male:female 0.88) 44% of S1 corridors were not eligible for a trans-sacral screw. In this ineligible group the height was shown to be a more significant limiting dimension (90.9%), compared to the width in 68.2% ($p < 0.05$). Mamillary processes, not recessed sacrum and dysmorphic sacral foramina were present in 38.3%, 34.6%, and 26.2% respectively, with not recessed sacrum demonstrating a significant correlation with a too narrow S1 corridor ($p < 0.05$).

Conclusion: The analysed geriatric population demonstrates a high prevalence of a too narrow S1 corridor, which makes a placement of a trans-sacral screw risky or even impossible. The height of the S1 corridor represents the main limiting factor with a dysmorphism sign of a not recessed sacrum being a significant predictor for the ineligible S1 corridor.

Accuracy in Navigated Percutaneous Sacroiliac Screw Fixation: A Systematic Review and Meta-Analysis

R. Haveman¹, B. van de Wall², P. Haefeli², F. Beeres², R. Babst³, B. C. Link² (¹Luzerner Kantons-spital, Lucerne; ²Orthopädie und Unfallchirurgie, Luzerner Kantonsspital, Lucerne; ³Fakultät für Gesundheitswissenschaften und Medizin, Universität Luzern, Lucerne)

Background: Percutaneous sacroiliac screw placement is a challenging procedure in patients with pelvic fractures. To overcome these challenges, navigated techniques have emerged as an alternative to conventional 2D fluoroscopy for guiding screw placement. However, it remains to be seen whether navigated techniques truly have a beneficial effect on accuracy, radiation exposure and occurrence of complications.

Aims: We performed a meta-analysis to investigate whether navigated techniques are superior to conventional 2D fluoroscopy in percutaneous sacroiliac screw fixation.

Methods: The electronic databases were searched for both randomized clinical trials and observational studies comparing percutaneous sacroiliac screw fixation with 2D fluoroscopy to new navigated techniques (2D or 3D fluoroscopic navigation with a c-arm, computer assisted ultrasound navigation, O-Arm navigation, mobile CT navigation, robotic navigation). Effects were pooled and presented as odds ratio, mean difference and standardized mean difference with corresponding 95% confidence interval.

Results: In total 18 studies were included. New navigated techniques had a higher accuracy (81% versus 91% with MD 10%, 95% CI 5-14%). The greatest benefit in accuracy was found in studies with more advanced navigated techniques (O-Arm, mobile CT or robotic navigation). Also, fluoroscopy time (MD 72.13 seconds, 95% CI 7.73;92.91) and fluoroscopy frequency (MD 17.22 images in total, 95% CI 7.73;26.70) were lower for new navigated techniques. Radiation dose was higher for new navigated techniques (SMD 0.50, 95% CI 0.01;0.99). Surgery duration showed no significant difference. Similar results were found among in vitro studies. Complications were rare in both groups.

Conclusion: This meta-analysis demonstrated a higher accuracy of screw positioning, lower fluoroscopic frequency and time for navigated percutaneous sacroiliac screw fixation compared to conventional 2D fluoroscopy. Complications are acceptably low for both groups. Future studies should focus on which of the navigated techniques is the best and whether the implementation costs of a new technique outweigh its benefits.

Assessment of Safe Early Fixation Strategies in a Cohort Polytraumatized Patients – How is the Surgical Treatment Influenced by the Injury Pattern?

S. Halva, R. Pfeifer, F. K. L. Klingebiel, Y. Kalbas, T. Berk, V. Neuhaus, H. C. Pape (Traumatologie, UniversitätsSpital Zürich, Zürich)

Background: While the initial assessment and the initial treatment of potentially life-threatening injuries is well-described, the surgical treatment strategy following initial resuscitation remains controversial. Timepoint of surgery and type of surgery still remain topics of discussions. Various different strategies for optimal timing of fracture fixation in polytrauma patients exist.

Aims: This study tests the hypothesis that a concept of clearing patients for early definitive surgery that relies on anatomical and physiologic parameters is influenced by the injury distribution.

Methods: Polytrauma patients treated at a Level 1 trauma center (01.01.2016 - 31.12.2018). Inclusion: primary admission, injury severity score (ISS) ≥ 16 points, requirement of surgical fixation of major extremity or a truncal injury. Exclusion: death <72h after admission, severe traumatic brain injury (TBI). Stratification according surgical fixation concept: Early total care (ETC, all surgeries <24 h), safe definitive surgery (SDS, staged surgeries <72h), and damage control orthopaedics (DCO, definitive care after stabilization). Endpoints: mortality, complication rates. Parameters of interest: Injury severity and distribution (ISS/AIS), pathophysiologic parameters of hemorrhagic shock, coagulopathy, hypothermia, soft tissue trauma.

Results: 527 patients, mean age 54.8 SD19.9 years, mean ISS 26.9 SD9.0 points, mortality 20.5%. Group ETC ($n=21$, 3.9%), Group SDS ($n=284$, 53.9%), Group DCO ($n=222$, 42.1%). Abdominal and spinal injuries associated with ETC (AIS Abdomen; OR 2.1, 95%CI 1.1 to 4.0,

$p=0.026$; AIS Spine OR 2.0, 95%CI 1.2 to 3.4, $p=0.007$). Extremity and pelvic injuries associated with SDS (OR 1.8, 95%CI 1.1 to 2.8, $p=0.012$ and OR 1.3, 95%CI 1.0 to 1.7, $p=0.036$), head injuries associated with DCO (OR 1.5, 95%CI 1.3 to 1.8, $p<0.001$). Head injuries were most relevant for mortality and were associated with patients undergoing DCO (29.7%) (ETC; 23.8%, SDS; 13.0%).

Conclusion: The concept of staged early fixation for major extremity and axial injuries (SDS) was successfully applied in the majority of patients. Predominant head and abdominal injuries were associated with ETC or DCO. The injury distribution influences decision making towards surgical management that is associated with a low complication rate.

Association Between Documented Intraoperative and Postoperative Adverse Events: An Analysis of Over 100,000 Surgical Trauma Cases

A. Mittlmeier¹, C. Canal^{2,3}, S. Dell-Kuster^{4,5}, H. C. Pape¹, V. Neuhaus¹ (¹Division of Trauma Surgery, University Hospital Zurich (USZ), University of Zurich, Zurich; ²Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld; ³Division of Trauma Surgery, University Hospital Zurich (USZ), University of Zurich, Zurich; ⁴Clinic for Anaesthesia, Intermediate Care, Prehospital Emergency Medicine and Pain Therapy, University Hospital Basel (USB), University of Basel, Basel; ⁵Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Zurich)

Background: Intraoperative adverse events (iAEs) are common during surgical procedures. However, structured and comparable documentation often depends on the physician's subjective assessment of each iAE.

Aims: The aim of this study was to validate the hypothesis that iAEs during surgical interventions are clearly associated with further postoperative complications and prolonged hospital stays.

Methods: We performed a retrospective analysis comparing surgical patients with and without any iAEs regarding postoperative outcomes during the hospitalization. We analyzed more than 100,000 patients with surgically treated injuries between January 2012 and December 2022 from over 70 institutions across Switzerland. Outcome parameters were further compared using a 1:1 case-control matching method, while controlling for same age, gender, main diagnosis and procedure.

Results: Regarding outcomes, patients with iAEs had a significantly longer duration of surgery (131 vs. 77 minutes), a prolonged length of hospital stay (10 vs. 8 days), a significantly higher need for an intensive care unit (ICU) stay of more than one day (7% vs. 3%), and a significantly higher rate of postoperative and procedure-associated complications (28% vs. 7%) than those without iAEs. The prolonged duration of surgery, length of stay, and postoperative and procedure-associated complications in the iAE group were also confirmed in the matched-pair analysis to be associated with poorer patient outcomes while controlling for significant characteristics.

Conclusion: In line with the current literature, our data show a clear relevance of iAEs as crucial factors for patient outcomes, manifesting in significantly longer durations of surgery, prolonged lengths of stay, and more postoperative complications, in a broad spectrum of surgical trauma procedures. We propose the mandatory documentation of iAEs through a standardized classification system, such as ClassIntra, and in accordance with the Intraoperative Complications Assessment and Reporting with Universal Standards (ICARUS) guidelines for clinical practice and surgical research.

Clinical Validation of the "Straight-Leg-Evaluation-Trauma-Test" (SILENT) as a Rapid Assessment Tool for Injuries of the Lower Extremity in Trauma Bay Patients

C. Nierlich¹, T. Berk², V. Neuhaus², Z. J. Balogh³, F. K. L. Klingebiel², Y. Kalbas², H. C. Pape², S. Halvachizadeh² (¹Zürich; ²Department of Trauma, University Hospital Zürich, Zürich; ³Department of Traumatology, John Hunter Hospital and University of Newcastle, Newcastle)

Background: Clinical assessment of the major trauma patient follows international validated guidelines without standardized trauma specific assessment of the lower extremities for injuries.

Aims: This study aimed to validate a novel clinical test for lower extremity evaluation during trauma resuscitation phase.

Methods: This diagnostic, prognostic observational cohort study was performed on major trauma patient treated at one Level I trauma center between Mar 2022 and Mar 2023. The Straight-Leg-Evaluation-Trauma (SILENT) test follows three steps during the primary survey: inspection for obvious fractures (e.g. open fracture), active elevation of the leg, gentle elevation of the lower extremity from the heel. SILENT considered positive when obvious fracture were present, painful or pathological mobility was observed. The SILENT test was compared with standardized radiographs (CT scan or X-ray) as the reference test for fractures. Statistical analysis included sensitivity, specificity and receiver-operating characteristic testing.

Results: Inclusion of 403 trauma bay patients, mean age 51.6 (standard deviation SD 21.2) years with 83 fractures of the lower extremity and 27 pelvic/acetabular fractures. Overall sensitivity 75% (95% CI 64 to 84%), overall specificity 99% (95% confidence interval CI 97 to 100%). Highest sensitivity was for detection of tibia fractures (93%, 95%CI 77 to 99%). Sensitivity of SILENT was higher in the unconscious patient (96%, 95%CI 78 to 100%) with a near 100% specificity. Area Under Curve was highest for tibia fractures (0.96, 95%CI 0.92 to 1.0) followed by femur fractures (0.92, 95%CI 0.84 to 0.99).

Conclusion: The SILENT test is a clinical applicable and feasible rule out test for relevant injuries of the lower extremity. A negative SILENT test of the femur or the tibia might reduce the requirement of additional radiological imaging.

Operative Versus Non-Operative Treatment of Concomitant Ulnar Styloid Process Base Fractures in Patients with Distal Radius Fractures Requiring Surgery – A Systematic Review and Meta-Analysis

L. van Rossenberg (University of Luzern, Lucerne, and Hollandsche Rading NL)

Background: Concomitant ulnar styloid process (USP) fractures are present in 40-65% of distal radius fractures. USP base fractures are most common and may cause distal radioulnar joint instability due to rupture of the triangular fibrocartilage complex. Currently there is no consensus whether fixation of concomitant USP base fractures is necessary after fixation of the distal radius.

Aims: The aim of this systematic review and meta-analysis is to compare operative versus non-operative treatment of concomitant ulnar styloid base fractures in patients with surgically treated distal radius fractures regarding wrist function, USP union, grip strength, range of motion, pain scores and complications.

Methods: A comprehensive search of the PubMed/Medline/Embase/CENTRAL databases was conducted, identifying randomised controlled trials and comparative observational studies. Critical appraisal was performed with the NEXT-tool. Effect estimates were extracted and pooled analyses were performed using random effect models to account for heterogeneity across studies. Results were presented as (standardized) mean differences (SMD or MD) or odds ratios (OR) and their corresponding 95% confidence intervals (95% CI).

Results: Two RCT's (161 patients) and three observational studies (175 patients) were included. Non-operatively treated patients had better wrist function at six months (SMD 0.57; 95% CI 0.3 – 0.9; I2 = 0%), fig 1. Operatively treated patients had higher bony union rates (OR 0.08; 95% CI 0.04 – 0.18; I2 = 0%), fig 2, but also suffered more complications (OR 14.3; 95% CI 1.08 – 188.39; I2 = 89%), fig 3. The most common complication was hardware irritation (56.5%). No other significant differences were present.

Conclusion: Operative treatment of the USP results in higher union rates, but also more complications. Conservative treatment results in better function at six months. Based on these results, routinely performing surgery for ulnar styloid base fractures should be avoided, although surgery must remain an option for specific cases such as persistent DRUJ instability.

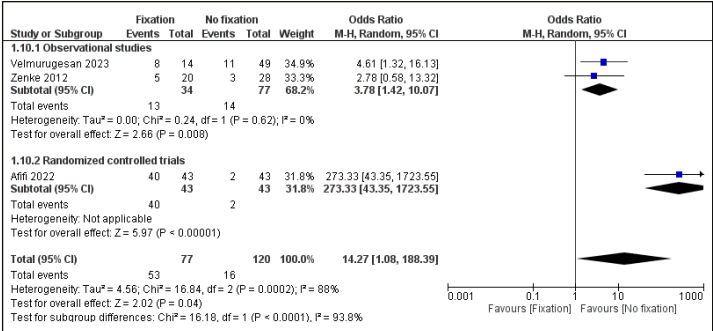


Table 1. Forest plot of complication rates in operatively versus non-operatively managed USP base fractures

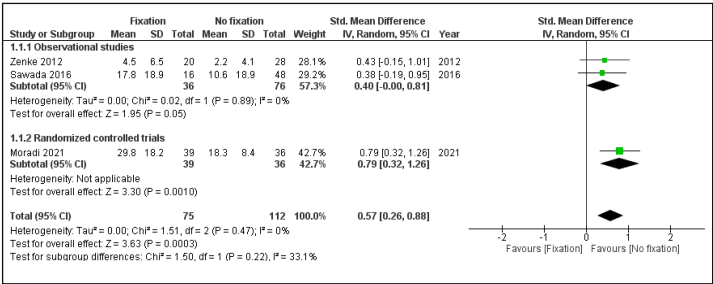


Table 2. Forest plot of functional wrist outcomes six months after injury in operatively versus non-operatively managed USP base fractures

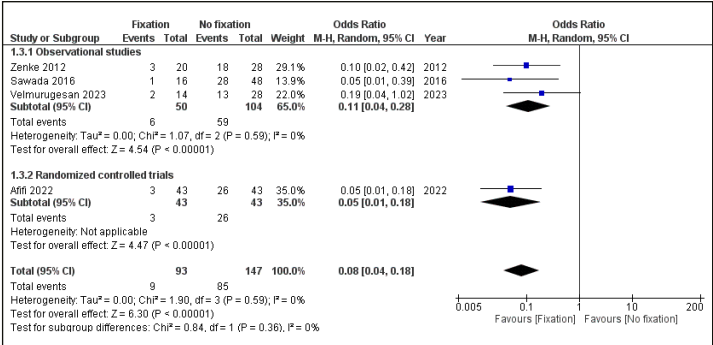


Table 3. Forest plot of occurrence of non-union in operatively versus non-operatively managed USP base fractures

New Generation Superior Single Plating versus Low-Profile Dual Mini-Fragment Plating of Diaphyseal Clavicle Fractures – A Biomechanical Study

T. Pastor¹, T. Pastor^{2,3}, I. Zderic², T. Berk⁴, F. Souleiman⁵, E. Vögelin³, F. Beeres⁶, B. Gueorguiev² (¹Luzerner Kantonsspital, Orthopädie und Traumatologie, Lucerne; ²AO Research Institute, Biomechanics, Davos; ³Inselspital Bern, Handchirurgie, Bern; ⁴Universitätsklinikum Zürich, Traumatologie, Zürich; ⁵Traumatologie, Universitätsklinikum Leipzig, Leipzig; ⁶Luzerner Kantonsspital, Traumatologie, Lucerne)

Background: Recently, a new generation of superior clavicle plates was developed featuring the variable-angle locking technology for enhanced screw positioning and optimized plate-to-bone fit design. On the other hand, mini-fragment plates used in dual plating mode have demonstrated promising clinical results. However, these two bone-implant constructs have not been investigated biomechanically in a human cadaveric model.

Aims: To compare the biomechanical competence of single superior plating using the new generation plate versus dual plating with low-profile mini-fragment plates.

Methods: Sixteen paired human cadaveric clavicles were assigned pairwise to two groups for instrumentation with either a 2.7 mm Variable Angle Locking Compression Plate placed superiorly (Group 1), or with one 2.5 mm anterior plate combined with one 2.0 mm superior matrix mandible plate (Group 2). An unstable clavicle shaft fracture AO/OTA15.2C was simulated by means of a 5 mm osteotomy gap. All specimens were cyclically tested to failure under craniocaudal cantilever bending, superimposed with bidirectional torsion around the shaft axis and monitored via motion tracking.

Results: Initial stiffness was significantly higher in Group 2 (9.28±4.40 N/mm) compared to Group 1 (3.68±1.08 N/mm), p=0.003. The amplitudes of interfragmentary motions in terms of craniocaudal and shear displacement, fracture gap opening and torsion were significantly bigger over the course of 12500 cycles in Group 1 compared to Group 2; p<0.038. Cycles to 2 mm shear displacement were significantly lower in Group 1 (22792±4346) compared to Group 2 (27437±1877), p=0.047.

Conclusion: From a biomechanical perspective, low-profile 2.5/2.0 dual plates demonstrated significantly higher initial stiffness, less interfragmentary movements, and higher resistance to failure compared to 2.7 single superior variable-angle locking plates and can therefore be considered as a useful alternative for diaphyseal clavicle fracture fixation especially in unstable fracture configurations.

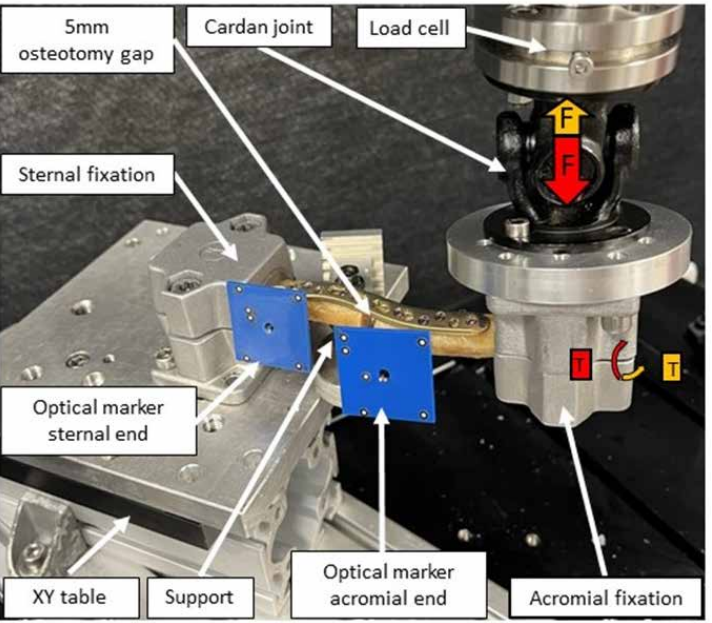


Figure 1. Testsetup including optical motion tracking technology

Urology: Posterior Urthethral Valves

Long-Term Follow-Up after Ureteral Reimplantation in Children: A 12-Year Analysis
T. Gerwinn¹, M. Zellner², A. Prouza¹, U. Kennedy¹, M. Horst¹, L. Mazzone¹ (¹Pediatric Urology, University Children's Hospital, Zurich; ²Radiology, University Children's Hospital Zurich, Zurich)

Background: Ureteral reimplantation (UR) is a well-established procedure, yet there exists a notable absence of evidence-based guidelines for postoperative follow-up. Existing literature suggests that routine follow-up extending beyond one year may not yield significant advantages, particularly for asymptomatic children. However, it is crucial to acknowledge that many studies supporting this assertion rely on relatively short observation periods.

Aims: This study seeks to address the potential emergence of late-presenting complications post UR. Our objective is to comprehensively evaluate our patient cohort for the incidence of conditions warranting the establishment of standardized, long-term follow-up practices after UR.

Methods: Retrospective review of 137 medical records from children who underwent UR at our institution between January 2006 and June 2013. Inclusion criteria required a minimum 10-year postoperative follow-up.

Results: Fifty-three renal units in 34 children met inclusion criteria. Ureterovesical junction (UVJ) obstruction occurred in 7.5% of the units and was diagnosed within eight months after UR. Obstruction occurred exclusively after Politano-Leadbetter reimplantation, and was silent in all cases. Postoperative UTIs occurred in 9 children. Notably, these were all singular events without signs for recurrent reflux. A decade after surgery, one child developed chronic kidney disease (CKD) due to preexisting reflux nephropathy (RN), while one children was newly diagnosed with RN during follow-up despite the timely surgical correction of vesicoureteral reflux (VUR) or hypertension linked to RN were recorded.

Conclusion: Children with uncomplicated postoperative recoveries within the first-year, devoid of evident UVJ obstruction, exhibit a low subsequent risk, suggesting limited benefit from repeated scheduled long-term follow-up. Nevertheless, we recommend that general practitioners conduct regular monitoring, considering individual risk factors, to enhance the detection of late-onset hypertension or proteinuria as potential indicators of RN during adolescence.

Retroperitoneoscopic Renal Surgery in Infants <10kg, Description of First 50 Patients

O. Sanchez¹, J. Birraux², I. Andrieu Vidal², E. Broennimann¹, E. Stathopoulos¹, M. Alam², C. Sommer¹ (¹Service de chirurgie de l'enfant et de l'adolescent, CHUV, University Center of Pediatric Surgery of Western Switzerland, University of Lausanne, Lausanne; ²Service de chirurgie de l'enfant et de l'adolescent, HUG, University Center of Pediatric Surgery of Western Switzerland, University of Geneva, Geneva)

Background: Most paediatric urologists have adopted minimally invasive surgery when approaching the kidney for reconstructive or ablative surgery. Although small weight has previously been described as a limiting factor for retroperitoneoscopic surgery, as of 2017, we have approached all non-oncological initial renal surgery by retroperitoneoscopy regardless of patient weight, with a standardised technique for port placement and initial dissection.

Aims: The aim is to present our current experience and short-term results with a minimally invasive approach to renal surgery in small patients.

Methods: We present a description of the cohort and performed operations with conversion and intra-operative complication rate.

Results: The median age of our patients is 4,7 months (26days-12months), mean weight is 5,8kg (3,5 Kg-9,6 Kg) F:M 16:34, we performed 12 nephrectomies, 5 hemi-nephrectomies, 3 uretero-ureterostomies, 30 pyeloplasties, with 3 patients presenting with crossing vessels. No patient needed transfusion; 1 patient presented with nephrostomy catheter migration needing a second anaesthesia on day 1. We had to perform 1 conversion to open surgery because of unclear anatomy following percutaneous drainage. No patients showed significant loss of function on the remaining pole after hemi-nephrectomy.

Conclusion: The retroperitoneoscopic approach and its advantages in terms of minimal post-operative pain, quick recovery and reliable results can safely be offered to all our paediatric patients for routine and complex non-oncological renal surgery.

Access for Retroperitoneoscopy in Small Infants

O. Sanchez¹, H. Chandran², J. Birraux³ (¹Service de chirurgie de l'enfant et de l'adolescent, CHUV, University Center of Pediatric Surgery of Western Switzerland, University of Lausanne, Lausanne; ²Paediatric Surgery and Urology, Birmingham Children's Hospital, Birmingham; ³Service de chirurgie de l'enfant et de l'adolescent, HUG, University Center of Pediatric Surgery of Western Switzerland, University of Geneva, Geneva)

Background: Small weight has previously described as a limiting factor for retroperitoneoscopic renal surgery. We present a short description of our current technique for this approach in patients under 10 Kgs.

Aims: To provide clear description of how retroperitoneoscopy can be offered to patients regardless of weight.

Methods: We describe main considerations in patient position and port placement and our current standardised practice using a combination of 3 and 5 mm instruments.

Results: This is short technical description video.

Conclusion: In our experience routine ablative and reconstructive surgery can be offered to all patients regardless of weight. We present our current practice.

Free Communication I – SGG

Endovascular Treatment of Complex Aortic Aneurysms Using Inner Branch Device (IBEVAR): A Single Center Experience

A. Déglise, J. Longchamp, P. Ricciardi, E. Côté, R. Trunfio, C. Deslarzes-Dubuis (Vascular Surgery, CHUV, Lausanne)

Background: Due to advances in devices and techniques, the endovascular approach using fenestrated or branched endografts has emerged as a valid and safe alternative for patients with complex aortic aneurysms, especially if considered at high risk for surgery. The use of inner branch devices (IBEVAR) combining benefits of fenestrations and outer branches could offer an

ideal configuration in this context.

Aims: The aim of our study was to report our monocentric experience with IBEVAR in the treatment of complex aortic aneurysms.

Methods: A retrospective analysis of prospective data retrieved from 1 center between January 2020 and January 2024 was done. Endpoints were immediate technical success, postoperative morbidity, rate of re-intervention and mortality.

Results: During this period, 72 patients with a mean age of 68.5 years (range 41-88) were identified. The maximum preoperative mean aortic diameter was 56 mm (44-71 mm). The majority of patients was asymptomatic. For diffuse thoraco-abdominal aortic aneurysms, a 2-steps procedure was used. There were 34 off-the-shelf E-nside (47%) and the remaining 38 patients were treated with a custom-made Extra-Design graft (53%). Despite successful endograft deployment in all patients and branch catheterization in 69/72 cases (96%), the technical success was 94% due to an additional open conversion for ilio-mesenteric bypass. The 30-days mortality was 5.5%.

During the post-operative period, 19% of patients presented complications with 1 case of mesenteric ischaemia requiring a visceral resection and 2 cases of paralytic ileus, treated conservatively. 5 cases (6.9) of spinal cord ischemia were observed. During the median follow-up, 22 patients (31%) had a re-intervention, for endoleaks, bridging-stent events or limbs problems. The overall target vessel patency was 94%.

Conclusion: The use of IBEVAR appears to be safe and effective for the treatment of complex aortic aneurysms with an acceptable rate of complications. Strict follow-up is mandatory and about one-third of patients required a re-intervention. Further patients and longer follow-up are needed.

Endovascular Arch Repair of Anastomotic Aneurysm and Pseudoaneurysm in Patients after Open Repair of the Ascending Aorta and Aortic Arch: A Case Series

D. Becker^{1,2}, J. Stana¹, C. F. Prendes¹, N. Konstantinou¹, T. Öz¹, M. Pichlmaier³, S. Peters³, N. Tsiliparis¹ (¹Vascular Surgery, Ludwig-Maximilian-University Munich, Munich; ²Vascular Surgery, University Hospital Bern, Inselspital, Bern; ³Cardiac Surgery, Ludwig-Maximilian-University Munich, Munich)

Background: Endovascular techniques have provided new options in the treatment of arch pathologies. Multiple studies have reported good results after endovascular treatment of aortic arch aneurysms and it has developed to be a considerable approach, especially in patients who are unfit for open surgery. In treatment of progressing distal pathologies after open ascending aorta and/or aortic arch replacement, the endovascular arch repair has shown promising results.

Aims: Aim of study was to investigate the outcomes of endovascular arch repair (b-TEVAR) with a custom-made double or triple branched arch endograft in patients with distal anastomotic aneurysms after open repair of the ascending aorta or proximal arch replacement (Figure 1).

Methods: Retrospective analysis was conducted of all consecutive patients with anastomotic aneurysms after open surgical repair involving the ascending aorta and/or aortic arch treated with b-TEVAR. All patients were treated with a custom-made double or triple inner-branched arch endograft. Study endpoints were technical success, 30-day and follow up mortality/ morbidity and re-interventions.

Results: Between 2018 and 2022, ten patients were treated with custom-made double or triple branched TEVAR due to anastomotic aneurysms after open ascending aorta and/or proximal aortic arch replacement. Eight patients received a triple and two a double arch branched endograft. Eight cases were performed electively and two urgently for contained rupture. Technical success was achieved in nine cases (90%). All elective patients survived. Two patients treated due to contained ruptures expired. Within 30 postoperative days, one transient ischemic attack occurred. No early endograft-related re-interventions were necessary. Median follow-up was 20 months. One patient died two months after discharge due to sepsis caused by pneumonia. No further deaths or endograft-related re-interventions were observed.

Conclusion: Endovascular aortic arch repair with double or triple inner-branched arch endograft for anastomotic aneurysms after open ascending and/or proximal arch replacement is technically feasible and a promising alternative in a patient cohort unfit for surgery.

Analysis of Endovascular Repair of Ruptured Iliac Aneurysms

A. Sommerau, S. Hofer (Gefässchirurgie, Kantonsspital Graubünden, Chur)

Background: Ruptured iliac aneurysms (rIA) are rare. The endovascular sealing is technically more demanding than in ruptured aortic aneurysms. Preserving the hypogastric artery (HA) should also be the goal in these anatomies.

Aims: The objective of this study was to analyze the endovascular procedures and outcomes of rIA in a single center.

Methods: From January 2016 until December 2023 122 patients underwent iliac aneurysm repair. All patients were treated endovascularly. Out of these, we identified all rIA. Treatment and anesthesia modalities, anatomies, hemodynamic stability, technical success rate, 30-day mortality and long-term outcome were analyzed.

Results: Seven patients (6%) with rIA were identified. Three ruptured HA aneurysms (42%) could be treated by iliac branched stentgraft, four common iliac aneurysms were sealed by a tube stentgraft. In two of them an additional coiling of the HA was performed, two patients presented with already occluded HA.

Four patients could be treated in local anesthesia, one in general anesthesia, two had to be converted to general anesthesia for a laparotomy to relieve an abdominal compartment syndrome.

Three patients showed systolic blood pressure <60 millimeter mercury during surgery, two of

them needed an occlusion of the HA. The technical success rate was 100%. One patient died 18 days after rupture, therefore 30-day mortality was 14%. The mean follow up was 3.2 years (range 0-92 months) with a mean iliac diameter shrinkage of 13mm (0-32mm). One type III endoleak occurred and was sealed with a new bridging stentgraft (reintervention rate 14%).

Conclusion: Ruptured iliac aneurysms can safely be treated endovascularly. There seem to be some factors that determine the possibility of HA preservation as anatomies, aneurysm localization and hemodynamic stability. The good long-term outcome after endovascular sealed rIA is promising.

Midterm Outcomes of iCover as Bridging Stent Graft in Fenestrated and Branched Endovascular Aortic and Iliac Repair

A. L. Menges¹, B. Reutersberg², A. Zimmermann² (¹University Hospital Zurich, Zurich; ²Vascular Surgery, University Hospital Zurich, Zurich)

Background: Complex endovascular aortic repair is widely used in treating thoracoabdominal, pararenal, juxtarenal aortic or iliac artery aneurysms. In these procedures, the aortic branches must be connected with bridging stent grafts (BS). A few BS are available, but none are approved as BS and generally in off-label use.

Aims: The aim was to evaluate the efficacy of iCover stent grafts (iCover-SG) used as bridging stents (BS) in complex endovascular aortic or iliac repair procedures (EVAR/ EVIR).

Methods: A total of 32 patients underwent fenestrated or branched EVAR/ EVIR using iCover-SG between 08/2021-01/2023. The primary endpoint was to evaluate the iCover-SG-related target vessel instability, including intraoperative complications, stent graft patency, endoleaks (EL), and additional interventions. Secondary endpoints were clinical outcomes, major adverse events and secondary reinterventions. Data obtained from routine clinical and radiological follow-up controls were included up to July 2023.

Results: 101 iCover-SG were implanted in 76 target vessels with a primary and secondary technical success rate of 97% and 99%. The primary and secondary patency rate was 99%. Throughout the median follow-up period of 8 (2,13) months, 3 type 1c EL and 3 type 3c EL were detected. 5 of them required reinterventions. No other BS-related reinterventions were performed. This results in an iCover-SG-related freedom of target vessel instability of 93%. Secondary endpoints included 9 major adverse events in 7 patients (acute renal failures n=4, spinal cord ischemia n=3, mesenteric ischemia n=1, and multi-organ failures n=2), leading to a 6% in-hospital mortality rate. The overall mortality was 13% (n=4), which was not BS- or aneurysm-related.

Conclusion: These findings suggest that iCover-SG is an effective and reliable BS for complex EVAR/ EVIR. The iCover-SG showed favourable technical success rates and low complication rates. However, further long-term studies are required to evaluate the durability and long-term outcomes of iCover-SG.

Bridging Stent-Graft Implantation in the Renal Artery during Complex Endovascular Aortic Procedures Does not Alter the Renal Sonographic Resistance Index

D. Reithner, T. H. W. Stadlbauer, A. Zimmermann (Vascular Surgery, University Hospital Zurich, Zurich)

Background: Ultrasound examination of the resistance index (RI) of both kidneys can provide evidence of renal artery stenosis. The extent to which the RI is changed after bridging stent-graft implantation due to altered flow characteristics is not known.

Aims: The aim of the study was to investigate the influence of renal bridging stent-grafts on the RI of the kidneys after fenestrated endovascular aortic repair (FEVAR).

Methods: Ultrasound examinations of the kidneys were conducted using a GE LOGIQ S7 XD-clear ultrasound system (GE Medical Systems AG, Glattpburg, Switzerland). The evaluation was performed according to SGUM 2D standard criteria. The RI was determined in all consecutive patients on the day before and after renal bridging stent-graft implantation. For this purpose, the kidneys were divided into 3 areas according to the standard protocol and 2 RI values were recorded per area by evaluating intrarenal arterial Doppler signals. Mean values were calculated and compared for each kidney.

Results: For 64 kidneys in 32 consecutive patients (73.9±7.8 years, 4 female, 28 male) treated with FEVAR and renal bridging stent-graft implantation pre- and postinterventional examinations were carried out. Sonomorphologically, the kidneys examined were inconspicuous (pre: size at least 107.1x52.4 mm, parenchymal margin 18.3 mm versus post: size at least 107.9x52.9 mm, parenchymal margin 18.6 mm, p>0.4). The arborization of the renal perfusion was preserved pre and post implantation. The RI did not differ before and after implantation (0.66±0.06 versus 0.67±0.07; p=0.10). None of the patients experienced severe impairment of renal function.

Conclusion: After successful implantation of a bridging stent-graft in a non-stenosed renal artery, there is no relevant change in the RI of the kidney. The RI seems therefore to be suitable for assessing renal perfusion after complex endovascular aortic therapy.

Hostile Iliac Access in Endovascular Aortic Repair: A Predictive Scoring System for Operative Challenges and Outcomes

S. Ruddakies, S. Hofer (Gefässchirurgie, Kantonsspital Graubünden, Chur)

Background: In the realm of endovascular aortic repair (EVAR), various anatomical severity grading scores have been used to link the characteristics of aneurysms to intra- and postoperative outcomes. These scores typically rely on measurements of the proximal neck, aneurysm sac, and the iliac arteries.

Aims: This study introduces a novel iliac access score (IAS), designed as a straightforward tool to anticipate prolonged operation times and the requirement for supplementary resources when dealing with challenging iliac anatomy.

Methods: A retrospective review was conducted on patients undergoing EVAR between 2016 and 2022. Morphology, operation times, and iliac access maneuvers were analyzed. The IAS was calculated (0 - 12) and correlated with operation times through regression analysis. Further subgroup analyses were performed. Patients with a follow-up of >2 years underwent assessment for iliac-related reinterventions.

Results: 119 patients were included, revealing a mean IAS of 4.3 and mean operation time of 97.9 minutes. A positive correlation was observed between operation time and IAS. 10.9% of cases required further maneuvers for challenging iliac access, with a mean operation time of 153.5 minutes and IAS of 7.1, compared to 91.1 minutes and IAS of 4.0 for the remaining patients (p < 0.001). Subgroup analysis (Score ≤4 vs. >4) revealed significant differences in mean operation times (82.8 vs. 119.6 minutes, p < 0.001).

63 Patients with a follow-up of >2 years were evaluated for iliac-related reinterventions, 11.1% underwent reintervention due to a type 1b endoleak, with no significant difference in IAS between those with and without reinterventions.

Conclusion: The proposed IAS effectively predicts operation time and need for additional access maneuvers, offering valuable insights for surgical planning. However, we did not establish a clear correlation between the IAS and long-term postoperative outcomes.

Morphology	Absent: 0	Mild: 1	Moderate: 2	Severe: 3
Iliac artery angle	160 - 180°	121 - 159°	90 - 120°	<90°
Iliac calcification	None	<25%	25 - 50%	>50%
Diameter and/or occlusive disease	>10mm, no occlusive disease	8 - 10mm, no stenosis <7 mm in diameter or >30mm in length	7 - 8mm, focal stenosis <7 mm in diameter and <30mm in length	<7mm, stenosis <7mm in diameter and >30mm in length or more than one focal stenosis <7mm
CIA length	>30mm	21 - 30mm	10-20mm	<10mm

Table 1. Scoring System

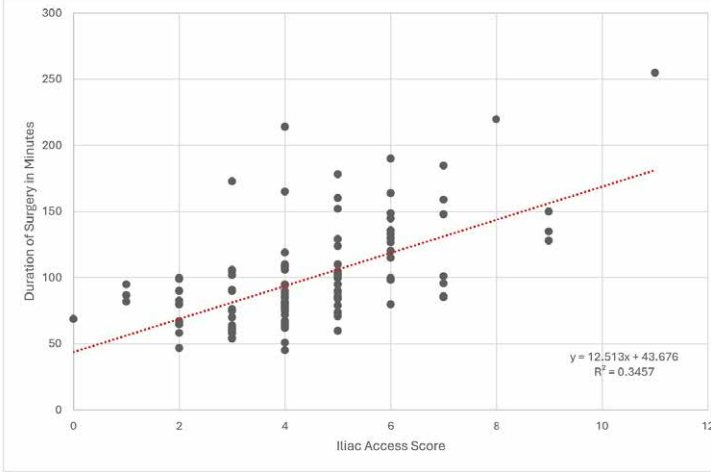


Figure 1. IAS to Duration of Surgery Correlation

Perioperative and Mid-Term Outcomes of Bovine Xenografts in Infected Aortic/Iliac Surgery

J. A. Celi de la Torre, M. Hakimi (Vascular Surgery, LUKS - Lucerne Cantonal Hospital, Lucerne)

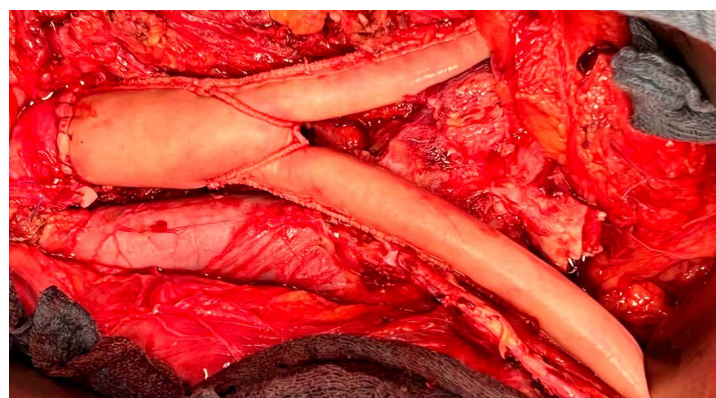
Background: Various methods of open-surgical treatment of infected aortic and iliac pathologies are available. The use of surgeon-made bovine pericardium grafts in infected aortic/iliac context has been associated with a low re-infection rate as well as high feasibility. Prefabricated (factory pre-sewn) bovine pericardium prostheses have been available for a few years. Studies reporting clinical results are rare.

Aims: Present the perioperative and mid-term outcomes of a bifurcated and straight bovine pericardium prostheses (BioModiVasc®) in infected aortic and iliac pathologies.

Methods: Retrospective database analysis of all vascular surgery operations between 2021 and 2023 at our centre.

Results: 28 BioModiVasc® grafts were implanted in 27 patients due to INAA (40,7%), VGEI (51,9%), trauma (3,7%) or Leriche-Syndrome (3,7%). Patients were predominantly male (85,2%) and often presented arterial hypertension (88,9%). Significant risk factors were infection in a remote site (29,6%), emergency/urgent operations in the past 12 months (22,2%) and previous vascular procedures (44,4%). Elevated CRP (88,9%) and soreness at site (81,5%) were the most common findings at presentation. CT-scan showed infection-typical findings in 96,3%. Pathogen was isolated in 77,8% of the cases. Median operation time was 300 minutes. 88,9% of the operations were emergency/urgent ones. 96,3% of the reconstructions were orthotopic, access was mostly transperitoneal (59,3%). Median hospital/ICU days were 19 and 2 respectively. Infection a/o operation-associated 30-day mortality was 11,1%. 3-deaths occurred at follow-up (median 12 months), non infection a/o operation related. 1 patient required a re-do due to a duodenal erosion caused by the prosthetic anastomosis.

Conclusion: Open surgical treatment of aortic/iliac septic pathologies with the BioModiVasc® prosthesis yields good results, which are similar to the reported results of the use of surgeon-made bovine pericardial reconstructions.



Bifurcated BioModiVasc® xenograft

Infective Native Aortic Aneurysms: A Delphi Consensus Document on Terminology, Definition, Classification, Diagnosis, and Reporting Standards

T. Wyss, K. Söreläus (Cantonal Hospital, Winterthur)

Background: There is no consensus regarding the terminology, definition, classification, diagnostic criteria, and algorithm, or reporting standards for the disease of infective native aortic aneurysm (INAA), previously known as mycotic aneurysm.

Aims: The aim of this study was to establish this by performing a consensus study.

Methods: The Delphi methodology was used. Thirty-seven international experts were invited via mail to participate. Four two week Delphi rounds were performed, using an online questionnaire, initially with 22 statements and nine reporting items. The panellists rated the statements on a five point Likert scale. Comments on statements were analysed, statements revised, and results presented in iterative rounds. Consensus was defined as $\geq 75\%$ of the panel selecting "strongly agree" or "agree" on the Likert scale, and consensus on the final assessment was defined as Cronbach's alpha coefficient $> .80$.

Results: All 38 panellists completed all four rounds, resulting in 100% participation and agreement that this study was necessary, and the term INAA was agreed to be optimal. Three more statements were added based on the results and comments of the panel, resulting in a final 25 statements and nine reporting items. All 25 statements reached an agreement of $\geq 87\%$, and all nine reporting items reached an agreement of 100%. The Cronbach's alpha increased for each consecutive round (round 1 = .84, round 2 = .87, round 3 = .90, and round 4 = .92). Thus, consensus was reached for all statements and reporting items.

Conclusion: This Delphi study established the first consensus document on INAA regarding terminology, definition, classification, diagnostic criteria, and algorithm, as well as reporting standards. The results of this study create essential conditions for scientific research on this disease. The presented consensus will need future amendments in accordance with newly acquired knowledge.

Infective Native Aortic Aneurysm: A Delphi Consensus Document on Treatment, Follow Up, and Definition of Cure

M. Giardini, T. R. Wyss, K. Söreläus (Cantonal Hospital, Winterthur)

Background: Evidence is lacking to guide the management of infective native aortic aneurysm (INAA).

Aims: The aim of this study was to establish expert consensus on surgical and antimicrobial treatment and follow up, and to define when an INAA is considered cured.

Methods: Delphi methodology was used. The principal investigators invited 47 international experts (specialists in infectious diseases, radiology, nuclear medicine, and vascular and cardiothoracic surgery) via email. Four Delphi rounds were performed, 3 weeks each, using an online questionnaire with initially 28 statements. The panelists rated the statements on a 5 point Likert scale. Comments on statements were analysed, statements were revised and added or deleted, and the results were presented in the iterative rounds. Consensus was defined as $\geq 75\%$ of the panel rating a statement as strongly agree or agree on the Likert scale, and consensus on the final assessment was defined as Cronbach's $\alpha > 0.80$.

Results: All 49 panelists fulfilled all four rounds, resulting in 100% participation. One statement was added based on the results and comments of the panel, resulting in 29 final statements: $n = 3$ on need for consensus, $n = 20$ on treatment, $n = 5$ on follow up, and $n = 1$ on definition of cure. All 29 statements reached agreement of $\geq 86\%$. Cronbach's α increased for each consecutive round; round 1, 0.85; round 2, 0.90; round 3, 0.91; and round 4, 0.94. Thus, consensus was reached for all statements.

Conclusion: INAA is rare, and high level evidence is lacking to guide optimal management. This consensus document was established with the aim of helping clinicians manage these challenging patients, as a supplement to current guidelines. The presented consensus will need future amendments in accordance with newly acquired knowledge.

Prix NaChwuchs

2-Stage Hypospadias Repair: An Analysis of Complications and Long-Term Outcome

S. Stalder, M. Horst Lüthy, A. Hölscher (Urology, University Children's Hospital Zurich, Zurich)

Background: The surgical correction of severe hypospadias is necessary to enable penile functionality. However, the reported incidence of complications in the literature varies greatly. A standardized follow-up routine was established at our institution in 2016, so that all patients are seen until adolescence. Accurate data is needed to facilitate true informed consent and allows for a critical review of the current surgical practice.

Aims: This study aims to analyze the incidence of surgical complications and their timing, providing realistic data for transparent parental counseling.

Methods: A retrospective analysis of patients that underwent 2-stage hypospadias repair at our institution was performed. The records were screened for outcome measures to determine the incidence and time of occurrence of complications.

Results: 50 patients were included that were operated between 2006 and 2021 for primary repair of severe hypospadias (45) or as a secondary intervention after a complicating primary repair (5). 27 patients (54%) had a complication rated as Clavien-Dindo IIIb. The complication rate was higher from 2006 - 2016 (78%) compared to 2017 - 2021 (33%). The mean follow-up time was 5.5 years. Complications occurred at a mean of 11.6 months after the second-stage operation and were detected in the first postoperative year in 44 patients (78%). Complications mainly included fistulas (43%) and strictures (20%). The mean time between the detection of the complication and the interventional correction was 7.9 months.

Conclusion: In line with the literature, complications following 2-stage hypospadias correction are numerous. However, our data show that there is a significant learning curve. Even though most complications occur in the first postoperative year, long-term monitoring is necessary to detect all complications as some may manifest only years after the repair. Honest communication about complication rates, adequate surgical experience, and long-term follow-up are absolutely necessary when managing patients with severe hypospadias.

Enough Is Enough – How Many Rectal Suction Biopsies Do You Need to Diagnose Hirschsprung's Disease?

S. Metzger¹, H. R. Neeser¹, I. Robbiani¹, A. K. Rodewald², T. Nigbur, A. Di Natale¹, U. Moehrlen¹, S. J. Tharakan¹ (¹Pediatric Surgery, University Children's Hospital Zurich, Zurich; ²Institute for Pathology and Molecular Pathology, University Hospital Zurich, Zurich)

Background: Rectal suction biopsy (RSB) is the gold-standard for diagnosing Hirschsprung's disease (HD) in infants. However, despite this being a common procedure no standard exists on how many biopsy specimens and at which level they should be taken.

Aims: The aim of this study is to determine the conclusiveness of RSB specimens in relation to their location within the rectum in diagnosing HD. With this, we would like to define how many specimens are necessary to diagnose HD and eventually propose a standardized protocol to conduct RSB.

Methods: We reviewed the epidemiological data and pathology results of 92 patients undergoing RSB between January 2011 and May 2022 at our institution. We perform RSB by taking 4 specimens at 1 cm, 3 cm and 5 cm above the dentate line, as well as one specimen at the dentate line.

Results: We included 92 patients who had 115 biopsies performed with a mean of 3.77 specimens per session. Of the specimens taken at 1 cm above the dentate line 73.9% were conclusive, at 3 cm 75.9% and at 5 cm 79.2%. Specimens taken at the dentate line were squamous or transitional epithelia in 31.5% and therefore of no use for HD diagnostics. If the specimen at 3 cm was conclusive, the whole session was more likely to be diagnostic.

Conclusion: We propose that taking a total of three specimens, namely one at 1 cm, one at 3 cm and further biopsy at 3 or 5 cm above the dentate line, is enough to diagnose or exclude HD.

A Prospective Randomized Clinical Trial to Evaluate Wound Healing, Cosmetic and Functional Result and Postoperative Adverse Events Comparing two Types of Dressing Technique after Hypospadias Repair

K. Lawo, D. Feller, B. S. Klein, S. G. Holland-Cunz, M. Frech-Dörfler (Pediatric Surgery, University Children's Hospital of Basel, Basel)

Background: Dressing technique after hypospadias repair is one of the most controversially discussed subjects in aftercare as it is a burden in care for the parents, reason for frequent outpatient consultations and financial load with potentially no positive effect. Although current literature presents an enormous number of publications regarding postoperative dressing techniques, there is still no consent on how and if to perform postoperative dressing.

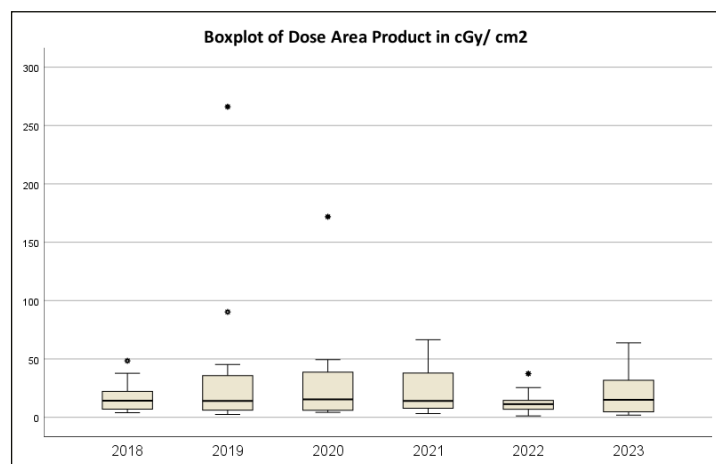
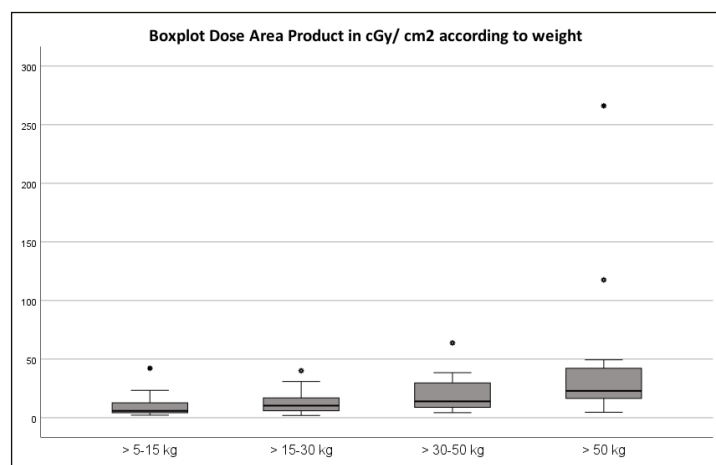
Aims: The aim of this study is to evaluate two techniques (Tegaderm circular dressing vs. Polymem Silver and Tegaderm dressing) frequently used in clinical routine after hypospadias surgery in regard of wound healing, cosmetic and functional result and postoperative adverse events.

Methods: Primary outcomes of this prospective randomized clinical trial were wound healing using Southampton Wound Assessment Scale (SWAS) and cosmetic and functional result using Hypospadias Objective Penile Evaluation (HOPE) Score. Secondary outcomes were postoperative adverse events after hypospadias repair after 1 and 4 weeks as well as 6 months after surgery. Data collection was performed between May 2021 and February 2023.

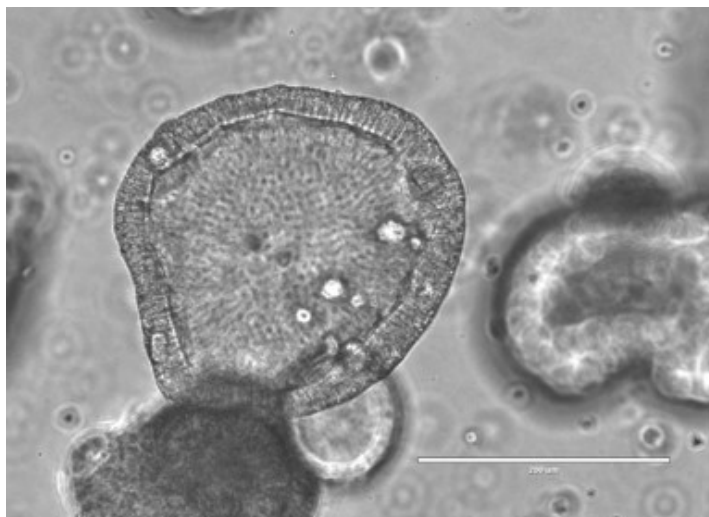
Conclusion: In line with current literature our study could not show superiority of one dressing regarding wound healing or functional and cosmetic result and thereby strengthens the assumption that the individual dressing technique does not play a crucial role in the postoperative outcome. The biggest limitation of this study is its small study population, limiting its power and further investigation in larger prospective randomized trials is needed.

T. Krause¹, M. Milosevic², S. Berger², E. Stöckli³ (¹Inselspital Bern, Bern; ²Pediatric Surgery, Inselspital Bern, Bern; ³Pediatric Radiology, Inselspital Bern, Bern)

Conclusion: So far, there are only few data published regarding radiation exposure in pediatric port implantation. Our analysis provides a benchmark in those patients, useful for quality control and development of protocols aiming at reduction of radiation exposure in children.



Conclusion: Our results highlight potential molecular and functional signatures associated with impaired organoid development in the aganglionic colon segments. Intestinal organoids generated from Hirschsprung's diseased colon provide excellent patient-derived models for this disease and can be used to better recapitulate and individualize therapeutic approaches for this challenging congenital disease.

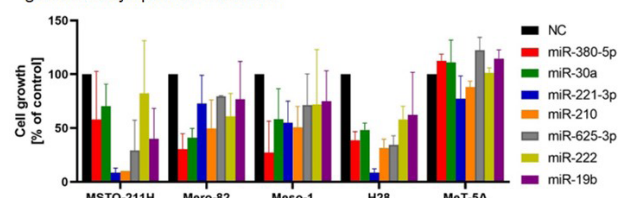


Methods: PM cell lines MSTO-211H (biphasic), H28, Meso-1, Mero-82 (epithelioid) and non-malignant Met-5A were reverse transfected with synthetic microRNA mimics for 15 candidates. Following transfection, cell growth, colony forming ability, and migratory potential were assessed using standard assays. Furthermore, transfected cells were exposed to increasing concentrations of cisplatin to evaluate sensitivity to these drugs.

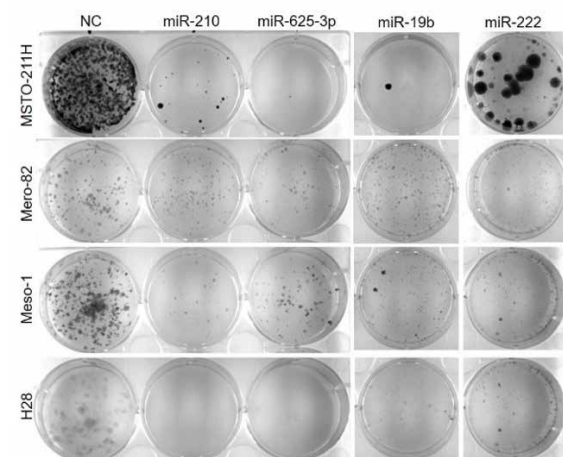
Results: Overexpression of seven candidate microRNAs resulted in growth inhibition in all investigated PM cell lines five days post transfection. The strongest effects were observed for miR-380-5p, miR-221-3p, miR-210, miR-625-3p, and miR-19b, which reduced cell growth to 30-60%. Growth of non-malignant MeT-5A cells remained largely unaffected (Fig. A). Overexpression of those microRNAs also resulted in a strong reduction of colony forming ability (Fig. B), while an effect on wound healing capacity (migration) could not be observed. Finally, we found that especially overexpression of miR-221-3p, miR-625-3p and miR-19b was able sensitise cells towards cisplatin, with the strongest effect observed in MSTO-211H for miR-221-3p (IC50 from 17.6µM to 2.7µM) and miR-19b (IC50 from 17.6µM to 0.7µM), and in Mero-82 for miR-625-3p (IC50 from 3.75µM to 0.8µM) (Fig. C).

Conclusion: We show that overexpression of several microRNAs has the potential to alter PM cell growth and colony forming ability. Furthermore, microRNA overexpression can sensitise cells towards cisplatin, although the degree of sensitisation varies between different cell lines. Current analyses focus on the response towards the cisplatin/pemetrexed doublet and on the effect on cell cycle and expression of associated genes.

A. Effect of overexpression of microRNAs with 5nM mimic on PM cell growth 5 days post transfection.



B. Colony formation following microRNA overexpression at 5-7 days post transfection with 5nM microRNA. Cells were fixed with ethanol and stained with cristal violet.



C. Response of PM cells towards cisplatin following microRNA overexpression.

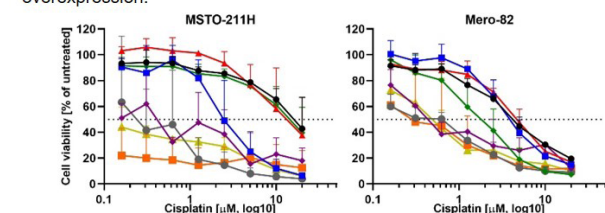


Figure 1. SGC 2024 microRNAs chemoresistance

Potential Advantage of Magnetic Resonance Imaging in Detecting Thoracic Wall Infiltration in Pleural Mesothelioma. A Retrospective Single Center Analysis

I. Barreto¹, S. Franckenberg², T. Frauenfelder², I. Opitz³, O. Lauk³ (¹Visceral- und Thoraxchirurgie, Kantonsspital Winterthur, Winterthur; ²Institute of Diagnostic and Interventional Radiology, University Hospital Zurich, Zurich; ³Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Thoracic wall infiltration in pleural mesothelioma (PM) can be an important prognostic factor when determining the extent of resection. Currently, standardized imaging for restaging after neoadjuvant systemic therapy comprises contrast enhanced Computed Tomography (CT) or Positron Emission Tomography (PET/CT) scan.

Aims: However, thoracic Magnetic Resonance Imaging (MRI) could be a better discriminator of chest wall infiltration prior to surgery. To increase the preoperative staging accuracy, we introduced a MRI protocol at our center.

Methods: A retrospective analysis of this prospective new imaging protocol was performed from 07/2018 to 08/2023, including descriptive analysis for patient's sex, age, nicotine consumption, asbestos exposure, histological subtype, TNM-stage, RECIST criteria and number of neoadjuvant therapy cycles. Preoperative restaging included routine imaging and MRI. After histological diagnosis of PM, neoadjuvant therapy was conducted, followed by partial pleurec-

tomy or extended pleurectomy/decortication, with intraoperative biopsies of suspicious chest wall lesions. The CT/MRI results were compared to the intraoperative biopsies. Sensitivity and specificity of both modalities were analyzed.

Results: Twenty-five patients (mean age 65.4, 12% female) with possible chest wall infiltration were included out of the 35 patients with PM treated during the observation period. Of the 10 patients with actual chest wall infiltration, 9 (90%) had a T-Stage of 3 or higher, 9 (90%) had PM of epithelioid histologic subtype and 4 (40%) a R2-Resection. The mean overall survival of all patients was 18.88 months (8-58).

In our study, thoracic MRI showed a high sensitivity (90%) and specificity (100%) for the detection of chest wall infiltration, especially when compared to the CT scan (sensitivity of 10%).

Conclusion: With the adjunctive use of thoracic MRI we demonstrated a higher sensitivity for detection of chest wall infiltration compared to conventional imaging prior to surgery. This may facilitate the preoperative assessment of the extent of resection. Nevertheless, larger studies are required to confirm these results.

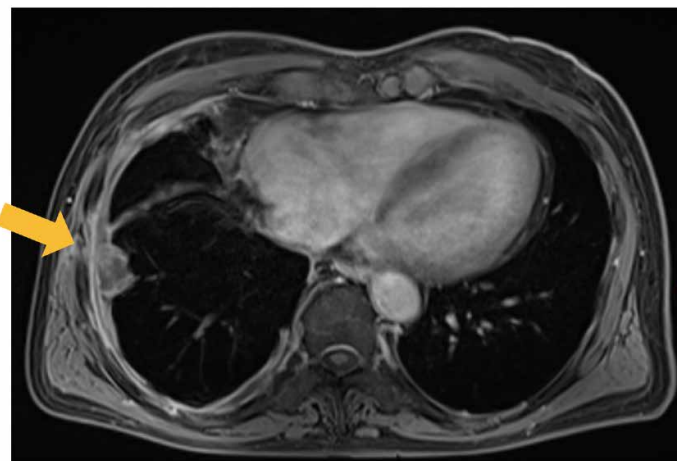


Figure 1. Thoracic MRI showing PM chest wall infiltration on the right seventh intercostal space laterally



Figure 2. Thoracic Restaging CT of the same Patient without evidence of PM chest wall infiltration

Air-Leak-Management Supported by Ventilation-SPECT/CT: a new Perspective on a Long-Known Problem

H. Gelpke¹, L. Guglielmetti¹, H. Nagel², B. Klaeser², A. Zehnder¹ (¹Viszeral- und Thoraxchirurgie, Kantonsspital Winterthur, Winterthur; ²Radiologie und Nuklearmedizin, Kantonsspital Winterthur, Winterthur)

Background: Prolonged air leakage (PAL) is a common problem after lung surgery. Localization of air leaks (AL) remains challenging in some cases especially in minimally invasive surgery. Ventilation-SPECT/Computed Tomography (vSPECT/CT) has been reported as potential aid to identify and localize AL.

Aims: To evaluate vSPECT/CT as potential aid for the localization of AL and explore its use as support for PAL management.

Methods: Retrospective analysis of a case series of seven patients with PAL after minimally invasive thoracic surgery at our institution in 2023 for which vSPECT/CT was applied.

Results: Six patients underwent oncologic lung resections, one patient underwent thymectomy for a thymoma. In 5/7 cases an AL was spotted with vSPECT/CT (maximal AL ranged from 40-2000 ml/min). In the remaining two cases (with a maximal AL of 1900ml/min for 1 day, and 10 ml/min after more than 4 weeks and continuous clinical signs of PAL), the AL could neither be localized during revision surgery.

Nevertheless, the AL ceased in all patients after revision surgery. In two cases the detected AL supported the continuance of conservative treatment as it confirmed a leak within the prior resection site (maximal AL 40ml/min and 200ml/min). These results are depicted in the at-

tached visual abstract.

Conclusion: The use of vSPECT/CT for localizing ALs proved to be precise in all instances where an imaging spot was observed (5/5 cases). Additionally, in the two cases where no spot was detected, no AL was found during subsequent revision surgery. These initial results are promising and support further prospective studies of a broader group of cases, reinforcing the role of vSPECT/CT as valuable aid in managing PAL.

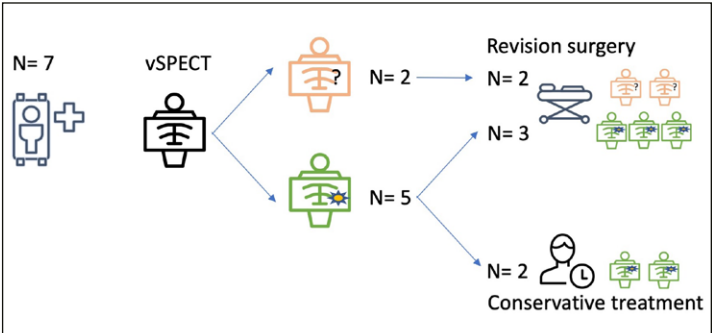


Figure 1. Visual abstract

Risk Factors for Prolonged Air Leakage After Uniportal Anatomical Segmentectomy
O. Riederl¹, K. Gioutsos², M. Galanis³, T. L. Nguyen³, Ö. Senbaklavaci³, P. Dorn³ (¹Inselspital-Universitätsspital Bern, Bern; ²Universitätsklinik für Thoraxchirurgie, Inselspital-Universitätsspital Bern, Bern; ³Universitätsklinik für Thoraxchirurgie, Inselspital - Universitätsspital Bern, Bern)

Background: As the population ages and comorbidities increase, minimalinvasive anatomical segmentectomies are increasingly being performed. Complications are to be considered in this vulnerable population.

Aims: Our aim was to investigate the incidence and risk factors for prolonged air leak in patients undergoing minimally invasive single-port pulmonary segmentectomy at our institution.

Methods: Retrospective analysis of all patients undergoing uniportal segmentectomy in our department from March 2015 to August 2023. Prolonged air leak (PAL) was defined as an air leak that lasted longer than 5 days.

Results: 575 segmentectomies were performed using uniportal video-assisted thoracoscopic surgery (uVATS). 374 complex segmentectomies (65.0%) and 405 (70.4%) single segmentectomies were performed (table 2). Prolonged air leak occurred in 88 patients (15.3%). Length of stay and duration of drainage were 8.6 (±4.86) and 10.6 (±8.12) days in the PAL subgroup, whereas they were 3.6 (±2.25) and 2.0 (±1.3) days in the non-PAL group, both statistically significant. Patients with COPD GOLD II/III were significantly more common in the PAL group (table 1).

Using machine learning, two models were developed that predicted the occurrence of PAL with an accuracy of 70%. The first model detected the following parameters as significant: removal of segment 2 or 8, diabetes, inhalers, squamous cell carcinoma. The second model recognized DLCO (%), pack-years, FEV1 (%) and operation time as parameters.

Furthermore, we used recursive partitioning to develop a decision tree that stratified PAL risk by answering 1-3 yes/no questions. Patients with >28 pack-years and DLCO < 71% had a 77% probability of developing prolonged air leak.

Conclusion: Severe COPD, low DLCO and FEV1, increased pack-years, inhalers, diabetes, and segment 2 or 8 surgery were identified as risk factors for prolonged air leak. These findings may help in the planning of surgery and the use of sealants at the end of surgery in high-risk patients.

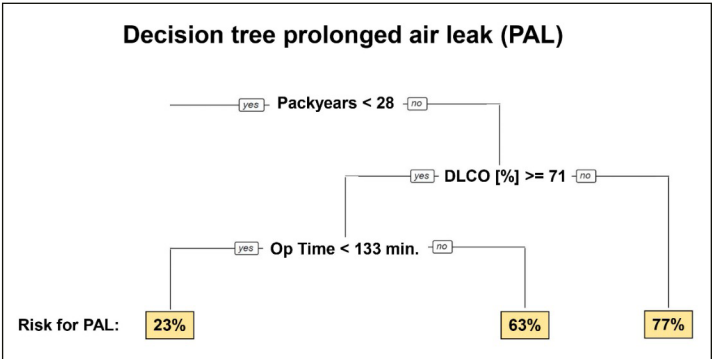


Figure 1. Decision tree PAL

Variables	Total population (n=575)	Without PAL (n=487)	With PAL (n=88)	P value
Male gender (n, %)	333 (57.9%)	276 (56.7%)	57 (64.8%)	0.3613
Age (mean, SD)	64.8 (10.5)	64.4 (10.7)	67.2 (8.9)	0.0210
FEV1 % (mean, SD)	83.9 (20.8)	86.4 (19.6)	70.3 (21.8)	<0.0001
DLCO % (mean, SD)	78.5 (22.7)	80.9 (22.2)	64.8 (21.0)	<0.0001
Smoking status (n, %)				
current	240 (41.7%)	193 (39.6%)	47 (53.4%)	0.0738
ex-smoker	220 (38.3%)	182 (37.4%)	38 (43.2%)	0.4556
never smoker	112 (19.5%)	109 (22.4%)	3 (3.4%)	0.0002
unknown	3 (0.5%)	3 (0.6%)	0 (0%)	
Pack years (mean, SD)	37.59 (30.7)	34.7 (30.7)	53.3 (25.8)	<0.0001
BMI, kg/m2 (mean, SD)	25.2 (4.64)	25.4 (4.7)	24.2 (4.0)	0.0247
Diabetes (n, %)	67 (11.6%)	53 (10.9%)	14 (15.9%)	0.1703
COPD (n, %)				
GOLD I	50 (8.7%)	40 (8.2%)	10 (11.4%)	0.4404
GOLD II	92 (16.0%)	64 (13.1%)	28 (31.8%)	<0.0001
GOLD III	26 (4.5%)	15 (3.1%)	11 (12.5%)	0.0001
GOLD IV	4 (0.7%)	2 (0.4%)	2 (2.3%)	0.2482
Asthma (n, %)	27 (4.7%)	19 (4.0%)	8 (9.1%)	0.0302
Inhalatives (n, %)	116 (20.2%)	79 (16.3%)	37 (42.0%)	<0.0001
OSAS (n, %)	40 (6.9%)	30 (6.2%)	10 (11.4%)	0.0765
Arterial hypertension (n, %)	215 (37.4%)	172 (35.3%)	43 (48.9%)	0.0585

Table 1. Demographics and preoperative characteristics

Variables	Total population (n=575)	Without PAL (n=487)	With PAL (n=88)	P value
Side of operation (right) (n, %)	290 (50.4%)	239 (49.1%)	51 (57.9%)	0.3305
Pleural adhesions (n, %)	65 (11.3%)	49 (10.1%)	16 (18.2%)	0.0391
Complex segmentectomies (n, %)	374 (65.0%)	312 (64.1%)	62 (70.4%)	0.4719
Multiple segments removal (n, %)	170 (29.6%)	145 (29.8%)	25 (28.4%)	0.8313
Histology				
Primary (n, %)	376 (65.4%)	304 (62.4%)	72 (81.8%)	0.0456
Metastasis (n, %)	100 (17.4%)	94 (19.3%)	6 (6.8%)	0.0117
Benign (n, %)	99 (17.2%)	89 (18.3%)	10 (11.4%)	0.1611
Operation time [min] (mean, SD)	152 (55.31)	148 (53.7)	172 (60.2)	0.0002
Length of stay [day] (mean, SD)	4.33 (3.35)	3.55 (2.25)	8.60 (4.86)	< 0.0001
Drainage duration [day] (mean, SD)	3.27 (4.58)	1.97 (1.30)	10.59 (8.12)	< 0.0001

Table 2. Operatives characteristics

Elimination of Routine Chest X-Rays after Lung Resection: A Quality Improvement Initiative
B. Bédar, M. Laurent, B. Vasey, M. S. Demarchi, F. Triponez, W. Karenovics (Thoracic and endocrine surgery, University Hospitals of Geneva, Geneva)

Background: Performing a postoperative chest X-ray (CXR) is routine practice following lung surgery. Despite studies indicating that CXRs may be unnecessary for most patients, no initiative has been taken to discontinue routine CXRs.

Aims: To improve quality of care, our initiative aims to eliminate routine CXR after lung resection and assess its safety.

Methods: We performed a single-centre, controlled, prospective cohort study. Patients who underwent lung resection between January 2022 and May 2023, excluding pneumonectomy and spontaneous pneumothorax, were included. Prior to implementation of the initiative, patients had routine CXRs immediately after surgery, after chest tube removal, and during outpatient consultation. After implementation, CXR were only ordered if there was a clinical need. We compared 30-day readmission rates before and after discontinuation of routine CXRs. Cardiopulmonary complications, length of hospital stay, and reoperation were also analyzed. We performed additional analyses 8 months after the start of the initiative to monitor the evolution of our practices.

Results: A total of 128 patients (64 in each group) were included in this study. Among them, 46.1% underwent segmentectomy, 29.7% lobectomy, and 24.2% wedge resection. The total number of CXRs decreased by 56% after discontinuation of routine CXRs. 28.6% of patients did not receive any CXRs after the initiative. Moreover, 17/23 of the CXRs performed immediately after the operation and 9/14 during outpatient consultation were undertaken by mistake. There were no statistically significant differences in 30-day readmission rates between patients before and after the initiative (14.1% vs 4.8%, respectively, p=0.073) or in cardiopulmonary complications (28.1% vs 20.3%, respectively, p=0.302). Eight months after the initiative was introduced, 86.4% of patients no longer received postoperative CXRs, and the 30-day readmission rate was reduced to 0%.

Conclusion: Eliminating routine chest X-rays after lung resection is safe. The process of adapting to this practice and building confidence, however, takes time.

Insights from the Edge: Examining Emergency Lung Transplants in a Specialized small European Program

L. Hoyos Mejia¹, T. Papasotiropoulos², G. Lang², I. Iskender², M. Schuumanns³, R. Habe³, I. Opitz² (¹University Hospital Zurich, Zurich; ²Thoracic Surgery, University Hospital Zurich, Zurich; ³Pneumology, University Hospital Zurich, Zurich)

Background: The combined influence of challenges in pinpointing the ideal timing for lung transplantation (Ltx) and the potential merging of graft scars contributes to an escalated demand for emergency transplantation (ELTx).

Aims: We aim to analyze the outcomes of our significantly high rate of ELTx over 10 years.

Methods: A retrospective analysis, excluding retransplanted and pediatric LTx, was performed between January 2010 and December 2022. Donor and recipient variables were collected, and univariate, multivariate, and survival analyses compared the two groups.

Results: A total of 265 LTx were conducted, 219 being conventionally listed (81.5%) and 49

being ELTx (18.5%). Notably, 67.7% BLTx were bridging with extracorporeal membrane oxygenation (ECMO). The overall characteristics of donors and recipients were similar, as detailed in Image 1. Although recipients undergoing ELTx tended to be slightly younger (49 vs. 54 years) and had a lower BMI (20 vs. 22, p 0.050). Furthermore, this group exhibited higher requirements for intra and postoperative ECMO support (76% vs. 52% and 31% vs. 20%), surgical reintervention (20% vs. 11%), and primary graft dysfunction (PGD 3) at 72 hours (29% vs. 11%, p 0.009). Whereas maintaining a slightly worse 5 years overall survival (51% vs 62.7% (IC 95%) p 0.043 (Imagen 2). Besides, multivariate analysis also revealed a greater risk of prolonged hospital stays (p=0.0002), 90-day mortality (p=0.0004), and one-year mortality (p=0.038). Imagen 2. Additionally, while the overall incidence of chronic lung allograft dysfunction (CLAD) was identical, time-free rejection was superior in the Non-BLTx group (810 vs. 522, p 0.0611 [Opi1]). [Opi1]How is Overall survival between both groups

Conclusion: Despite a high incidence of emergency transplants in our center, the collaboration of a well-prepared multidisciplinary team and careful case selection has enabled us to achieve comparable and acceptable results.

Variable	Bridged (49)	% / IQR	Non (219)	% / IQR	p-value
Age (Median)	49	37, 58	54	41, 61	0,1245
Gender (Female)	23	47	98	45	1
BMI	20,83	[18.76 24.5]	22,59	[19.2- 26.2]	0,051
Diagnosis					
COPD	16	32	93	42	
Cystic Fibrosis	17	35	47	21	
Pulmonary Fibrosis	13	26	51	23	
Other	3	6	28	12	
Sum Charlson Deyo Index	1	1, 3	2	1, 3	0,22
PERIOPERATIVE					
Type of Tx (Doble)	46	94%	216	99%	0,0845
CIT Right	267	224, 310	262	212, 348	0,8672
CIT Left	367	254, 390	353	303, 436	0,366
IntraOP ECMO	37	76	113	52	0,1312
PostOP ECMO	15	31	43	20	0,2031
Reintervention	10	20	23	11	0,1075
72h PGD Grade 3	14	29	23	11	0,0092
Mechanical Ventilation	3	2, 14	1	1, 4	1,48E-04
UCI	7	3, 24	4	3, 11	0,0309
InHos	50	32, 75	33	26, 48	4,30E-06
30 D Mortality	2	4	7	3	0,6727
90 D Mortality	4	8	14	6	0,7531
1 y	8	16	25	11	0,4787
CLAD Dx	15	31	79	36	0,7534
Time Dx	522	149, 756	810	383, 1281	0,0611
DONOR					
Age (Median)	55,96	[38.4 66.24]	51,28	[36.79 59.91]	0,2298
Gender (Female)	21	43%	94	43%	
Donor Cause of Death					
Anoxic Brain Injury	5	10	34	16	
Spontaneous intracranial bleeding	25	51	97	44	
Brain ischemia	5	10	37	17	
Traumatic intracranial bleeding	11	22	44	20	
Other	3	6	7	3	
Unknown	3	6	16	7	
PF ratio	379	[327.94 428.88]	353,25	[308.37 456.25]	0,9342

BMI, Body mass index, COPD chronic obstructive lung disease, CIT cold ischemia time, ECMO extracorporeal membrane oxygenation, ICU intensive care unit, InHos, In-hospital stay, F Female, PF ratio Partial pressure oxygen over fraction inspiratory oxygen , BLTx bridged lung transplant

Table 1. Emergency

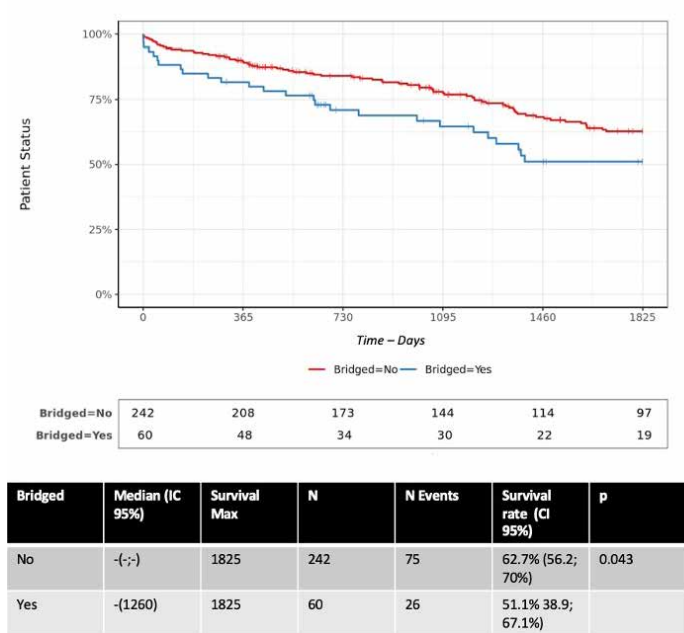


Figure 1. Pic 12 ESTS

Controlled Donation after Circulatory Death Lung Transplantation: 10-years' Experience

L. Hoyos Mejia, T. Papasotiropoulos, G. Lang, I. Iskender, M. Schuumanns, R. Habe, I. Opitz (University Hospital Zurich, Zürich)

Background: Controlled organ donation after circulatory death (cDCD) was launched in Switzerland in 2012.

Aims: We aim to analyze the outcomes of lung transplantations (LTx) with cDCD after 10 years in our center.

Methods: Patients transplanted between January 2012 and December 2022 were included in this retrospective analysis, excluding re-LTx and pediatric LTx. Donor and recipient information was obtained from our database, and several prognostic factors for short- and long-term survival and CLAD incidence were included in uni- and multivariate analyses.

Results: Of 268 LTx performed, 222 (82.8%) were DBD, and 46 were cDCD (17.%). Recipient characteristics are summarized in Table 1. Donor and recipient characteristics did not differ significantly between the two groups. COPD was the main indication for LTx in this cohort (33% vs. 37% in DBD and cDCD groups). Followed by Cystic fibrosis (24% both).

After a multivariate analysis, the DBD group was found to be correlated with a higher risk for prolonged ventilation (p=0.0054) and higher 90-day mortality (p=0.0016). Whereas cDCD groups were associated with an extended hospital stay (p 0.0017). Meanwhile, late transplant outcomes presented no statistically significant differences among groups; there was marginally superior 1-year mortality and early appearance of CLAD in the cDCD cohort (14% vs. 7% and 702 vs. 838 days p 0,33 and 0,651).

Conclusion: As the most extensive series of cDCD in Switzerland, our findings assert that the introduction of the cDCD program has established a secure and valuable source of high-quality organs for lung transplantation. Notably, outcomes are on par with conventional DBD methods.

RECIPIENT					
Variable	DBD (222)	IQR / %	DCD (46)	IQR / %	p-value
Age years (Median)	54	39-61	43	53-58	0.915
Gender (Male)	122	55	25	54	1
BMI (kg/m ²)	22,12	19-26	22,4	19-25	0,9525
Diagnosis					
'COPD'	73	33	20	43	
'Cystic Fibrosis'	53	24	11	24	
Pulmonary Fibrosis	53	23	11	24	
Other	25	11	3	6.5	
Sum Charlson Devo Index	1,5	1, 3	1	1, 2	0,2569
Perioperative					
Bridge	42	58	7	15	1
Type of Tx (Doble)	217	98%	45	98%	1
CIT 1er graft	210	259, 340	290	290, 348	0,0423
CIT 2do graft	286	345, 421	341	392, 453	0,0072
IntraOP ECMO	130	59	20	43	0,1508
Post OP ECMO	52	23	6	13	0,4144
Mechanical Ventilation (Days)	2	1, 5	2	1, 4	0,7191
ICU Stay (Days)	5	3, 13	4	3, 7	0,3686
InHos (Days)	36	29, 55	33	24, 50	0,2171
Reintervention	29	13	4	9	0,622
CLAD Dx	82	37	12	26	0,41
Time Dx (Days)	702	358, 1237	838	271, 1185	0,6516
30 Days Mortality	7	3	2	4	0,66
90 Days Mortality	15	7	3	7	1
1 year Mortality	30	14	3	7	0,33
DONOR					
Media Age	50	[35.27 61.0]	56	[44.03 63.0]	0,127
Gender (F)	97		18		0,76
BMI	24	[22.49 26.32]	25,6	[22.49 26.32]	0,0347
Cause of Death					
Anoxic Brain Injury	31	13,96	8	17,4	
Spontaneous intracranial bleeding	108	48,65	14	30,4	
Brain ischemia	29	13,06	13	28,3	
Traumatic intracranial bleeding	48	21,62	7	15,2	
PF ratio	366	[315 457.5]	350	[307.5 405.75]	0,0777

BMI, Body mass index, COPD chronic obstructive lung disease, CIT cold ischemia time, ECMO extracorporeal membrane oxygenation, ICU intensive care unit, InHos In-hospital stay, F Female, PF ratio Partial pressure oxygen over fraction inspiratory oxygen

Table 1. DCD vs DBD

Loco-Regional Ropivacaine Analgesia via a Surgically Placed Intercostal Catheter after Anatomic Lung Resection: Prospective, Placebo-Controlled, Double-Blind; Randomized Superiority Trial

A. Hojski¹, A. Hojski², M. Krämer², P. Gecas², D. Bolliger^{3,4}, A. Lampart³, D. Lardinois² (¹University Hospital Basel, Basel; ²Division of Thoracic Surgery, Department of Surgery, University Hospital Basel, Basel; ³Clinic for Anaesthesia, Intermediate Care, Prehospital Emergency Medicine and Pain Therapy, University Hospital Basel, Basel; ⁴Department of Clinical Research, University Hospital Basel, Basel)

Background: Even after minimally invasive anatomic lung resection, pain remains a burden for patients. Current guidelines recommend the surgical placement of intercostal catheters at the end of the surgery to promote faster recovery after lung surgery.

Aims: The aim of this trial was to investigate the analgesic efficacy of continuous loco-regional application of ropivacaine via an intercostal catheter and to establish this method as a possible standard of care in postoperative analgesia management.

Methods: Between December 2021 and October 2023, we evaluated the efficacy of surgically inserted intercostal catheters. Patients were eligible when undergoing anatomic VATS lung resection under general anaesthesia for confirmed or suspected stage I lung cancer (UICC, 8th edition). Patients received ropivacaine at a concentration of 2 mg/ml or a placebo through an elastomer pump, flow rate of 6-8 ml/h for 72 hours after surgery. The sample size was calculated to find an NRS (numerical rating scale) difference associated with a pain reduction of 1.5 points.

Results: 14 patients were randomly included in the ropivacaine group and 18 in the placebo group. The patients' characteristics and preoperative pain scores were similar in both groups. Between the observed groups there was no statistically significant difference in postoperative pain scores and morphine consumption. The NRS score for cough 24 hours postoperatively was 4.9 (±2.2) in the ropivacaine group and 4.3 (±2.4); p=0.474 in the placebo group (Graph 1). In addition, we were unable to determine any influence of the pain management on the relative postoperative pulmonary function.

Conclusion: Our results suggest that the analgesic efficacy of continuous loco-regionally applied ropivacaine administered through a surgically placed intercostal catheter after surgery does not have a positive effect on postoperative pain scores or morphine requirements. Instead, local analgesia started at the beginning of the procedure and covering several intercostal spaces should be considered.

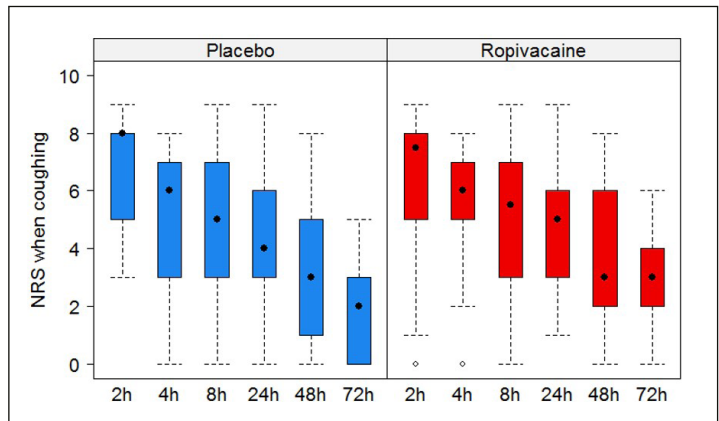


Figure 1. Postoperative pain scores when coughing after Minimally invasive anatomical lung resections without or with locoregional analgesia through intercostal catheter

MicroRNA Expression Correlates with Clinical Presentation of Chronic Thromboembolic Pulmonary Hypertension

I. S. Martínez Lopez¹, T. Papasotiropoulos², F. Schläpfer², S. Ulrich², I. Opitz², M. Kirschner² (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich; ²University Hospital Zurich)

Background: The pathophysiology underlying development of chronic thromboembolic pulmonary hypertension (CTEPH), including involved genes, is thus far only poorly understood.

Aims: Here we want to understand if and how changes in microRNA expression contributes to the development of CTEPH.

Methods: Levels of miR-939, miR-942, let-7b and let-7d were measured in a) 50 CTEPH pulmonary endarterectomy (PEA) specimens vs 49 pulmonary arteries (PAs) from explant lungs of transplant recipients (27 COPD, including 22 with pulmonary hypertension (PH)), and b) pre-operative plasma from 47 CTEPH patients and 21 lung transplant patients (12 COPD, including 3 with PH). Statistical analyses were performed by Spearman correlation, Kruskal-Wallis and Mann-Whitney test.

Results: Expression levels in PEA-derived tissues correlated negatively for right-sided micro-RNAs let-7b and mPAP (n=43, R= -0.34, p=0.02), and miR-942 and 6-minute walk distance (6MWD) (n=46, R= -0.34, p=0.02), as well as left-sided let-7d and CRP (n=49, R= -0.296, p=0.04), and miR-939 and oxygen saturation (SpO₂) at peak 6MWD (n=47, R= -0.4, p=0.005). Positive correlation was found with SpO₂ before 6MWD for let-7b (n=41, R= 0.318, p=0.043). Jamieson left showed association with mean expression levels of let-7b (n=43, H=8.25, P=0.04) and left-sided let-7d (n=43, H=9.19, P=0.03). Plasma analysis showed positive correlations with SpO₂ after 6MWD and miR-939 (n=40, R= 0.35, p=0.026) and for let-7b with CRP (n=44, R= 0.30, p=0.048), and NYHA (n=45, H=16.56, P=0.0009).

Relative to the comparator groups, significance was reached in PAs for expression of let-7b (p <0.0001), and in plasma for miR-939 (p <0.0001).

Conclusion: Correlations and associations with clinical parameters suggest that miRNA expression is associated with disease severity, and that plasma microRNA levels might serve as circulating biomarkers. Furthermore, the significant elevation compared to comparator samples suggest that miRNA dysregulation might be involved in CTEPH development.

Acute Care & Miscellaneous

Laparotomy for Traumatic Splenic Injury: Should We Increase Our Efforts to Preserve the Spleen?

D.A. Jakob¹, M. Müller², A. Kolitsas³, A. K. Exadaktylos², D. Demetriades³ (¹Division of Trauma and Surgical Critical Care, Department of Surgery + Department of Emergency Medicine (Inselspital), Los Angeles General Medical Center, University of Southern California + Inselspital University Hospital of Bern, Bern; ²Department of Emergency Medicine, Inselspital University Hospital of Bern, Bern; ³Division of Trauma and Surgical Critical Care, Department of Surgery, Los Angeles General Medical Center, University of Southern California, Los Angeles)

Background: In trauma laparotomy the spleen is removed very liberally and often little effort is made for splenic preservation.

Aims: The aim of this study was to assess the effect of surgical management (splenic repair vs. splenectomy) on outcomes in patients undergoing trauma laparotomy.

Methods: This is a trauma registry (TQIP) study (2013–2019), including adult patients with severe splenic injuries (grades III-V) undergoing trauma laparotomy. Characteristics and outcomes of patients who underwent splenic repair vs. splenectomy within 6 hours of admission were compared using different statistical approaches, i.e. 1:1 exact matching with consecutive conditional logistic regression analysis as primary analysis, multivariable logistic regression, propensity score matching and inverse-probability weighting as sensitivity analyses. The primary outcome was in-hospital mortality.

Results: A total of 11,247 patients with a severe splenic injury undergoing trauma laparotomy within 6 hours of admission were identified. Of these, 10,820 (96.2%) patients underwent

splenectomy and 427 (3.8%) patients splenic repair within 6 hours of admission. Among patients who underwent an initial splenic salvage procedure, 23 (5.3%) patients underwent a splenectomy during the subsequent hospital stay. 400 patients with splenic preservation, were matched with 400 patients who underwent splenectomy (matched for age, sex, hypotension, trauma mechanism as well as AIS spleen grades 3, 4, 5 and AIS groups (AIS 0-2, AIS 3, AIS 4-5) for head, face, neck, thorax, spine, and lower & upper extremity). The mortality was significantly lower in the group of patients with splenic repair (6.5% vs 12.8%, $p=0.002$). The mortality benefit was subsequently verified by conditional regression analysis (aOR 0.4, CI 95% 0.2; 0.9). Multivariable logistic regression, propensity score matching, and inverse-probability weighting confirmed the lower mortality in the splenic repair group (Table 1).

Conclusion: In trauma laparotomy splenic repair was independently associated with lower mortality compared with splenectomy. Splenectomy was required in approximately 5% of the patients after initial splenic repair. The findings provide evidence that efforts for spleen preservation in trauma laparotomy should be considered in selected cases.

No.	Statistical approach	Covariables/matching parameter	Effect size	p-value
1	1:1 exact matching and consecutive multivariable conditional logistic regression (93.7% of cases being matched)	Exact matching: - Age group, sex - Hypotension - Penetrating trauma - AIS spleen grades 3, 4, 5, AIS group* for head, face, neck, chest, abdomen excl. spleen, spine, lower & upper extremity Covariables: Race as categorical parameter, smoking, diabetes, AIS group* for abdomen excl. spleen, ISS	aOR 0.4 [95% CI: 0.2; 0.9]	0.027
2	Multivariable logistic regression	- Age group, race - hypotension tachycardia, GCS - liver cirrhosis, chronic renal failure - penetrating trauma - ISS, AIS head, face, neck, spleen, abdomen without spleen, spine, lower & upper extremity	aOR: 0.6 [95% CI: 0.4; 0.9]	0.012
3	Propensity score matching	Same as #2	ATE: -0.05 [95% CI: -0.09; -0.02]	0.003
4	Inverse-probability weighting	Same as #2	ATE: -0.05 [95% CI: -0.09; -0.01]	0.009

Abbreviations: AIS, Abbreviated Injury Scale; excl., exclusive; ISS, Injury Severity Score; aOR, adjusted Odds Ratio; ATE, Average Treatment Effect; CI, Confidence Interval; HR, ISS, Injury Severity Score

* AIS group defined as AIS 0-2, AIS 3, AIS 4-5.

Hypotension is defined as systolic blood pressure <90mmHg; tachycardia is defined as heart rate >120 beats per minute

Table 1. The effect of splenic repair compared with splenectomy on mortality in severe splenic trauma using different statistical approaches

Surgical Management of Latrogenic Colonoscopy Perforation [ICP]: A Case-Series
M. Ortolini¹, M. Burgard², B. Egger¹ (¹Chirurgie générale, HFR – Hôpital Cantonal de Fribourg, Fribourg; ²Chirurgie Viscérale, HUG - Genève, Geneva)

Background: Perforation rates after diagnostic and therapeutic colonoscopy may rise to 0.8% and 8%, respectively. The time between perforation and diagnosis substantially changes the management strategy of ICP and a diagnostic delay of >24h has shown to increase the risk of more invasive surgical treatments.

Aims: To raise awareness of the importance of an early management of ICP.

Methods: We conducted a retrospective analysis of all patients presenting to our surgical department with ICP and needing surgical intervention from January 2017 to December 2023. Medical records were screened for patient demographics, ASA score, indication for colonoscopy, type of procedure, means and timing of diagnosis, localization and mechanism of the ICP, treatment and outcome.

Results: 17 patients were referred for an ICP and underwent surgical treatment. The main perforation site was the sigmoid colon (n=10, 59%). Most perforations were endoscope induced (table 1). Direct suture was performed in 4, resection with direct anastomosis in 5 and resection with diversion (Hartmann's procedure, split stoma) in 8 patients. One direct suture and one direct anastomosis were protected by a diverting loop ileostomy. Patients with longer time to diagnosis (>24 hours), underwent substantially more diversion operations without anastomosis than patients with shorter time to diagnosis (<24 hours) (80% versus 33%). The type of surgery (type of resection, direct suture) mainly depended on endoscopic findings and eventual pathologies (table 2).

Conclusion: As reported previously, our findings demonstrate that rapid diagnosis and management of ICP results in less extensive surgery, with potentially more direct suturing or primary anastomosis and less diversion procedures. The type of surgery; suture or resection and the type of resection, is mainly dictated by the time span to diagnosis and the endoscopic find-

ings of eventual pathologies. Therefore, a preoperative discussion with the endoscopist is of paramount interest.

Characteristics	Total of patients (n=17)	Suture or direct anastomosis (n=9)	Diversion surgery (n=8)
Age (yr), median (range)	74 (33-86)	74(51-83)	73 (33-86)
Sex			
- Male	5	2	3
- Female	12	7	5
ASA classification			
- I, II	7	5	2
- III, IV	10	4	6
Time span to diagnosis (hours)			
- <24	12	8	4
- >24	5	1	4
Localization of perforation	10	5	5
- Sigmoid colon	4	3	1
- Caecum	1	0	1
- Ascending colon	0	0	0
- Transverse colon	2	1	1
- Descending colon			
Cause of perforation			
- Endoscope induced	11	6	5
- Polypectomy induced	4	2	2
- Others (barotrauma, electrocoagulation)	2	1	1

Table 1

Type of surgery	Number (17)	Endoscopic finding
Sigmoid resection		
-With colostomy (Hartmann procedure)		
- Oncologic	1	Sigmoid tumor
- Non oncologic	3	Benign looking caecal or transverse polyp (2x), normal (1x)
-With direct anastomosis		
- Without ileostomy	2	Benign looking caecal polyp (1x), normal (1x)
- With ileostomy	1	Sigmoid diverticulosis
Right hemicolectomy		
-Oncologic, with split stoma	1	Caecal polyp
-with direct anastomosis	1	Sigmoid diverticulosis
Ileo-caecal resection		
- with split stoma	1	Sigmoid diverticulosis
- with direct anastomosis	1	Benign looking polyp on caecum and sigmoid
Direct suture		
Without ileostomy	3	Normal (2x), diverticulosis (1x), benign looking polyp (1x).
With ileostomy	1	
Sigmoid resection with anastomosis +oncologic right hemicolectomy split stoma	1	Caecal mass
Transverse colon resection with colostomy	1	Benign looking transverse polyp

Table 2

Case Report: A Small Bacterium With a Big Impact
K. Roosen¹, N. Menzi², R. Rosenberg¹, S. Lamm¹ (¹Klinik für Chirurgie und Viszeralchirurgie, Kantonsspital Baselland, Liestal; ²Plastische, Rekonstruktive, Ästhetische u. Handchirurgie, Universitätsspital Basel, Basel)

Background: Vibrios are gram-negative bacteria, divided into cholera vibrios and non-cholera vibrios. While the cholera vibrios (most commonly *Vibrio cholerae*) are responsible for gastrointestinal complaints, the non-cholera vibrios (e.g. *Vibrio vulnificus*) often cause wound infections. *Vibrio mimicus* is similar to *V. cholerae* and usually causes gastrointestinal symptoms. In this case report, the pathogen causes a necrotizing fasciitis.

Aims: Although rare, we would like to present the *V. mimicus* as a possible cause of necrotizing fasciitis.

Methods: A 63-year-old woman hit her leg while biking and then went swimming in brackish water in the Netherlands the following day. After two days, she noticed a swelling and redness of the leg and presented herself at a local hospital. The patient was transferred to our hospital with the suspicion of an erysipelas. The next morning, the infection parameters were high under empirical antibiotics and the wound showed signs of necrosis (Figure 1). An emergency radical debridement was done and revealed a necrotizing fasciitis. A second look operation was performed the next day and showed no signs of ongoing necrosis.

After 4 weeks of vacuum-assisted therapy and germ-specific antibiotics (Figure 2), she underwent reconstruction of her lower limb with flap surgery (Figure 3), from which she fully recovered.

Results: The blood culture showed a vibrio species and the biopsies of the tissue revealed a vibrio mimicus. The antibiotic therapy was adjusted to Ciprofloxacin and Vibramycin, which showed a positive effect. Surprisingly, a keyword search in Pubmed identified only one case of a wound infection in a burn patient associated to vibrio mimicus. There are no cases with necrotizing fasciitis known.

Conclusion: Although it is a rare case of vibrio species, this case highlights how dangerous this bacterium could be and that early radical necrosectomy is mandatory for the recovery.



Figure 1. On Day 1 of the hospitalisation, there were only the swelling with the redness (red lines) suspected as an erysipelas. 12 hours later necrosis (black line) appeared. The patient underwent emergency necrosectomy



Figure 2. Leg after one month of vacuum-assisted therapy and antibiotic use with Vibramycin and Ciprofloxacin right before the flap surgery



Figure 3. Leg after flap surgery

EUS-Guided Drainage of Pancreatic Necrotic Collection with a HOT AXIOS Stent in a Patient with Pancreatitis Following EGDS/EUS for Suspected Pancreatic NET

C. M. Fragati¹, G. Amvrosiadis², A. Cristaudi³, G. Pozza³, M. Di Giuseppe¹, G. Lollo² (¹Surgery, Ente Ospedaliero Cantonale, Locarno; ²Gastroenterology, Ente Ospedaliero Cantonale, Bellinzona; ³Surgery, Ente Ospedaliero Cantonale, Lugano)

Background: The HOT AXIOS stent is an endoscopic device that can be inserted echoendoscopically to drain peripancreatic collections, mostly caused by pancreatitis. It is a flexible, self-expanding, fully silicone-coated, MRI-compatible nitinol stent that is preloaded in the delivery system with LAMS (lumen apposing metal stent).

Aims: To present the successful debulking of a walled-off pancreatic necrosis (WOPN) in a patient with iatrogenic pancreatitis following echo endoscopic biopsy.

Methods: A 59-year-old man presented with epigastric pain radiating to the back, increased lipase (4063 U/L) and leukocytosis (26.9 x10E9/L) after an echoendoscopy performed to characterize two pancreatic body masses compatible with neuroendocrine tumors 1 and 2 cm in the pancreatic body, discovered on CT done for other reasons. Abdominal CT showed edematous pancreatitis, with a diffuse peripancreatic fluid collection up to 1 cm thick near the tail (Balthazar D). On worsening clinical conditions at 72 hours, CT scan showed an increased fluid collection in the lesser sac (13 x 6 cm), but the situation could be managed conservatively. Two months later, a follow-up CT scan showed a WOPN (Atlanta 2012) along the ventral profile of the pancreas with an axial diameter of 16.5 x 7 x 8.5 cm, enhancing walls and heterogeneous content. A 15 x 10 mm metallic Hot-Axios stent was placed under echoendoscopic and fluoroscopic guidance with subsequent balloon dilatation (12 to 15 mm CRE®) and partial endoscopic necrosectomy. This procedure was repeated three times. After three necrosectomies (one month), the Hot-axios stent was removed with final placement of single double polyethylene Pigtail 10 Fr x 5 cm.

Results: Control CT showed a small residual cavity.

Conclusion: The Hot Axios Stent is an effective method for endoscopic necrosectomy of walled-off necrosis. It enables puncture, drainage, and LAMS insertion in a single delivery, followed by several courses of necrosectomy if needed, without stent exchange.

Emergency Surgery for Blunt Abdominal Injury in Polytrauma – The Impact of Time-to-Laparotomy on Outcome

F. Klingebiel, G. Rausch, Y. Kalbas, M. Teuben, H. C. Pape, V. Neuhaus, R. Pfeifer (Traumatology Department, University Hospital Zürich, Zürich)

Background: Blunt abdominal trauma is common in polytrauma patients. Surgical intervention is indicated for hemodynamically relevant intra-abdominal injuries and hollow organ injuries. Imaging may delay surgery and the impact of timing of surgery on outcome is unclear.

Aims: The aim of the current study is to determine the impact of time to laparotomy on outcome in polytrauma patients.

Methods: All adult polytrauma patients undergoing emergency laparotomy for blunt abdominal trauma admitted between 1996 and 2020 were identified from our prospective trauma registry. Patients were stratified into two groups based on the time elapsed from admission to emergency surgery: Group 1h: ≤60 min and Group 1-3h: 60-180 minutes. Outcome parameters included: LOS, LOS/ICU, ventilation time, complications and mortality. Adjusted logistic regression was used to assess independent predictive parameters for mortality.

Results: 190 polytraumatized patients with a mean age of 42.29 years (±17.06) and a median ISS of 36 (IQR: 19) were included, with 95 patients in each group. Patients in group 1h were characterized by impaired haemodynamic status and higher ISS. Mortality rates were also significantly different between groups (1h: 51.6% vs. 1-3h: 26.3%, p=0.0006). The adjusted regression model showed that time to emergency laparotomy was not an independent predictor of mortality, but increased ISS (OR=1.04, p=0.049) and age (OR=1.03, p=0.037) and decreased systolic blood pressure (OR=0.98, p=0.025).

Conclusion: Patients who underwent laparotomy within the first hour were more physiologically unstable than those who underwent laparotomy later, which may explain the increased mortality in this group. Timing of surgery did not show an independent association with mortality when laparotomy was performed within 3 hours of admission. Future research should focus on determining the role of delayed laparotomy on outcome in specific subgroups of patients (such as geriatric patients).

Longterm Results After Transorcal Outlet Reduction (TORe) of the Gastrojejunal Anastomosis for Secondary Weight Regain and Dumping Syndrome after Roux-en-Y Gastric Bypass

J. Mühlihäusser¹, J. Lovis¹, S. Fischli², F. Mongelli³, P. Aeppli⁴, M. Sykora⁵, A. Scheiwiller¹, J. Metzger¹, J. M. Gass¹ (¹Department of General Surgery, Luzerner Kantonsspital, Lucerne; ²Department of Endocrinology, Luzerner Kantonsspital, Lucerne; ³Department of Surgery, Regional Hospital of Lugano, Lugano; ⁴Department of Gastroenterology, Luzerner Kantonsspital, Lucerne; ⁵Department of General Surgery, Spital Nidwalden, Stans)

Background: Bariatric surgery is the most effective therapy for Obesity and Roux-en-Y gastric bypass is the gold standard procedure. However, in a relevant number of cases weight regain and dumping syndrome occur. The transorcal outlet reduction (TORe) procedure using an endoscopic suturing device (OverStitch™) is an option to treat patients with a wide gastrojejunal anastomosis.

Aims: Aim of the study was to analyze outcome parameters and long-term results.

Methods: A retrospective data analysis of patients who underwent TORe using OverStitch™ to reduce the diameter of the gastrojejunal anastomosis from January 2015 to December 2020 was performed. 71 subjects were included. 45 patients received the intervention for weight regain, 9 for dumping syndrome and 17 for both. Primary endpoint was a successful procedure, defined as weight stabilization or loss for weight regain, and resolution of symptoms for dumping syndrome. Secondary endpoints were intraoperative complications, procedure time, duration of follow-up and diameter of anastomosis after one year.

Results: The median size of the gastrojejunal anastomosis was estimated 30 mm before and 9.5 mm after the intervention. Overall procedure time was 37 minutes. 8 perioperative complications occurred. Mean follow-up was 26.5 months. All interventions (71/71) were successful within the first 3 months, 98.2% (56/57) at 12 months, decreasing to 75.0% (9/12) at 48 months.

During follow-up, the % excess weight loss was 23.0% within the first 3 months, 21.6% at 6 months, 11.4% at 12 months, 13.5% at 18 months, 8.2% at 24 months, -9.2%±60.4 at 36 months and -44.3%±74.3 at 48 months. In 84.6% of the subjects persisting improvement of dumping syndrome was achieved.

Conclusion: TORe using OverStitch™ is safe and effective in the treatment of patients with secondary weight regain or dumping syndrome after laparoscopic RYGB. A prospective randomized trial should be conducted to compare the effects with other surgical methods like banding the gastrojejunal anastomosis.

The Role of Bariatric Surgery on Beta-Cell Function and Insulin Resistance in Patients with Nonalcoholic Fatty Liver Disease and Steatohepatitis

A. Poljo^{1,2}, S. Kopf^{3,4}, A. Sulaj^{3,4}, S. Rössler⁵, T. Albrecht⁶, B. Goepfert⁶, S. Bojko⁷, B. P. Müller-Stich¹, A. T. Billeter¹ (¹Visceral Surgery, Clarunis – University Digestive Health Care Center Basel, Basel; ²Department of General, Visceral and Transplant Surgery, Heidelberg University Hospital, Heidelberg; ³Department of Endocrinology, Diabetology, Metabolism and Clinical Chemistry (Internal Medicine 1), Heidelberg University Hospital, Heidelberg; ⁴German Center of Diabetes Research, DZD, Neuherberg; ⁵Department of Pathology, Heidelberg University Hospital, Heidelberg; ⁶Department of Pathology, Ludwigsburg Hospital, Ludwigsburg; ⁷Department of Anesthesiology, Heidelberg University Hospital, Heidelberg)

Background: Nonalcoholic fatty liver disease (NAFLD) and steatohepatitis (NASH) are strongly associated with obesity, metabolic syndrome, and insulin resistance (IR).

Aims: The aim of this study was to investigate the effects of metabolic surgery on pancreatic beta cell function and IR in patients with obesity and NAFLD.

Methods: Liver biopsies were taken intraoperatively from 112 patients undergoing sleeve gastrectomy (n = 68) or Roux-en-Y gastric bypass (n = 44) and analyzed histologically for the presence of simple steatosis (NAFL) or NASH. Clinical and biochemical parameters were collected over up to 2 years. Beta cell function and IR were assessed using the homeostasis model assessment of beta-cell function (HOMA2-%B) and insulin resistance (HOMA2-IR) index.

Results: NASH was present in 53.6% (n 5 60) of the patients and NAFL in 25.9% (n 5 29). Liver enzymes, adiponectin/leptin ratio, triglycerides, and HbA1c were improved at 6 months, 1, and 2 years after surgery. HOMA2-IR was significantly lower in patients without NAFLD while HOMA2-IR did not differ between patients with NAFL and/or NASH. HOMA2-%B was highest in the NAFLD group and lowest in patients with NASH. While there was no change in HOMA2-%B and HOMA2-IR in the No-NAFLD group, HOMA2-%B decreased and IR improved in the NAFL and NASH groups.

Conclusion: Insufficient compensatory beta-cell function may contribute to the progression from NAFL alongside with IR to NASH. Our findings suggest that bariatric surgery decreases IR while at the same time reducing compensatory insulin oversecretion. These results are associated with beneficial changes in adipose tissue function after bariatric surgery.

Laser Treatment (LHP) in the Hemorrhoidal Disease. Always Mucopexy? Considerations after Almost 1000 Cases

I. Roman (chirurgie générale, Clinique CIC Vivalto Santé, Montreux)

Background: Surgery for hemorrhoidal disease still remains controversial. In fact, despite many surgical breakthroughs, postoperative pain and discomfort are still the major weaknesses. And the classical procedure remains, apparently, the most effective, even though the most painful.... Laser hemorrhoidal procedure (LHP) is an effective, non-painful, minimally invasive technique to treat symptomatic hemorrhoids.

Aims: The aim of this study was to draw some preliminary conclusions regarding the treatment of hemorrhoidal disease by LASER, using the LHP technique, with or without associating a short mucopexy / RAR (rectal anal repair). The main goal of the study is to prove if mucopexy brings an advantage to the outcome of the LHP technique in terms of acceptability and results.

Methods: The study comprises almost 1000 patients operated since January 2018. Indications for LHP included patients with symptomatic hemorrhoids grade II-III-IV, resistant to medical therapy, with/without low- medium-high grade of prolapse. Clinical efficiency was evaluated assessing resolution of symptoms and patient satisfaction. We compared the acceptability, postoperative evolution and levels of pain, hospitalization, and overall short time results after more than six years of experience with LHP.

Results: LHP demonstrates a large acceptability in selected patients. At least one third of the patients do not have pain postoperatively at all.

It is also necessary to mention that the study reflects the results of a single surgeon, the author. The good short term results, confirmed also by other studies already published, seem to confirm especially if associated to short mucopexy, which seems to diminish even more the postoperative pain when performed.

Conclusion: The LHP LASER procedure for the treatment of hemorrhoids seems to be safe and effective in patients with symptomatic disease, even high graded.

It is simple, minimally invasive, and relatively pain free.

It can be performed in an ambulatory setting, and it achieves high patient satisfaction and lesser side effects and complications, keeping a good level of the outcome.

Immunotherapy in Colorectal Cancer: A Literature-Review

A. Gilson¹, V. Tan², V. Delaune¹, E. Liot¹, G. Meurette¹, T. Koessler³, J. Meyer¹, F. Ris¹ (¹Visceral Surgery, HUG – Hôpitaux Universitaires de Genève, Geneva; ²Internal Medicine, Hôpital de La Tour, Geneva; ³Oncology, HUG - Hôpitaux Universitaires de Genève, Geneva)

Background: Colorectal cancer remains a prevalent and fatal condition. Research on immunotherapy in colorectal cancer has made significant progress, with clinical trials demonstrating its efficacy in prolonging survival and improving the quality of life for patients with advanced colorectal cancer. However, the use of immunotherapy in colorectal cancer has traditionally been reserved for patients who have failed other treatment options.

Aims: This literature review aims to provide an up-to-date analysis of the latest studies on immunotherapy in colorectal cancer, to shed light on the evolving role of immunotherapy in the management of colorectal cancer and to identify key areas for future research and clinical practice.

Methods: A systematic review was conducted on Medline with the MeSH terms "colorectal cancer" and "immunotherapy" combined using the Boolean operator "AND", from January 2019 to January 2023. Only randomized controlled trials (RCTs) and clinical trials were considered.

Results: Preliminary results suggest potential synergistic effects when combining immunotherapy with radiotherapy, chemotherapy, or other agents. While specific trials have yielded mixed results, the study emphasizes the importance of further research to explore the potential benefits of combination therapies in colorectal cancer treatment. The promise of monoclonal antibodies, particularly immune checkpoint inhibitors targeting PD-1/PD-L1 and CTLA-4, create debate about the use of immunotherapy in non-metastatic colorectal cancer.

Conclusion: Traditionally, immunotherapy has been reserved for patients who have failed other treatment options, mostly for patients with MSI because it offers more immunotherapy targets. However, there is ongoing research aiming to modify guidelines and explore the use of immunotherapy as a first-line treatment in non-metastatic colorectal cancer, or the use of immunotherapy in patients with MSS.

Colon I

Decentralized Colorectal Cancer Care: Benefit or Burden in the Pandemic? – An International Comparative Study in two Health Care Systems (DCCC Study)

B. Wiesler¹, J. M. Gass^{2,3}, J. Metzger², M. Hartel⁴, C. Nebiker⁴, U. Zingg⁵, D. Stimpfle⁵, C. T. Viehl⁶, A. Müller⁶, M. Worni^{1,7}, P. Studer⁷, L. Eisner⁸, C. Andreou⁹, R. Rosenberg¹⁰, R. Galli¹⁰, B. P. Müller¹, K. Denhaerynck¹¹, P. Hall¹², C. Gallagher¹², C. Lilley¹², M. Zuber^{1,13}, H. M. Paterson¹⁴, M. von Strauss Und Torney^{1,13} (¹Department of Visceral Surgery, Clarunis University Centre for Gastrointestinal and Liver Diseases, Basel; ²Department of Visceral Surgery, Cantonal Hospital of Lucerne, Lucerne; ³Department of Health Sciences and Medicine, University of Lucerne, Lucerne; ⁴Department of Visceral Surgery, Cantonal Hospital of Aarau, Aarau; ⁵Department of Visceral Surgery, Spital Limmattal, Schlieren; ⁶Department of Surgery, Spitalzentrum Biel, Biel; ⁷Stiftung Lindenhof I Campus SLB, Swiss Institute for Translational and Entrepreneurial Medicine, Bern; ⁸Department of Surgery, Cantonal Hospital of Olten, Olten; ⁹Department of Surgery, Cantonal Hospital of Olten, Olten; ¹⁰Department of Visceral Surgery, Cantonal Hospital of Basel-Land, Liestal; ¹¹Department of Public Health, University of Basel, Basel; ¹²Edinburgh Cancer Research Centre, University of Edinburgh, Edinburgh; ¹³St. Clara Research Ltd., St. Clara Hospital, Basel; ¹⁴Department of Visceral Surgery, Western General Hospital Edinburgh, Edinburgh)

Background: Beneficial effects of centralization could be shown. During SARS-CoV2 pandemic however, the centralization in the UK healthcare system led to cessation of screening colonoscopies and oncological resections. In the decentralized healthcare system of Switzerland, a high frequency of colonoscopies could be maintained.

Aims: The aim of this international study is to evaluate if a decentralized health care systems can prevent the threatening unmet needs of colorectal cancer patients under pandemic conditions.

Methods: This observational trial was performed in the south east of Scotland and in the extended northwest of Switzerland with a catchment area of 1.5 Mio. inhabitants each. Patients with colorectal cancer diagnosed during January 2019 and December 2022 were included.

Results: Six thousand six hundred and eighty patients were included in this preliminary analysis (4059 in the NHS group and 2621 in the Swiss group). In Scotland the median number of diagnosed patients per quarter was 258 pre-pandemics, 218 during lockdown and 258 after lockdown (p=0.56). There was no significant alteration of the median diagnosed patients per quarter during different phases in Switzerland (165 pre-pandemic vs. 187 during lockdown vs. 162 post-lockdown, p=0.56). In Scotland the median number of all performed tumor treatments per quarter were lower during lockdown (83 pre-pandemic vs. 75 during lockdown vs. 93 post-lockdown, p<0.01). In Switzerland the median treatment numbers per quarter didn't differ during different phases (56 pre-pandemic vs. 62 during lockdown vs. 60 post-lockdown, p=0.51). The number of patients diagnosed with a T4 tumor during pandemic was higher in Scotland than in Switzerland (28% vs. 19%, p<0.01). The 30-day mortality under pandemic condition was 7.5% (65 of 859) in Scotland compared to 3.7% (14 of 374) in Switzerland (p=0.01).

Conclusion: SARS-CoV2 pandemic led to a reduction in performed cancer treatments in Scotland. In Switzerland's decentralized healthcare system, cancer treatments were maintained during pandemic.

Randomised Controlled Pilot Trial on GHOST Ileostomy Versus Conventional Loop Ileostomy in Patients Undergoing low Anterior Resection for Rectal Cancer

P. Probst¹, R. Klotz², M. K. Diener³, P. Knebel², F. J. Hüttner³ (¹Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld; ²Department of General, Visceral and Transplantation Surgery, Heidelberg University Hospital, Heidelberg; ³Department of General, Visceral and Thoracic Surgery, Klinikum Nürnberg, Nürnberg)

Background: Anastomotic leakage is the most important complication after colorectal surgery. In patients undergoing low anterior resection with total mesorectal excision (LAR/TME) a loop ileostomy is fashioned to protect the low anastomosis. Ghost ileostomy is a pre-stage ileostomy, which can be converted to a diverting ileostomy, if anastomotic leakage is suspected. If there are no signs of anastomotic leakage an actual ileostomy can be avoided.

Aims: The objective was to evaluate whether ghost ileostomy is a safe alternative to a conventional loop ileostomy.

Methods: GHOST was a randomised controlled pilot trial without formal hypothesis. Patients undergoing LAR/TME for rectal cancer were intraoperatively randomised to receive a ghost ileostomy or loop ileostomy. Patients were followed prospectively for 6 months. Comprehensive complication index, transformation of ghost ileostomy into loop ileostomy, presence of an ostomy at 6 months, Wexner score and quality of life were assessed.

Results: Thirty patients were equally randomised. The CCI was 30.7 (± 17.7) in the ghost ileostomy group compared to 29.7 (± 18.6) in the loop ileostomy group at 6 months (p=0.889). The ghost ileostomy was converted into a loop ileostomy in 6 of 15 (40.0%) patients. At 6 months after low anterior resection, 6 (40.0%) patients in the ghost ileostomy group and 7 (46.7%) patients in the ileostomy group still had an ileostomy. There was no mortality and no need for creation of a terminal ostomy within the trial. Neither postoperative function assessed by the Wexner score, nor the overall quality of life showed significant differences.

Conclusion: Ghost ileostomy seems to be a viable and safe option to a more selective approach regarding creation of an ileostomy in patients undergoing LAR/TME. However, the difficult patient selection with exclusion of patients at high risk of anastomotic leakage limits its widespread application and should be optimised in future trials.

Snapshot Audit Early Onset Colorectal Cancer (EOCC) – What is the Current Situation in Switzerland?

H. Gros¹, S. Taha-Mehlitz¹, S. Erdem-Sanchez¹, J. M. Klasen¹, U. Friedrich¹, D. Steinemann¹, A. K. Huber^{2,3}, M. Gass^{2,3}, D. Rodjakovic⁴, R. Galli⁴, C. Nebiker⁵, M. Hartel⁵, A. Müller⁶, C. Viehl⁶, C. Di Pietro⁷, Martinelli⁷, M. Holzgang⁷, S. Happ⁸, T. Simon⁸, D. Stimpfle⁹, U. Zingg⁹, S. Teixeira Da Cunha¹⁰, L. Eisner¹⁰, P. Studer¹¹, M. Worn^{11,12}, M. von Strauss Und Torney^{1,12} (¹Klinik für Viszeralchirurgie, Clarunis – Universitäres Bauchzentrum Basel, Basel; ²Klinik für Allgemein- und Viszeralchirurgie, Luzerner Kantonsspital, Lucerne; ³Department of Health Sciences and Medicine, Universität Luzern, Lucerne; ⁴Klinik Chirurgie & Viszeralchirurgie, Kantonsspital Baselland, Liestal; ⁵Klinik für Allgemein- und Viszeralchirurgie, Kantonsspital Aarau, Aarau; ⁶Chirurgische Klinik, Spitalzentrum Biel, Biel; ⁷Chirurgie Zentrum St. Anna, Hirslanden Klinik St. Anna, Lucerne; ⁸Klinik für Chirurgie, Spitalzentrum Oberwallis, Visp; ⁹Klinik für Allgemein-, Gefäss- & Viszeralchirurgie, Spital Limmattal, Schlieren; ¹⁰Departement Chirurgie, Kantonsspital Olten, Olten; ¹¹Klinik für Viszeralchirurgie, Lindenhof, Bern; ¹²St. Clara Forschung AG, St. Claraspital, Basel)

Background: Early onset colorectal cancer (EOCC), defined as colorectal cancer (CRC) ≤ 50 years, has seen an alarming rising incidence in western countries.

Aims: This research aims to determine the current state of incidence, symptoms, diagnostic methods, and treatment approach in EOCC compared to late onset CRC (LOCRC) in the extended Northwestern Switzerland.

Methods: Patients seeking care for CRC between April-November 2023 were enrolled in a prospective multicenter (11 hospitals within extended Northwestern Switzerland) observational cohort study. Information was collected using questionnaires and patient charts.

Results: We included 315 patients, thereof 38 (10.8%) EOCC. In total 211 (58.9%) patients were male, mean age was 42.5 and 71.2 years, respectively. Rectal bleeding was the main symptom in both groups (60.5% vs 37.0%), followed by change in bowel habits in EOCC and fatigue in LOCRC without reaching significance. Rectal bleeding and mucous, abdominal pain, change of bowel habits and bloating were significantly more often in EOCC. Significantly more LOCRC patients stated that their physical condition affected sexual erection and social interaction, whereas in EOCC, family life was significantly affected. For both groups, endoscopy was the leading diagnostic tool. EOCC had a diagnostic delay of 6.5 weeks compared to their counterparts. No difference in frequency of neoadjuvant treatment, surgical approach or need for emergency surgery was observed. In EOCC, a trend to more lymph node retrieval was observed and significantly more EOCC received an ostomy. Postoperatively, significantly more EOCC than LOCRC patients received adjuvant chemotherapy (55.6% vs 28.6%).

Conclusion: Our analysis illustrates the current standard-of-care of EOCC in the extended Northwestern Switzerland. EOCC compared to LOCRC patients present themselves differently to the medical community, leading to a different approach to their symptoms, which eventually results in a delayed diagnosis. Based on these results, it is time to foster awareness and start redefining national screening criteria.

Metabolomics and Tumor Recurrence after Colorectal Cancer Surgery

B. Montcusí¹, F. Madrid-Gambín², O. J. Pozo², S. Marco³, S. Marin⁴, X. Mayol⁵, M. Jiménez-Toscano¹, S. Salvans¹, S. Alonso¹, M. Pascual¹, M. Cascante⁴, F. Ris⁶, M. Pera⁷ (¹Section of Colon and Rectal Surgery, Department of General Surgery, Hospital del Mar, Barcelona; ²Applied Metabolomics Research Group, Hospital del Mar Medical Research Institute (IMIM), Barcelona; ³Signal and Information Processing for Sensing Systems, Institute for Bioengineering of Catalonia (IBEC), The Barcelona Institute of Science and Technology, Barcelona; ⁴Department of Biochemistry and Molecular Biomedicine, Faculty of Biology, Universitat de Barcelona (UB), Barcelona; ⁵Colorectal Neoplasms Clinical and Translational Research Group, Hospital del Mar Medical Research Institute (IMIM), Barcelona; ⁶Section of Colorectal Surgery, Department of Visceral Surgery, Hôpitaux Universitaires de Genève, Geneva; ⁷Department of General and Digestive Surgery, Hospital Clínic, Barcelona)

Background: Recurrence rates after colorectal cancer (CRC) surgery range from 15 to 25%, despite performing a radical resection with optimal lymphadenectomy and chemotherapy when necessary. The most important prognostic factor is lymph node involvement. Other tumor-related factors, such as lymphovascular and perineural invasion or degree of differentiation, have not improved our capacity to forecast individual oncological outcome. There is a need for studying more factors, which could provide information about the mechanisms of recurrence. Metabolic phenotyping is one of the most widely applicable fields for the evolution of precision medicine.

Aims: The aim of this study was to investigate metabolomics signatures with prognostic value for recurrence after CRC surgery.

Methods: Prospective cohort study including CRC patients operated on for cure from 2015 to 2018. Plasma samples were collected before surgery and analyzed by mass spectrometry-based targeted metabolomics, obtaining 149 metabolites and 21 metabolic ratios. Oncological outcomes were collected. Potential associations between preoperative metabolic markers and recurrence were assessed using cox regression.

Results: 146 patients were included. Clinical, surgical and histopathological characteristics are shown in Table 1. After a minimum follow-up of 5 years, 24 patients (16%) developed recurrence: local in 2 and systemic in 22. After adjusting for potential confounders, 3 metabolic markers were significantly associated with recurrence when analyzing preoperative samples and time to recurrence: spermine, spermidine and aspartate (Table 2). The concentration of these metabolites that optimally differed among the risk of presenting recurrence was calculated and validated by the Kaplan-Meier analysis, providing significance for spermine and spermidine (Figure 1). These metabolites have already been associated with mechanisms of tumor progression.

Conclusion: Metabolic phenotyping could provide biomarkers with prognostic value for recurrence after CRC surgery, in order to identify high-risk patients who would benefit from stricter

follow-up strategies or adjuvant treatment.

	N = 146
Age, mean (SD)	71.2 (12)
Gender, n (%)	
Male	89 (61.0)
Female	57 (39.0)
ASA physical status score, n (%)	
I	3 (2.1)
II	71 (48.6)
III	71 (48.6)
IV	1 (0.7)
Tumor location, n (%)	
Right and transvers colon	64 (43.8)
Left colon	55 (37.7)
Rectum	27 (18.5)
Surgical approach, n (%)	
Laparoscopy	120 (82.2)
Laparotomy	26 (17.8)
Anastomotic leak, n (%)	8 (5.5)
TNM stage, n (%)	
I	40 (27.4)
II	61 (41.8)
III	45 (30.8)
Histological type, n (%)	
Intestinal adenocarcinoma	135 (92.5)
Mucinous adenocarcinoma	8 (5.5)
Others	3 (2.0)
Histological differentiation, n (%)	
Low grade	132 (90.4)
High grade	14 (9.6)
Lymphovascular invasion, n (%)	57 (39.0)
Perineural invasion, n (%)	37 (25.3)

Table 1

Metabolic marker	HR	CI 2.5%	CI 97.5%	P	FDR
Spermine (Spm)	7.16	2.19	23.38	0.001	0.007
Spermidine (Spd)	8.03	2.37	27.23	0.001	0.007
Aspartate (Asp)	7.70	2.20	26.92	0.001	0.031
Asparagine (Asn)	30.00	2.73	329.96	0.005	0.054
Isoleucine (Ile)	11.55	1.93	69.14	0.007	0.054
Acylcarnitine C16	7.28	1.62	32.84	0.010	0.059
Acylcarnitine C18	6.32	1.60	24.98	0.009	0.059
Acylcarnitine C10	6.34	1.25	32.05	0.026	0.077
Acylcarnitine C18:1	11.37	1.42	91.27	0.022	0.077
Sphingomyelin SM C26:0	6.03	1.73	24.58	0.006	0.090
Methionine sulfoxide (MetSO)	7.16	1.02	50.07	0.047	0.204
Sphingomyelin SM C26:1	6.03	1.04	35.06	0.045	0.363
Phosphatidylcholine PC aa C32:3/PC aa C32:0	0.01	0.00	0.29	0.005	0.563
Lysophosphatidylcholine LPC a C20:4	12.91	1.15	144.73	0.038	0.994

CI indicates confidence interval; FDR, false discovery rate; HR, hazard ratio.

Table 2

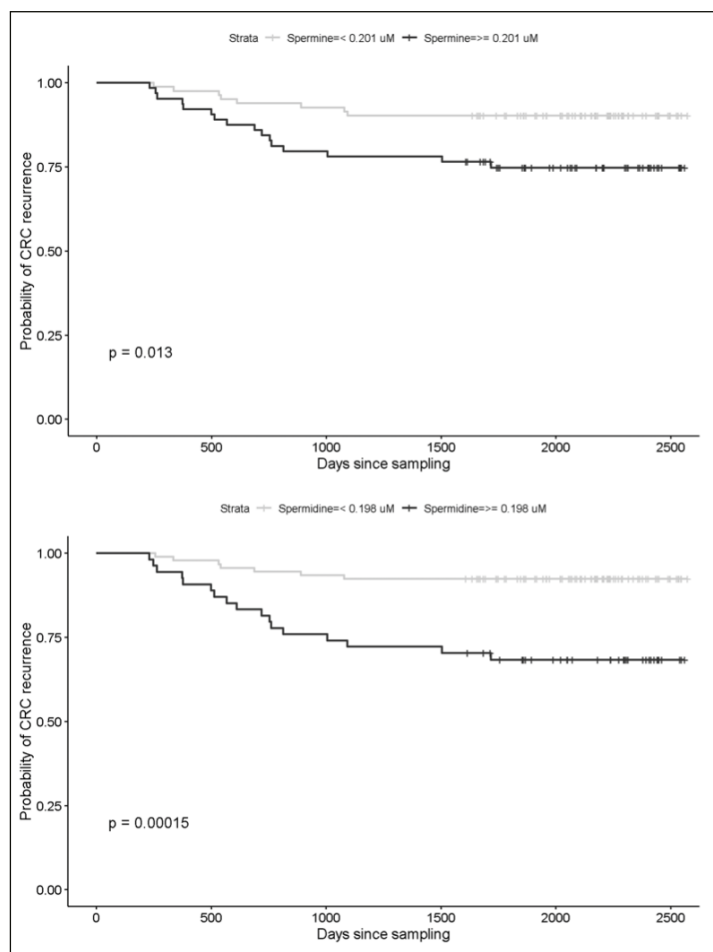


Figure 1

Evaluation of the Low Anterior Resection Syndrome and Quality of Life in Patients Having Undergone Sphincter Sparing Rectal Cancer Surgery

J. Fiechter¹, R. Sguinzi¹, L. Bafumi², B. Gremaud³, B. Geng¹, L. Bühler¹, B. Egger¹ (¹General Surgery, HFR Fribourg, Fribourg; ²Faculty of medicine, University of Fribourg, Fribourg; ³Faculty of Medicine, University of Fribourg, Fribourg)

Background: In order to avoid abdomino-perineal amputation and permanent colostomy in patients with low rectal cancer sphincter sparing low anterior resection (SSLAR) techniques with/without neoadjuvant radio-chemotherapy are administered. However, a lot of SSLAR-patients have life quality limiting symptoms afterwards, like fecal urgency, incontinence, constipation and sensation of incomplete rectal emptying. Such symptoms are defined as "low anterior resection syndrome" (LARS). LARS quantification can be made by a specific and validated quality of life (QoL) questionnaire (Fig. 2).

Aims: Assessment of the QoL in patients after SSLAR suffering from LARS before and after specific therapy.

Methods: This is a monocentric, retrospective cohort study including patients having undergone SSLAR for rectal cancer 2014 - 2021. Initial LARS-scores were obtained by completion of the specific questionnaire. Patients with a minor LARS (scores 21-29) were treated with electrostimulation and bio-feedback physiotherapy. Those with a major LARS (scores >29) were first investigated by anal manometry followed by physiotherapy. After treatment LARS-scores were obtained again.

Results: Of 136 identified SSLAR-patients, 68 did not fulfill the inclusion criteria's (Fig. 1). Of the remaining 54 patients, 20.4% had a minor, 37% a major and 42.6% no LARS. Of all LARS-patients, 13 completed pelvic physiotherapy, 4 are still completing and 14 (26%) refused such a treatment. The mean-LARS score was 32.77 and 22.92, before and after treatment, respectively ($p=0.004$). Risk factor analysis (diabetes, type of anastomosis, neoadjuvant radio-chemotherapy, previous operations, nicotine, alcohol) did not reveal any significant difference between groups.

Conclusion: More than 50% of patients undergoing SSLAR are suffering from LARS, more than one third from major LARS. QoL is impressively improved by specific physiotherapeutic measures. In order to avoid later treatment hesitancy (26%), we began to initiate early specific physiotherapy as a standard in all SSLAR-patients.

Patients with dementia
Institutionalized patients
Patients with a definitive stoma at the moment of the study
Patients who are not able to fill out the questionnaire due to poor medical conditions
Patients who refuse to participate to the study
Minor patients

Figure 1. Exclusion criteria

The aim of this questionnaire is to assess your bowel function. Please tick only one box for each question. It may be difficult to select only one answer, as we know that for some patient's symptoms vary from day to day. We would kindly ask you to choose one answer which best describes your daily life. If you have recently had an infection affecting your bowel function, please do not take this into account and focus on answering questions to reflect your usual daily bowel function.

Q.1 : Do you ever have occasions when you cannot control your flatus (wind)?

☐ No, never 0

☐ Yes, less than once per week 4

☐ Yes, at least once per week 7

Q.2 : Do you ever have any accidental leakage of liquid stool?

☐ No, never 0

☐ Yes, less than once per week 3

☐ Yes, at least once per week 3

Q.3 : How often do you open your bowels?

☐ More than 7 times per day (24 hours) 4

☐ 4-7 times per day (24 hours) 2

☐ 1-3 times per day (24 hours) 0

☐ Less than once per day (24 hours) 5

Q.4 : Do you ever have to open your bowels again within one hour of the last bowel opening?

☐ No, never 0

☐ Yes, less than once per week 9

☐ Yes, at least once per week 11

Q.5 : Do you ever have such a strong urge to open your bowels that you have to rush to the toilet?

☐ No, never 0

☐ Yes, less than once per week 11

☐ Yes, at least once per week 16

Add the scores from each of the five answers to one final score.

Interpretation: 0-20 = No LARS 21-29 = Minor LARS 30-42 = Major LARS

Figure 2. LARS score

Utero-Ovarian "out of field" Transposition Before Pelvic Radiation in a Patient with Rectal Cancer: A First Swiss Experience

I. Fournier^{1,2}, D. Huber³, Y. Hurmi³, I. Dischl⁴, F. J. Pena Rios⁵ (¹General Surgery, Hôpital du Valais-CHVR-Sion, Sion; ²Visceral Surgery and transplantation, Geneva University Hospital (HUG), Geneva; ³Gynecology and Obstetrics, Hôpital du Valais-CHVR-Sion, Sion; ⁴Oncology, Hôpital du Valais-CHVR-Sion, Sion; ⁵Radio-oncology, Hôpital du Valais-CHVR-Sion, Sion)

Background: Colorectal cancer represents the third most common cancer and the second leading cause of cancer-related mortality worldwide. The incidence of rectal cancer is rising faster and is increasing among young adults. Due to advances in diagnosis and treatment, most young patients with rectal cancer present long-term survival. Treatment-related infertility represents a largely unaddressed problems.

Fertility preservation is essential in managing young women requiring chemo- and radiotherapy for rectal cancer. Ovaries and oocytes are very sensitive to radiation and chemotherapeutic agents, and current fertility preservation strategies include oocytes, embryos, or ovarian tissue cryopreservation and ovarian transposition out of the radiation field. Nevertheless, patients have little probability of procreating due to irreversible uterine radiation damages. Utero-ovarian "out of field" Transposition [UOT] represent an interesting perspective specially in countries where pregnancy surrogacy is not allowed.

Aims: Demonstrate feasibility of an innovative surgical procedure permitting uterine functional preservation after long course neoadjuvant therapy for low rectal cancer including total chemo and radio-chemotherapy.

Methods: First Clinical Swiss experience case presentation. In addition, of a systematic review of the literature available to date on all cases of UOT was realized, and 13 patients from 9 articles were included

Results: A 28-year-old nulligravida patient was diagnosed with a low-grade rectal adenocarcinoma. Before neoadjuvant therapies, the patient underwent laparoscopic UOT. The intervention was performed without complications, and the patient received neoadjuvant treatments as planned. TaTME and uterus repositioning were completed six weeks after the radiotherapy's end. No complications were observed during the first 9 postoperative months. Adequate utero-ovarian perfusion was assessed by Doppler ultrasound, cervicovaginal anastomosis appeared healed correctly, and the patient experienced menstrual bleeding. Data from the literature review of reported cases of UOT were presented.

Conclusion: UOT represents a valuable option to preserve fertility in patients requiring pelvic radiotherapy. This study provides additional evidence on the feasibility and safety of UOT.

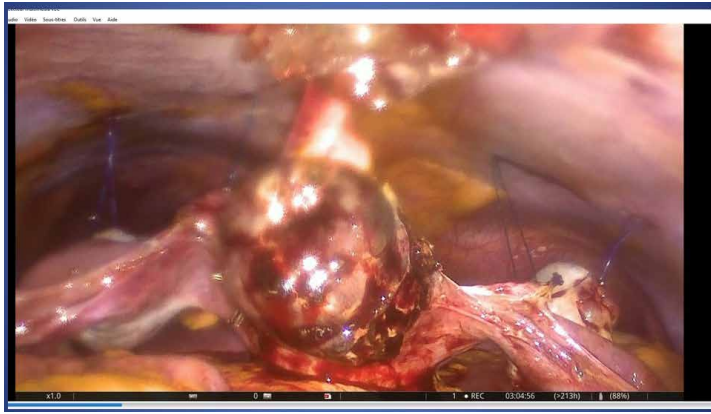


Figure 1. Uterine transection

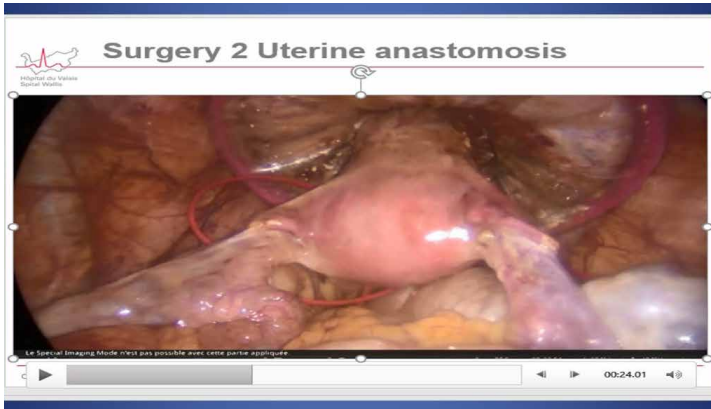


Figure 2. Uterine reimplantation

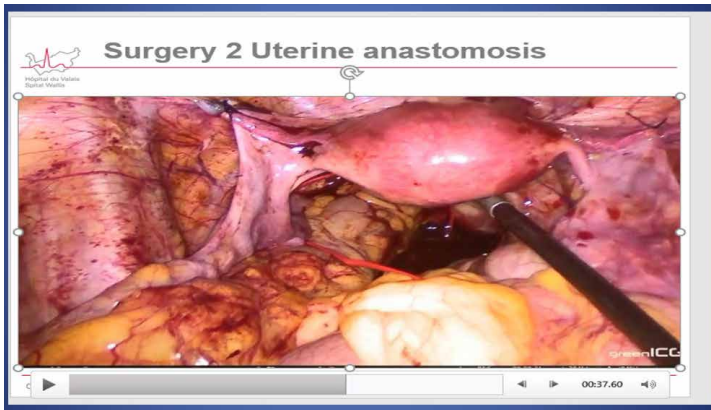


Figure 3. Final view after colorectal anastomosis

Influence of Diabetes Mellitus on the Early Postoperative and Longterm Oncologic Outcome of Colonic Cancer

J. Kühnel¹, R. Otto², F. Meyer², R. Croner² (¹Viszeral-, Allgemein-, Gefäß- und Transplantationschirurgie, Universitätsklinikum Magdeburg, Magdeburg DE; ²Viszeral-, Allgemein-, Gefäß- und Transplantationschirurgie, Universitätsklinikum Magdeburg, Magdeburg)

Background: The influence of diabetes (DM) on the incidence of cancer has been known for some time. So far only less is known about the influence of DM on the postoperative outcome on patients with colonic cancer.

Aims: Aim of this study was to evaluate the influence of DM and its associated factors on the early postoperative and the longtime oncologic outcome.

Methods: As part of a prospective multicentric observation study 62 items including pre-, peri- and postoperative factors in patients with colonic cancer were collected for 3 years. Patients with DM have been compared with patients without DM. Early postoperative outcome included morbidity and hospital lethality. Longterm oncologic outcome has been characterized by 5-year-overallsurvival, 5-year-diseasefree-survival and 5-year-LRR.

Results: In total 9167 patients were included. The patients were separated in diabetic patients (DM) 20.5% (37.8% insulindependent (IDDM)) and 79.5% non-diabetic (NDM) patients. At the time of cancer diagnosis DM patients had a higher UICC level. In addition DM patients had a significant higher ASA Score than NDM patients ($p < 0.001$). In particular IDDM patients showed a higher incidence of ASA- Scores III-IV. More general complications were noticed in DM patients ($p < 0.001$). Of a total hospital lethality of 4.2%, DM patients also had the significant higher number. In particular IDDM patients (5.8%) had a higher number of hospital lethality compared with NIDDM patients (5.0%, $p < 0.001$). In summary the multivariate analysis identified diabetes, in particular insulindependent diabetes, as an independent risk factor of a worse

5-y-OAS (HR = 1,24 [95-Cl: 1,10-1,38]; $p < 0,001$) and a worse 5-y-DFS (HR = 1,23 [95-Cl: 1,07-1,41]; $p = 0,004$).

Conclusion: In answer to the hypothesis a higher postoperative rate of complications was found as well as an inferior 5-y-OAS and a lower 5-y-DFS in diabetic patients. Continuation of the higher risk potential of insulindependent diabetes should be further discussed and investigated.

Intratumoral Budding in Preoperative Biopsies is Predictive for Survival in Patients with Colorectal Cancer - A Prospective Observational Single Center Study

J. Fischer¹, L. Brügger¹, A. Haefeli¹, A. Lugli², D. Candinas¹, H. Dawson², A. Kohler¹ (¹Department of Visceral Surgery and Medicine, Inselspital, Bern University Hospital, University of Bern, Switzerland, Bern; ²Institut für Gewebemedizin und Pathologie, University of Bern, Switzerland, Bern)

Background: Tumor budding is defined as a cluster of up to five tumor cells detached from the main tumor and can be determined at the invasive front of the tumor (peritumoral budding, PTB) or within the tumor mass (intratumoral budding, ITB). While PTB is an established prognostic biomarker but only assessed in colorectal cancer (CRC) resections, ITB can be identified in early biopsies, potentially guiding personalized treatment like neoadjuvant therapy or surgical planning. Therefore, the application of ITB in biopsies would support the preoperative management of CRC patients.

Aims: The aim of this study was to prospectively assess survival depending on ITB in the initial endoscopic biopsy in CRC patients.

Methods: 79 patients with newly diagnosed colorectal cancer from 2016 to 2020 were prospectively enrolled. ITB was assessed in the initial biopsy after staining with H&E and immunohistochemistry for cytokeratin. Primary outcome was overall survival as assessed by a follow-up two years after surgery. To determine the cutoff between the low- and high risk ITB group, a ROC-Analysis was performed. Kaplan-Meier (KM) estimates and a log-rank test were performed to analyze the difference between the ITB-low and -high groups.

Results: Mean age (\pm SEM) of the participants was 68.02 ± 1.47 years. Male to female ratio was 1.7 to 1. The ROC analysis determined a cutoff of > 8 buds/ 0.785 mm^2 for stratification between the low- and high-risk group. The survival analysis in the ITB low group revealed six deaths out of 51 patients (11.7%) compared to four out of ten patients (40%) in the ITB high group. Survival probability differed significantly in the two groups in the KM-analysis ($p = 0.022$).

Conclusion: This prospective study reveals a prognostic role of ITB in pre-operative biopsies and its assessment could lead to a better management of CRC patients.

When the Transverse Colon does not Reach the Rectum: Laparoscopic Technique of the Retroileal Transmesenteric Colorectal Anastomosis

G. Staccini, A. Vanoni-Colombo, V. Sitta, D. Christoforidis (Chirurgia viscerale, Ospedale civico Lugano, Lugano)

Background: A tension-free colorectal anastomosis is often difficult to perform after an extended left hemicolectomy, determining an increased risk of anastomotic leak. In this case, one option is a total colectomy with ileo-rectal anastomosis, but it has the disadvantage of scarifying healthy colon length and the ileo-cecal valve resulting to increased bowel frequency. Alternatively, a transverse colon-rectal anastomosis can be fashioned using the Deloyers' rotation technique or a retroileal transmesenteric anastomosis technique.

Aims: This video demonstrates the technique and our experience with laparoscopic tension-free colorectal anastomosis through a transmesenteric retroileal window.

Methods: Three patients between April 2018 and December 2023 were operated using this approach following extended left colectomy. Colonic length was insufficient to reach the rectum from the left side of the Treitz for several reasons: one patient had inadvertent intraoperative marginal artery injury of the solenic flexure; one had synchronous colonic tumors; one had undergone several colonic resections.

Results: After extended left colectomy, the terminal ileum was identified and a window was created in an avascular portion of the ileal mesentery, between the ileocolic pedicle and the SMA arcade. The transverse colon was brought into the pelvis through the window and a standard end-to-end anastomosis was then performed. There were no anastomotic complications or early postoperative morbidity related to the mesenteric window.

Conclusion: The transmesenteric retroileal colorectal anastomosis can be performed laparoscopically and is a good option to counteract the lack of length after extended left colectomy.

Endocrine Session – AGEC/GTEC

Syndromic MEN1 Parathyroid Adenomas Consist of Both Subclonal Nodules and Clonally Independent Tumors

C. Nesti¹, K. Bräutigam², B. Niederle³, A. Perren⁴, R. M. Kaderli¹ (¹Department of Visceral Surgery and Medicine, Inselspital Bern, Bern; ²Institute of Tissue Medicine and Pathology, University of Bern, Bern; ³Division of Visceral Surgery, Medical University of Vienna, Vienna; ⁴Institute of Tissue Medicine and Pathology, University of Bern, Bern)

Background: Primary hyperparathyroidism with parathyroid tumors is a characteristic presentation in Multiple Endocrine Neoplasia Type 1 (MEN1), historically referred to as "primary

hyperplasia." The question of whether these tumors signify a multi-glandular clonal disorder or hyperplasia remains inconclusive. Loss of Menin protein expression serves as a reliable surrogate marker for biallelic inactivation and indicates a mutation in the MEN1 gene. The cyclin-dependent kinase inhibitor 1B (CDKN1B) gene, associated with MEN4, encodes the p27 protein, whose expression is inadequately explored in the context of syndromic MEN1.

Aims: The aim was to explore the molecular basis of syndromic MEN1 parathyroid adenomas, identifying hyperplasia, multiple independent clones, and the extent of Menin loss. Additionally, p27 expression was assessed to evaluate its potential in indicating a germline mutation, especially in distinguishing MEN4 as a clinical alternative to MEN1.

Methods: In this investigation, we examined histomorphology and protein expression of Menin and p27 in parathyroid adenomas from 25 patients in two independent, well-characterized MEN1 cohorts. Loss of heterozygosity (LOH) patterns were evaluated using fluorescence in situ hybridization (FISH) in one MEN1-associated parathyroid adenoma. Furthermore, next-generation sequencing (NGS) was conducted on eleven nodules from four MEN1 patients.

Results: Morphologically, the majority of MEN1 adenomas displayed multiple distinct nodules, characterized by predominantly lost Menin expression and reduced p27 protein expression. FISH analysis indicated that most nodules exhibited MEN1 loss, with or without centromere 11 loss. NGS demonstrated both subclonal evolution and the existence of clonally unrelated tumors.

Conclusion: Syndromic MEN1 parathyroid adenomas, therefore, consist of multiple clones with subclones, aligning with the current framework of the novel WHO classification of parathyroid tumors (2022). The observed loss of p27 expression in a significant fraction of MEN1 parathyroids emphasizes the need for caution when inferring MEN4 solely based on p27 expression.

Autonomous and Self-sustained Circadian Oscillators Displayed in Human Primary Parathyroid Cell Culture Drive Parathormone Secretion

V. Petrenko^{1,2}, C. Dibner^{2,3}, O. Golaz⁴, F. Triponez¹, C. de Vito⁵, M. S. Demarchi¹ (1Surgery, University Hospitals of Geneva, Geneva; 2Cell Physiology and Metabolism, University of Geneva, Geneva; 3Surgery, Geneva University Hospitals, University of Geneva, Geneva; 4Diagnostics Department and Department of Internal Medicine Specialities, University Hospitals of Geneva, Geneva; 5Clinical Pathology, University Hospitals of Geneva, Geneva)

Background: Most cells in our body possess circadian oscillators controlling diurnal rhythmicity of body metabolism. The role of molecular clocks in regulating the function and dysfunction of human parathyroid gland (PG), responsible for calcium homeostasis, has not been unraveled. Hyperparathyroidism is a common endocrine pathology, characterized by an unadapted PTH secretion to calcium levels.

Aims: Here we aimed at characterizing molecular makeup of circadian clocks in human primary parathyroid cell culture (HPPCC), and at establishing differential transcriptional patterns of normal and pathological PGs.

Methods: RNA extracted from normal, adenomatous, and hyperplastic PG tissues was subjected to RNA sequencing (RNAseq) analysis. The rim of normal PG tissue was dissected from parathyroid adenoma specimens based on the higher autofluorescence intensity assessed by the near infra-red imaging. HPPCCs were established from adenomatous and hyperplastic PG biopsies. Efficient circadian clock disruption was achieved in HPPCCs by small interfering RNA-mediated knockdown of CLOCK. The functionality of circadian clock machinery was assessed by continuous recording of circadian bioluminescence introduced via lentivectors and paralleled with around-the-clock measurement of PTH secretion using perfusion system.

Results: The RNAseq analyses revealed transcriptional signatures that distinguished between pathological and normal PGs, and among adenomatous and hyperplastic PGs. We report, for the first time, robust anti-phasic circadian rhythmicity of Per2-luciferase and Bmal1-luciferase reporters in HPPCCs synchronized in vitro. Strikingly, we observed circadian rhythmicity of PTH secretion by parathyroid adenoma cells. Moreover, clock disruption in PG adenoma cells has an impact on transcription of functional genes.

Conclusion: Our data indicate presence of cell-autonomous molecular clock in human PG cells paralleled with circadian rhythmic PTH secretion and provide large-scale transcriptional pattern of parathyroid adenoma and hyperplastic tissues.

Minimal Invasive Resection of Large Retrosternal Thyroid Goiter: A Technical Video

P. Aeschbacher, M. A. Huguenin-Dezot, Y. M. Borbély, R. M. Kaderli (Inselspital, Bern University Hospital, University of Bern, Switzerland, Bern)

Background: Resecting a large goiter extending into the retrosternal space is challenging, especially when a sternotomy or thoracotomy is required. The transthoracic approach is linked to higher postoperative morbidity reaching up to 30% when compared to the transcervical approach. Although alternative options like thoracoscopic resection have shown promising results, the morbidity of mediastinal dissection remains a concern.

Aims: We present an innovative technique: a thoracoscopic-assisted transcervical approach for large retrosternal goiter resection. This video outlines the steps and potential pitfalls of the procedure.

Methods: The patient is positioned supine with an extended neck. Initially, the endocrine surgeon performs a conventional thyroidectomy through a cervical access, including lymphadenectomy if indicated. Subsequently, the patient is mobilized into a lateral decubitus position, and a second team thoracoscopically guides the mediastinal tumor through the thoracic inlet. This allows a stepwise controlled transcervical dissection of the retrosternal mass until complete resection is achieved, thus, eliminating the need for mediastinal dissection.

Results: To demonstrate the procedure, we present the case of an 84-year-old male with lymph node-positive oncocytic thyroid carcinoma and a large retrosternal goiter extending posteriorly

into the mediastinum up to the aortic arch. Thoracoscopic-assisted transcervical resection was performed. The recurrent laryngeal nerve was identified and monitored with a neurostimulator device during dissection. No palsy was noted in the postoperative evaluation. The patient had an uneventful postoperative course and was discharged on the second postoperative day.

Conclusion: Thoracoscopic-assisted transcervical resection of large retrosternal goiter seems a feasible alternative to mitigate risks associated with thoracotomy, sternotomy or thoracoscopic mediastinal dissection. Potential advantages include decreased postoperative morbidity and length of stay. This technique requires the presence of a second team with thoracoscopic experience and may be limited depending on the goiter's size and mediastinal positioning.

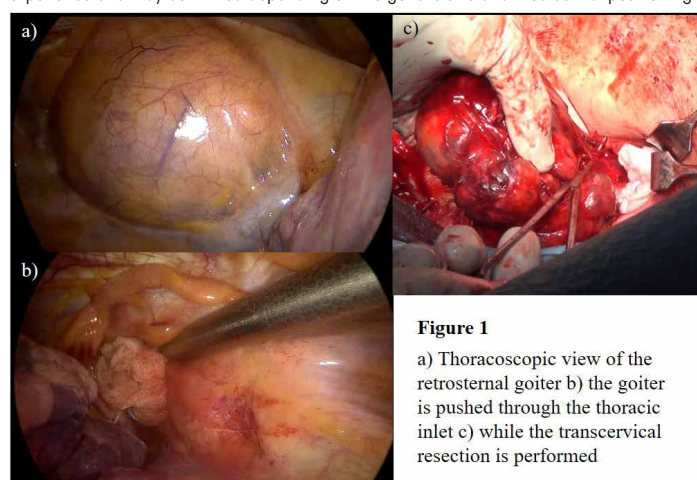


Figure 1

a) Thoracoscopic view of the retrosternal goiter b) the goiter is pushed through the thoracic inlet c) while the transcervical resection is performed

Minimally-Invasive Robotic-Assisted Resection for Intrathoracic Goiter- a Feasible Alternative to Thoracotomy and Sternotomy

A. S. Hotz, H. Gelpke, A. Zehnder, S. Schmidt, A. Goldmann (Kantonsspital Winterthur, Winterthur)

Background: Goiter is a common presentation in daily clinical practice. It usually grows slowly and in rare cases with intrathoracic extension. There is no clear definition of intrathoracic goiters. The incidence in the literature varies from 3% to 7%. Most intrathoracic goiters are localized in the anterior mediastinum, with less than 25% are localized in the posterior mediastinum. This presents a challenge for surgical resection. Traditionally, the intrathoracic portions have been resected via sternotomy for anterior goiters and thoracotomy for posterior goiters. With the increasing use of robotic surgery, new possibilities for minimally invasive surgery and especially robotic procedures have emerged. This may reduce morbidity and length of hospital stay

Aims: The study aims to show that minimally-invasive robotic-assisted resection for intrathoracic goiter is safe and feasible.

Methods: During the study period from January 2021 to December 2023, 548 thyroid operations were performed in our clinic. All operations were prospectively recorded in the Eurocrine registry and retrospectively analyzed. Goiter was defined as intrathoracic according to perioperative findings (caudal border not visible on sonography and/ or further preoperative investigations ordered). Primary and secondary endpoints were outcome, conversion rate, and incidence of intrathoracic goiter.

Results: In our clinic, 19/548 patients (3.5%) presented with intrathoracic goiter. 17/19 patients were operated via conventional cervical approach. In 2 patients, minimally-invasive robotic mobilization of the large posterior portion of the goiter was performed in combination with conventional cervical thyroidectomy. No conversion was required. Based on our cases, we present robotic intrathoracic thyroid mobilization as a novel technique to avoid thoracotomy. The rate of recurrent nerve palsy in intrathoracic goiter was 1/28 (3.5%) nerves at risk and occurred with conventional approach. No secondary bleeding or other complications were observed.

Conclusion: The minimally-invasive robotic approach seems to be a promising alternative to open procedures such as thoracotomy and can reduce morbidity and length of hospital stay.

Intraoperative Detection of Parathyroid Glands Through Autofluorescence: A Comparative Analysis

J. B. Dubuis, M. S. Demarchi, F. Triponez, B. Vasey, V. Petrenko (Hôpitaux universitaires de Genève, Geneva)

Background: Accurate parathyroid identification in thyroid surgery is essential for optimal patient outcomes and preventing post-operative hypoparathyroidism. Traditional naked-eye observation methods pose challenges, prompting exploration into the effectiveness of Near-Infrared Autofluorescence (NIRAF) technology in enhancing intraoperative parathyroid gland detection.

Aims: This study aims to evaluate the effectiveness of image-based Near-Infrared Autofluorescence (NIRAF) technology in enhancing intraoperative parathyroid gland detection compared to naked-eye identification.

Methods: A single-center retrospective study involving 490 patients undergoing total thyroidectomy between September 2014 and April 2023 was conducted by experienced endocrine surgeons in a high-volume center. Patients were categorized into three groups based on parathyroid identification methods: 1. Naked eye before NIRAF introduction (naked eye; n=176), 2.

Conclusion: This study suggests that image-based autofluorescence devices significantly enhance parathyroid gland detection compared to naked-eye observation, even during active searches for parathyroid tissue. These findings underscore the valuable contribution of image-based autofluorescence technology in improving parathyroid gland identification during surgical procedures and potentially reducing complications.

A. Fiore¹, A. Posabella², C. Carlen³, A. Lalos², I. Lazaridis⁴, B. Kern², B. Müller², R. Droeser⁵, T. Delko⁶
(¹Universitätsklinik für Viszerale Chirurgie und Medizin, Inselspital Bern, Bern; ²Viszeralchirurgie, Clarunis Universitäres Bauchzentrum Basel, Basel; ³Faculty of Medicine, University of Basel, Basel; ⁴Viszeralchirurgie, Spital Limmattal, Schlieren; ⁵Faculty of Medicine, University of Basel, Basel; ⁶Viszeralchirurgie, Chirurgie Zentrum St. Anna, Lucerne)

Results: A total of 145 patients underwent surgery, with a mean age of 57.4 years and prevalence of women (64.8%). The preoperative localization of solitary adenoma obtained by two different concordant imaging studies, has been confirmed during surgery in 137 cases (94.4%). In 113 patients (77.9%) a focused parathyroidectomy has been performed, while in 27 patients (18.6%) a simultaneous hemithyroidectomy was necessary. No ectopic parathyroid adenoma has been removed. The mean intraoperative parathormone (iPTH) drop was 75.6% ($\pm 15.9\%$), meeting the Miami criterion in 92.5% of cases. The volume of the lesion after pathological specimen analysis was divided into three groups (low $<1\text{ml}$, middle $1\text{--}1.99\text{ml}$, large $>2\text{ml}$). Preoperative calcium and PTH values were significantly higher in the large volume group compared to the low volume group (resp. $p=0.008$ and $p=0.001$), while phosphate values were significantly lower ($p=0.001$). The volume of the gland of any group did not correlate with the drop of iPTH ($p=0.071$), the surgical approach ($p=0.426$), the duration of the surgery ($p=0.141$), the onset of intraoperative laryngeal nerve lesion ($p=0.477$) and postoperative morbidity ($p=0.785$).

Conclusion: Compared to volume less than 1 ml, volume of pathologic parathyroid gland >2ml was associated with higher preoperative PTH and calcium levels and lower phosphate levels. The volume of the parathyroid gland does not impact the intra and perioperative outcomes.

Free Communication II – SGG

F. Moehle¹, R. D'Amico², A. Zdoroveac², C. Thalhammer³, L. Guerke¹, T. Wolff¹, A. Isaak² (¹Vascular surgery, University Hospital Basel, Basel; ²Vascular surgery, Cantonal Hospital Aarau, Aarau; ³Angiology, Cantonal Hospital Aarau, Aarau)

Results: Between 2017 and 2023 38 patients were treated with a FRAME™ device, 29 (76%) had a popliteal aneurysm, 11 (24%) had peripheral artery disease. Mean vein diameter was 5.6 mm (+/- 1.7 mm). Mean diameter of the FRAME™ device was 5.7 mm, mean length 65.7 cm. Mean follow-up was 23 months. Overall, death-censored primary patency was 84% after 1 year and 78% after 2 and 3 years. (Figure 1) On ultrasound no infolding of the vein wall of varicose vein segments contained in the FRAME™ device could be identified. No patients developed focal vein graft stenosis in the treated graft segments. No patients developed infectious complications. Vein grafts to the popliteal artery had a primary patency of 94% after 1. 2

Conclusion: External stenting of ectatic vein grafts used for femoro-popliteal or -tibial bypass seems to be feasible and safe to protect vein graft from aneurysmatic modification. Primary patency rates are comparable with literature data from conventional lower extremity vein grafts.

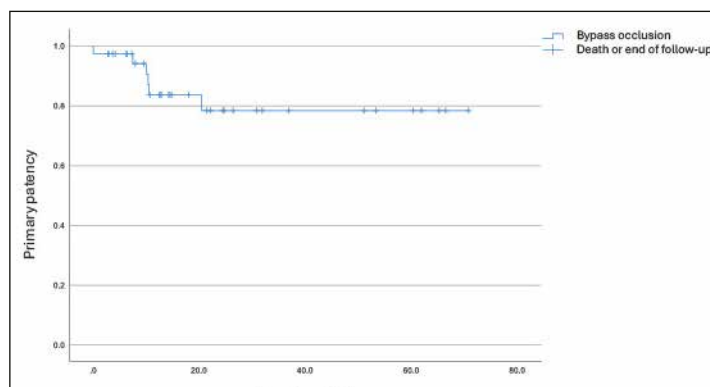


Figure 1. Overall bypass patency

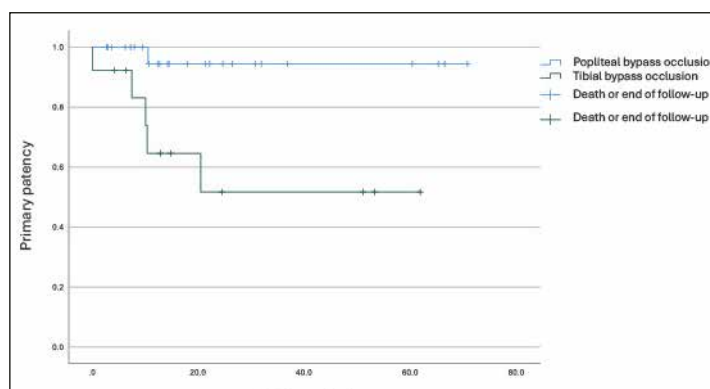


Figure 2. Popliteal an tibial bypass patency

S. Déglise, J. Longchamp, E. Côté¹, R. Trunfio, C. Deslarzes-Dubuis, S. Marques Lopes, E. Haefeli
(Vascular Surgery, CHUV, Lausanne)

Results: Forty-two patients with an average age of 69 years were included in this study. A history of dialysis was present in 45% (n = 19) of patients. The native AVFs were separated according to their location with 55% of humero-cephalic fistulas (n=23) and 45% of radio-cephalic fistulas (n=19). Mean diameter of radial and humeral arteries were 2.3 mm (1.4-3.5) and 4.3 mm (3-6.2), respectively. Mean diameter of the cephalic vein was 3.0 (2.2-3.9) and 3.8 (2.2-5), respectively. The mean blood flow at 1 month was 753 ml/min (428-1200) and 1415 ml/min (320-3094), respectively. Two patients with a radio-cephalic AVF presented an occlusion. The overall maturation failure rate at 1 month was 21%. It reached 10% and 38% (p=0.0217) for humero-cephalic and radio-cephalic fistulas, respectively.

Conclusion: Our study validates the data reported in the literature finding a similar quite elevated rate of early maturation failure. Despite adapted definition of maturation failure and a small cohort, we manage to underline the importance of early maturation failure and its prevalence. Further studies intended to be prospective and including a more large number of patients are nevertheless necessary in order to identify real predictive factors.

O. A. Sayin¹, A. Zdoroveac¹, L. Gürke², A. Isaak¹ (¹Kantonsspital Aarau, Aarau; ²Universitätsspital Basel, Basel)

Aims: This retrospective study aims to report the outcomes of obturator bypass procedures performed between 2019 and 2024 in our institution.

Methods: Sixteen patients underwent a total of 18 obturator bypass procedures during the study period. Demographic data, comorbidities and previous interventions as well as graft material, in- and outflow vessels and patency were recorded. A descriptive analysis has been performed.

Results: The mean clinical follow-up was 420 ±457 days. The predominant indication for surgery was infection of the groin in 12 patients (75%). The choice of inflow artery varied, with the iliac artery utilized in 8 cases, the infrarenal aorta in 5 cases, and the axillary artery in 3 cases. A PTFE vascular graft was used in 11 cases, bovine pericardium in 5 cases. In one patient, the original PTFE was replaced with pericardium due to graft infection. In another patient, the pericardial prosthesis was replaced with a PTFE ring prosthesis due to thrombosis. The primary and secondary patency rates at 12 months were 66% and 72% respectively. There was no peri- or early postoperative mortality. Three patients died during the follow-up period. One could be attributed to sepsis due to graft infection at the wound site.

Conclusion: This data supports the significance of the obturator bypass in patients with hostile groin and provides valuable insight into its efficacy. The technique remains the vascular surgeon's armamentarium.

Mobile vs Fixed Fluoroscopy System for EVAR Image Quality and Radiation Doses for Patients and Professionals: Mobile C-Arm vs Hybrid Room for EVAR

S. Déglise¹, M. Nowak², A. Labarbe², J. Caldas Rodrigues³, E. Côté¹, R. Trunfio¹, J. Longchamp¹, C. Deslarzes-Dubuis¹ (¹Vascular Surgery, CHUV, Lausanne; ²Institute of Radiation Physics, CHUV, Lausanne; ³Radiology, CHUV, Lausanne)

Background: Allowing less invasive treatments, endovascular aortic repair (EVAR) has become the gold standard worldwide for the treatment of abdominal aortic aneurysms, leading to questions regarding staff and patients' exposure to radiation. Widely performed in our center, EVAR was initially carried out on mobile C-arm (Cios-alpha, Siemens). Since 2022, EVAR was then performed in a hybrid room (Artis-Pheno, Siemens).

Aims: The aim of this study is to compare image quality and patients and professionals' radiation exposure between both systems.

Methods: Image quality has been tested for fluoroscopy and fluorography mode on the moving system, with PMMA plates and copper disc. A Radcal ionization chamber was used to measure patient skin dose. Dosimetric and clinical parameters (e.i. Kerma, fluoroscopy time, BMI...) were recorded for 79 and 43 patients, respectively, on mobile C-arm and hybrid room. Staff exposure was measured with thermoluminescent detectors, on an anthropomorphic phantom, representative of the physician. Scattered radiation was created by irradiating PMMA plates. Different radiation protection gears have been tested comparable to daily clinical use.

Results: We showed that using the fluoroscopy mode, Cios-alpha was more irradiating for similar image quality as compared to the Artis-Pheno. Moreover, using the fluorography mode, Artis-Pheno provided a comparable dose rate but significantly better image quality. When comparing similar patient cohorts (BMI, sex), kerma was twice higher on Artis-Pheno due to fluorography, accounting for 27% of the total dose.

In terms of staff exposure, the dose rate decreased by 51% and 99% in fluoroscopy, and 22% and 99% in fluorography when using Artis-Pheno compared to Cios-alpha (respectively, without any and with radiation protection gear).

Conclusion: Our study highlights the advantage of a fixed system (hybrid room) in term of both image quality and staff exposure compared to mobile system. However, particular attention must be paid to optimize protocols of such a machine to guarantee the best possible radiation protection for the patient.

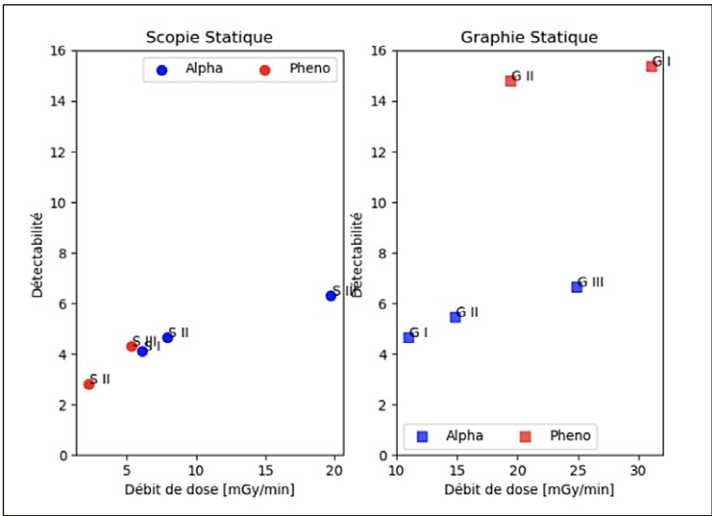


Figure 1. Image quality in function of the dose rate

	Cios Alpha n = 79	Artis Pheno n = 8	p-value
DAP Total [Gy.cm ²]	112.2 (87.7-147.0)	127.5 (101.1-148.2)	0.6541
Fluoroscopy	98.4 (77.1-127.5)	62.7 (50.3-67.7)	
Graphy	13.9 (10.2-20.6)	47.63 (32.2-68.7)	
Air Kerma Total [mGy]	536 (406-687)	1185 (664-1383)	0.0045
Fluoroscopy	473 (359-579)	609 (432-751)	
Graphy	60 (44-91)	432 (232-485)	
Irradiation time Total [s]	5335 (4138-6702)	4889 (4018-5881)	0.7745
Fluoroscopy	4834 (3884-6285)	4750 (3917-5708)	
Graphy	308 (227-442)	136 (102-174)	
Exposition Total [s]	674 (537-868)	138 (115-194)	0
Fluoroscopy	631 (508-794)	127 (105-177)	
Graphy	43 (32-54)	11 (10-14)	
Temps en salle			

Table 1. Exposition characteristics between two imaging modalities

Hybrid Procedures in Surgery of Varicose Veins

C. Rouden, C. Koella, F. Lain (Gefässchirurgie-Venen Zentrum, Kantonsspital Baselland, Bruderholz/ Binningen)

Background: During the past 25 years ETA (endovenous thermal ablation) has successively replaced classic "high ligation and stripping" and been established as the new gold standard in the treatment of varicose veins. Nevertheless in situations, where the great saphenous vein (GSV) shows a very superficial course, ETA may be associated with thermal lesions to the skin

Aims: Our aim was to evaluate a hybrid procedure, combining ETA (Laser ELVeS® to the proximal, deeper course of the GSV (Fig.1) with partial PIN stripping to its superficial distal course (Fig.2).

Methods: From January 2023 to January 2024 15 hybrid procedures were performed in 14 patients (12 men/ 2 women). Mean age: 58,1 years (36- 79y.). Mean BMI 27,8 kg/m2 (22,5-38,8). CEAP Classification: C2: 6; C3: 4; C4: 4; C5: 1. Three patients had Aspirin 100mg/d. All the operations were performed in local anesthesia in an outpatient setup in our vein center, outside the operating room.

Results: In all 15 cases the proximal part of the GSV was treated with ETA. Mean Length: 16,6cm (6- 25cm). The superficial distal part of the vein was stripped: GSV: 11 and VSAA: 4 (vena saphena accessoria anterior). Mean Length: 30cm (5- 50cm). One operation was bilateral Tearing of the stripped vein occurred in 5 cases (GSV: 3, VSAA: 2). All GSV could be completely removed thanks the rescue retriever, both VSAA by miniphlebotomy. No relevant hematoma, infections or nerve lesions due to stripping were observed.

Conclusion: In our experience in cases with a very superficial course of the (distal) saphenous vein, the combination of ETA with classical PIN stripping is a valuable alternative strategy. It allows a safe and complete treatment of all reflexive segments without notable morbidity and once again shows the importance of surgical skills in the treatment of varicose veins.

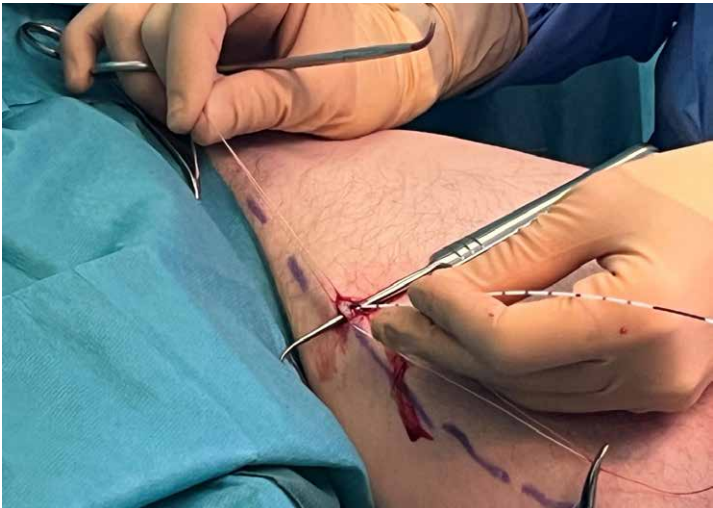


Figure 1. Laser GSV proximal



Figure 2. Stripping GSV distal

Molecular Nature of Baroreceptors in Human Aortic Arch (MONARCH-Study) – First Results

B. Reutersberg, Y. Yundung, A. Zimmermann, J. Pelisek (Universtiy Hospital Zurich, Zurich)

Background: The exact molecular nature of baroreceptors remains unclear despite extensive research. Current knowledge, based only on animal studies, suggests that baroreceptors are ion channels located at nerve endings in the adventitia of the aortic arch. Additionally, the specific types of mechanosensitive receptors responsible for signaling during mechanical deformation in the arterial wall are still unknown.

Aims: This ongoing study aims to analyze and identify the baroreceptors responsible for mechano-transduction within human tissue, focusing on the aortic arch.

Methods: Aortic arch specimens were obtained as part of cardiac surgery for aortic dissections or aneurysms. Additionally post-mortem biopsies of healthy aortic arches served as controls. Tissue samples were meticulously processed, fixed, and stained using various neuronal markers to identify the spatial distribution of neuronal terminals containing baroreceptors. Proteome analysis was performed following the extraction of nerves using laser microdissection.

Results: In the first step histological analysis in the controls confirmed that nerves are distributed throughout the adventitia of the entire aortic arch, with most promising staining achieved using antibodies like Tyrosine Hydroxylase and PGP9.5. Using VGLUT1 and VGLUT2 for detecting sensory neurons containing the mechanosensitive baroreceptors were so far unsuccessful. Subsequent proteome analysis identified 334 neuron-specific proteins in the isolated nerve bundles but did not detect any baroreceptor candidates. In contrast, analysis of the nerve surrounding areas revealed for the first time potential human baroreceptors, such as PIEZO1 and ancyrin-1, which seem to be located throughout adventitia as single sensory nerve cords and seem to be not visible by simple histological analyses.

Conclusion: These first molecular analyses of baroreceptors in human aortic arch revealed that nerves are distributed throughout the entire adventitia. Using proteomics, neuron-specific proteins could be detected as well as mechano-sensitive baroreceptor candidates located most likely outside of the histologically detectable nerve cords. The next steps will follow.

Evaluation of The Infrarenal Aorta by Tomographic 3D Ultrasound: Is it achievable?

K. Stoklasa¹, T. Stadlbauer², A. Döpp², A. Zimmermann² (¹Universitätsspital Zürich, Zürich; ²Klinik für Gefässchirurgie, Universitätsspital Zürich, Zürich)

Background: Diagnosis and surveillance of infrarenal aortic aneurysms is conducted by different imaging modalities such as 2-dimensional ultrasound or 3-dimensional cross-sectional imaging like computed tomography.

Aims: The aim of the study was to evaluate a suitable scanning approach with innovative 3-dimensional tomographic ultrasound of the infrarenal aorta.

Methods: The infrarenal aorta was assessed by 2-dimensional ultrasound examination using the GE LOGIQ S7 XDclear ultrasound system (GE Medical Systems AG, Glattpburg, Switzerland). 3-dimensional recording of scans were enabled by a tracking system attached to a curved array transducer. Semiautomatic analysis was performed using "tomographic ultrasound" software (PIUR Imaging, Vienna, Austria). The option "Volume Segmentation" created and calculated a 3-dimensional model of the infrarenal aortic vessel.

Four different scanning approaches were evaluated (medial and lateral scanning route, each in inspiration and expiration) and applied to two different groups (reference group: young lean fasting volunteers; patient group: clinical non-fasting patients with aortic pathologies). Both group contained 12 subjects.

Results: 63 (33%) of 192 scans were either perfectly or almost perfectly evaluable. Evaluability of the remaining scans did not permit satisfactory analysis. Percentage of evaluable scans from the reference group was higher than from the patient group (60% vs. 5%). Age (26.8 ± 5.2 vs 69.6 ± 9.2 , $p < 0.0001$) and body mass index (BMI: 22.6 ± 2.1 vs 26.1 ± 2.8 , $p < 0.002$) were statistically significantly different between both groups.

2- and 3-dimensional diameter measurements ($r = 0.96$, $p < 0.0001$) showed a highly positive correlation. Reproducible measurement of volume and length of the aorta is not feasible. Clear recommendations regarding the best scanning approach cannot be provided.

Conclusion: Tomographic 3-dimensional Ultrasound evaluation of the infrarenal aorta may be applicable only in a small number of clinical patients. The majority of patients with pathological changes cannot be evaluated conclusively. No ideal scanning approach could be detected.

Towards Standardized Aortic Endovascular Surgery Training and Dose Reduction: Software for Semi-Automated Imaging Application as a new Tool in Hybrid Operating Rooms

A. Reeg¹, M. Hakim¹, Y. Braun² (¹Klinik für Gefässchirurgie, Luzerner Kantonsspital, Lucerne; ²Global Clinical Marketing Surgery, Siemens Healthineers, Forchheim)

Background: In line with development of complex endovascular aortic operations, imaging technology has advanced significantly including application of intelligent technical aids in hybrid operating rooms (HOR). Recent innovations require education of residents to encompass optimal use of modern imaging technology in addition to performing complex endovascular reconstructions. Importance increases since modern HORs enable standardization and dose reduction on a new level. Due to a software update, our hospital was first worldwide to apply "Case Flows" (Siemens Healthineers, Forchheim, Germany), a software application for semi-automation of imaging technology in HOR.

Aims: This work aims to present a standardized and semi-automated approach for performing standard endovascular aortic repair (EVAR) by using "Case Flows". With an edited case-video, impact of "Case Flows" towards standardization of endovascular surgery, improvement of education and significant dose reduction is shared.

Methods: At our academic teaching and research hospital, in 2023 110 patients were undergoing surgery for aortic aneurysm, 67 were endovascular. From October 2023 to January 2024 a translational research team was working on optimal settings for the applicability of "Case Flows". In January 2024, EVAR training for residents based on Case Flows started.

Results: Settings can be applied in a patient tailored setting or can be overruled by manual adjustment depending on patients' anatomy. Regarding usability, "Case Flows" is easily integrated into pre-existing standard protocols and surgery workflow. By introduction, residents in training for endovascular surgery are supported by allowing to decrease focus on imaging and shift attention towards technical aspects of procedure. First EVARs performed by residents with "Case Flows" were with ultra-low radiation dose (below $10 \text{ Gy} \cdot \text{cm}^2$).

Conclusion: By integration of "Case Flows", education and training of residents in vascular surgery was positively influenced regarding process, safety and radiation dose. To ensure conditions for future innovations in HOR technology and imaging, software tools for automation are mandatory.

Hepato-Pancreatico-Biliary I

Recurrence and Survival after Robotic vs. Laparoscopic Liver Resection in Very-Early to Early Stage (BCLC 0-A) Hepatocellular Carcinoma: A Retrospective Cohort Study with Propensity Score Matching

L. Bernardi¹, L. Bernardi², E. Balzano³, R. Roesel², P. Vacca³, A. Senatore², M. L. Garo², P. Majno-Hurst^{2,4}, A. Cristaudi^{2,4}, D. Ghinolfi³ (¹Lausanne; ²Department of surgery, Lugano Regional Hospital, Lugano; ³Hepatobiliary surgery and liver transplant division, University of Pisa, Pisa; ⁴Faculty of biomedical sciences, University of Southern Switzerland, Lugano)

Background: Robotic (RLR) and laparoscopic liver resection (LLR) provide similar short-term outcomes in hepatocellular carcinoma (HCC) of stage BCLC 0-A, but data on recurrence and survival are still lacking in populations with high prevalence of cirrhosis.

Aims: We investigated the outcomes of RLR vs. LLR for HCC in a cohort with high rate of cirrhosis. The primary endpoint was recurrence-free (RFS) and overall survival (OS); incidence, pattern, and treatment of recurrence were the secondary ones.

Methods: RLRs and LLRs for HCC of stage BCLC 0-A from two tertiary centers for liver surgery were retrospectively reviewed. Propensity score matching (PSM) was used to mitigate selection bias. Survival was estimated with Kaplan Meier method with Log rank.

Results: One-hundred-ninety-six patients underwent RLR (n=68) or LLR (n=128) for BCLC 0-A HCC (Figure 1).

After 1:1 PSM, two groups (RLR=68; LLR=68) of patients with similar characteristics, liver function and HCC features were obtained: age (median) 71-year-old, males 73.5%, underlying cirrhosis 91.2% (Child A 96.8%, MELD <9 96%), portal hypertension 22.1%, single-HCC 90.4%. At a median follow-up of 29.0 months, 2- and 5-year RFS were 78.0 vs. 59.0% and 54.0 vs. 53.0% ($p=0.107$), while OS was 97.0 vs. 90.0% and 87.0 vs. 90.0% ($p=0.951$) for RLR vs. LLR respectively. Incidence of recurrence was similar (35.3 vs. 39.7%; $p=0.723$) and was mostly within the liver (29.4 vs. 30.9%; $p=1.000$) or within 2 years after hepatectomy (54.2 vs. 81.5%, $p=0.116$) in RLR vs. LLRs. Curative-intent treatment of recurrences did not differ (liver transplantation 19.6%, redo-resection 15.7%) except for a tendency to more redo-resections of recurrences after RLR (29.2 vs. 3.7%; $p=0.062$).

Conclusion: Oncologic outcomes of RLR were not inferior to those of LLR in selected HCC patients of stage BCLC 0-A with underlying cirrhosis. Both techniques guaranteed similar salvageability at HCC recurrence in our experience.

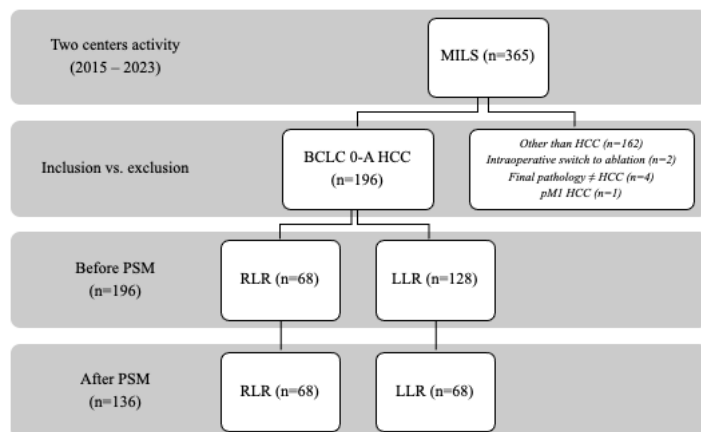


Figure 1. Flowchart of the study

Which Surgical Technique for Liver Resection is Favourable in Patients with Colorectal Liver Metastases?

J. Zeindler¹, G. F. Hess¹, M. von Heesen^{2,3}, S. Muenst⁴, M. Bolli¹, S. D. Soysal⁵, O. Kollmar^{1,2}, A. M. Schmitt⁶ (¹Abdominal Surgery, Clarunis – University Centre for Gastrointestinal and Liver Diseases, Basel; ²Department of General, Visceral, Vascular and Pediatric Surgery, University of Saarland, Homburg; ³Department of General- and Visceral Surgery, University Hospital Göttingen, Göttingen; ⁴Institute of Medical Genetics and Pathology, University Hospital Basel, Basel; ⁵Faculty of Medicine, University of Basel, Basel; ⁶Department of Internal Medicine, Medical Oncology, University Hospital Basel, Basel)

Background: The liver is the most common metastatic site after curative treatment for colorectal cancer (CRC). Around 50% of all patients with CRC will develop colorectal liver metastases (CRLM). Liver resection (LR) represents a curative treatment option. Benefits of anatomic (ALR) versus non-anatomic liver resection (NALR) show a lack of consistent evidence. While ALR seems to be associated with a higher postoperative complication rate, NALR could lead to more recurrences.

Aims: We investigated complication and survival rates of patients with CRLM after both resection types.

Methods: This is a multicentre cohort study using retrospectively and prospectively collected data. All patients undergoing LR for CRLM between 2009 and 2020 from 3 specialised centres in Switzerland and Germany were included. Complication and survival rates after ALR versus NALR were analysed using uni- and multivariate Cox regression models.

Results: 624 patients were included. Median follow-up time was 25.49 months. In 292/624 patients (47%) ALR was performed, while 53% underwent NALR. Complications according to the Clavien-Dindo classification have been observed significantly more often in the ALR group ($p=0.001$). Especially severe complications grade III and IV have been more present after ALR (36/292 vs. 26/332 and 13/292 vs. 11/332, respectively). Both, length of ICU and postoperative hospital stay have been significantly longer in the ALR group ($p<0.001$ each). The uni- and multivariate models have shown no significant differences in overall survival (OS) and recurrence free survival rates (RFS) between both groups (for OS adjusted HR of 0.84 (95% CI 0.59 - 1.21; $p=0.35$) and for RFS adjusted HR 0.92 (95% CI 0.69 - 1.22, $p=0.56$)).

Conclusion: This multicentre prospective study investigating ALR versus NALR for CRLM has shown no significant differences in OS and RFS. However, postoperative complications have been reported significantly more often after ALR. NALR seems to be the better choice for patients with CRLM undergoing LR.

Full Robotic versus Open ALPPS: A Bi-institutional Comparison of Perioperative Outcomes

P. C. Müller^{1,2}, C. Guidetti³, P. Magistri⁴, J. P. Jonas², R. Odorizzi⁴, P. Kron², G. Guerrini⁴, C. E. Oberkofler², S. Di Sandro⁴, P. A. Clavien², H. Petrowsky², F. Di Benedetto⁴ (¹Department of Surgery, Clarunis – University Centre for Gastrointestinal and Hepatopancreatobiliary Diseases, Basel; ²Department of Surgery and Transplantation, University Hospital Zurich, Zurich; ³Hepato-pancreato-biliary Surgery and Liver Transplantation Unit, University of Modena and Reggio Emilia, Modena, Italy; ⁴Hepato-pancreato-biliary Surgery and Liver Transplantation Unit, University of Modena and Reggio Emilia, Modena)

Background: In primarily unresectable liver tumors, ALPPS (Associating Liver Partition and Portal Vein Ligation for Staged hepatectomy) may offer curative two stage hepatectomy through a fast and extensive hypertrophy. However, concerns have been raised about the invasiveness of the procedure. Full robotic ALPPS has the potential to reduce the postoperative morbidity through a less invasive access.

Aims: The aim of this study was to compare the perioperative outcomes of open and full robotic ALPPS.

Methods: The bicentric study included open ALPPS cases from the University Hospital Zurich, Switzerland and robotic ALPPS cases from the University of Modena and Reggio Emilia, Italy from 01/2015 to 07/2022. Main outcomes were intraoperative parameters and overall complications.

Results: Open and full robotic ALPPS was performed in 36 and 7 cases. Robotic ALPPS was associated with less blood loss after both stages (418 ± 237 ml vs. 319 ± 197 ml; $P=0.04$ and 631 ± 354 ml vs. 258 ± 53 ml; $P=0.01$) as well as a higher rate of interstage discharge (86% vs.

37%; $P=0.02$). OT was longer with robotic ALPPS after both stages (371 ± 70 min vs. 449 ± 81 min; $P=0.01$ and 282 ± 87 min vs. 373 ± 90 min; $P=0.02$). After ALPPS stage 2, there was no difference for overall complications (86% vs. 86%; $P=1.00$) and major complications (43% vs. 39%; $P=0.86$). The total length of hospital stay was similar (23 ± 17 days vs. 26 ± 13 ; $P=0.56$).

Conclusion: Robotic ALPPS was safely implemented and showed potential for improved perioperative outcomes compared to open ALPPS in an experienced robotic center. The robotic approach might bring the perioperative risk profile of ALPPS closer to interventional techniques of portal vein embolization/liver venous deprivation.

Selective Inhibition of Hepatocyte Claudin-3 Ameliorates Fibrotic and Cholestatic Liver Damage by Enhancing Bicarbonate Secretion and Bile Dynamics

F. Baier¹, F. Baier², D. Stroka², N. Melin², T. Yarahmadov², D. Sánchez-Taltavull², S. Moghadamrad³, S. Murugan², A. Keogh², A. Odermatt⁴, C. Gómez Castellá⁴, E. Feraille⁵, A. Sassi⁵, U. Deutsch⁶, B. Engelhardt⁶, M. Furue⁷, D. Candinas² (¹University of Bern and Inselspital Bern, Bern; ²Department for Visceral Surgery and Medicine, University of Bern and Inselspital Bern, Bern; ³Faculty of Biomedical Sciences, Università della Svizzera italiana, Lugano; ⁴Department of Pharmaceutical Sciences, University of Basel, Basel; ⁵Département de physiologie cellulaire et métabolisme, University of Geneva, Geneva; ⁶Theodor Kocher Institute, University of Bern, Bern; ⁷Division of Cell Structure, National Institute for Physiological Sciences, Okazaki)

Background: Cholestatic-fibrotic liver diseases have a high unmet medical need. Tight junctions, which maintain the blood-biliary-barrier in the liver, have important biological functions that impact cholestatic diseases. A main component of the hepatic tight junction is claudin-3.

Aims: In this study, we explored the function of claudin-3 and demonstrate its potential as a new drug target in cholestatic-fibrotic liver diseases.

Methods: Adult C57BL/6 N background Cldn3^{+/+} or Cldn3^{-/-} mice were subjected to extra- and intrahepatic cholestasis via surgical ligation of the common bile duct (BDL) or chemically, by gavage or feeding alpha-naphthyl isothiocyanate (ANIT). Hepatic necrosis and serum liver injury markers were determined. Bile flow and bicarbonate levels were quantified. Bile acid levels were measured by LC-MS/MS in serum and liver tissue. Claudin-3 was knocked down using liver specific claudin-3 GalNAc-siRNAs.

Results: Claudin-3 is expressed in normal- and cholestatic liver tissues. Cldn3^{-/-} mice have a higher bile-flow rate, more bicarbonate secretion, and the bile is less concentrated with bile acids and bilirubin. Following bile duct ligation or ANIT, Cldn3^{-/-} mice showed macroscopically less signs of bile acid retention and a different bile color. Hepatic bile acid levels were significantly lower in normal- or cholestasis challenged Cldn3^{-/-} mice. Following BDL, ANIT gavage- or ANIT feeding, liver injury in was remarkably ameliorated in Cldn3^{-/-} mice. Liver specific knockdown of claudin-3 using GalNAc-siRNAs ameliorated cholestasis at a lower success rate compared to the complete knockout.

Conclusion: Knockout or GalNAc-siRNA mediated inhibition of claudin-3 protected the liver from injury in models of extra- or intrahepatic cholestasis. Further pre-clinical and clinical studies need to be conducted to show whether claudin-3 inhibition is an efficient and safe therapeutic approach for the treatment of cholestatic liver diseases. As next step towards translation of our results, we are currently screening and optimizing human GalNAc conjugated claudin-3 inhibitors.

A Multicenter Exploration of the APRI/ALBI Score in Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy (ALPPS)

J. P. Jonas¹, M. Linecker², P. C. Müller³, S. Sander⁴, V. Ardiles⁵, Z. Wen⁶, I. Romic⁷, M. Kysela⁸, S. Truan⁹, T. Reese¹⁰, F. Rauchfuss¹¹, F. Ullmer¹², R. Wahba¹³, O. Hahn¹⁴, C. Guidetti¹⁵, R. Fernandez-Placencia¹⁶, R. Robles Campos¹⁷, E. Sparrelid¹⁸, H. Petrowsky⁴, J. Santol¹⁹, D. Eshmunov⁴, C. Oberkofler²⁰, F. Rössler⁴, M. Amann²¹, P. Ignatavicius²², J. Oberholzer²³, P. Starlinger²³ (¹Department of Visceral- and Transplant Surgery, University Hospital Zurich, Zurich; ²Department of Visceral- and Transplant Surgery, University Medical Center Schleswig-Holstein, Kiel; ³Department of Surgery, Clarunis – University Centre for Gastrointestinal and Hepatopancreatobiliary Diseases, Basel; ⁴Department of Visceral- and Transplant Surgery, University Hospital Zurich, Zurich; ⁵HPB and Liver Transplant Unit, Hospital Italiano de Buenos Aires, Buenos Aires; ⁶Department of hepato-biliary-pancreatic surgery and liver transplantation, The first affiliated hospital Guangxi Medical University, Nanning; ⁷Department of Hepatobiliary Surgery and Organ Transplantation, University hospital Centre Zagreb, Zagreb; ⁸Department of hepato-biliary-pancreatic surgery and liver transplantation, IKEM, Prague; ⁹Department of Digestive Surgery and Liver Transplantation, University Hospital C. Huriez, Lille; ¹⁰Department of Surgery, Division of Hepatobiliary and Pancreatic Surgery, Asklepios Hospital Barmbek, Semmelweis University of Medicine, Hamburg; ¹¹Department of General, Visceral and Vascular Surgery, University Hospital Jena, Jena; ¹²Department of Surgery and Transplantation, University Hospital RWTH Aachen, Aachen; ¹³Department of General, Visceral and Cancer Surgery, Transplant Center Cologne, Cologne; ¹⁴1st Department of Surgery, Semmelweis University, Budapest; ¹⁵Hepato-Pancreato-Biliary Surgery and Liver Transplantation Unit, University of Modena and Reggio Emilia, Modena; ¹⁶Hepato-Pancreato-Biliary Section, Instituto Nacional de Enfermedades Neoplásicas, Lima; ¹⁷Department of Surgery, Virgen de la Arrixaca Hospital, Murcia; ¹⁸Department of Clinical Science, Intervention and Technology, Division of Surgery and Oncology, Karolinska University Hospital, Stockholm; ¹⁹Department of Surgery, Clinic Favoriten and Sigmund Freud Private University, Vienna; ²⁰Vivévis AG-Visceral, Tumour and Robotic Surgery, Clinic Hirslanden, Zurich; ²¹Department of Surgery, State Hospital Wiener Neustadt, Wr Neustadt; ²²Department of Surgery, Lithuanian University of Health Sciences, Kaunas; ²³Department of Surgery, Division of Hepatobiliary and Pancreatic Surgery, Mayo Clinic, Rochester)

Background: Perioperative morbidity and mortality remains a point of concern for the Associating Liver Partition and Portal Vein Ligation for Staged hepatectomy (ALPPS) procedure. Post-hepatectomy liver failure (PHLF) after the second step poses the most significant risk factor for futile outcome. Recovery of liver function after the first step of ALPPS is critically important to allow for sufficient liver function after this surgery. The APRI+ALBI score has been proposed as an easily assessable score to monitor liver function and its dynamic recovery.

Aims: We explored if the APRI+ALBI score was able to assess liver function recovery after the first step of ALPPS and allow for optimal timing of the 2nd step.

Methods: Based on the ALPPS registry, patients from 2012 to 2020 with available APRI+ALBI score were included. Postoperative outcomes (PHLF A – C, PHLF B + C, 90-day mortality and severe morbidity) were defined as per standard definitions. The APRI+ALBI score was monitored perioperatively.

Results: Overall, 464 patients from 16 international participating centers in the ALPPS registry were included. Clinically relevant PHLF (B + C) was observed in 7.5% and of these 63% of patients ultimately died due to liver failure. The APRI+ALBI score immediately increased after each surgical intervention and continuously decrease thereafter (figure 1). Failure of the APRI+ALBI score to decrease until the 2nd step of ALPPS predicted PHLF B+C (p = 0.001 ; AUC 0.78) (figure 2). Particularly patients with high APRI+ALBI scores and short interstage intervals were at risk to develop PHLF B+C.

Conclusion: The APRI+ALBI score objectifies liver function recovery after the 1st step of ALPPS and failure to sufficiently decreased is associated with a higher risk for PHLF B+C. This might allow for optimized planning of the 2nd step of ALPPS to allow for sufficient liver function recovery to minimize the risk for PHLF B+C and associated futile outcome.

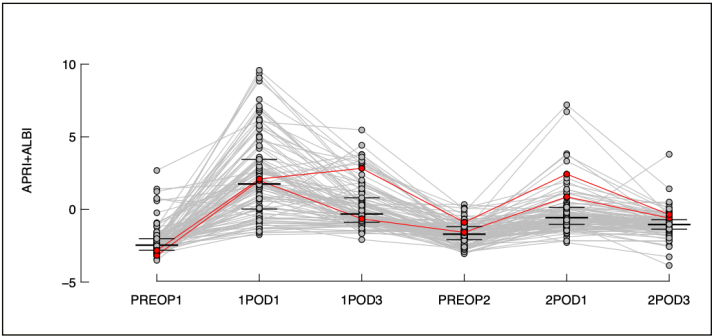


Figure 1. Trend

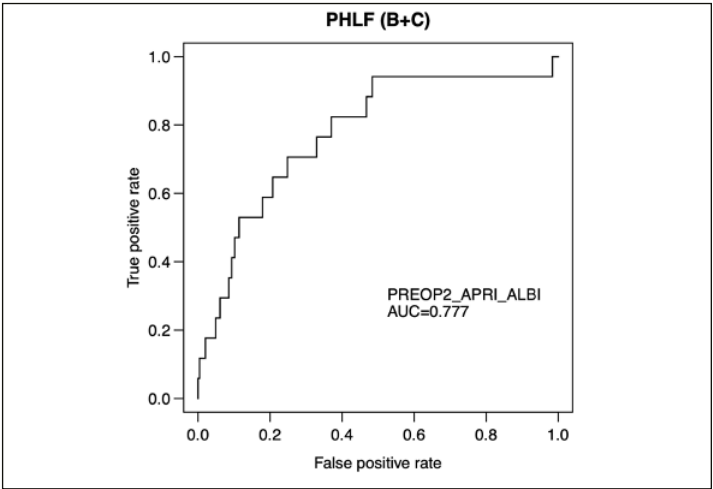


Figure 2. PHLF BC

Impact of Enhanced Recovery After Surgery (ERAS) Compliance on the Short-Term Outcomes after Open versus Minimally Invasive Liver Surgery

L. Bernardi, E. Uldry, G. R. Joliat, N. Halkic, N. Demartines, E. Melloul (Department of surgery, Lausanne University Hospital, Lausanne)

Background: Enhanced recovery after surgery (ERAS) programs after hepatectomy is now widely used due to significant improvement of postoperative outcomes. On the other hand, the data on ERAS compliance after open (OLS) vs minimally invasive liver surgery (MILS) are scarce.

Aims: To investigate the impact of ERAS compliance on the short-term outcomes after OLS vs MILS.

Methods: This was a retrospective study based on a prospectively maintained institutional ERAS database. High ERAS compliance was defined as $\geq 70\%$. The outcomes within 30 days after surgery were compared between high vs low compliance patients after OLS vs MILS. A logistic regression model was used to determine predictors of compliance.

Results: Out of 620 patients (MILS=189; OLS=431) who underwent liver resection (median age 64 years, BMI 25.1 kg/m²) high compliance to ERAS was observed in 224 (36%), more frequently following MILS compared to OLS (77 vs 18%; p<0.001).

High and low compliance cohorts had similar baseline characteristics. High ERAS compliance

was associated with less blood loss (median 300 vs 700 ml), shorter operative time (176 vs 299 min), lower morbidity (30.3 vs 57.3%), mortality (0 vs 1%), re-operations (3.1 vs 9.5%) and shorter hospital stay (median 5 vs 9 days; p<0.001) (Table 1).

In MILS, high compliance was associated with lower morbidity (23 vs 45%; p=0.005) and shorter hospital stay (4 vs 6 days; p<0.001). Similarly, ERAS compliance following OLS was associated with less complications (43 vs 59%, p=0.011) and shorter hospital stay (7 vs 10 days; p<0.001) (Figure 1).

Operative time (OR 1.1, p<0.001), irrespective of the surgical approach, was the only independent predictor of ERAS compliance.

Conclusion: Compliance to ERAS is associated with improved short-term outcomes after MILS and OLS. High ERAS compliance after OLS is challenging and needs more investigations.

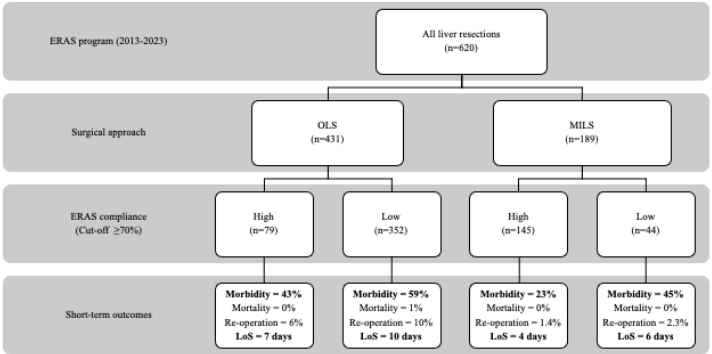


Figure 1

	ERAS compliance (Cut-off $\geq 70\%$)		
	High (n=224)	Low (n=396)	p
Number of patients: 620	OLS, n (%)		79 (35.3) 352 (88.9) <0.001
Median cohort age: 64 (IQR 54-71)	MILS, n (%)		145 (64.7) 44 (11.1) <0.001
Median cohort BMI: 25.1 (IQR 22.5-28.6)	Major hepatectomy, n (%)		47 (20.1) 244 (61.6) <0.001
Age: no difference between the groups (p=0.426)	Blood loss (ml), median		300 700 <0.001
Sex: no difference between the groups (p=0.097)	Operative time (min), median		176 299 <0.001
BMI: no difference between the groups (p=0.490)	Morbidity (Clavien-Dindo), n (%)		68 (30.3) 227 (57.3) <0.001
OLS= open liver surgery; MILS= minimally invasive liver surgery; LoS= length of hospital stay.	Mortality, n (%)		0 (0) 4 (1.0) <0.001
Major hepatectomy ≥ 3 liver segments.	Re-operation, n (%)		7 (3.1) 38 (9.5) 0.003
Morbidity, mortality and re-operation within 30 days after the operation.	LoS (days), median		5 9 <0.001

Table 1

Robotic Liver Surgery Offers Improved Outcomes: A Propensity Score Matched Analysis with an Open Cohort

G. F. Hess, C. Kümmerli, N. L. E. Aegerter, P. Sedlacek, B. P. Müller-Stich, O. Kollmar, P. C. Müller, A.T. Billeter (Clarunis Universitäres Bauchzentrum, Universitätsspital Basel, Basel)

Background: Robotic liver surgery (RLS) is a promising and increasingly implemented alternative to open liver surgery (OLS). Compared to OLS, the robotic approach seems to be associated with improved intra- and postoperative outcomes. However, high-level evidence is limited and current comparisons mainly lack adequately matched comparison groups.

Aims: Following a 1-year implementation of RLS, the aim of this single-centre study was to compare the short-term outcomes of RLS during the learning curve and OLS with propensity score matching (PSM).

Methods: From the start of RLS at our centre in November 2022 all robotic cases were included until December 2023. The comparison group consisted of OLS from 2021-2023. Main outcomes comprised of intraoperative parameters and postoperative complications. PSM was performed for age, sex, previous surgery, tumour size, and exact type of resection.

Results: 175 liver surgeries were included, 130 (74%) patients underwent OLS and 45 (26%) RLS. Three patients underwent planned conversion (7%). After PSM, 60 open and 36 robotic cases were compared. A similar proportion of malignant indications were included in the RLS and OLS group (62% vs. 78%). Compared to OLS, blood loss was significantly reduced in the RLS-group (400 (200-813) vs. 200 (50-400) ml; p=0.003), on the other hand RLS was associated with a longer operation time (188 (127-237) vs. 144 (103-193) minutes p=0.031). Postoperatively, overall- and major complications were more frequent after OLS than RLS (60% vs. 17%; p=0.002 and 30% vs. 0%; p<0.001). Hospitalisation stay was significantly shorter in the RLS group (4 (3-6) vs. 9 (8-13) days; p<0.001).

Conclusion: Including patients during the initial learning curve, RLS was associated with intra- and postoperative patient benefits compared to the open approach. With increasing experience and accumulating evidence, RLS will become the standard of care for benign and malignant liver pathologies.

Visualization of a Novel Surgical Process Model for Liver Surgery by a Surgical Workflow Management System – Implications for Improvement of Surgical Quality

F. Haak^{1,2,3}, P. C. Müller³, O. Kollmar³, A. Wiencierz⁴, B. P. Müller-Stich³, M. von Strauss Und Torney³
(¹Uniklinikum Leipzig, Leipzig DE; ²Viszeral-, Thorax-, Transplantations- und Gefäßchirurgie, Uniklinikum Leipzig, Leipzig; ³Department of Surgery, Clarunis University Center for Gastrointestinal and Liver Disease, Basel; ⁴Department of Clinical Research, University of Basel, Basel)

Background: Surgical quality is defined by attributes which can be categorized into structure, process, and outcome dimensions and as such is not only the result of the individual surgeon efforts. Surgical process models (SPM) as simplified representations of the network of involved activities and their visualization by surgical workflow management systems (SWMS), offer a solution to enhance communication and workflow.

Aims: The aim of this study was to evaluate if the implementation of a SWMS can improve intraoperative process quality.

Methods: A 1:1 randomized controlled trial at a single tertiary center was conducted. All patients undergoing an open liver resection were randomized whether a SWMS was used (intervention) or not (control). A SPM was defined and refined to reduce complexity by generalization of the defined sub steps. The primary outcome, termed "deviation" measured the difference between actual and planned surgery duration. Secondary outcomes included stress levels of the operating team and complications. Analyses employed Welch t-tests and linear regression models.

Results: 18 patients were allocated per group. Patient characteristics are shown in Table 1. The deviation showed no significant difference between the intervention and control group (Intervention 22.1 min vs control 17.6 min., p = 0.473) (Table 2). Risk of complication (Intervention 55.6% vs control 66.7%) and intraoperative blood loss (Intervention 609 ml vs control 647) was lower in the group where the SWMS was used. Duration of individual steps of SPM are shown in Figure 1 and especially show consistency in final step. Stress levels were not significantly different when SWMS was used. Analyses investigating potential confounders remained inconclusive due to the limited sample size.

Conclusion: While no significant change in deviation in planned operation time was observed when the surgical workflow management system was used, it demonstrated safety, reducing blood loss and postoperative complications. The model proved valuable for predicting operation end times.

	level	control	planning tool	SMD
n		18	18	
Gender (%)	male	10 (55.6)	13 (72.2)	0.352
	female	8 (44.4)	5 (27.8)	
Diabetes (%)	no diabetes	16 (88.9)	14 (77.8)	0.302
	insulin	1 (5.6)	2 (11.1)	
	oral medication	1 (5.6)	2 (11.1)	
Previous abdominal surgery (%)	no	11 (61.1)	8 (44.4)	0.339
	yes	7 (38.9)	10 (55.6)	
ASA class (%)	2	0 (0.0)	1 (5.6)	0.632
	3	18 (100.0)	15 (83.3)	
	4	0 (0.0)	2 (11.1)	
Hospitalisation type (%)	elective	18 (100.0)	17 (94.4)	0.343
	emergency	0 (0.0)	1 (5.6)	
ICU stay (%)	no	0 (0.0)	6 (33.3)	1
	yes	18 (100.0)	12 (66.7)	
Resection type (%)	non-anatomic/ metastasectomy	1 (5.6)	5 (27.8)	0.914
	left lateral sectionectomy	3 (16.7)	1 (5.6)	
	segmentectomy	1 (5.6)	2 (11.1)	
	bisegmentectomy (other than seg. 2+3)	3 (16.7)	1 (5.6)	
	right hepatectomy	5 (27.8)	4 (22.2)	
	left hepatectomy	4 (22.2)	5 (27.8)	
	extended left hepatectomy	1 (5.6)	0 (0.0)	
Complexity Score (Kawaguchi) (%)	low complexity	3 (16.7)	8 (44.4)	0.659
	medium complexity	9 (50.0)	7 (38.9)	
	high complexity	6 (33.3)	3 (16.7)	
Lead surgeon ID (%)	surgeon 1	11 (61.1)	8 (44.4)	0.873
	surgeon 2	0 (0.0)	1 (5.6)	
	surgeon 3	0 (0.0)	1 (5.6)	
	surgeon 4	1 (5.6)	0 (0.0)	
	surgeon 5	0 (0.0)	0 (0.0)	
	surgeon 6	3 (16.7)	3 (16.7)	
	surgeon 7	1 (5.6)	0 (0.0)	
	surgeon 8	2 (11.1)	5 (27.8)	
Lead surgeon 1 (%)	surgeon 1	11 (61.1)	8 (44.4)	0.339
	other surgeon	7 (38.9)	10 (55.6)	
Joint operations surgeon/nurse (%)	0	0 (0.0)	0 (0.0)	0.781
	1-5	3 (17.6)	3 (16.7)	
	6-10	6 (35.3)	3 (16.7)	
	11-20	3 (17.6)	6 (35.3)	
	21-50	5 (29.4)	3 (16.7)	
	>50	0 (0.0)	2 (11.8)	
Joint operations surgeon/1st assistant (%)	<21	10 (55.6)	8 (44.4)	0.452
	21-50	1 (5.6)	0 (0.0)	
	>50	7 (38.9)	10 (55.6)	
Years experience 1st assistant (median [IQR])		18.00 [16.50, 24.00]	24.00 [18.00, 24.00]	0.29
Years experience nurse (median [IQR])		3.00 [2.00, 8.00]	3.00 [1.00, 10.00]	<0.001

Table 1

	level	control	planning tool	SMD
n		18	18	
Planned duration (minutes) (mean (SD))		244.94 (47.07)	243.11 (44.48)	0.04
Actual duration (minutes) (mean (SD))		211.61 (82.58)	197.28 (82.56)	0.174
Absolute deviation (mean (SD))		19.86 (13.83)	19.56 (12.67)	0.023
Post-operative complication (%)	no	6 (33.3)	8 (44.4)	0.229
	yes	12 (66.7)	10 (55.6)	
Post-operative complication category (%)	none	6 (33.3)	8 (44.4)	0.678
	1	1 (5.6)	0 (0.0)	
	2	6 (33.3)	5 (27.8)	
	3a	2 (11.1)	1 (5.6)	
	3b	0 (0.0)	0 (0.0)	
	4a	1 (5.6)	1 (5.6)	
	4b	1 (5.6)	3 (16.7)	
	5	1 (5.6)	0 (0.0)	
Blood loss (mean (SD))		647.22 (540.83)	609.44 (645.68)	0.063
Stress level surgeon (mean (SD))		37.22 (21.66)	42.82 (17.32)	0.286
Stress level 1st assistant (mean (SD))		38.33 (17.21)	37.54 (20.20)	0.042
Stress level 2nd assistant (mean (SD))		36.99 (17.05)	34.63 (17.67)	0.136
Stress level nurse (mean (SD))		27.82 (17.41)	30.81 (17.36)	0.172
Stress level anaesthetist (mean (SD))		37.28 (14.33)	36.86 (8.16)	0.036

Table 2

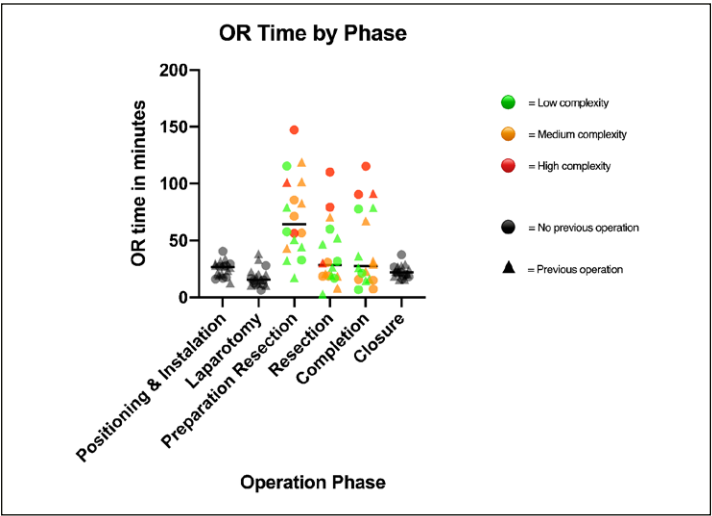


Figure 1

Liver Quality and Type of Resection Influence the Accuracy of the American College of Surgeons' Perioperative Risk Calculator

N. L. E. Aegerter¹, A. Just², P. Sedlaczek¹, C. Kümmerli¹, G. F. Hess¹, A. T. Billeter¹, B. P. Müller-Stich¹, P. C. Müller¹, O. Kollmar¹ (¹Viszeralchirurgie, Clarunis, Basel; ²Humanmedizin, Universität Basel, Basel)

Background: Depending on the extent of liver resection (LR) and the underlying liver disease, liver surgery is associated with a significant risk for postoperative complications. Therefore, adequate patient selection is crucial.

Aims: The aim of this study was to assess the accuracy of the American College of Surgeons risk calculator (ACS-RC), taking into account the type of LR and liver parenchyma quality.

Methods: Patients who underwent LR at the University Hospital Basel were included from 01/2019 to 03/2023. Inclusion criteria were any LR for benign or malign lesions, open and minimal invasive surgery. Statistical analysis was performed using descriptive statistics, area under the curve (AUC), and relative importance analysis of the parameters.

Results: 376 patients were included. 214 (57%) underwent partial hepatectomy, 89 (24%) hemi-hepatectomy, and 73 (19%) trisegmentectomy. 143 patients had (38%) fibrosis, 75 (20%) steatosis and 61 (16%) cirrhosis. The ACS-RC was most accurate in predicting acute renal failure (AUC 0.753), urinary tract infection (AUC 0.732), and overall complications (AUC 0.715). The accuracy for the prediction of overall complications was mainly impaired for cirrhotic patients (Δ 0.075), while the accuracy in steatotic (Δ 0.044) and fibrotic patients (Δ 0.032) remained comparable. The prediction of overall complications was worse for patients undergoing trisegmentectomy (Δ 0.103) and partial hepatectomies (Δ 0.078). According to the relative importance analysis, ascites (15%), patient age (12%), and sepsis (11%) had the biggest influence on major complications.

Conclusion: The ACS-RC is a relevant tool to estimate 30-day postoperative morbidity for patients with healthy liver parenchyma undergoing hemi-hepatectomies. The accuracy of the prediction could be improved when adjusting for underlying liver disease or extent of resection. Other than extent of surgery and liver parenchyma, patient comorbidities mainly influenced the perioperative risk profile after LR.

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Pediatric Surgery

Enough Is Enough – How Many Rectal Suction Biopsies Do You Need to Diagnose Hirschsprung's Disease?

S. Metzger¹, H. R. Neeser¹, I. Robbiani¹, A. K. Rodewald², T. Nigbur, A. Di Natile¹, U. Moehrlen¹, S. J. Tharakan¹ (1Pediatric Surgery, University Children's Hospital Zurich, Zurich; 2Institute for Pathology and Molecular Pathology, University Hospital Zurich, Zurich)

Background: Rectal suction biopsy (RSB) is the gold-standard for diagnosing Hirschsprung's disease (HD) in infants. However, despite this being a common procedure no standard exists on how many biopsy specimens and at which level they should be taken.

Aims: The aim of this study is to determine the conclusiveness of RSB specimens in relation to their location within the rectum in diagnosing HD. With this, we would like to define how many specimens are necessary to diagnose HD and eventually propose a standardized protocol to conduct RSB.

Methods: We reviewed the epidemiological data and pathology results of 92 patients undergoing RSB between January 2011 and May 2022 at our institution. We perform RSB by taking 4 specimens at 1 cm, 3 cm and 5 cm above the dentate line, as well as one specimen at the dentate line.

Results: We included 92 patients who had 115 biopsies performed with a mean of 3.77 specimens per session. Of the specimens taken at 1 cm above the dentate line 73.9% were conclusive, at 3 cm 75.9% and at 5 cm 79.2%. Specimens taken at the dentate line were squamous or transitional epithelia in 31.5% and therefore of no use for HD diagnostics. If the specimen at 3 cm was conclusive, the whole session was more likely to be diagnostic.

Conclusion: We propose that taking a total of three specimens, namely one at 1 cm, one at 3 cm and further biopsy at 3 or 5 cm above the dentate line, is enough to diagnose or exclude HD.

Use of Fish Skin Grafts for Wound Management: Report of 5 Pediatric Cases

M. Doan¹, I. Cherry², L. Tarhini³, A. de Buys Roessingh⁴ (1)Department Of Pediatric Surgery, Hospital Riviera Chablais, Rennaz; (2)Department of Plastic and Reconstructive Surgery, Université Libre De Bruxelles, Bruxelles; (3)Faculty of Pharmaceutical Science, Université Libre de Bruxelles, Bruxelles; (4)Department of Pediatric Surgery, Centre Hospitalier Universtaire Vaudois, Lausanne)

Background: Managing wounds and scars in children presents a significant challenge for surgical and rehabilitation teams. Studies have already explored the potential of fish skin grafts with Omega-3 in hard-to-heal lower extremity chronic ulcers and deep-burn management.

Aims: The purpose of this study is to assess the safety and outcome of intact fish skin grafts with Omega-3 when used as skin replacement therapy in the pediatric population.

Methods: This article was conducted in adherence to our hospital's ethical guidelines. Patients enrolled in this study were identified retrospectively. Their medical records were reviewed and data was collected concerning patient demographics, initial mode of injury, indication for fish skin placement, operative data, postoperative care, complications and outcomes. The acellular dermal matrix was obtained from North Atlantic codfish skin (*Gadus morhua*) farmed in Isafjordur, Iceland.

Results: All patients underwent meticulous wound debridement and patch application under general anesthesia and were discharged the same day. Wound surface ranged between 10 and 110 cm² (mean: 53 cm²). Standard analgesic medications were taken for a maximum period of 48 hours in all patients. Upon follow-up at our outpatient clinic, shrinkage in the wound surface was observed in all patients after a few days, followed by early wound granulation. Two patients underwent subsequent split-thickness grafting to achieve healing. The mean time required to achieve complete epithelialization was 48.6 days (range: 29 – 62 days). No hypersensitivity or allergic reaction was reported. The definitive outcome was satisfactory in all wounds, meaning complete wound coverage.

Conclusion: The findings from this case series reveal that fish skin grafts with Omega-3 can be an effective and a safe scaffold in the process of repairing damaged tissues in the pediatric population. We have been able to accomplish a quality skin replacement therapy, with no donor site morbidity.

Circumscribed Thinning of the Calvaria – A Long-Term Sequela After Vacuum Extraction Delivery

B. Liniger (Inselspital Bern und Spitalzentrum Biel, Biel)

Background: Vacuum extraction deliveries are associated with a number of complications like injuries to the skin, subperiosteal, subgaleal and intracranial hemorrhages. Even skull fractures have been described, but data on persistent changes in the bone structure of the skull like thinning of the calvaria is lacking in the literature.

Aims: We describe a previously unreported long-term sequela of vacuum extraction delivery.

Methods: We present a series of 8 children, who were referred because of an irregularity of the cranial surface without other symptoms. The investigations revealed a circumscribed thinning of the calvaria in all 8 cases. Detailed history and the specific clinical findings were crucial in the assessment. Various imaging techniques were used to visualize the lesions and rule out some differential diagnoses.

Results: All children had undergone a vacuum-assisted delivery. All irregularities of the cranial surface were discovered incidentally. Clinical examination revealed a round (6) or linear (1) channel-shaped indentation of the calvaria in 7 cases. The shape and size of the annular thinning of the calvaria matched devices commonly used in vacuum extraction very well. In one

patient, a localized protrusion of the calvaria was investigated, but an indentation more posteriorly was detected in the CT scan. CT scan was performed in 6 patients, in 2, parents refused this examination. In the follow-up, no progression or symptoms was observed in any of the patients.

Conclusion: Such long-term sequelae after vacuum-assisted delivery have not been reported yet and the underlying mechanism is unclear. In children who present with irregularities of the cranium, an accurate history, including the mode of birth, and detailed clinical examination should be performed. Knowledge about the presented pathology may help to avoid extensive investigations, particularly CT scan. The publication of further cases could help to propagate the circumscribed thinning of the calvaria after vacuum extraction as a distinctive clinical entity.

Aulsion Fractures of the Knee in Adolescents: A Dual Case Report and Comprehensive Literature Review

N. Keller, C. Matissek, T. F. Krebs (Kinderchirurgie, Ostschweizer Kinderspital St.Gallen, St.Gallen)

Background: Avulsion fractures of the collateral ligaments of the knee, like Stieda, Second and Reverse Second fractures, are a rare but diverse entity in adolescents. Associated with anterior or posterior cruciate ligament tears, meniscal injuries and contralateral collateral ligament injuries, these types of fractures are complex. While existing literature focuses on adults, limited studies address the characteristics of these injuries in adolescents. We present two cases of avulsion fractures, providing an understanding of the clinical nuances and outcomes within the context of literature.

Aims: We aim to elucidate the clinical presentation, diagnostic challenges, associated injuries, and management approaches in adolescents with these types of fractures. By analyzing two cases and conducting a comprehensive literature review, our goal is to contribute insights to guide clinicians in the management of these injuries in adolescents.

Methods: Two cases of adolescents were selected from our hospital and a systematic review of studies reporting these types of fractures in adolescents was undertaken. Demographics, clinical presentation, radiographic findings, associated injuries, and treatment modalities were examined for both cases. The literature review encompassed studies on diagnostic modalities, associated injuries, and management approaches.

Results: The presented case reports show two examples of presentation and management strategies. Radiographic assessments, including advanced imaging such as magnetic resonance imaging (MRI), played a pivotal role in diagnosis and identification of associated injuries, particularly ACL tears. The literature review showed variability in management of these fractures in this age group, emphasizing the need for personalized care.

Conclusion: The cases show the importance of diagnostic and therapeutic strategies and aims to guide clinicians in optimizing outcomes through informed decision-making. Even with minimal radiographic evidence, it is crucial to bear in mind the possibility of associated knee injuries in avulsion fractures affecting the collateral ligaments.

Colon II

Anastomotic Leakage after Colorectal Surgery is Associated with a Specific Tissue-Microbiome Signature

A. Cianfrani^{1,2}, V. Sitta^{1,2}, J. Galafassi^{1,2}, F. Mongelli^{1,3}, E. Sorrenti^{2,3}, M. Villa^{2,3}, J. Djordjevic^{2,3}, P. Majno-Hurst^{1,3}, G. Iezzi^{2,3}, D. Christoforidis^{1,3,4} (¹Department of Surgery, Ente Ospedaliero Cantonale, Lugano; ²Laboratory for Surgical Translational Research, Ente Ospedaliero Cantonale, Bellinzona; ³Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ⁴Department of Visceral Surgery, CHUV, Lausanne)

Background: Anastomotic leakage (AL) occurs in 5-15% of colorectal resections. In addition to well-known risk factors, recent evidence suggests that the gut microbiota might critically affect anastomotic healing. However, studies in humans are limited.

Aims: To explore differences in pre-operative microbiome of patients with or without AL and identify anastomosis-protective or damaging bacterial species.

Methods: Clinical records of patients undergoing left colon or rectal resection with anastomosis at our department between 2013 and 2021 were screened. AL cases were matched equally to controls by propensity score, based on common AL risk factors. The microbiome was analyzed by amplification and sequencing of the V4 region of the 16S gene of DNA extracted from formalin-fixed paraffin-embedded mucosa taken at the proximal and distal margin of the resected specimen, mixed in equal amounts. Differential abundance of identified operational taxonomic units (OTUs) in AL-cases and controls was tested by using the R-package DESeq2.

Results: Among 588 patients screened, 41 cases and 42 matched controls were eligible for microbiome analysis. Patient characteristics were similar except for a higher percentage of rectal resections in the AL group (see Table). Out of 5406 OTUs identified, 197 OTUs were differentially abundant between the two groups (adjusted-p value <0.05). Of those, 175 OTUs were more prevalent in the AL-group, in particular *Fusobacterium periodonticum* (32% vs. 5% of patients) and bacteria from the *Hyphomicrobium* genera (39-44% vs. 12-21%); 22 were more prevalent in the control group, in particular *Akkermansia muciniphila* (26 vs. 17%) and *Eubacterium sium* (19 vs. 5% of patients).

Conclusion: Our analysis unravels AL-associated microbiome-signatures and identifies bacterial species highly prevalent in particular in patients with AL. These findings could be used for future research to develop targeted antibiotic therapy that helps prevent AL.

	No leakage N=41	Anastomotic leakage N=42	p
Age, years (SD)	65.6 (11.9)	67.5 (13.7)	0.497
Gender, female (%)	19 (46.3)	18 (42.9)	0.751
Body mass index, kg/m2 (SD)	26.0 (5.5)	24.8 (4.8)	0.289
Colectomy for cancer, n (%)	21 (51.2)	23 (54.8)	0.748
Colectomy in emergency setting, n (%)	11 (26.8)	8 (19.0)	0.402
Palliative surgery, n (%)	1 (2.4)	1 (2.4)	0.984
Comorbidities			
• Hypertension, n (%)	19 (46.3)	21 (50.0)	0.743
• Renal disease, n (%)	4 (9.8)	2 (4.8)	0.382
• Pulmonary disease, n (%)	2 (4.9)	1 (2.4)	0.545
• Diabetes, n (%)	4 (9.8)	3 (7.1)	0.670
• Obstructive arteriopathy, n (%)	1 (2.4)	3 (7.1)	0.320
Protective stoma, n (%)	7 (17.1)	9 (21.4)	0.617
Type of operation			
• Sigmoidectomy/left colectomy, n (%)	35 (85.3)	21 (50)	0.0009
• High/low anterior resection, n (%)	6 (14.7)	21 (50)	

Table 1. Patients' characteristics

Concomitant Cervical and Anal Screening for Human Papillomavirus (HPV) – Worth the Effort or Waste of Time?

I. Espirito Santo¹, A. Kefleyesus¹, B. Pache², C. Chilou¹, M. Hübner¹, D. Hahnloser¹, F. Grass¹ (¹Department of Visceral Surgery, University Hospital Lausanne (CHUV), University of Lausanne (UNIL), Lausanne; ²Department of Gynecology, University Hospital Lausanne (CHUV), University of Lausanne (UNIL), Lausanne)

Background: Human papilloma virus (HPV) infection represents the most common sexually transmitted disease and a major risk factor for disease progression to anal cancer.

Aims: This study aimed to analyze the rate of concomitant anal dysplasia in a prospectively surveilled cohort of sexually active women.

Methods: This study represents a follow-up analysis of the AnusGynecology (ANGV) study (doi.org/10.3390/cancers14205096). This prospective, cross-sectional single-center study recruited women for concomitant cervical and anal screening of HPV genotypes and cytology during a single appointment. Cervical / anal smears +/- biopsies if deemed necessary were performed by board-certified specialists during a single outpatient visit. All women with findings of either HPV or any type of dysplastic lesions on anal smears were offered follow-up in a specialized high-resolution anoscopy (HRA) outpatient clinic.

Results: Overall, 275 patients (mean age 42±12) were included. Among them, 102 (37%) had cervical high risk (HR)-HPV. Anal smear cytology was performed in 255 patients (93%), while 19 patients (7%) underwent anal biopsy during the combined visit. In total, HPV was (incidentally) revealed in 91 patients (33%) on anal smears, while any degree of anal dysplasia was found in 30 patients (11%), 6 if which were high-grade squamous intraepithelial lesions (H-SIL). Furthermore, 10 out of 19 biopsies were positive (3 H-SIL lesions). Only half (48/93, 52%) of women agreed to undergo the recommended specialized follow-up evaluation. Of them, 18 (38%) were diagnosed with dysplastic lesions (9 L-SIL and H-SIL, respectively) on biopsies, while the remaining visits revealed no abnormalities.

Conclusion: The present study revealed a significant number of dysplastic lesions in women willing to undergo specialized proctologic evaluation after abnormal findings on initial screening. Close follow-up of these women is hence strongly recommended.

The Incidence of Incisional Hernia after Colorectal Surgery Depends on the Extraction Site: A Cohort Analysis

M. Burgard, E. Liot, G. Meurette, C. Toso, F. Ris, J. Meyer (Visceral Surgery, Hôpitaux Universitaires de Geneve, Geneva)

Background: Although minimally invasive surgery has reduced the incidence of incisional hernia in colorectal surgery, specimen extraction site still constitutes a risk for incisional hernia.

Aims: We aimed to analyse the incidence of incisional hernia according to the specimen extraction site.

Methods: We conducted a retrospective observational cohort study of consecutive patients who underwent elective laparoscopic colorectal surgery for colorectal cancer between 01.2013 and 12.2021. The primary outcome was the CT-proven incidence of incisional hernia at the level of the extraction site until the end of follow-up (12.2023). Patients with open surgery, previous hernia repair, reoperations during the study period or without imaging follow-up were excluded.

Results: One hundred and fifty-eight patients were included. One hundred and four patients (65,8%) had an extraction site located on the midline, and 54 patients (34,2%) had an extraction site which was off midline. The midline was preferably used as extraction site during right and transverse colectomy (96,5% and 100% respectively), and off midline was used in left hemicolectomy, sigmoid colectomy and anterior resection (60%, 88%, 93,8% respectively).

The overall incidence of incisional hernia at the level of the extraction site was of 29,8% (31 patients) when midline was chosen as the extraction site, and of 1,9% (1 patient) when the extraction site was off-midline (p-value<0,001). Seven patients (6,7%) required hernia repair in the midline group and no patient (0%) in the off-midline group (p-value=0.051). The mean follow-up was of 3.1+/-2.1 years. Uni- and multivariate logistic regression identified the choice of extraction site as a risk factor for incisional hernia (odds ratio: 22,5, 95%CI: 2,3-27,1, p-value: 0,03).

Conclusion: Choosing the midline as an extraction site exposes patients to the risk of incisional hernia. Fully minimally invasive colorectal resection using off-midline incision as extraction site should be encouraged.

Evidence Map of Appendicitis – A Living Systematic Review with Meta-Analyses

D. Kleindienst¹, K. Maurer², J. Mohr¹, P. Probst², P. Antony², F. Hauswirth¹, M. K. Müller² (¹Department of Surgery, Cantonal Hospital Thurgau, Münsterlingen; ²Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld)

Background: Appendicitis is one of the most common diseases of the gastrointestinal tract with a lifetime incidence of 7-9%. For over a century, emergent appendectomy has been the gold standard of care. Recently, there is growing evidence regarding non-operative treatment of appendicitis. In addition, many different approaches with regard to peri-operative treatment exist and are being studied. As a result, a large field for research has evolved. However, an overview of the evidence and a structured analysis of research gaps is missing.

Aims: The aim of this project was to create a systematic and living Evidence Map of Appendicitis.

Methods: PubMed, CENTRAL and Web of Science were systematically searched for all randomised controlled trials (RCT) and systematic reviews (SR) dealing with the treatment of appendicitis. RCTs and SRs on identical subjects were grouped in research topics. From RCTs, data on morbidity such as surgical site infection, re- admission, re- intervention or re- operation were extracted. Additional outcomes including pain, quality of life, length of hospital stay and absence of work were also extracted. Whenever possible, outcomes for each research topic were meta-analysed. Furthermore, trial quality was assessed using the Cochrane risk of bias 2.0 tool.

Results: Out of over 12000 articles, more than 100 RCTs and 130 SRs were included. Research topics of interest were non-surgical treatment strategies compared to surgical treatment. In trials analysing surgical treatment the following interventions were compared: open vs. laparoscopic techniques, single-incision vs conventional techniques and stump ligation techniques. Moreover, there are many trials comparing the accuracy of diagnostic tools. Currently, the extraction is ongoing and mapping of the articles is in process.

Conclusion: The results of the Evidence Map of Appendicitis will be presented at the SCS congress in May 2024. Thereafter, the Evidence Map of Appendicitis will be freely accessible via the internet and available as a mobile phone app.

Anal Cancer Screening – 10-year Experience of a Specialized Outpatient Clinic

A. Kefleyesus, D. Clerc, M. Hübner, D. Hahnloser, F. Grass, I. Espirito Santo (Department of Visceral Surgery, University Hospital Lausanne (CHUV), University of Lausanne (UNIL), Lausanne)

Background: Human papilloma virus (HPV) infection represents the most common sexually transmitted disease and a major risk factor for disease progression to anal cancer.

Aims: This study aimed to analyze experience and outcomes of a dedicated high resolution anoscopy (HRA) outpatient clinic.

Methods: Retrospective analysis 10 years (2013-2022) after implementation of a dedicated screening program at the Lausanne University Hospital (CHUV) including consecutive patients providing research consent. Demographic data, HPV genotypes and cytology, medical and surgical treatments and outcomes in terms of follow-up and disease progression were analyzed.

Results: Over the study period, 537 patients (72% male) with a mean age of 47.7±12.7 years were followed at the clinic, totaling 2214 consultations. Median length of follow-up was 51.4 months. Overall, 365 patients (68%) presented risk factors such as male sex male (MSM, 69% of male patients), HIV infection (52%) or high-grade dysplasia (H-SIL) at initial presentation (12%). Treatment modalities (922 treatments total) consisted of cryotherapy (n=484, 52.5%), surgical excision (exam under anesthesia, n=196, 21.3%), excisional biopsy at the clinic (n=138, 14.9%), topical immunomodulators (n=61, 6.6%) and laser ablation (n=43, 4.7%) and. A total of 257 patients (47.8%) presented dysplastic lesions, consisting of either low squamous intraepithelial lesions (L-SIL (35.9%) or high squamous intraepithelial lesions (H-SIL, 11.9%). Of them, 14 (5.4%) eventually progressed to higher grade lesions (12 from LSIL to HSIL, 2 from HSIL to cancer in situ). In total, 4 anal squamous cell carcinomas, all at the first screening visit, were diagnosed, and treated with exclusive radiotherapy and one salvage surgery.

Conclusion: During the 10-year study period since implementation of a dedicated outpatient screening clinic, only few patients progressed to higher stage lesions. The present study helps to refine algorithms and treatment schemes for a standardized surveillance protocol.

Laparoscopic vs. Ultrasound-Guided Transversus Abdominis Plane (TAP) Block in Colorectal Surgery: A Systematic Review and Meta-Analysis of Randomized Trials

F. Mongelli^{1,2}, F. Iaquinandi¹, D. Christoforidis^{2,3}, A. Cianfarani¹, R. Pini¹, A. Saporito⁴, S. G. Popeskou³, D. Ia Regina^{1,2} (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ³Surgery, Ospedale Regionale di Lugano, Lugano; ⁴Anesthesia, Ospedale Regionale di Bellinzona e Valli, Bellinzona)

Background: The transversus abdominis plane block (TAPB) is effective for postoperative pain management in patients undergoing colorectal surgery. However, evidence regarding the optimal delivery method, either laparoscopic (L-TAPB) or ultrasound-guided (U-TAPB) is lacking.

Aims: Our study aimed to compare the effectiveness of these delivery methods.

Methods: We carried out a literature search of PubMed, Cochrane Library, Web of Science, and Google Scholar databases to include randomized studies comparing patients receiving either L-TAPB or U-TAPB during minimally-invasive colorectal surgery. The primary endpoint was opioid consumption in the first 24 hours after surgery. Risk of bias was assessed with the RoB-2 tool. Effect size was estimated for each study with 95% confidence interval and overall effect measure was estimated with a random effect model.

Results: The literature search revealed 294 articles, of which four randomized trials were eligible. A total of 359 patients were included, 176 received a L-TAPB and 183 received a U-TAPB. We established the non-inferiority of L-TAPB, as the absolute difference of -2.6 morphine-mg (95%CI -8.3 to 3.0) was below the pooled non-inferiority threshold of 8.1 morphine-mg (low certainty level). No difference in opioid consumption was noted at 2, 6, 12, and 48 hours (low to very low certainty level). Postoperative pain, nausea and vomiting were similar between groups at different timepoints (low to very low certainty level). No TAPB-related complications were recorded. Finally, the length of hospital stay was similar between groups.

Conclusion: For postoperative multimodal analgesia both L-TAPB and U-TAPB may result in little to no difference in outcome in patients undergoing colorectal surgery.

Laparoscopic Management of Gallstone Ileus

A. Misar, B. Egger, F. Cherbanyk (Department of Surgery, HFR Fribourg, Fribourg)

Background: Spontaneous cholecysto-enteric fistula is a rare complication with high morbidity and mortality rates, affecting mostly elderly and female patients. The most frequent cause is chronic cholecystitis due to cholelithiasis. The Rigler's triad (pneumobilia, small bowel (SB) obstruction, ectopic gallstone) on imaging studies is pathognomonic and surgery is mandatory without an existing consensus on the best surgical approach.

Aims: To present the feasibility and safety of laparoscopic management for gallstone ileus.

Methods: We present the case of a 67-year-old female patient with morbid obesity (BMI 42 kg/m²) and no previous biliary disease nor surgical history. She presented to our emergency department with abdominal pain and signs of SB-ileus for the past five days. CT-scan of the abdomen revealed the classical Rigler's triad. (Figure 1 A+B)

Results: After resuscitation, the patient underwent emergency explorative laparoscopy. Revision of the SB allowed identification of the obstacle at 100 cm from the ileocecal valve, without signs of intestinal ischemia. Longitudinal enterotomy and extraction of a 5 cm gallstone was done (Figure 2 A+B). SB-closure was performed using the Heineke-Mikulicz procedure (Figure 3 A+B). Due to extensive mesocolic adhesions neither the gallbladder nor the fistula were visualized and also not touched. Post-operatively, the patient required parenteral nutrition and treatment for a mild re-nutrition syndrome and could finally be discharged on postoperative day 6. At 6 months, follow-up was completely uneventful. Elective cholecystectomy is planned in her home country.

Conclusion: Controversy exists concerning the best surgical treatment for gallstone ileus, with the options of simple entero-lithotomy or additional cholecystectomy together with fistula repair in either a one- or two-stage procedure. Given the acute setting, laparotomy is often inevitable for these patients. Albeit challenging, our case is an example that pure laparoscopic management including enterotomy and Heineke-Mikulicz repair is feasible and safe with good outcome.

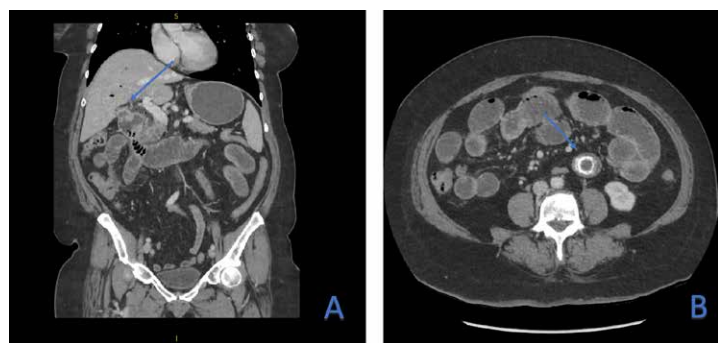


Figure 1

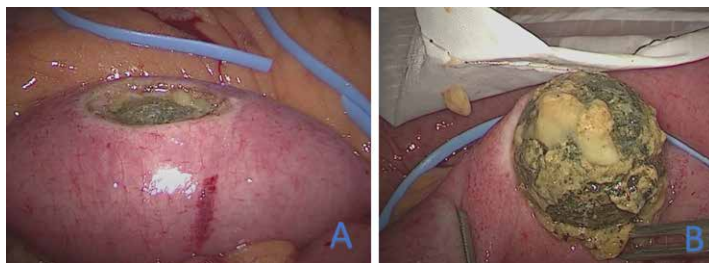


Figure 2

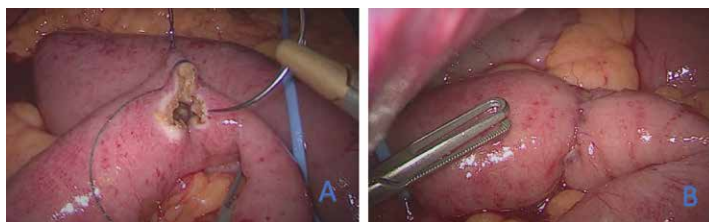


Figure 3

Histopathological Findings in Patients Undergoing Sigmoidectomy for Diverticular Disease: A Retrospective Study

F. Mongelli^{1,2}, A. Petrusic³, F. Sabbatini¹, D. Christoforidis^{2,3}, S. G. Popeskou³, D. Ia Regina^{1,2} (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ³Surgery, Ospedale Regionale di Lugano, Lugano)

Background: Over the last decades, the increase of healthcare costs has led to growing interest in cost-effectiveness analysis as a method to quantify the relative costs and benefits of alternative interventions. Colon resection for diverticulitis is a common procedure but, to date, there is no evidence in the literature supporting routine analysis of the surgical specimen, which is associated with costs that may not be justified.

Aims: The purpose of this study was to evaluate whether routine pathology in elective sigmoid resection for the treatment of diverticulitis is cost-effective.

Methods: We retrospectively searched from medical records all patients who underwent a sigmoidectomy for diverticular disease and a documented colonoscopy within one year before surgery from January 2013 to June 2023. We collected pre-, intra-, and postoperative data of all patients. Diagnostic concordance was assessed with the Cohen's kappa test. The primary endpoint was the percentage of patients with an unexpectedly abnormal histological report compared to colonoscopy.

Results: During the study period, 153 patients undergoing sigmoidectomy for diverticular disease were included. Mean age was 63.1±13.4 years, 83 (54.2%) patients were female and a preoperative colonoscopy was available for all patients. In nine cases an unexpected finding was noted on the histopathological exam, eight of them were polyps with low grade dysplasia, while in one case a diffuse large B-cell lymphoma was present. Weighted kappa was 0.88 (95%CI 0.81-0.96) indicating that colonoscopy has high diagnostic power, however, without the histopathological exam eight benign lesions and one malignant lesion would have been missed.

Conclusion: Colonoscopy reliably predicted the result of the histopathological specimen findings in patients undergoing sigmoidectomy for diverticular disease. However, few lesions requiring further treatments or follow-up surveillance were present. Larger studies are needed to evaluate whether routine pathology in elective sigmoid resection for the treatment of diverticulitis is cost-effective.

Star-Plasty for Ileostomy Stenosis: A Case Report

L. Wullemmin, H. Smet, O. Martinet (Chirurgie viscérale, HRC Rennaz, Rennaz)

Background: Stomal stenosis is a late complication occurring in 2 to 15% post-creation and is primarily caused by ischemia but can also result from factors like peristomal abscess, recurrent diseases (e.g., Crohn's disease), or malignancy. The initial mechanism involves early mucocutaneous separation leading to wound healing and contracture resulting in stenosis. While mild cases may respond to gentle dilation, severe instances may necessitate stoma revision. Only a few articles describe surgical treatments, including Z-plasty (Lyons et al.), Y-V-plasty (Chessa et al.), or W-plasty (Beraldo et al.). A novel approach, Star-plasty, has been proposed by Sanchez.

Aims: A 79-year-old male, multiple comorbidities, diagnosed with high-grade adenocarcinoma of the right colon (pT3pNOMOR0) in 2022 faced complications post-right hemicolectomy, leading to multiple surgeries and an ileostomy. Repeated hospitalizations ensued due to mechanical ileus from ileostomy stenosis. Despite conservative management and Hegar dilator interventions, the mechanical ileus persisted. A Star-plasty was performed to address the ileostomy stenosis (Fig. 1).

Methods: Under general anesthesia, Hegar dilators were used up to size 16. No other cause of mechanical ileus was found after cutaneous dilation. Following Sanchez's technique, a 4-pointed star was drawn at the ileostomy opening. Skin incision was made, and the ileal loop was dissected in the subcutaneous tissue. The distal stenotic part of the ileal loop and the cutaneous star were excised. Ethibon stitches partially closed the star, followed by fixing the ileal wall to the cutaneous opening using Vicryl stitches (Fig. 2).

Results: Post-surgery, no complications were observed, and the patient was discharged on

the second day. At one year, no complications arose, and the ileostomy healing progressed normally.

Conclusion: Star-plasty is an effective and uncomplicated procedure, regardless of the patient's general status with minimal morbi-mortality and yielded favorable medium-term results.

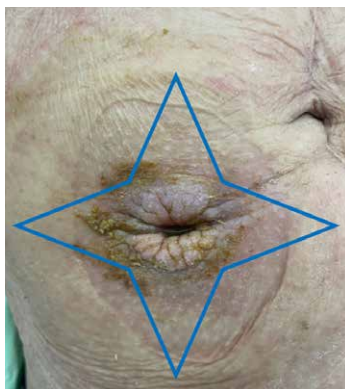


Figure 1. Ileostomy stenosis with skin retraction with 3-4mm opening. Illustration of the 4-pointed star



Figure 2. Result after Star-plasty

Hernia

Robotic-Assisted Inguinal Hernia Repair with The Dexter System™: A Prospective Multicentre Clinical Investigation

L. Gantner^{1,2}, H. Mignot³, J. Pochhammer⁴, F. Grieder¹, S. Breitenstein¹ (¹Viszeral-/Thoraxchirurgie, Kantonsspital Winterthur, Winterthur; ²Chirurgisches Zentrum Zürich, Hirslanden, Zürich; ³Chirurgie, Centre Hospitalier de Saintes, Saintes; ⁴Klinik für Allgemeine, Viszeral-, Thorax-, Transplantations- und Kinderchirurgie, Universitätsklinikum Schleswig-Holstein, Kiel)

Background: Robot-assisted transabdominal preperitoneal inguinal hernia repair (rTAPP) is established as safe and feasible with various robotic platforms. The Dexter robotic system is an open platform with a sterile surgeon's console, two robotic instrument arms, and one robotic endoscope arm.

Aims: We conducted a prospective multicentre study (ClinicalTrials.gov NCT05873582) to assess the safety and performance of this new robotic platform.

Methods: Three centres in France, Germany, and Switzerland participated. The primary objectives of the study were to document the successful completion of the rTAPP procedures and to collect data on the occurrence of adverse events and device-related events perioperatively and up to 30 days post-surgery. The procedures were performed by three surgeons with varying levels of experience in robotic systems, including novice, intermediate and expert.

Results: Fifty patients were operated for inguinal hernia repair (33 unilateral, 17 bilateral). The mean age and BMI of the patients were 60 years (± 15) and 25.7 kg/cm² (± 3.3), respectively. All surgeries were successfully completed as planned using three standard laparoscopy trocars sized 10/12mm. Each procedure was performed with robotic assistance, and there were no conversions to open surgery. No intra-operative complications, device deficiency, or adverse events of Clavien-Dindo Grade III to V occurred. The mean skin-to-skin operative time was 55 min (± 14) for unilateral hernia repair and 95 min (± 22) for bilateral hernia repair. The mean robotic console time was 34 min (± 12) for unilateral hernia and 68 min (± 21) for bilateral hernia repairs. The patients were discharged within 1 day (± 1 day) after surgery.

Conclusion: Our rTAPP experience with the Dexter system confirms feasibility, safety, and comparable operative times to other robotic platforms. This study demonstrates the practicality and safety of the robotic techniques, positioning the Dexter system as a valuable tool in hernia repair.

Robotic Minimally Invasive Inguinal Hernia Repair: A Step-by-Step Instructional Video Showing How to Achieve the Critical View of the Myopectineal Orifice Using the Dexter Robotic System™

L. Gantner^{1,2}, S. Breitenstein¹, F. Grieder¹ (¹Viszeral-/Thoraxchirurgie, Kantonsspital Winterthur, Winterthur; ²Chirurgisches Zentrum Zürich, Hirslanden, Zürich)

Background: The critical view of the Myopectineal Orifice (MPO) has been described by hernia experts to promote a safe and high quality minimal invasive (MIS) inguinal hernia repair. However, this new concept is not yet widely known among surgeons who perform these procedures. Robotic transabdominal preperitoneal inguinal hernia repair (rTAPP) has been proven safe and feasible with various robotic platforms. New robotic platforms have recently entered the market, offering new possibilities and approaches to robotic surgery. One of them is the Dexter robotic system.

Aims: The aim is to promote the concept of the critical view of MPO, highlighting the technical aspects and anatomical landmarks for a safe and high-quality MIS inguinal hernia repair. Additionally, we aim to demonstrate the application of Dexter and the potential benefits of an

on-demand approach.

Methods: Over 100 robotic MIS inguinal hernia repairs were performed using Dexter. The intraoperative videos were archived and evaluated for instructional value. High-quality videos were taken in the operating room, demonstrating the handling and functionalities of the new robotic system.

Results: The video illustrates the anatomical landmarks and surgical steps required to achieve the critical view of MPO using highlighted intraoperative footage. The video sequences are from a variety of rTAPP cases performed with Dexter. Video footage captured in the operating room demonstrates the application of the new surgical robot and highlights the possibilities of an on-demand robotic approach.

Conclusion: Promotion and implementation of the critical view of MPO can help improve quality and lower complication rates in MIS inguinal hernia repair. A standardized approach, illustrated with highlighted intraoperative videos, can enhance training and ultimately improve patient care. The Dexter robotic system can be used to achieve high-quality MIS inguinal hernia repair. The on-demand robotic approach enables a safe and efficient operation.

Robotic-Assisted Treatment of Large Incisional Abdominal Wall Hernias: A Cost Analysis

F. Mongelli^{1,2}, F. Sabbatini¹, D. Ia Regina^{1,2}, N. Murgante Testa¹, R. Pini¹ (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano)

Background: Robotic-assisted treatment of ventral hernia offers many advantages, however, studies reported higher costs for robotic surgery compared to other surgical techniques.

Aims: We aimed at comparing hospital costs in patients undergoing large ventral hernia repair with either robotic or open surgery.

Methods: We retrospectively searched from a prospectively maintained database patients who underwent robotic or open surgery for the treatment of the large ventral hernias from January 2016 to December 2022. The primary endpoint was to assess the costs incurred by the hospital in both groups. For eligible patients, data was extracted analyzed using a propensity score-matching.

Results: During the study period, 67 patients were retrieved from our database. 34 patients underwent robotic-assisted surgery while 33 underwent open surgery. Mean age was 66.4 years ± 4.1 years, 50% of patients were male. After a propensity score-matching, a similar total cost of 18,297 \pm 8,435 EUR vs. 18,024 \pm 7,514, $p=0.913$ in robotic-assisted and open surgery groups were noted. Robotic surgery showed higher operator theatre-related costs (7,532 \pm 2,091 EUR vs. 3,351 \pm 1,872 EUR, $p<0.001$), which were fully compensated by a shorter hospital stay of 5.3 \pm 4.5 vs. 10.4 \pm 5.2 days, $p=0.002$ (costs: 4,265 \pm 4,366 EUR vs. 7,373 \pm 4,698 EUR, $p=0.032$).

Conclusion: Our study showed that in the treatment of large ventral hernia, robotic surgery had higher operator theatre-related costs, however, they were fully compensated by shorter hospital stays and resulting in similar total costs.

Robotic Enhanced View Total Extraperitoneal Repair (eTEP) With Endoscopic Posterior Linea Alba Reconstruction (EPLAR) for Incisional Hernia Repair: Early Results From 34 Consecutive Cases

R. C. Bauer, C. Pradella, L. M. Schupp, I. Rosenblum, B. Schenkluhn, D. Eucker, R. Rosenberg, S. H. Lamm (Klinik für Chirurgie und Viszeralchirurgie, Kantonsspital Baselland, Liestal)

Background: Laparoscopic incisional hernia repair offers advantages compared to open surgery. However, laparoscopic reconstruction of the linea alba is technically demanding. The robotic approach may facilitate this process.

Aims: In this study, we present our experience with robotic enhanced view total extraperitoneal repair (eTEP) with endoscopic posterior linea alba reconstruction (EPLAR) for incisional hernia repair.

Methods: A standardized, commercially available robotic system (DaVinci Xi, Intuitive Systems, Sunnyvale CA) was utilized. Following preparation of the retrorectus space, EPLAR was performed using long-term absorbable barbed suture in a running fashion and a macroporous, nonresorbable synthetic mesh was introduced. Perioperative data were prospectively entered into the Herniamed register. One year follow up was conducted using a standardized questionnaire.

Results: From January 2022 to September 2023, robotic eTEP with EPLAR was performed in 34 patients (41% female) with incisional hernias. Hernia width was W1 (<4cm) in 38% of cases, W2 (4-10 cm) in 56% and W3 (>10 cm) in 6%. The mean operation time was 161 minutes. There were no intraoperative complications. The median length of stay was three days (range, 2-7 days). Postoperative complications occurred in four patients (one pulmonary embolism, one seroma, two cases of urinary retention). No reoperations were necessary. One year follow up has been completed in 11 patients, 90% were free of pain.

Conclusion: In our setting, robotic eTEP with EPLAR demonstrated favorable outcomes with no surgical site infections and excellent cosmesis. The robotic device provides the surgeon with the degrees of freedom necessary for technically demanding maneuvers. EPLAR may result in better abdominal core stability than techniques using mesh placement with or without defect closure.

Trocar-Site Incisional Hernia after 8-mm Robotic Trocar Placement: A Prospective Study

F. Mongelli^{1,2}, A. Cianfarani^{1,3}, F. Iaquinandi¹, G. Xhepa¹, R. Pini¹, P. Gaffuri¹, D. Ia Regina^{1,2}, A. M. Senatore¹ (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ³Surgery, Ospedale Regionale di Lugano, Lugano)

Background: The current literature supports the closure of trocar sites ≥ 10 mm for the risk of developing incisional hernias, while there is no need to suture the abdominal fascia when using 5 mm-trocars. To date, evidence regarding the closure of 8-mm trocars that are used by new robotic systems is weak.

Aims: The aim of our study was to investigate the incidence of incisional hernia for 8-mm trocars.

Methods: We prospectively collected data on all patients undergoing robotic-assisted abdominal wall surgery from 2020 to 2023, in whom the abdominal fascia of all 8-mm trocars was not closed. The enrolled patients underwent a follow-up visit during which we conducted clinical and sonographic evaluations of all 8-mm trocars, in addition to assessing the satisfaction levels of the patients. The primary outcome was the incidence of port-site hernia.

Results: We enrolled 166 patients, 155 men and 11 women, for a total of 513 trocars accessed. Mean age was 61.1 ± 14.0 years, and mean BMI was 27.0 ± 3.9 kg/m². The follow-up visits were carried out after a mean follow-up of 14.5 (9.0 - 23.2) months. Only one case developed an asymptomatic 1×1 cm supra-umbilical hernia that was not treated. Patient reported a satisfaction regarding the 8-mm trocars and skin sutures of 9.8 ± 0.5 out of 10 points.

Conclusion: The occurrence of a trocar-site hernia after 8-mm robotic access is extremely low. Hence, the fascia closure may not be necessary.

Safety and Feasibility of Emergency Robot-Assisted Transabdominal Preperitoneal (R-TAPP) Repair for the Treatment of Incarcerated Inguinal Hernia: A Retrospective Study

F. Mongelli^{1,2}, N. Murgante Testa¹, F. Sabbatini¹, F. Iaquinandi¹, R. Pini¹, D. Ia Regina^{1,2} (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano)

Background: Incarcerated inguinal hernia is a common surgical emergency. Standard treatment include open and laparoscopic repair, while few studies investigated the use of robotic in this setting and no solid evidence was demonstrated.

Aims: The aim of this study was to evaluate the feasibility and safety of robot-assisted transabdominal preperitoneal (R-TAPP) repair for the treatment of incarcerated inguinal hernia.

Methods: We retrospectively searched for a prospectively maintained database patients who underwent R-TAPP or open surgery for incarcerated inguinal hernias from January 2018 to March 2023. The primary endpoint was to assess safety and feasibility of the R-TAPP compared to the standard approach. For eligible patients, data was extracted and analyzed using a propensity score-matching (PSM).

Results: Thirty-four patients were retrieved from our database, 15 underwent R-TAPP, while 19 underwent open surgery. Mean age was 73.1 ± 14.6 years, 30 patients (88.2%) were male and mean BMI was 23.5 ± 3.2 kg/m². No intraoperative complication occurred. Three cases requiring small bowel resection were all in the open surgery group ($p=0.112$). The operative time was 108 ± 31 min vs. 112 ± 31 min in the R-TAPP and open surgery groups ($p=0.716$). Seven postoperative complications occurred, only one classified as severe was in the open surgery group. The length of hospital stay was 2.9 ± 1.8 in the R-TAPP vs. 4.2 ± 2.3 min in the open surgery group ($p=0.077$). PSM analysis showed similar postoperative outcomes and costs in both groups.

Conclusion: Despite its limitations, our study appears to endorse the safety and feasibility of the robotic-assisted treatment for incarcerated inguinal hernia. This approach yielded comparable results to open surgery, albeit in a limited number of patients, suggesting it might be a viable alternative.

Machine Learning Based Video Analysis of the Energy use During Robotic Ventral Hernia Repair

M. Hagen¹, J. Douissard¹, L. Dimonte², J. Barker², A. Dupuis³, C. Toso¹, T. Pizzico² (¹Department of Surgery, University Hospital Geneva, Geneva; ²MedTech Digital, J&J, Santa Clara; ³Department of Surgery, J&J, Santa Clara)

Background: Energy use during robotic ventral hernia repair might show variability across surgeons with a potential impact on clinical outcomes. However, this level of granularity is rarely captured, but machine learning based video analyses might deliver important insights.

Aims: To analyze energy use during robotic ventral hernia repair.

Methods: Automated machine learning based analysis was applied to robotic ventral hernia repair videos to analyze monopolar and bipolar energy application patterns as well as the probability for blood presence. Values were compared across three different surgeons.

Results: 121 cases were analyzed. Surgeon 1 (88 cases) was highly experienced, surgeon 2 (13 cases) was board certified and surgeon 3 (20 cases) was a resident. The latter two had less than 10 robotic ventral hernias performed at the beginning of the recording. The robotic procedure time was longest for surgeon 1 with 115.63 ± 5.88 minutes vs 76.38 ± 8.78 min for surgeon 2 and 76.08 ± 6.29 min for surgeon 3 ($p<0.000$). While the number of monopolar activations per case was the lowest for surgeon 1 (424.08 ± 23.26 vs 484.08 ± 49.55 and 557.10 ± 46.15 respectively, $p<0.000$), surgeon 1 used more bipolar activations (115.97 ± 10.06 vs 82.77 ± 16.79 and 38.56 ± 7.80 respectively, $p<0.000$). The mean activation time of monopolar energy was longer for surgeon 1 (3.23 ± 0.19 seconds vs 0.91 ± 0.19 s and 0.63 ± 0.04 s respectively, $p<0.000$), the variability in length was greater for surgeon 1 (3.67 0.16 s vs 1.17 0.36 s and

0.45 0.09 s respectively, $p<0.000$), and the gaps between activations were longer for surgeon 1 (1.99 ± 0.13 s vs 1.18 ± 0.09 s and 1.25 ± 0.12 s respectively, $p<0.000$) when compared to surgeon 2 and 3. The bloodiness score showed significant difference amongst the three surgeons (0.27 ± 0.02 vs 0.30 ± 0.007 and 0.23 ± 0.003 respectively, $p<0.000$).

Conclusion: The experienced surgeon showed a significantly differentiated energy use when compared to the less experienced colleagues. Larger analyses are needed to understand the impact of the variations in technique on clinical outcomes.

Exploring Primary Intraperitoneal Onlay Mesh Plasty (IPOM): Incidence of Ileus and Adhesions

S. K. Malcher, S. Soppe, A. Wirsching, A. Nocito (Kantonsspital Baden, Baden)

Background: Intraperitoneal onlay mesh plasty (IPOM) represents a minimally invasive approach to ventral- and incisional hernia repair. Recent scrutiny has been directed towards IPOM repair, primarily concerning potential adhesion formation with intraperitoneal mesh. Literature addressing the incidence of ileus following IPOM is limited.

Aims: This study aims to investigate the incidence of mechanical ileus after primary hernia repair using IPOM. Additionally, the impact of IPOM on subsequent unrelated surgeries is evaluated.

Methods: A retrospective analysis was conducted on 230 consecutive patients undergoing primary hernia repair with IPOM between August 2013 and January 2020. Patient data was prospectively collected in the HerniaMed database. Long-term outcomes were assessed through outpatient follow-ups, HerniaMed questionnaires, and phone-call follow-ups.

Results: Over a 7-year period, 230 patients underwent IPOM repair without prior abdominal surgery. Included patients were predominantly male ($N=190$, 82%). Obesity with an BMI > 30 was found in 114 patients (50%). Umbilical hernia was the most common location ($N=170$, 74%), and 123 patients (54%) had small hernias (diameter less than or equal to 2cm). The majority received a small ($15\text{cm} \times 15\text{cm}$) mesh. Postoperative major complications (Clavien-Dindo grade three and higher) were found in three patients (1.3%). One-year follow-up was available for 184 patients (80%), with three (2%) developing ileus symptoms. Five-year follow-up included 149 patients (65%), with six (3%) hospitalized for ileus and two (1%) requiring re-operation. Hernia recurrence occurred in five patients (3%), nine patients (6%) reported chronic pain. Among 28 patients undergoing subsequent, mostly unrelated, surgery post-IPOM repair, significant adhesions were discovered in eight patients (29%).

Conclusion: Adhesion-ileus is infrequent after primary ventral hernia repair with IPOM. However, nearly one third of patients exhibit significant adhesions, potentially prolonging subsequent abdominal surgeries.

Robotic Subxiphoidal Incisional Hernia Repair with Transversus Abdominis Release (rTAR): Video Demonstration of Surgical Technique and Report of Outcome

K. Herzog, J. Baur, R. Sortino, B. P. Müller-Stich, D. C. Steinemann, F. V. Angehrn (Department of Visceral Surgery, Clarunis University Center for Gastrointestinal and Liver Disease, Basel)

Background: Subxiphoidal incisional hernia repair is challenging due to closely located cartilaginous and osseous structures and high lateral distracting forces in this area. To prevent recurrence, a sufficient mesh reinforcement with a wide defect overlapping, especially cranial to the xiphoid, is required.

Aims: A video, demonstrating robotic subxiphoidal incisional hernia repair with cranial TAR and cranial subphrenic preperitoneal mesh placement will be contributed. Additionally, early postoperative outcomes are reported.

Methods: Early postoperative outcomes and morbidity of subxiphoidal hernia repair procedures using rTAR performed in our facility between April 2022 and December 2023 were collected and analyzed. A video demonstrating this robotic technique with port placement in the lower abdomen will be provided.

Results: Seven subxiphoidal hernia repair procedures treated with rTAR have been performed in the mentioned period. Port placement was caudal in two cases whereas in the other five procedures a lateral port placement was chosen. Patients' median age was 67 years [range 42-78] and showed a median Body Mass Index (BMI) of 28 kg/m² [range 24 – 35 kg/m²]. Median operative time was 295 minutes [range 168 – 355 minutes]. Patients showed a low level of pain in the postoperative course with a median value of 0 [range 0 – 9] on the visual analog scale on day 2 after surgery. Median hospital stay was 6 days [range 3 – 8]. There was no readmission to the hospital. One patient needed bedside treatment of superficial skin bleeding (Clavien-Dindo Grade I).

Conclusion: By using rTAR in subxiphoidal hernias, the retromuscular space can be extended cranially to a subphrenic preperitoneal space. This results in a wide extraperitoneal mesh overlapping cranial to the xiphoid. Robotic assistance with caudal port placement below the anterior superior iliac spines as demonstrated in our video, allows to perform this procedure minimal invasively ensuring a fast recovery and favorable cosmetic result.

Recurring Paronychia in Post-Traumatic Nail Dystrophy of the Thumb: Treatment by Radical Nail Ablation and Full Thickness Skin Graft Coverage

I. Sojovic, A. Gübeli (Unité de chirurgie de la main et des nerfs périphériques, Service de chirurgie orthopédique et traumatologie de l'appareil moteur, Hôpitaux Universitaires de Genève, Geneva)

Background: Nail dystrophy is a common pathology that can lead to pain, impairment in function and aesthetics, and poses a potential risk for infection. There are several lines of treatment, with widely differing recovery times, recurrence rates and aesthetic results.

We present the case of a 36 year old man with complex nail dystrophy of the right thumb following a crush trauma with nail bed lesion and longitudinal fracture of the distal phalanx 30 years prior. He had suffered several episodes of paronychia requiring multiple surgical interventions and long-term antibiotic therapy. In November 2023, he presented in our emergency department with yet again another paronychia infection and requested a definite treatment of the underlying cause.

Aims: Our goal was to offer the patient a definite solution with minimal risk of recurrence and a satisfactory functional and aesthetic result.

Methods: We performed radical nail ablation of the right thumb by removing the entire nail unit including hyponychium, nail bed, matrix, and lateral and proximal nail folds. Full thickness skin graft of the palmar side of the ipsilateral proximal forearm was used for coverage of the defect.

Results: Postoperative follow-up showed an excellent functional and a very satisfactory aesthetic result with complete take of the skin graft, no donor site complication and no nail regrowth or infection. The patient was able to return to work two weeks after surgery.

Conclusion: Nail ablation with skin grafting is a radical but reliable solution in case of recurring complications due to nail dystrophy with low recurrence rate and good functional and aesthetic outcome – an indispensable tool in every surgeon's toolbox.



Figure 1. Pre-op



Figure 2. 4 weeks post-op

Cat Bite Injuries to the Hand and Forearm: The Impact of Antibiotic Treatment on Microbiological Findings

L. Schoepke, S. Wangler, M. Elias, D. Merky, R. Meier, E. Vögelin (Olten)

Background: Patients and physicians often underestimate cat bite injuries. The deep and narrow wound seals quickly and provides an environment for the inoculated saliva and bacteria. Interestingly, the literature reports no bacterial growth in the microbiological workup of wound swabs in 43%. The time between bite injury and first clinical presentation, start of antibiotic treatment and surgical debridement might affect these findings.

Aims: This study examines if these factors impact the outcome of microbiological results following cat bite injuries and if the detection of bacterial growth leads to higher complication rates, longer hospital stays or longer treatment time or costs.

Methods: This single-center retrospective study analyzed data from 102 patients who received antibiotic and surgical treatment following cat bite injury. Microbiological samples were collected in all cases. The time from the bite incident to first presentation, beginning of antibiotic administration and surgical debridement was calculated. Demographic data, complication rate, length of hospital stay, total treatment time and costs were recorded. A generalized linear model was fitted using the microbiological outcome as the dependent variable. Two subgroups (negative or positive microbiological results) were formed and statistically compared.

Results: The median age was 50 and 72% were female. The time from the bite incident to first clinical presentation, antibiotic administration or surgical treatment was not associated with the outcome of the microbiological result. Subgroup analysis did not reveal any significant differences.

Conclusion: Our data do not suggest that early antibiotic administration or delayed surgical treatment affects the outcome of the microbiological workup following cat bite injuries to the hand and forearm. The microbiological outcome did not affect the complication rate, treatment

time, and total treatment costs. The local tissue conditions required surgical treatment in all cases, including 39% with a negative microbiological outcome. This might indicate that bacteria are not the only pathogen in cat saliva.

New Diagnostic-Based Systematic Classification for Skier's Thumb Injuries: A Revision That is Needed

A. Strohmaier, C. Wirtz, L. Krafft, M. Häfeli (Clinic for Hand Surgery, Cantonal Hospital Graubünden, Chur)

Background: Acute injuries to the ulnar collateral ligament (UCL) of the first metacarpophalangeal joint (MCPJ), commonly referred to as Skier's thumb injuries, can be further categorized into different types based on bone lesions and joint instability. However, none of the existing classifications encompasses all types and combinations of injuries. A unified classification system that provides direct treatment recommendations for each type is required, particularly for cases with no clear indications.

Aims: To develop a new classification system for acute UCL injuries of the first MCPJ that comprehensively defines all possible combinations and types of injuries and facilitates treatment decision-making for each specific type in daily clinical practice.

Methods: The retrospective study included patients with acute UCL lesions who underwent conservative or operative treatment at our clinic between 2018 and 2023. This classification addresses ligamentous or osseous lesions, fracture fragment size and dislocation, ligament configuration (e.g. Stener lesions), and joint stability. Correlated radiography, ultrasonography, MRI, and intraoperative findings were used to define all combinations and variants of skier's thumb injuries. Pre-therapeutic joint stability was characterized according to the criteria established in the literature. Dislocation criteria for bone lesions were defined in a preliminary observer trial. The classification was applied by three hand surgeons with different training levels. Treatment applied and a 3-months follow-up was documented.

Results: In 213 patients with acute UCL tears, the new classification was consistently applied, and the treatment derived was largely aligned with the recommendations in the literature for both absolute and relative indications for splint or operative therapy. The vast majority of the patients were stable after 3 months.

Conclusion: This new classification is the first to combine the clinical and radiological aspects of skier's thumb injuries into one classification and encompasses all variants. It is comprehensive, can be easily applied retrospectively, and provides clear treatment recommendations in most cases.

High-Intensity Focused Ultrasound Therapy for an Osteoidosteoma in a Pediatric Finger: A Case Report

J. Hüppi¹, N. Zechmann-Müller², C. Binkert³ (¹Winterthur; ²Hand- und plastische Chirurgie, Kantonsspital Winterthur, Winterthur; ³Radiologie, Kantonsspital Winterthur, Winterthur)

Background: High intensity focused ultrasound (HIFU) is a non-ionizing and non-invasive application for benign and malignant disease. Ultrasonic waves are concentrated to achieve high level of energy and therefore necrosis due to coagulation.

Aims: We will describe one pediatric case where an osteoidosteoma was successfully treated by HIFU.

Methods: A seven-year-old boy presented in our department for hand surgery due to indolent swelling of the distal phalanx of the right ring finger. Neither recent trauma, nor positive family history was present. Clinical examination showed significant enlargement of the distal phalanx with minimal pain on palpation and unlimited mobility. Conventional radiography showed discrete fuzzy sclerosis of the metaphyseal part of the growth plate. MRI was not conclusive. Bone biopsy showed reactive change with no signs for acute inflammatory event. Periodic checks were performed, with no change in clinical and radiographic aspect. Nine months after the first appointment, the patient presented with pain after minor trauma and increase of the swelling. Radiography showed a nidus in the distal phalanx leading to a suspected diagnosis of an osteoidosteoma. Therefore, MRI-guided HIFU (MR-HIFU) was recommended one year after the first appointment.

Results: MR-HIFU was performed to destroy the osteoidosteoma. Six months after the intervention the patient presented with no further exponential growth and the difference to the other phalanges was minimized. Furthermore, radiography showed no retention of the nidus with a plane distal phalanx.

Conclusion: MR-HIFU is a promising approach in the non-invasive treatment of tumorous neoplasm. Because of its non-ionizing ultrasonic waves, there is no upper limit in dosing. The deposition of heat is in general limited by the surrounding tissue. The main factors preventing MR-HIFU treatment are thick bone around the nidus, a superficial position with risk for skin burn and the vicinity to neural structures. Osteoidosteomas are generally rather small and therefore well suited for MR-HIFU.

Entrapment of the Deep Ulnar Motor Branch in Guyon's Canal due to Ganglion Cyst: Two Case Reports

J. Hüppi¹, N. Zechmann-Müller², M. Schnell³ (¹Kantonsspital Winterthur, Winterthur; ²Hand- und plastische Chirurgie, Kantonsspital Winterthur, Winterthur)

Background: Isolated compression of the deep ulnar motor branch is uncommon. Muscular atrophy of the hypothenar, reduced force in abduction of the fingers and positive Froment sign are typical clinical symptoms, whereas cutaneous innervation of the hand is not affected. Causative factors can be fracture of the hamate's hook, diseases of neighboring vessels, de-

generative diseases in the wrist, or a ganglion cyst.

Aims: We will describe two cases relating the latter case.

Methods: Two elderly people presented due to progressive loss of strength of their hand. Additionally, we could observe atrophy of the first webspace and the hypothenar area with positive Froment sign. Neurophysiological studies showed distal injury of the R. profundus N. ulnaris. Radiographic examination with MRI was initiated. Both cases presented cystic formation compressing the deep branch of the ulnar nerve against the hamulus of the hamate. Furthermore, edema of denervation of the intrinsic muscles was observed. In a synopsis of the present findings, surgical decompression of the nerve at Guyon's canal was indicated.

Results: Intraoperative findings were congruent with previous MRI examination. In both cases, the deep ulnar motor branch was compressed by a tumor in the piso-hamate hiatus. Histological investigation confirmed the presence of a ganglion cyst. After having performed the operation, both patients improved in their motor function of the ulnar nerve, whereas no sign of recurrence have been observed.

Conclusion: Heavy compression of the motor branch of the ulnar nerve is of significant limitation in hand function. Therefore, patients with a decrease in hand strength should undergo further neurophysiological and radiological diagnostics. Even though, compression by a ganglion cyst in the Guyon's canal is a rare condition, one should think about when examining patients with pure motoric ulnar nerve deficit. If these conditions are existing, early decompression is recommended to achieve best outcome with high probability of rehabilitation.

Case Report of an Infraclavicular Brachial Plexus Injury Associated with Axillary Artery Rupture and Floating Shoulder – The Challenge of "Blind" Exploration and Reconstruction in a Polytrauma Patient

A. Fellmann, R. Glaab, B. Bachofen, J. Plock, F. Fiumedini, F. Früh (Kantonsspital Aarau, Aarau)

Background: Infraclavicular plexus trauma, categorized into neurapraxia, axonotmesis, or neurotmesis, demands tailored interventions. High-energy trauma necessitates early surgical exploration, posing challenges in polytraumatized, intubated patients due to unreliable assessments.

Aims: The aim of this case presentation is to demonstrate the decision-making challenges in treating infraclavicular brachial plexus injuries, particularly in polytraumatized patients.

Methods: A 21-year-old male with polytrauma from a high-speed motor vehicle accident was referred to our tertiary care facility. Initial assessment revealed blunt abdominal and chest trauma, along with a floating shoulder, right axillary artery rupture, and suspected brachial plexus injury. Emergency treatment included revascularization with a carotid-brachial bypass and forearm fasciotomies for the right upper extremity. Multiple abdominal surgeries were conducted, delaying upper extremity treatment.

Remaining intubated until definitive treatment, the patient's challenging preoperative decision-making was marked by clinical examination showing weak long finger flexion with an otherwise paralyzed extremity. Magnetic resonance scans revealed intact C5-Th1 roots, but analyzing the retro/infraclavicular plexus was hindered by edema and hematoma.

An interdisciplinary surgery 11 days post-admission involved dissection of the supra- and infraclavicular brachial plexus, revealing injuries to the axillary, musculocutaneous, and ulnar nerves with defects > 7 cm. Following stabilization of fractures, axillary artery reconstruction was done using a greater saphenous vein graft. Cable grafts were used for musculocutaneous and ulnar nerve reconstruction. Dorsal exploration, initially postponed, addressed a multi-fragmentary scapular fracture and avulsion of the anterior axillary nerve division. A Somsak nerve transfer was used to re-innervate the deltoid muscle.

Results: The patient is currently in rehabilitation, showing signs of recovery from his multiple injuries. The reconstructive strategies utilized, including axillary artery grafting and nerve cable grafts, demonstrate the potential of restoring function.

Conclusion: Our case underscores decision-making for early brachial plexus injury treatment in polytrauma patients. Given inconclusive preoperative assessments, peripheral nerve surgeons must adapt reconstructive strategies based on intraoperative nerve damage assessment.

Our Experience with Primary Trapeziometacarpal Implant Arthroplasty in Severely Comminuted Rolando Fractures

M. Greminger¹, R. Buechel² (¹Plastic and Hand Surgery, Cantonal Hospital St.Gallen, St.Gallen; ²Plastic and Hand Surgery, Cantonal Hospital St.Gallen, St.Gallen)

Background: The concept of primary joint replacement in severely comminuted fractures in elderly patients has proven to be a suitable treatment option in the shoulder, elbow and knee joint. Comminuted intra-articular fractures of the first metacarpal base can pose significant technical challenges, and no established gold standard treatment currently exists. Conventional methods like open reduction and internal fixation or external fixation are commonly employed, emphasizing the importance of anatomical reduction for restoring the articular surface. However, achieving articular surface congruity is often unattainable in severely comminuted intra-articular fractures, leading to short-term joint stiffness and instability, as well as long-term complications like secondary osteoarthritis.

Aims: This case report aims to share our experience with the use of primary trapeziometacarpal implant arthroplasty in the treatment of two patients with severely comminuted Rolando fractures.

Methods: In two cases of comminuted Rolando fractures, a primary trapeziometacarpal prosthesis (MAIA™) was implanted based on preoperative decision-making facilitated by 3D-CT analysis. Patient's visual analogue score for pain, range of motion, pinch and grip strength compared to the contralateral side were asked and examined.

Results: Both patients exhibited successful adaptation to their daily routines within a three-month postoperative period. No complications, such as cup or stem loosening or dislocation, were identified. Both patients almost reached equal range of motion, pinch and grip strength compared to the contralateral side.

Conclusion: The use of primary trapeziometacarpal implant arthroplasty seems to be a viable alternative for managing severely comminuted Rolando fractures, particularly in elderly patients and those with pre-existing osteoarthritis. This approach offers promising outcomes. Studies with other implant arthroplasties have shown better outcomes in patients treated primarily, than after several failed surgeries. We suggest the same is true for the trapeziometacarpal joint. Further studies are necessary to validate the efficacy of this intervention in a larger cohort of patients.

Reasons for Scaphoid Non-Union Associated with Health Care Provider and Patient Behavior: Analysis of 134 Patients

R. Labèr, G. Lautenbach, A. Schweizer (Hand Surgery, University Hospital Balgrist, Zurich)

Background: Risk factors for scaphoid non-union are known e.g. fracture location, displacement, poor vascularity and time to treatment. Health system or patient behaviour related factors are only limited known.

Aims: To assess health system and patient behavior-related factors for non-union of scaphoid fractures.

Methods: A retrospective data analysis of scaphoid non-union patients regarding their history from accident to scaphoid reconstruction between 2002 and 2020 was performed. General demographics, date of medical consultation, speciality of treating physician, diagnostic procedure and treatment were collected.

Results: 134 patients were included. Mean age at the accident was 26y (range 9-75 y), and the mean age at surgery was 28y (range 13-75 years). Days to first consultation was mean 233d (range 0-12136d), and days to surgery was mean 740d (range 19-12362d). The treating physician was mostly a general practitioner (GP) (52.2%), orthopaedist/traumatologist (17.9%), general surgeon (12.7%), or a hand surgeon (17.2%). The initial diagnostic procedure was X-ray in 76.9% of the cases, computed tomography (CT) in 20.9%, magnetic resonance imaging (MRI) in 13.4%, and none in 11.2%. A fracture was diagnosed in 32.8% of the cases, and non-union in 14.9%. Patients mainly presented late, with 63% within three weeks, and a minority on the accident day (39%). In 11% of the cases, healthcare providers performed either no or inadequate (77%) imaging and missed the correct diagnosis in 52% of the cases. A total of 128 patients had a second consultation, and 77 patients even had a third consultation with the same or different physicians before surgery, leading to increased healthcare costs due to delayed diagnosis and proper treatment.

Conclusion: Delayed presentation and lack of suspicion by attending physicians were the main reasons found. Therefore, speeding up the diagnosis and improving physician training are vital and could significantly reduce health care cost. CT or MRI scans should be conducted with a low-threshold if a scaphoid fracture is suspected.

Ultrasound-Based Measurement of Dorsal Scaphoid Displacement During Watson Test in Scapholunate Ligament Lesion

N. Huber, A. Schweizer, L. Reissner (Hand Surgery, Balgrist, Zürich)

Background: Scapholunate ligament lesion (SLL) is the most common ligament lesion in the wrist. The diagnosis of scapholunate ligament injuries in clinical practice is not standardised and there are various clinical and radiological methods that have varying degrees of reliability.

Aims: The aim of our work was to find a method that was simple, easily reproducible and did not require expensive and time consuming second-tier examinations. We therefore assessed the reliability of sonography during Watson test (WT) in detecting SLL.

Methods: 20 patients with MRI and intraoperatively confirmed SLL were assessed preoperatively between July 2020 and April 2023. Sonography was performed on the scaphoid dorsal subluxation (DS) in wrist neutral and during WT and compared with the healthy contralateral side. The DS was measured by two independent investigators and intra- and interobserver reliability were assessed.

Results: We found a statistically significant difference between DS of the scaphoid of the healthy (0.89 mm, SD 0.67 mm) compared to the pathological side (1.67 mm, SD 0.95 mm). Reliability was very good and SEM was lower than 0.4 mm for all measurements.

Conclusion: Sonographic measurement during WT showed promising results with very good reliability; this method could be routinely adopted for the detection and diagnosis of SLL without the need for second-tier examinations.



Figure 1. 3D Printed Hand Held Device to Perform the Examination Alone



Figure 2. Watson Test Performed Using 3D Printed Hand Held Device

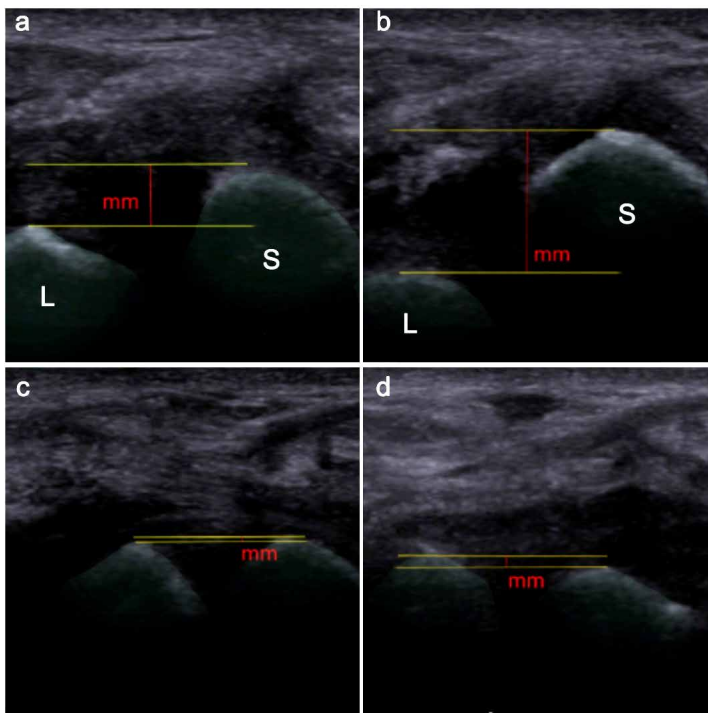


Figure 3. Dorsal Subluxation of the Scaphoid of the Healthy Compared to the Pathological Side

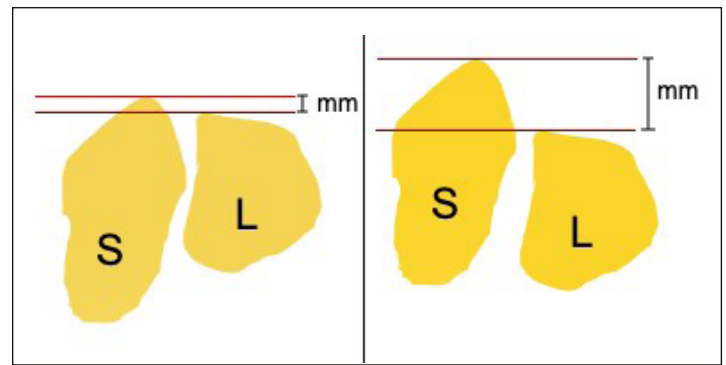


Figure 4. Schematic Representation of the Dorsal Subluxation of the Scaphoid

Bariatrics

Data-Driven Patient Clusters of Type 2 Diabetes may Help to Identify Patients at Risk and Predict Metabolic Surgery Outcomes on Diabetes Remission and NAFLD Progression

A. Poljo, J. M. Klasen, J. Süsstrunk, M. Kraljevic, R. Peterli, B. P. Müller-Stich, A. T. Billeter (Visceral Surgery, Clarunis – University Digestive Health Care Center Basel, Basel)

Background: Precision medicine and customized medicine have gained enormous attention in recent years, especially in the treatment of type 2 diabetes (T2D). Different subgroups of diabetes have been identified by research employing data-driven cluster analysis, each with a unique diabetes progression and complication risk (Ahlqvist et al., *Lancet Diabetes Endocrinol.* 2018). **Aims:** We aimed to apply the proposed cluster analysis to a patient population post metabolic surgery and investigate the association with T2D remission and presence of NAFLD.

Methods: We retrospectively linked newly defined clusters to metabolic surgery outcomes in 53 T2D patients. Utilizing k-means and hierarchical clustering, three clusters emerged based on glutamate decarboxylase antibodies, age, BMI, HbA1c, and homeostatic model assessment estimates of β -cell function (HOMA2-B%) and insulin resistance (HOMA2-IR). Intraoperative liver biopsies assessed nonalcoholic fatty liver disease (NAFLD) presence differentiating between simple steatosis (NAFL) and steatohepatitis (NASH). Clinical and biochemical data were collected over two years, focusing on T2D remission and NAFLD improvement.

Results: Cluster 1, characterized by the lowest BMI, highest NASH rate, impaired beta-cell function, and increased insulin resistance, displayed a favorable response to surgery, indicating robust regeneration of beta-cells. Despite increased insulin production, T2D remission was surprisingly low at 44.0% after one year, in contrast to 75.00% in Cluster 2 and 100.00% in Cluster 3. Metabolic surgery notably reduced insulin resistance and promoted NASH remission, evidenced by a significant reduction in a non-invasive NASH detection score and liver enzyme levels across all three clusters.

Conclusion: Our findings suggest that patients in Cluster 1 already show a lack of beta-cell compensation being associated with a higher prevalence of NAFLD and poorer diabetic control and therefore especially might benefit from an earlier intervention. Data-driven classification might help to customize treatment plans and identify patients at higher risk of problems at diagnosis.

Laparoscopic Versus Robotic Revisional Bariatric Surgery

M. Burgard¹, P. Iranmanesh¹, C. Toso¹, S. Mönig¹, B. Egger², F. Pugin², M. Jung¹ (¹Visceral Surgery, Hôpitaux Universitaires de Genève, Geneva; ²Visceral Surgery, Hôpital Cantonal de Fribourg, Fribourg)

Background: Revisional bariatric surgery (RBS) represents up to 15% of all bariatric procedures. The most performed conversion procedures are Roux-en-Y-Gastric Bypass (RYGB) and Vertical Sleeve Gastrectomy (VSG) after adjustable gastric banding (AGB), VSG or vertical banded gastroplasty (VBG). While the overall complication rate is known to be higher compared to primary surgery, the optimal surgical approach, laparoscopic or robotic, remains controversial.

Aims: We aimed to compare laparoscopic and robotic RBS in terms of peri and post-operative complications, ICU admission, operative time, and the length of hospital stay.

Methods: We conducted a retrospective multi-center case control study of patients who underwent RBS from 2013 to 2023 in two centers. Cases and controls were matched by the index procedure, - AGB or a stapled procedure and the revisional procedure, - RYGB or VSG.

Results: 59 revisional procedures were performed (36 and 23 per center). After matching according to index and revisional procedures, 46 patients were included, 23 in the robotic and 23 in the laparoscopic group. There were no statistically significant differences in demographics, BMI, or comorbidities between the groups (table 1). The overall peri- and early post-operative complication rate was similar while patients in the laparoscopic group had a higher rate of severe complications and reoperations (13% versus 0%), however, without reaching a statistically significant difference ($p = 0.07$). The operative time was shorter in the laparoscopic group (161 \pm 55 versus 232 \pm 63 minutes, $p < 0.05$) (table 2).

Conclusion: Our retrospective study showed a tendency towards more severe perioperative complications and reoperations in laparoscopic compared to robotic revisional surgery in pa-

tients with similar index and conversion procedures. Patients with complex revisional RYGB could benefit from robotic surgery. As the literature provides contrasting results, further studies should be performed to address this question.

Table 1. Patient's demographics, comorbidities, conversion; and index procedures

	Laparoscopic RBS N = 23	Robotic RBS N = 23	P
Age, years, median (range)	44,3 (16-62)	47,7 (29-74)	0,387
Gender %			0,084
F	20 (87%)	15 (65,2%)	
H	3 (13%)	8 (34,8%)	
BMI, kg/m ² , mean (SD)	41,9 (± 6,9)	39,2 (± 6,4)	0,181
ASA score %			0,592
Evtl 1, 2, 3, 4			
1,2	10 (43,5%)	11 (47,8%)	
3,4	13 (56,5%)	12 (52,2%)	
Comorbidities, %	14 (60,9%)	10 (43,5%)	0,238
Hypertension	7 (30,4%)	2 (8,7%)	
Diabetes	2 (8,7%)	0	
OSA	6 (26,1%)	5 (21,7%)	
Cardiopathy	2 (8,7%)	2 (8,7%)	
Immunosuppression	0	0	
Tabaco use, %	3 (13%)	1 (4,3%)	0,363
Type of revisional procedure, %			1
RYGB	22 (95,6%)	22 (95,6%)	
VSG	1 (4,3%)	1 (4,3%)	
+ Cholecystectomy	4 (17,4%)	7 (30,4%)	
+ Gastric wedge resection	3 (13%)	3 (13%)	
+ Fundoplication (Nissen) reversal	1 (4,3%)	1 (4,3%)	
Type of index procedure, %			0,730
AGB	18 (78,3%)	17 (73,9%)	
One-step	8 (34,8%)	15 (65,2%)	
Two-step	10 (43,5%)	2 (8,7%)	
Stapled procedure	4 (17,4%)	6 (26,1%)	
VBG	4 (17,4%)	0	
VSG	0	6 (26,1%)	
AGB + stapled procedure (two-step)	1 (4,3%)	0	
Time from index operation, months, mean (SD)	175,3 (± 64,1)	112,2 (± 41,9)	< 0,001
Reason for revisional surgery, %			1
Recurrence of obesity	22 (95,7%)	22 (95,7%)	
Symptoms	1 (4,3%)	1 (4,3%)	

RBS = Revisional bariatric surgery, N = Number, SD = Standard deviation,
RYGB = Roux-en-Y-Gastric Bypass, VSG = Vertical sleeve gastrectomy, VBG = vertical banded gastroplasty

How Preoperative Investigations Affect the Management of Bariatric Patients - Results of a Cohort Study of 897 Patients

A. Poljo, R. Schneider, J. Süssstrunk, J. M. Klasen, A. T. Billeter, R. Peterli, M. Kraljevic (Visceral Surgery, Clarunis - University Digestive Health Care Center Basel, Basel)

Background: Poorly defined preoperative diagnostic protocols worldwide vary in their emphasis on comprehensive investigations, with some prioritizing patient safety while others question routine procedures.

Aims: This study explores how diverse preoperative findings, from inflammatory processes to structural abnormalities, significantly influence patients' management and the choice of bariatric procedures, underscoring the complexity in decision-making for individualized surgical interventions based on a cohort study's findings

Methods: In a retrospective analysis of prospective data of over 1000 bariatric surgery patients from January 2017 to December 2022, we specifically included those who underwent primary laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic sleeve gastrectomy (LSG). In all patients, preoperative upper endoscopy was performed, with selected candidates also undergoing additional procedures like upper GI series and esophageal manometry, especially when LSG was planned. The study primarily analyzed the impact of preoperative examinations on therapeutic approaches.

Results: In this study, 897 patients were included, with 741 undergoing laparoscopic LRYGB and 156 LSG. All patients underwent upper endoscopy, revealing common findings such as type C gastritis, gastroesophageal reflux disease, and detection of *Helicobacter pylori*. Upper endoscopy prompted a therapeutic change in 216 patients (24.3%), resulting in a number needed to screen (NNS) of 4.1, with no significant differences based on the initially scheduled procedure. Preoperatively, upper GI series were more frequently conducted before planned LSG, uncovering hiatal hernias and motility disorders. However, no change in the surgical procedure resulted from upper GI series findings. Esophageal manometry, primarily performed for LSG, indicated normal findings in 84.6%, with a procedural change in 3 patients (2.0%). Overall, 14

(1.6%) patients experienced a change in the planned procedure, with 12 changes prompted by preoperative findings and two by technical difficulties.

Conclusion: We recommend routine upper endoscopy for all bariatric surgery patients, with additional manometry for planned LSG. Upper GI series should be reserved for selected cases and specific clinical indications.

Advantages of the 3- vs. the 2-Dimensional Laparoscopic Technology in Bariatric Surgery
C. de Vico, M. Burgard, B. Egger, F. Pugin (General Surgery, HFR, Fribourg, Fribourg)

Background: Bariatric surgery procedures as the laparoscopic Roux-en-Y-Gastric Bypass (RYGB) are highly standardized procedures. The difficulty in two-dimensional (2D) laparoscopic surgery is the loss of the depth perception which complicates surgical techniques as suturing and knotting. The development of three-dimensional (3D) laparoscopy has been shown to reduce operative times and surgeons' performances errors.

Aims: To compare operative times, post-operative complications and the lengths of hospital stay of patients having undergone laparoscopic RYGB before and after the introduction of the 3D-technology.

Methods: We conducted a retrospective cohort study including patients having undergone RYGB (without cholecystectomy) at our institution by the same surgical team before and after the introduction of the 3D-laparoscopic technology (Karl Storz, Tuttlingen, Germany). The primary outcome was the operative time, the secondary outcomes the post-operative complications and lengths of hospital stay.

Results: 100 consecutive patients, operated on 2019-2021 were included; 50 were operated utilizing the 2D- and 50 the 3D laparoscopic technology. There were no statistically significant differences in age, gender, body mass index or comorbidities, however, patients in the 3D-group had significantly more previous interventions. Operative time and hospital length of stay were significantly reduced in the 3D-group (83 (± 20.8) vs. 91 (± 13.5) minutes; p < 0.05 and 2.1 (± 0.4) vs. 2.7 (± 1.1) nights; p < 0.05). There were no statistically significant differences found between groups concerning post-operative complications and re-interventions.

Conclusion: 3D technology may help reducing the operative time and length of hospital stay in laparoscopic RYGB surgery with similar post-operative complications. We cannot completely exclude reduced operative times by the still growing experience of the surgical team.

	Total N= 100	2D N= 50	3D N= 50	P
Age, years, median (range)	43 (18-64)	42,5 (21-63)	44 (18-64)	0,453
Gender %				
F	77 (77%)	36 (72%)	41 (82%)	0,235
H	23 (23%)	14 (28%)	9 (18%)	
BMI, kg/m ² , mean (SD)	41,6 (± 5,4)	41,7 (± 5,3)	41,6 (± 5,5)	0,893
Comorbidities, %				0,534
Hypertension	32 (32%)	14 (28%)	18 (36%)	
Diabetes	15 (15%)	9 (18%)	6 (12%)	
OSA	37 (37%)	20 (40%)	17 (34%)	
Cardiopathy	2 (2%)	2 (4%)	0	
Arthrosis	16 (16%)	5 (10%)	11 (22%)	
Immunosuppression	1 (1%)	0	1 (2%)	
Tabaco use, %				0,006
Current	17 (17%)	5 (10%)	12 (24%)	
Past	16 (16%)	4 (8%)	12 (24%)	
Previous operations, %	41 (41%)	15 (30%)	26 (52%)	0,013
Laparoscopic abdominal	24 (24%)	9 (18%)	15 (30%)	
Open abdominal	3 (3%)	3 (6%)	0	
Other	14 (14%)	3 (6%)	11 (22%)	

D= Dimensional, N= number, SD= standard deviation.

Table 1. Patient demographic

	Total N= 100	2D N=50	3D N=50	p
Duration of intervention, minutes, mean, SD	87,4 (± 17,8)	91 (± 13,5)	83,9 (± 20,8)	0.045
Post-op. complications (30 days), %	6 (6%)	4 (8%)	2 (4%)	0,4
Bleeding	1 (1%)	0	1 (2%)	
Anastomotic leakage	0	0	0	
Thrombosis	0	0	0	
Embolism	0	0	0	
Ileus	1 (1%)	1 (2%)	0	
Other	4 (4%)	3 (6%)	1 (2%)	
Reoperation (30 days), %	2 (2%)	1 (2%)	1 (2%)	1
Length of hospital stay, nights, mean (SD)	2,4 (± 0,8)	2,7 (± 1,1)	2,1 (± 0,4)	0,001

D= dimensional, N= number, SD= standard deviation, post-op.= postoperative

Table 2. Surgical outcomes

Laparoscopic Magnetic Sphincter Augmentation for Symptomatic Gastroesophageal Reflux After Roux-en-Y Gastric Bypass: Outcome in 13 Patients

Y. Fringelli, E. Moser Schaub, U. Kessler, J. Zehetner (Department of Visceral Surgery, Hirslanden Clinic Beau-Site, Bern)

Background: Gastroesophageal reflux disease (GERD) represents a common burden after bariatric procedures, particularly after laparoscopic sleeve gastrectomy (LSG). While GERD after LSG is usually treated with conversion to Roux-en-Y gastric bypass (RYGB), there are limited surgical options to manage medically refractory GERD after RYGB due to the altered anatomy. The use of magnetic sphincter augmentation (MSA) is one option, but the literature on this topic remains scarce.

Aims: To present mid- to long-term outcome of patients treated with MSA for GERD after RYGB.

Methods: We performed a retrospective single-centre analysis of data from patients who underwent laparoscopic MSA for GERD between August 2015 and December 2023, and who had previously RYGB. Outcomes were persistence/recurrence of GERD symptoms, use of proton pump inhibitors (PPIs) and need for redo surgery related to MSA complications or recurrent GERD.

Results: Of the 312 MSA procedures performed for GERD, we identified 13 patients who underwent laparoscopic MSA after RYGB. There were 10 female patients (77%), with mean age of 42.6 ± 13.7 years and mean BMI of 27.2 ± 2.7 kg/m². Seven patients (54%) had de novo GERD. All MSA procedures included hiatoplasty. Median follow-up was 40 months (range 7-72) and median time between RYGB and MSA placement was 42 months (range 8-242). One patient (8%) required endoscopic dilatation due to persistent postoperative dysphagia. Two patients (15%) needed redo surgery: 1 redo hiatoplasty with adhaesiolysis and 1 conversion to esophagojejunostomy with implant removal. There was no erosion or migration of the MSA implant. Overall satisfactory control of reflux with discontinuation or reduction of PPIs was achieved in 9 patients (69%).

Conclusion: The use of MSA to manage refractory GERD after RYGB is a safe option and was effective in 69% of patients, but is limited to patients with intact oesophageal motility.

Gastric Bypass Conversion to Sleeve Gastrectomy with Robot Da Vinci Xi: A Video Case Report

A. Petrusic¹, A. Torre¹, S. Popeskou¹, F. Mongelli², F. Garofalo¹ (¹Visceral Surgery, EOC Civico, Lugano, Lugano; ²Visceral Surgery, EOC Bellinzona e Valli, Bellinzona, Bellinzona)

Background: Roux-en-Y gastric bypass (RYGB) has been the gold standard bariatric procedure for years. However, some patients experience weight regain or insufficient weight loss and revisional surgery is needed. The most challenging one is the conversion of the RYGB to biliopancreatic diversion (BPD), that can be completed in one or two stages.

Aims: In this case-report we present a robotic conversion from RYGB to sleeve gastrectomy (SG), as first step-procedure to BPD.

Methods: We present a 45 years-old patient who had undergone RYGB for super-obesity (BMI 59.5 kg/m²), 15 years prior. She had reached a BMI of 41 kg/m², then she started to regain weight. Although diet counseling and treatment with GLP-1 analogue, her BMI remained over 50 kg/m². A gastroscopy showed a gastro-jejunal anastomosis over 3 cm in diameter. A volumetric-CT showed a dilated gastric pouch. After multidisciplinary evaluation, a Conversion to BPD was offered in two stages.

Results: After trocars insertions and robotic docking accomplished, the operation begun with the identification of the gastro-jejunal anastomosis and resection of the gastric pouch 1 cm proximal to the anastomosis. A smaller gastric pouch was then calibrated with a 40 French bougie and stapled. Adherences and gastro-colic ligament were sectioned to free the excluded stomach and the short gastric vessels were dissected. A termino-terminal gastro-gastric anastomosis was then created. A sleeve of the antrum and gastric body was concluded. The intestinal continuity was restored by building a new lateral anastomosis between the alimentary and biliary limb. At 2 months after the surgery, the patients has lost 10 Kg and no complications were reported.

Conclusion: In selected cases, a robotic conversion of RYGB can be offered. Two stage-approach seems feasible and safe when a conversion to BPD has to be plan.

Effects of Hand-Sewn versus Linear Stapler Gastro-Jejunostomy in Laparoscopic Roux-en-Y Gastric Bypass on the Incidence of Anastomotic Ulcers

J. Kurylec, A. Poljo, R. Schneider, I. Lazaridis, J. Klasen, B. Müller, A. Billeter, R. Peterli, T. Delko, M. Kraljevic (University Hospital of Basel, Wallbach)

Background: Anastomotic ulcers (AU) at the gastro-jejunostomy (GJ) are a common postoperative complication after laparoscopic Roux-en-Y Gastric Bypass (RYGB). Known risk factors for ulcer formation are smoking, using of non-steroidal anti-inflammatory drugs or factors that increase the acid secretion or decrease the blood circulation of the gastric pouch. Currently, the effect of the anastomotic technique on AU remains still unclear.

Aims: This study aims to compare the occurrence of AU in patients with hand-sewn versus linear stapler gastro-jejunostomy.

Methods: The study was a retrospective analysis of prospectively collected data collected from patients undergoing RYGB between 2016 and 2022 with a complete and minimal FU of one year. Follow-up examinations with upper GI endoscopy to diagnose AU was only performed in symptomatic individuals. Age, weight evolution, obesity associated medical problems, smoking, and medication were analyzed in two groups, hand-sewn (HS-GJ) and linear stapler (LS-GJ) gastro-jejunostomy.

Results: A total of 315 patients were included into the analysis (137 with HS-GJ and 178 with

LS-GJ). A hand-sewn gastro-jejunostomy significantly decreased the rate of AU (HS-GJ 5.6% versus LS-GJ 12.4%, $p = 0.04$). Mean operative time was not significantly different between the groups. There were no anastomotic leaks in either group. Postoperative bleeding was rare with both techniques. Smoking was an additional risk factor for the occurrence of AU.

Conclusion: A change towards performing a hand-sewn gastro-jejunostomy in RYGB may lead to a significant decrease of AU. This finding may influence the anastomotic technique in RYGB, particularly for longer gastric pouches.

Challenges in Multi-centric Generalization: Phase and Step Recognition in Roux-en-Y Gastric Bypass Surgery

J. L. Lavanchy¹, S. Ramesh², D. Dall'alba³, C. Gonzalez⁴, P. Fiorini³, B. Müller-Stich¹, P. C. Nett⁵, J. Marescaux⁶, D. Mutter², N. Padoy⁷ (¹Department of Surgery, University Digestive Health Care Center - Clarunis, Basel; ²Institute of Image-Guided Surgery, IHU Strasbourg, Strasbourg; ³Altair Robotics Lab, University of Verona, Verona; ⁴Institute of Image Guided Surgery, IHU Strasbourg, Strasbourg; ⁵Department of Visceral Surgery and Medicine, Inselspital, Bern University Hospital, Bern; ⁶IRCAD France, Strasbourg; ⁷Institut of Image-Guided Surgery, IHU Strasbourg, Strasbourg)

Background: Most studies on surgical activity recognition utilizing artificial intelligence (AI) have focused mainly on recognizing one type of activity from small and mono-centric surgical video datasets. It remains speculative whether those models would generalize to other centers.

Aims: To assess the generalizability of phase and step recognition across centers.

Methods: One hundred forty surgical videos (MultiBypass140) of laparoscopic Roux-en-Y gastric bypass (LRYGB) surgeries performed at two medical centers, i.e., Hospital A (Bypass70A) and Hospital B (Bypass70B), have been fully annotated with phases and steps by two board-certified surgeons. We assessed the generalizability of phase and step recognition in 7 experimental studies:

- 1) Training and evaluation on Bypass70A;
- 2) Training and evaluation on Bypass70B;
- 3) Training and evaluation on the joint MultiBypass140 dataset;
- 4) Training on Bypass70A, evaluation on Bypass70B;
- 5) Training on Bypass70B, evaluation on Bypass70A;
- Training on MultiBypass140, 6) evaluation on Bypass70A and
- 7) evaluation on Bypass70B.

Model performance was assessed comparing human annotations with AI predictions measuring F1-score defined as the harmonic mean of precision (positive predictive value) and recall (sensitivity).

Results: The model's performance is markedly influenced by the training data. The worst results were obtained in experiments 4) (mean±standard deviation F1-score for phases and steps: 33.1 ± 5.7 and 23.8 ± 5.6) and 5) (39.1 ± 12.0 and 23.2 ± 6.6) confirming the limited generalization capabilities of models trained on mono-centric data. The use of multi-centric training data, experiments 6) (60.6 ± 9.5 and 46.8 ± 11.4) and 7) (81.9 ± 8.5 and 58.4 ± 7.8), improves the generalization capabilities of the models, bringing them beyond the level of independent mono-centric training and validation (experiments 1) [62.4 ± 12.9 and 48.0 ± 10.2] and 2) [79.9 ± 9.4 and 57.3 ± 8.5]).

Conclusion: MultiBypass140 shows considerable variation in surgical technique and workflow of LRYGB procedures between centers. Therefore, generalization experiments demonstrate a remarkable difference in model performance. These results highlight the importance of multi-centric datasets for AI model generalization to account for variance in surgical technique and workflows.

Analyzing the Impact of Surgical Technique on Intraoperative Adverse Events in Laparoscopic Roux-en-Y Gastric Bypass Surgery by Video-Based Assessment

J. L. Lavanchy¹, L. Sestini², D. Alapatt³, P. C. Nett⁴, D. Mutter³, N. Padoy³ (¹Department of Surgery, University Digestive Health Care Center – Clarunis, Basel; ²Politecnico di Milano, Milano; ³Institute of Image-Guided Surgery, IHU Strasbourg, Strasbourg; ⁴Department of Visceral Surgery and Medicine, Inselspital, Bern University Hospital, Bern)

Background: Despite high-level evidence that variations of surgical technique in laparoscopic Roux-en-Y gastric bypass (LRYGB) are correlated with postoperative outcomes and might be linked to intraoperative adverse events (IAE), there is a paucity of studies analyzing IAE in depth.

Aims: The aim of this study is to analyze the impact of surgical technique on temporal occurrence and frequency of IAE in LRYGB by video-based assessment.

Methods: MultiBypass140, a video dataset containing 70 LRYGB surgeries from Hospital A (Bypass70A) and 70 LRYGB surgeries from Hospital B (Bypass70B) was annotated with LRYGB phases and IAE occurrence.

Results: Compared to Bypass70B, in Bypass70A the omentum was not routinely divided (94% vs. 36%, $p < 0.0001$), and the mesenteric defects were not routinely closed (100% vs. 21%, $p < 0.0001$). In MultiBypass140 a total of 797 IAE occurred. The most IAE prone phases were gastric pouch creation, gastrojejunal and jejunojejunal anastomosis creation. Bypass70B showed significantly more IAE in the omentum division (23 vs. 5 IAE, $p = 0.0007$), Petersen space closure (13 vs. 1 IAE, $p = 0.0013$) and mesenteric defect closure phases (34 vs. 1 IAE, $p < 0.0001$) compared to Bypass70A.

Conclusion: Variations of LRYGB technique between centers influence the temporal occurrence and frequency of IAE. By adapting the surgical technique IAE might be omitted.

Decoding the Clavien-Dindo Classification: Artificial Intelligence (AI) as a Novel Tool to Grade Postoperative Complications

S. Staubil¹, H. L. Walker², F. Saner³, C. H. Salinas⁴, D. C. Broering³, M. Malago³, M. Spiro⁵, D.A. Raptis³ (¹HPB and Liver Transplantation, Royal Free Hospital, London GB; ²Obstetrics & Gynaecology, University College London, London; ³Organ Transplant Center of Excellence, King Faisal Specialist Hospital and Research Center, Riyadh; ⁴Global Healthcare Sciences, University Oxford, Oxford; ⁵Department of Anaesthesia and Intensive Care, Royal Free Hospital, London)

Background: The CDC standardizes grading of postoperative complications. However, consistent, and precise application in dynamic clinical settings is challenging. AI offers a potential solution for efficient automated grading.

Aims: To assess ChatGPT's capability of grading postoperative complications using the Clavien-Dindo classification (CDC) via Artificial Intelligence (AI) with Natural Language Processing (NLP).

Methods: ChatGPT's accuracy in defining the CDC, generating clinical examples, grading complications from existing scenarios, and interpreting complications from fictional clinical summaries, was tested.

Results: ChatGPT 4 precisely mirrored the CDC, outperforming version 3.5. In generating clinical examples, ChatGPT 4 showcased 99% agreement with minor errors in urinary catheterization. For single complications, it achieved 97% accuracy. ChatGPT was able to accurately extract, grade, and analyze complications from free text fictional discharge summaries.

Conclusion: ChatGPT 4 demonstrates promising proficiency and accuracy in applying the CDC. In the future, AI has the potential to become the mainstay tool to accurately capture, extract, and analyze CDC data from clinical datasets.

Preliminary Results from the International Registry on Liver Venous Deprivation (EuroLVD)

G. R. Joliat¹, P. Chevallier², S. Wigmore³, D. Martin¹, I. Labgaa¹, E. Uldry¹, N. Halkic¹, T. Newhook⁴, J. N. Vauthey⁴, R. Memeo⁵, B. Dasari⁶, E. Braunwarth⁷, R. Duran⁸, A. Denys⁹, E. Melloul¹ (¹Visceral Surgery, Lausanne University Hospital CHUV, Lausanne; ²Radiology, Hôpital L'Archet, CHU de Nice, Nice; ³Clinical Surgery, Royal Infirmary of Edinburgh, Edinburgh; ⁴Surgical Oncology, The University of Texas MD Anderson Cancer Center, Houston; ⁵Hepatobiliary and Pancreatic Surgery, Miulli Hospital, Bari; ⁶Hepatopancreatobiliary and Transplant Surgery, Queen Elizabeth Hospital, Birmingham; ⁷Visceral, Transplantation and Thoracic Surgery, Medical University of Innsbruck, Innsbruck; ⁸Medical Radiology, Lausanne University Hospital CHUV, Lausanne)

Background: Liver venous deprivation (LVD) is a recently-developed method to reach maximal liver hypertrophy before major hepatectomy. LVD combines simultaneous portal and ipsilateral hepatic vein embolization. An international registry was created in 2021.

Aims: This study aimed to describe the outcomes after LVD of patients included in the registry.

Methods: Since its creation, 7 international expert HPB centers participated to the registry. Preoperative characteristics, data on liver regeneration after LVD, and postoperative results after hepatectomy were collected. Future liver remnant (FLR) and standardized FLR ratios were defined as FLR/total functional liver volume and FLR/total estimated liver volume.

Results: A total of 191 patients were included (71 women). Median age was 63 (IQR 53-69) and body-mass index 24.8 kg/m² (IQR 22.3-28.7). Fifty-three patients were ASA III/IV.

Main surgical indication was colorectal metastases (n=116). Median FLR and standardized FLR ratios before LVD were 33% (IQR 26-47) and 32% (IQR 23-39). Median time for the LVD procedure was 122 minutes (IQR 99-164). In one patient right hepatic vein embolization failed. Complications after LVD occurred in 14 patients (7%), including 7 hemorrhages/hematomas. After LVD, median FLR and standardized FLR ratios significantly increased to 46% (IQR 39-59, p<0.001) and 44% (IQR 35-50, p<0.001), corresponding to a median kinetic growth rate of 3.2%/week (IQR 1.6-5.3). Hepatectomy was performed in 142 patients (69 extended hepatectomies), while 49 dropped out (7 for insufficient hypertrophy (4%), 27 for tumor progression (14%), and 15 for other reasons (8%)). Seventy-one patients had postoperative complications (50%), and only 2 developed postoperative liver failure (1%). Median Comprehensive Complication Index was 20.9 (IQR 0-30.8) and 10 patients were reoperated (7%).

Conclusion: The preliminary data of this international registry showed that LVD had a high technical success rate (190/191) with few post-procedural complications and significant kinetic growth. Major hepatectomy after LVD appeared to be safe.

Evaluation of Tolerance Towards Ureteral Double-J-Stents in Children: An Unmet Need

M. Frech¹, D. Planta², R. Vuille-Dit-Bille², S. Holland-Cunz² (¹University Children's hospital Basel, Basel; ²Pediatric Surgery, University Children's Hospital Basel, Basel)

Background: Ureteric double-J-stents (DJS) are commonly applied devices in urology that often cause irritative symptoms in adults, leading to decreased quality of life. Little is known about how they are tolerated by children. Furthermore, standardized patient-centered care for children has not yet been established.

Aims: The aim of this study was to assess the tolerance of children towards DJS by evaluating their irritative symptom rate and to raise awareness of the need for a standardized evaluation method.

Methods: A prospective observational single-center study was conducted over a period of 14 months on children with indwelling DJS. A questionnaire addressing 5 categories (void-

ing symptoms, general symptoms, social activities and/or sexual health, catheter removal, and medication) was developed for different age groups and employed after stent removal.

Results: Twenty patients requiring DJS with a mean age of 5.8 years (ranging from 3 months to 15 years) were enrolled in the study. During the indwelling time (mean 6 weeks), 65% (n=13) of the patients suffered from irritative symptoms (intermittent pain and/or voiding problems). There was a positive association between age and the reported pain score (Spearman's $\rho = 0.54$, p = 0.04).

Conclusion: Irritative symptoms caused by DJS were systematically assessed in children for the first time. To guarantee patient-centered care, our study's high rate of irritative symptoms must be accounted for when employing DJS. With the questionnaire, we provide an example of a sensitive tool to evaluate the management of children with DJS and treatment options to reduce stent-related symptoms.

Compatibility of Family Planning and Surgical Training in Switzerland

S. Faes, J. Ferreirinha, M. Weber (Klinik für Viszeral-, Thorax- und Gefässchirurgie, Stadtspital Zürich, Zürich)

Background: Surgeons undertake a long training and have stressful work schedules during optimal childbearing age. Training and career plans can entice young surgeons to renounce part-time work and delay pregnancy, risking pregnancy complications and infertility.

Aims: This survey study aims to determine the prevalence and constraints of part-time work and family planning among young surgeons in Switzerland.

Methods: An anonymous, voluntary survey was distributed to young board-certified surgeons. It queried work schedules and desire for part-time work as well as history of pregnancies and use of assisted reproductive treatment.

Results: A total of 375 surgeons participated, 308 were included (157 female, 151 male). There were no differences in current age (male median 37 (IQR 5), female 37 (6), p=0.93), median age at medical school graduation (male 26 (2), female 26 (2), p=0.90), and mean time to board certification (male 8.3 (SD 2.4), female 8.2 (SD 2.7), p=0.61). Female surgeons had a higher rate of part-time employment (38% vs 19%, p=0.0002). More male surgeons had children compared to their female counterparts (70% vs 45%, p<0.0001). Female surgeons were older (median 35 (IQR 4.5)) than male surgeons (median 33.5 (IQR 3.25), p=0.0002) and female partners of male surgeons (median 32 (IQR 3), p<0.0001) at birth of their first child. Female surgeons more frequently desired further children (71% vs 38%, p<0.0001) and delayed pregnancy due to training (74% vs 22%, p<0.0001). Female surgeons had longer time to conceive (>12 months 24% vs 10%, p=0.014), lower spontaneous pregnancy rates (82% vs 93%, p=0.029) and higher rates of assisted reproductive treatment (14% vs 4%, p=0.0089). Female surgeons more frequently perceived their gender as a negative career influence (67% vs 5%, p<0.0001).

Conclusion: Whilst part-time work and family planning are challenging for surgeons of both genders, female surgeons face striking inequities when trying to consolidate family planning with their profession.

Overall Survival in Patients with Esophageal Cancer and Clinical Complete Response after Radiochemotherapy: Should a Watchful Waiting Strategy be the new Standard of Care?

S. Gerber^{1,2}, M. Berger³, H. Hemmatzad⁴, D. Candinas¹, D. Kröll¹, T. Haltmeier¹, Y. Borbély¹ (¹Department for Visceral Surgery and Medicine, Inselspital, Bern University Hospital, Bern; ²Department for General and Visceral Surgery, Spital Interlaken, Interlaken; ³Department of Oncology, Inselspital, Bern University Hospital, Bern; ⁴Department for Radiation Oncology, Inselspital, Bern University Hospital, Bern)

Background: The current standard of care for curative treatment of esophageal cancer (EC) consists of neoadjuvant radiochemotherapy (RCT) followed by resection. However, an organ-sparing approach with a watchful waiting (WW) strategy and resection only in case of cancer recurrence is gaining importance in patients with clinical complete response (cCR) after RCT. Nevertheless, data on overall survival, particularly in subgroups with and without tumor recurrence, is limited.

Aims: To compare overall survival (OS) rates in patients with cCR based on initial management and at time of recurrence.

Methods: We retrospectively analyzed data from all patients with EC and cCR to RCT between 01/2014 and 12/2021. OS- and disease-free survival was calculated using Kaplan-Meier survival analysis.

Results: Of 96 patients with cCR after RCT, 45 underwent resection (47%), and 51 (53%) a WW approach. There were no significant differences in baseline patient or tumor characteristics. In the WW group, 28 patients (55%) had cancer recurrence. Of those, 11 patients (of 28, 39%) underwent either salvage esophagectomy or endoscopic submucosal dissection in curative intent.

No significant difference in OS could be detected in patients with WW and either no recurrence or recurrence treated in curative intention (p=0.716). Further, OS was significantly longer in those patients than in patients with primary resection (p=0.031) and WW patients with recurrence and palliative treatment (p<0.001). (Fig 1).

Conclusion: In a WW concept for patients with EC and cCR after RCT, patients with cancer recurrence can achieve the same OS as patients without recurrence if treated in curative intention. Moreover, OS in both those patient groups was superior to that of patients undergoing direct resection after RCT, supporting a WW approach as at least safe and applicable in clinical practice. Further prospective data are needed to determine the value of WW as standard of care for patients with cCR following neoadjuvant RCT.

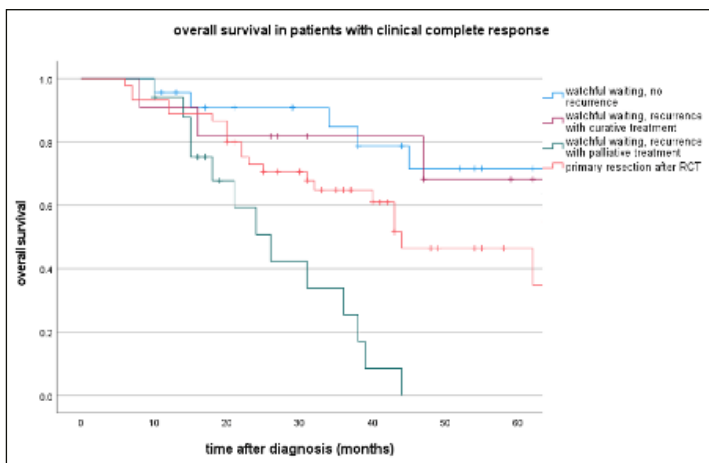


Figure 1. OS in patients with cCR after neoadjuvant RCT regarding their treatment strategy

Hepato-Pancreatico-Biliary II

Spatial Heterogeneity of Immune Drivers Coordinates the Organisation of Antitumor Immunity in Pancreatic Cancer, Affecting Patient Outcome

A. S. Wenning¹, P. Aeschbacher¹, B. Gloor¹, E. Karamitopoulou², A. Perren², I. Marinoni² (¹Department of Visceral Surgery and Medicine, University Hospital Bern, Bern; ²Institute of Tissue Medicine and Pathology, University of Bern, Bern)

Background: Pancreatic ductal adenocarcinoma (PDAC) is considered low immunogenic with "cold" tumor microenvironment (TME) and is mostly unresponsive to immune checkpoint blockade therapies.

Aims: We aim to decipher the impact of intratumoral heterogeneity of immune determinants on antitumor response.

Methods: 130PDAC specimens were classified according to overall survival in long-term survivors (LTSs, n=29, OS≥60 months) and short-term survivors (STSs, n=101, OS<60 months). Spatial compartment masks were defined by immunofluorescence imaging (tumor cells: Pancytokeratin+CD45-, leukocytes: CD45+Pancytokeratin-, stroma cells: PanCK-CD45-). Regions of interest from tumor center (TC) and the invasive front (IF) were examined by transcriptomic and proteomic analysis using the Nanostring platform for immune pathway targets. Results of NGS and morphological features were integrated. 20samples underwent immunophenotypic analysis by multiplex immunofluorescence.

Results: LTSs displayed mostly homogeneous morphology with extended glandular differentiation and immunogenic TME both at TC and IF, with increasing gradient towards the IF. There was higher presence of immune checkpoint-associated and immunogenic genes and proteins at the IF as compared to the TC, including CD40, CD3, CD8, CD4, GZMB and PD-L1. In contrast, STSs were characterized by morphologic heterogeneity, including areas with reduced glandular differentiation and high tumor budding, and a mostly immunosuppressive TME with negative gradient towards the IF. Moreover, there was reduced gene expression and protein abundance at the IF as compared to the TC, including CD3, CD8, CXCL10, GZMB, IFNG, HLA-DR and CD40.

Conclusion: LTSs display a highly immunogenic TME, underscoring their effective antitumor immunity, especially at the area of IF compared with STSs. A significant intratumoral heterogeneity between TC and IF exists with regards to immune determinants in both, LTSs and STSs, which might explain the different antitumor immune responses, affecting patient outcome. The differential expression of immune drivers may help selecting patients for combination therapies to improve antitumor immunity and harness the responsiveness to immune checkpoint inhibitors in PDAC.

The Pancreatic Surgery Composite Endpoint PACE – Development and Validation of a Clinically Relevant Endpoint Requiring Lower Sample Sizes

C. Kümmerli¹, F. Nickel^{2,3}, P. C. Müller¹, M. W. Schmidt⁴, L. P. Schmidt⁴, P. Wise^{2,3}, R. Klotz², C. Tjaden⁵, M. Diener⁶, P. Probst⁶, T. Hackert², M. W. Büchler^{2,7} (¹Department of Surgery, Clarunis University Digestive Health Care Centre Basel, Basel; ²Department of General, Visceral and Transplantation Surgery, Heidelberg University Hospital, Heidelberg; ³Department of General, Visceral and Thoracic Surgery, University Medical Center Hamburg-Eppendorf, Hamburg; ⁴Department of Gynecology and Obstetrics, University Medical Centre Mainz, Mainz; ⁵Department of General, Visceral, and Thoracic Surgery, Hospital of Nuremberg, Nuremberg; ⁶Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld; ⁷Botton-Champalimaud Pancreatic Cancer Center, Champalimaud Foundation, Lisbon)

Background: Single endpoints in prospective and randomized studies have become impractical due to their low frequency and the marginal benefit of new interventions.

Aims: To provide a composite endpoint in pancreatic surgery.

Methods: Data from prospective studies were used to develop (n=1273) and validate (n=544) a composite endpoint based on postoperative pancreatic fistula, post-pancreatectomy hemor-

rhage as well as reoperation and reinterventions. All patients had pancreatectomies of different extents. The association of the developed Pancreatic surgery Composite Endpoint (PACE) with prolonged length of hospital stay (LOS) >75th percentile and mortality was assessed. A single-institution database was used for external validation (n = 2666). Sample size calculations were made for single outcomes and the composite endpoint.

Results: In the internal validation cohort, the PACE demonstrated an AUC of 78.0%, a sensitivity of 90.4% and a specificity of 67.6% in predicting a prolonged LOS. In the external cohort, the AUC was 76.9%, the sensitivity 73.8% and the specificity 80.1%. The 90-day mortality rate was significantly different for patients with a positive versus a negative PACE both in the development and internal validation cohort (5.1% vs 0.9%; P< 0.001), as well as in the external validation cohort (8.5% vs 1.2%, P< 0.001). The PACE enabled sample size reductions of up to 80.5% compared to single outcomes.

Conclusion: The PACE performed well in predicting prolonged hospital stays and can be used as a standardized and clinically relevant endpoint for future prospective trials enabling lower sample sizes and therefore improved feasibility compared to single outcome parameters.

Frailty Assessment for Risk Stratification in Pancreatic Surgery - Results of a Single-Center Cohort Study

M. Frey¹, E. Krombolz², S. Patalong², A. Wirsching², A. Nocito² (¹Visceral and Transplantation Surgery, University Hospital Zurich, Zurich; ²General, Visceral and Vascular Surgery, Kantons-spital Baden, Baden)

Background: Large cohort studies found an increase in frailty with age. Age is a known risk factor for pancreatic cancer. Seventy percent of new diagnoses are made in patients aged more than 65 years. Pancreatic resections represent the only hope for cure, but are associated with high morbidity. The definition "fit for pancreatic surgery", currently mainly based on age and comorbidities, is continuously challenged.

Aims: The aim of this study is to analyze the impact of frailty on postoperative outcomes after pancreatic resections.

Methods: Data of consecutive patients undergoing pancreatic resections between January 2015 and July 2022 were retrospectively analyzed. Postoperative complications were graded by the Clavien-Dindo Classification, Comprehensive Complication Index (CCI) and complications specific to pancreatic resections as recommended and published by the International Study Group of Pancreatic Surgery. The modified frailty index (mFI) was defined by 11 variables. An mFI score above 0.27 was set to define frailty.

Results: A pancreatic resection was performed in 159 patients, of which 23 (15%) were classified as frail. Pancreatoduodenectomies were similarly distributed in both groups. Frail patients were older (median of 74 vs. 69 years). Male gender was associated with frailty (83%, p=0.001). Moreover, frailty was associated with an increased rate of preoperative biliary drainage. Although intensive care stay was increased in the frail group (median 3 vs. 0 days; p=0.01), total length of hospital stay was not affected. Frailty was associated with severe complications as defined by a comprehensive complication index >50 (35% vs. 10%; p=0.003), an increased rate of severe type C pancreatic fistula (13% vs. 2%, p=0.04), and a higher 90-day mortality (13% vs. 2%, p=0.04).

Conclusion: Assessment of frailty should be used for preoperative risk stratification since frailty is associated with a higher morbidity and mortality after pancreatic resections.

Survival Comparison Between Irreversible Electroporation combined with Chemotherapy and Chemotherapy alone in Locally Advanced Pancreatic Cancer – A Meta-Analysis

S. Erdem-Sanchez, C. Kümmerli, H. Gros, P. C. Müller, A. Billeter, B. Müller (Surgery, Clarunis University Digestive Health Care Centre Basel, Basel)

Background: Locally advanced pancreatic cancer (LAPC) is an aggressive disease with a grim prognosis. Even with improved chemotherapy regimens, local progression contributes to nearly one-third of patient deaths. Irreversible electroporation (IRE), a non-thermal ablation technique, shows promising results in the treatment of selected patients. Besides its cytoreductive effect through cell apoptosis, evidence indicates that IRE induces protective, anti-tumor immunity. This potential role may be crucial in eliminating undetected (micro-)metastatic disease, commonly known as the abscopal effect.

Aims: This study aimed to assess the efficacy of IRE with chemotherapy compared to chemotherapy alone in LAPC patients.

Methods: Five databases were systematically searched for articles reporting outcome from LAPC patients undergoing chemotherapy with or without IRE. The primary outcome was defined as overall survival (OS). Pooled analyses for the estimation of survival were carried out to compare the two groups.

Results: Three articles including a total of 2827 patients were identified; 2566 of these received chemotherapy alone while 261 patients were treated with the combination of IRE and chemotherapy. LAPC patients treated with IRE and chemotherapy, compared to chemotherapy alone, exhibited improved OS. In the chemotherapy-alone group, 17% of patients were alive 10 months after treatment initiation, whereas this figure increased to 27% in the IRE plus chemotherapy group. Furthermore, the survival rate at 20 months was 6% in the chemotherapy-alone cohort, while it increased to 10% in the combined IRE and chemotherapy group.

Conclusion: Though not reaching statistical significance, there seemed to be a potential positive impact on OS in LAPC patients with the combination of IRE and chemotherapy. Given the ability of IRE to induce protective anti-tumor immunity, additional research is required to assess whether the enhanced survival is attributed to its abscopal effect on micrometastatic disease.

Incidental Findings of Pancreatic Pathologies in Preoperative MRCP for Cholecystectomy
J. Zeindler¹, G. F. Hess¹, P. Sedlacek¹, S. Muenst², M. Bolli¹, O. Kollmar¹, S. D. Soysal³ (¹Abdominal Surgery, Clarunis - University Centre for Gastrointestinal and Liver Diseases, Basel; ²Institute of Medical Genetics and Pathology, University Hospital Basel, Basel; ³Faculty of Medicine, University of Basel, Basel)

Background: Preoperative magnetic resonance cholangiopancreatography (pMRCP) is commonly used to exclude choledocholithiasis and to have a better understanding of patient's anatomy prior to cholecystectomy. Pancreatic pathologies often represent incidental findings in these preoperative imaging studies.

Aims: We investigated a large cohort of patients with pMRCP for cholecystectomy and analysed the occurrence of incidental pancreatic pathologies.

Methods: This retrospective cohort study consecutively included all patients undergoing pMRCP for cholecystectomy between 2010 and 2020. The occurrence of incidental pancreatic pathologies have been recorded as well as their impact on further surveillance and diagnostic analysed.

Results: In the given time period, 2267 patients underwent MRCP prior to cholecystectomy. In 542/2267 patients (24%) pancreatic pathologies have been observed. The most common pancreatic pathologies were pancreatic cysts (171/542, 32%) and radiological signs of pancreatitis (50/542, 9%). Intraductal papillary mucinous neoplasia (IPMN) were diagnosed in 15 cases (3%), and 12 (80%) of these were branch-duct-IPMN. 8 patients showed duodenal diverticula (1.5%), 8 atrophy of the pancreas (1.5%), 6 patients had lipomatosis (1%), 5 ductal ectasia (1%), and 5 patients had pancreatolithiasis (1%). In addition, 11 (2%) patients were diagnosed with solid tumours of which 10 were unspecific lesions, which were followed up with imaging in 9 patients and with endoscopic ultrasound +/- biopsy in one patient. The remaining tumour was radiologically suspicious and was diagnosed as adenocarcinoma on biopsy.

Conclusion: Incidental findings of pancreatic pathologies in preoperative MRCP for cholecystectomy are common. While the majority of these findings are benign and don't require further workup, IPMN and suspicious cysts often require additional imaging surveillance, in accordance with guidelines and the age of patients. Detection of suspicious lesions requiring additional diagnostic workup and treatment is rare.

3D Modelling to Predict Vascular Involvement for Locally Advanced Pancreatic Adenocarcinoma

R. Sguinzi¹, J. Vidal², F. Poroes², D. A. Bartolucci², A. Litchinko¹, E. Gossin³, A. Fingerhut⁴, C. Toso⁵, L. Bühler¹, B. Egger¹ (¹General Surgery, Cantonal Hospital of Fribourg, Villars sur Glane; ²Radiology, Cantonal Hospital of Fribourg, Villars sur Glane; ³Faculty of Medicine, University of Fribourg, Fribourg; ⁴General Surgery, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai; ⁵General Surgery, University Hospital of Geneva, Geneva)

Background: The current management of patients with locally advanced pancreatic adenocarcinoma (LAPC) is based on radiological and endoscopic imaging. Intraoperative strategy depends on the degree of involvement of the major arterial and venous structures.

Aims: To evaluate 3D segmentation and printing to predict tumor size and vascular involvement of LAPC with the objective to improve pre-operative planning when vascular resection might be needed or to select patients for neoadjuvant therapy rather than initial surgery.

Methods: We retrospectively analyzed 16 consecutive patients with LAPC who underwent pancreatoduodenectomy (PD) in two centers from 2015 to 2021. The pre-operative computed-tomography (CT) scan images were processed performing segmentation with 3D reconstructions, subsequently printed as 3D models. Two radiologists specialized in pancreatic imaging and two pancreatic surgeons analyzed, blindly and independently, the pre-operative CT scans and 3D models using a defined checklist. Their evaluations were compared to the pre-operative CT scan reports utilized for patient management. A positive delta was defined if the 3D analysis resulted in a higher accuracy for predicting vascular involvement, confirmed by intraoperative data and pathological examinations, if compared to pre-operative radiological analysis.

Results: Fourteen PD, one total pancreatectomy and one exploratory laparotomy have been performed. Ten out of 16 patients had a positive delta concerning vascular involvement of superior mesenteric vein (SMV) or portal vein (PV). Tumor extension was also found to be more accurately evaluated by 3D modelling than by 2D pre-operative imaging ($p < 0.05$). This information could have led to a change of the operative planning envisioning vascular resection or to a different treatment strategy such as neoadjuvant therapy. 3D segmentation was sufficient without additional benefit from 3D-printing.

Conclusion: 3D segmentation provides additional information to choose the best treatment strategy and plan surgical procedures for patients with LAPC and will be further evaluated in a planned prospective multicenter study.

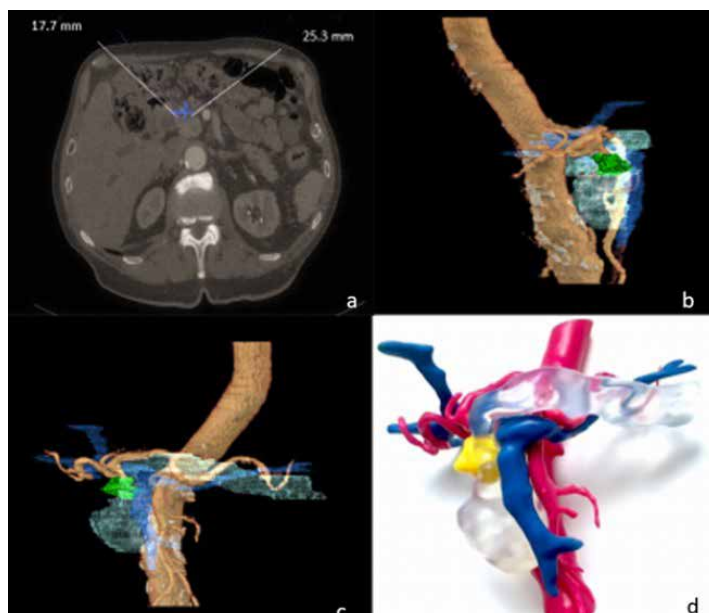


Figure 1

Quantity and Quality of Randomised Controlled Trials in Pancreatic Surgery

K. Czuj¹, P. Probst², M. K. Müller², F. Hauswirth¹, P. Antony², H. Strothmann¹, P. Renzulli¹ (¹Department of Surgery, Cantonal Hospital Thurgau, Münsterlingen; ²Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld)

Background: Randomised controlled trials (RCTs) are considered the gold standard in clinical research. However, surgical RCTs are demanding and therefore sparse. In addition, they are often considered to be of poor methodological quality.

Aims: The objective of this systematic review was to evaluate the quantity and quality of RCTs in pancreatic surgery.

Methods: A systematic literature search was performed in PubMed, CENTRAL and Web of Science. All RCTs investigating pancreatic surgery were included. Date of publication and region of origin was analysed quantitatively for the periods before 1996, from 1996 to 2010, and after 2010. The methodologic quality of the RCTs was analysed using the Cochrane risk of bias 2.0 tool with special attention to the blinding of surgeons and patients.

Results: The search yielded a total of 33522 results, of which 362 RCTs with a total of 43942 patients were included. Only 34 trials were published before 1996, whereas 93 appeared between 1996 and 2010, and 235 after 2010. Most trials were conducted in Europe (174 of 362, 48%), followed by Asia (134 of 362, 37%), and North America (47 of 362, 13%). The overall risk of bias judgement was low in 15% (53 of 362), with some concerns in 36% (130 of 362) and high in 49% (178 of 362) of RCTs. Patients were blinded in 23% (81 of 362) and not blinded in 21% (73 of 362) of RCTs. Whereas surgeons were blinded in 12% (41 of 362) and not blinded in 32% (111 of 362) of RCTs. In the remainder, blinding status remained unknown. Industry funding was reported in 9% (34 of 362) of RCTs, whereas no industry funding took place in 47% (169 of 362) of RCTs.

Conclusion: The quantity of RCTs in pancreatic surgery has increased exponentially. Generally, there is a considerable risk of bias present in pancreatic surgery RCTs, however, quality increases over time.

Postpancreatectomy Hyperamylasemia is Associated with Postoperative Pancreatic Fistula but not Overall Morbidity or Mortality

E. Krombholz¹, E. Krombholz¹, M. Frey², S. Patalong¹, A. Wirsching¹, A. Nocito¹ (¹Kantonsspital Baden, Baden; ²Viszeralchirurgie, Unispital Zürich, Zürich)

Background: Postpancreatectomy acute pancreatitis (PPAP) is a recognized complication following pancreatic surgery. The international study group for pancreatic surgery has contributed significantly to the understanding of PPAP by developing a definition and grading system. PPAP is defined as an acute inflammatory condition within the first 3 postoperative days, encompassing sustained postoperative serum hyperamylasemia > 48 h, coupled with radiological and clinical features. The classification system helps to better standardize the diagnosis of PPAP and identify the incidence and associated risk factors.

Aims: This study aims to investigate the incidence, risk factors, and outcomes of PPAP after pancreatic resections in a single-center retrospective analysis.

Methods: All consecutive patients after partial pancreatectomy between January 2015 and July 2022 were screened for diagnostic criteria of PPAP. Postoperative complications were graded according to Clavien-Dindo (CD), Comprehensive complication index and complications defined by the ISGPS.

Results: Partial pancreatectomy was performed in 145 patients. Postoperative hyperamylasemia (POH) for at least 48 hours after surgery was found in 33 patients. None of the patients had a CT scan performed at the time of hyperamylasemia. Type of resection (pancreatoduodenectomy vs. distal pancreatectomy) was not different between groups. Postoperative pancreatic fistula occurred more frequent in the POH group (36% vs. 13%, $p = 0.003$). Thereby, biochemical

Conclusion: Postoperative hyperamylasemia was associated with biochemical leak (ISGPS definition of postoperative pancreatic fistula). There was no impact on morbidity or mortality.

M. Perrin¹, P. Antony¹, H. Strothmann², P. Renzulli², M. K. Müller¹, P. Probst¹ (Department of Surgery, Cantonal Hospital Thurgau, Frauenfeld; ²Department of Surgery, Cantonal Hospital Thurgau, Münsterlingen)

Aims: This umbrella review compares complication rates of different spleen preservation techniques in distal pancreatectomy.

Results: Fifteen SR met the inclusion criteria and were included in this review. In 9 out of 10 SR, significantly fewer gastric variceal rates were described for distal pancreatectomies that preserved the splenic vessels (pSV) versus those that resected them (rSV). Moreover, significantly fewer spleen infarctions and infarction-associated postoperative splenectomies were observed in pSV-DP. In 12 SR, no differences were observed regarding the occurrence of POPF between the two techniques. However, two SR showed a significantly lower incidence of POPF in pSV-DP. Operating time was significantly lower in rSV-DP in three SR while four showed no difference with pSV-DP. The incidence of intraoperative haemorrhage was lower in rSV-DP in 3 of 12 SR.

Conclusion: This umbrella review showed a reduction in gastric varices and splenic infarction rate when performing pSV-DP compared to rSV-DP. Unfortunately, the evidence was based on non-randomised studies. Therefore, more robust trials are needed to investigate splenic vessels preservation in DP. Moreover, no criteria exist yet to determine in which situations pSV-DP is oncological safe.

Pathological Complete Response after Radiochemotherapy and Esophagectomy - False Sense of Security?

S. Gerber^{1,2}, H. Hemmatzad³, M. Berger⁴, D. Candinas¹, D. Kröll¹, T. Haltmeier¹, Y. Borbély¹ (¹Department for Visceral Surgery and Medicine, Inselspital, Bern University Hospital, Bern; ²Department for General and Visceral Surgery, Spital Interlaken, Interlaken; ³Department for Radiation Oncology, Inselspital, Bern University Hospital, Bern; ⁴Department for Oncology, Inselspital, Bern University Hospital, Bern)

Background: Esophageal cancer (EC) is associated with a high morbidity and mortality, even in a curative treatment approach. The current standard of care for curative treatment of EC consists of neoadjuvant radiochemotherapy (RCT) followed by resection. Pathological response in the resected tissue is a well-known predictor of disease-free (DFS) and overall survival (OS). Yet, even in a pathological complete response (pCR), cancer recurrence is not infrequent.

Aims: To analyze DFS and OS in patients with pCR after trimodal therapy and identify risk factors for recurrence.

Methods: We retrospectively analyzed all patients with pathological complete response after RCT and esophagectomy treated for EC between 01/2014 and 12/2021. Clinical data such as demographic data, tumor characteristics at staging and restaging and postoperative follow-up, were extracted from electronic medical records.

Results: Of 28 patients, 10 (35.7%) developed cancer recurrence. There were no statistically significant differences in patient or tumor characteristics between patients with or without recurrence.

Recurrence occurred after a median 21 months (IQR 30). Median OS was 40.5 months (IQR 40) in patients with and 48.5 months (IQR 32) in patients without recurrence ($p=0.121$). Recurrence was mostly distant ($n=9$, 90%). 4 (of 10, 40%) patients were then addressed in curative, 6 (60%) in palliative intention.

Predictive factors for cancer recurrence were persistent tumor in endosonography and/or computed tomography during restaging.

Conclusion: Even in patients with pCR after RCT and esophagectomy, around one third develops cancer recurrence. A tight follow-up with special attention to distant rather than local recurrence seems beneficial. Patients with an aspect of only partial response at restaging are at higher risk for recurrence and should be monitored even closer.

M. Schneider¹, J. Kim², F. Berth³, Y. Sugita⁴, P. Grimminger⁵, G. L. Baiocchi⁶, G. de Manzoni⁷, M. Bencivenga², S. Nunobe², T. G. Consortium¹, T. G. Consortium⁷, H. K. Yang², C. A. Gutschow¹ (¹Department of Surgery, University Hospital Zurich, Zurich; ²Department of Surgery, Seoul National University Cancer Hospital, Seoul; ³Department of Surgery, University Hospital Tuebingen, Tuebingen; ⁴Department of Gastroenterological Surgery, Cancer Institute Hospital of the Japanese Foundation for Cancer Research, Tokyo; ⁵Department of Surgery, University Hospital Mainz, Mainz; ⁶Department of Surgery, University Hospital Brescia, Brescia; ⁷Department of Surgery, University Hospital Verona, Verona)

Aims: Their effects on anastomotic leakage and postoperative morbidity have not been extensively studied.

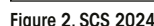
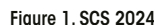
Methods: Patients after minimally invasive TG and DG were selected from a cohort of 9356 oncological gastrectomies performed between 2017-2021 in 44 specialized centers.

Results: Three anastomotic techniques (circular stapled (CS, 3.7%); linear stapled (LS, 93.8%); hand sewn (HS, 2.5%)) and three types of bowel reconstruction (Roux (RX, 51.5%); Billroth I (BI, 23.1%); Billroth II (BII, 25.4%)) were identified after TG (n=878) and DG (n=3334). Post-operative morbidity was higher after TG compared to DG (AL 5.2% vs. 1.1%, $p \leq 0.001$; 90-day mortality 1.6% vs. 0.4%, $p \leq 0.001$; overall morbidity 28.6% vs. 16.3%, $p \leq 0.001$; major morbidity 15.4% vs. 8.0%, $p \leq 0.001$).

Anastomotic leakage rate in the TG cohort was higher after CS (13.1%) and HS (7.9%) than after LS anastomoses (1.9%, $p<0.001$). Similarly, overall (CS: 43.9%, HS: 28.6%, LS: 23.1%) and major complications rates (CS: 25.2%, HS: 11.1%, LS: 12.0%) as well as mortality (CS: 4.7%, HS: 2.2%, LS: 0.8%) were higher after CS. Multivariate analysis confirmed anastomotic technique as a predictive factor for anastomotic leakage (Fig. 1), but not for occurrence of mortality, overall and major complications.

In the DG cohort, most (98.7%), outcomes were similar for all types of bowel reconstruction: Anastomotic leakage (BI: 1.4%, BII: 0.8%, RX: 1.2%, $p=0.440$), 90-day mortality (BI: 0%, BII: 0.1%, RX: 1.1%, $p=0.109$), overall (BI: 14.5%, BII: 15.0%, RX: 18.7%, $p=0.208$, Figure 2) and major morbidity (BI: 7.9%, BII: 9.1%, RX: 7.2%, $p=0.219$).

Conclusion: In suitable situations, DG should be preferred to TG, as postoperative morbidity is significantly lower. In addition, LS should be the preferred method of anastomosis after TG. Conversely, the techniques for bowel reconstruction can be chosen according to the surgeon's preference.



Robotic-Assisted Urgent Treatment of Giant Hiatal Hernia Causing Severe Dysphagia and Respiratory Distress: A Video Case Report

F. Mongelli^{1,2}, T. Doria¹, D. Ia Regina^{1,2}, F. Garofalo³ (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ³Surgery, Ospedale Regionale di Lugano, Lugano)

Background: The laparoscopic approach has garnered substantial validation as the preferred modality for managing upper-GI pathologies, including hiatal hernia, demonstrating superiority over open surgery in both elective and urgent scenarios. While the application of robotic assistance in elective upper-GI surgery has been proposed, evidence regarding its utilization in complex urgent surgical cases remains limited.

Aims: This study sought to evaluate the feasibility and safety of employing a robotic-assisted approach in the urgent treatment of a severely symptomatic giant hiatal hernia.

Methods: The presented case involves a 78-year-old female admitted to the emergency department due to severe thoracic pain, dysphagia, vomiting, and respiratory distress. Computed tomography revealed bilateral aspiration pneumonia, a giant type III hiatal hernia with upside-down stomach, and significant esophageal dilation. Given the rapid deterioration of her general condition, surgical intervention became imperative.

Results: The operation was carried out with the da Vinci Xi Robotic System, with the patient positioned supinely, legs open, and at a 30° reverse-Trendelenburg angle. Employing four 8-mm robotic arms and a 5-mm laparoscopic trocar, the entire stomach was reduced into the abdominal cavity. Subsequently, the hernia sac was excised. Crural repair ensued using interrupted non-absorbable sutures, followed by the application of a biologic mesh to reinforce the hiatus. Ultimately, a short-floppy Nissen fundoplication was executed by enveloping the gastric fundus around the esophagogastric junction. Intraoperative gastroscopy confirmed the absence of endoluminal lesions or esophageal kinking. Respiratory weaning occurred on the third postoperative day, and the patient's recovery progressed without complications.

Conclusion: The robotic-assisted urgent treatment of a severely symptomatic giant hiatal hernia proved to be both effective and safe. The principal challenge encountered pertained the coordination among operating theater personnel and instruments, necessitating the continuous availability of a proficient team trained in robotic surgery.

Transgastric Laparoscopic Resection of Gastric Submucosal Tumors: An Alternative Approach in Anatomically Challenging Locations?

D. Kröll¹, J. Fischer², Y. Borbély¹, T. Haltmeier¹, D. Candinas³, P. Aeschbacher⁴ (¹Visceral Surgery and Medicine, Inselspital, University Hospital of Bern, Bern; ²Visceral Surgery and Medicine, Inselspital, University Hospital of Bern, Bern; ³Visceral Surgery and Medicine, Inselspital, University Hospital of Bern, Bern; ⁴Inselspital, University Hospital of Bern)

Background: Surgical resection remains the recommended method in treatment for patients with Gastrointestinal stromal tumors (GIST). However, resection in anatomically challenging locations, e.g., lesser curvature of the stomach or gastroesophageal (GE) junction, might be challenging.

Aims: We report the feasibility and the safety outcomes of a case series of patients who underwent trans gastric resection of gastric GISTs.

Methods: Patients with intraluminal GIST at the fundus, GE junction, lesser curvature, or prepyloric region resected with transgastric resection were included between 2023 and 2024 in a single-center institution. Data on the demographics, comorbidities, lesion parameters, operative findings, complications, and histopathology were collected.

Results: A total of 8 patients (47.5% female; mean age 60.5 years) were identified. The average tumor size was 3.2 (range 2.7–4.1) cm. The average tumor size was 4.6 cm. No intra- or postoperative complications occurred.

Conclusion: The transgastric resection technique for GIST at anatomically challenging locations was feasible and safe and presented an alternative and additional armamentarium of resection techniques.

Small Cuts, Big Difference? The Impact of a Minimally Invasive Thoracic Phase during Ivor Lewis Esophagectomy on Long-Term Quality of Life of Esophageal Cancer Patients

K. Neuschütz¹, L. Fourie¹, N. Germann², A. Pieters², S. Däster¹, F. Angehrn¹, J. Klasen¹, B. Müller¹, D. Steinemann¹, M. Bolli¹ (¹Clarunis University Digestive Health Care Center, Basel; ²University of Basel)

Background: Due to improved survival of esophageal cancer patients, long-term quality of life (QoL) is increasingly gaining importance. We analyzed QoL of patients treated with open Ivor Lewis esophagectomy (Open-E) or a hybrid operation including laparotomy and a robot-assisted thoracic phase (hRob-E), as well as a standard group of healthy individuals.

Aims: The aim of this study is to evaluate the impact of a minimally invasive compared to an open approach during the thoracic phase of Ivor Lewis esophagectomies on quality of life.

Methods: With a median follow-up of 36 months after hRob-E (n=28) and 40 months after Open-E (n=43), patients' QoL was assessed using the European Organization for Research and Treatment of Cancer (EORTC) QoL Questionnaire Core 30 (QLQ-C30) and the EORTC Esophagus specific QoL questionnaire 18 (QLQ-OES18).

Results: Patients showed similar clinical-histological characteristics, yet hRob-E patients had significantly higher ASA scores at surgery (p<0.001). Patients and healthy controls reported similar global health status, emotional and cognitive functions. All of the surgically treated cancer patients reported reduced role and social functioning, fatigue, nausea and vomiting, dyspnea and diarrhea. However, physical functioning of Open-E patients was significantly reduced compared to healthy controls (p=0.019). In addition, a trend towards a better pain score after

hRob-E compared to Open-E emerged (p=0.063). Regarding QLQ-OES18, hRob-E and Open-E treated patients similarly reported eating problems, reflux, and troubles swallowing saliva.

Conclusion: The general health status is not impaired after esophagectomy. Despite higher ASA scores, QoL of hRob-E patients is similar to that of patients operated with Open-E. Moreover, patients after hRob-E appear to have a better score regarding physical functioning and a better pain profile than patients after Open-E, indicating a benefit of a minimally invasive approach during the thoracic phase.

Nodal Metastatic Pattern in Gastric Cancer: A Descriptive Study of a Single Institution Cohort

M. Schelletter¹, M. Chevallay², C. Toso², S. P. Mönig², M. K. Jung² (¹Geneva; ²Chirurgie viscérale, Hôpitaux universitaires de Genève, Geneva)

Background: Gastric cancer exhibits diverse nodal metastatic patterns. However, the relation between metastatic lymph node (LN) stations and tumor location, pT-stage, and histological subtype remains unclear.

Aims: This descriptive study aims to identify potential metastatic patterns in gastric adenocarcinoma, underscoring the need for a D2 lymphadenectomy within gastrectomy.

Methods: Between May 2016 and December 2022, LN stations for 86 patients undergoing total or subtotal gastrectomy for gastric cancer were examined.

Results: Among 86 patients, positive lymph node metastases were present in 42 patients (49%). A mean of 46 (SD=20) lymph nodes were harvested, with a 0% mortality rate. Middle tumors exhibited the highest prevalence of lymph node metastases (53%), surpassing proximal (48%) and distal tumors (45%). Proximal tumors primarily metastasized to proximal LN stations 2 and 9 (16%, 12%) and distal LN stations 5 and 6 (8%, 16%). For middle third tumors, LN stations 3 and 7 were highly affected (21%). Distal tumors exhibited the highest frequency of metastases in distal LN stations 4d and 6 (8%, 15%) and proximal LN stations 7 and 9 (8%, 8%) (Table 1). LN metastases were most prevalent in diffuse (50%) and mixed type (72%) gastric cancers compared to intestinal tumors (42%) (Table 2) (Figure 1). Factors like larger tumor size (p=0.002), higher pT-stage (p<0.001) (Table 3), and lymphatic (p<0.001) or vascular invasion (p<0.001) significantly correlated with an increased likelihood of lymph node metastases. In the multivariate analysis, only positive metastatic LN status and advanced pT-stage correlated significantly (p=0.008) (Table 4).

Conclusion: LN stations close to the tumor show higher LN metastases prevalence, but metastases can occur in any station, regardless of tumor location, pT-stage, or histological subtype. Higher pT-stage significantly increases the likelihood of lymph node metastases. Our findings reinforce the need for D2 lymphadenectomy.

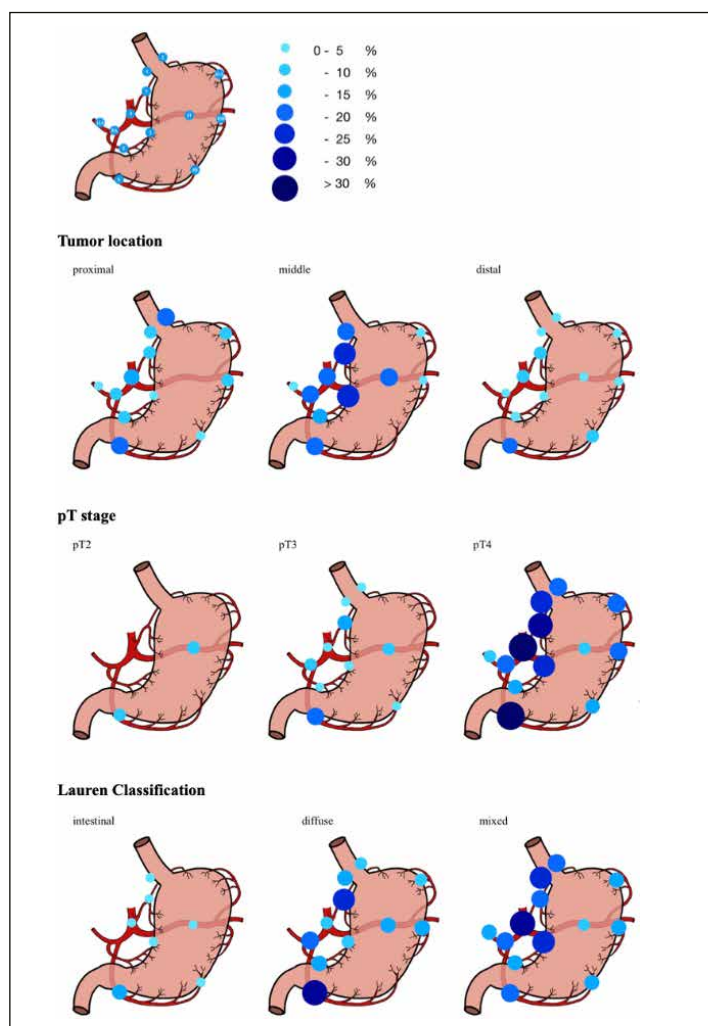


Figure 1. Distribution of metastatic lymph node stations by category

Tubular tumor location, n (%)	Total n = 44	No. Patients (%)	Perioperative	1	2	3	4a	4b	4d	5	6	7	8	9	10	11	12
Proximal	21	12 (58)	12 (58)	2 (9)	4 (19)	1 (5)	2 (9)	2 (9)	1 (5)	2 (9)	4 (19)	2 (9)	2 (9)	3 (14)	---	---	1 (5)
Middle	19	13 (68)	7 (37)	3 (16)	---	4 (21)	1 (5)	1 (5)	---	2 (11)	3 (16)	4 (21)	3 (16)	---	---	3 (16)	1 (5)
Distal	42	19 (45)	13 (31)	2 (5)	1 (2)	2 (5)	1 (2)	1 (2)	3 (7)	2 (5)	6 (15)	3 (7)	1 (2)	3 (7)	---	2 (5)	---

Table 1. Tubular tumor location

Lauren Classification, n (%)	Total n = 44	No. Patients (%)	Perioperative	1	2	3	4a	4b	4d	5	6	7	8	9	10	11	12
Intestinal	41	17 (41)	14 (34)	1 (2)	---	1 (2)	---	---	2 (5)	---	5 (12)	2 (5)	---	2 (5)	---	2 (5)	---
Gastric	18	4 (22)	7 (39)	1 (5)	---	1 (5)	---	1 (5)	---	2 (11)	3 (16)	4 (22)	3 (16)	---	---	1 (5)	---
Mixed	16	13 (75)	10 (63)	4 (25)	3 (17)	4 (25)	2 (13)	2 (13)	2 (13)	2 (13)	3 (17)	3 (17)	5 (25)	---	---	1 (5)	2 (13)

Table 2. Lauren Classification

pT Stage, n (%)	Total n = 44	No. Patients (%)	Perioperative	1	2	3	4a	4b	4d	5	6	7	8	9	10	11	12
pT0	6	1 (17)	1 (17)	2 (33)	2 (33)	2 (33)	---	---	---	---	---	---	---	---	---	---	---
pT1a	12	3 (25)	3 (25)	2 (17)	2 (17)	2 (17)	---	---	---	---	---	---	---	---	---	---	---
pT1b	7	1 (14)	1 (14)	1 (14)	1 (14)	1 (14)	---	---	---	---	---	---	---	---	---	---	---
pT2	11	4 (36)	2 (18)	---	---	---	---	---	---	---	---	---	---	---	---	---	---
pT3	23	13 (57)	9 (39)	1 (4)	1 (4)	1 (4)	---	---	1 (4)	1 (4)	4 (17)	3 (13)	2 (9)	---	---	1 (4)	---
pT4a	25	22 (88)	20 (80)	6 (24)	3 (12)	6 (24)	3 (12)	4 (16)	3 (12)	3 (12)	8 (32)	7 (28)	4 (16)	7 (28)	---	2 (8)	2 (8)
pT4b	2	1 (50)	1 (50)	---	---	---	---	---	---	---	---	---	---	1 (50)	---	---	---

Table 3. pT Stage

Entire cohort	Univariable Analysis			Multivariable Analysis		
n = 86, N+ = 42	OR	95% CI	p-value	OR	95% CI	p-value
pT Stage 3-4	17.646	5.664-54.980	<0.001	6.914	1.657-28.849	0.008
Lauren Diffuse/Mixed	1.789	0.724-4.423	0.208	1.419	0.372-5.408	0.608
Tumor size ≥ 40mm	4.261	1.676-10.836	0.002	2.412	0.651-8.939	0.188
Tumor location						
Proximal	1.067	0.416-2.738	0.893	0.817	0.060-11.115	0.879
Middle	1.442	0.483-4.303	0.512	2.077	0.117-36.721	0.618
Distal	0.750	0.321-1.755	0.507	1.303	0.113-15.078	0.832
Lymphatic invasion	7.500	2.883-19.508	<0.001	1.743	0.409-7.433	0.453
Vascular invasion	17.348	3.707-81.178	<0.001	10.223	0.978-106.814	0.052

Table 4. Univariate and multivariate analysis of predictors for metastatic lymph nodes based on the total number of patients (Hosmer and Lemeshow Test = 0.706)

Minimally Invasive Pylorus-Preserving Gastrectomy – A Step by Step Video Guide

M. Schneider¹, J. Kim², C. A. Gutschow¹, H. K. Yang², D. Vetter¹ (¹Department of Surgery, University Hospital Zurich, Zürich; ²Department of Surgery, Seoul National University Cancer Hospital, Seoul)

Background: Pylorus-preserving gastrectomy (PPG) is an established treatment option for patients with early-stage gastric cancer (cT1, cN0) situated in the middle third of the stomach and has been shown to have comparable perioperative and oncological outcomes to distal or total gastrectomy, while having certain nutritional advantages. PPG is mainly performed in east Asia, while the procedure is relatively unknown in European/American centers.

Aims: The aim of the current video is to provide a step-by-step guide for performing a minimally invasive PPG with a focus on different anastomotic techniques for gastrogastrostomy.

Methods: The procedure is illustrated using real-time footage of two surgeries performed in August 2023 at Seoul National University Hospital, Republic of Korea, including a laparoscopically assisted PPG with extracorporeal anastomosis and a robotic PPG with intracorporeal gastrogastrostomy.

Results: The voiceover narration provides detailed explanations of each surgical step with a focus on anastomosis and dissection of relevant lymph node stations. The video also includes a discussion of the indications, contraindications, and potential complications of PPG.

Conclusion: The high-quality video tutorial on PPG is a valuable and comprehensive resource for surgeons who are interested in learning more about the procedure, is easy to follow, and provides a comprehensive overview of the important steps of minimally invasive PPG.

Robotic-Assisted Duodeno-Digijunostomy for Superior Mesenteric Artery Syndrome: Report of a Case

F. Mongelli^{1,2}, S. P. Iovinella¹, F. Pedersoli³, D. Ia Regina^{1,2} (¹Surgery, Ospedale Regionale di Bellinzona e Valli, Bellinzona; ²Faculty of Biomedical Sciences, Università della Svizzera Italiana, Lugano; ³Radiology, Ospedale Regionale di Bellinzona e Valli, Bellinzona)

Background: Superior mesenteric artery syndrome, also known as Wilkie's syndrome, is a rare vascular condition characterized by the abnormal course of the superior mesenteric artery, which arises from the abdominal aorta at an angle narrower than the norm (less than 22°). This reduced angle leads to compression of structures passing between the aorta and the superior mesenteric artery, such as the duodenum and the left renal vein.

Aims: The aim of this study is to present the robotic-assisted treatment of a patients with Wilkie's syndrome.

Methods: We present the case of a 24-year-old male patient who presented in the emergency department with postprandial epigastric pain, discomfort, vomiting. Such symptoms were lasting for seven years and drastically worsened during the last months, also associated to a 10 kg weight loss. First, the patient underwent an esophago-gastro-duodenoscopy, which showed a compression of the third duodenal segment. Such a finding was confirmed in the barium swallow test and the CT scan, also revealing that the duodenal compression was between the aorta and the superior mesenteric artery. The aorto-mesenteric angle was 12°, therefore, highly suggestive of an aorto-mesenteric syndrome.

Results: The patient underwent a robotic-assisted duodeno-digijunostomy with a 4-trocar technique. A duodenal enterotomy was performed in the third portion of the duodenum proximally to the stenosis. We measured 50 cm of jejunum from the Treitz's ligament, we performed an enterotomy and then a side-to-side hand-sewn duodeno-digijunostomy using two continuous v-lock 3-0 absorbable sutures. The postoperative course was uneventful, with oral feeding well tolerated from the second postoperative day and the patient was discharged on the third day.

Conclusion: Superior mesenteric artery syndrome is a challenging and rare condition. In our experience, the robotic-assisted hand-sewn duodeno-digijunostomy was feasible and effective for treating a patients affected by superior mesenteric artery syndrome.



Visual Abstracts

Laparoscopic Management of Jejunal Intussusception Caused by Jejunal Lipoma: A Rare Case in Adults

A. Petrusic, D. Christoforidis (Visceral Surgery, EOC Civico, Lugano, Lugano)

Background: Jejunal intussusception, a rare cause of chronic abdominal pain in adults, is often misdiagnosed. Benign tumors are the most common cause. Conventional endoscopy may not reach the lesion, CT scan or MRI may be required for diagnosis if suspected. There is a single case report dealing with a jejunal intussusception, caused by jejunal lipoma, successfully fixed by laparoscopy and bowel resection.

Aims: We present the case of a 50-year-old male patient with chronic left abdominal pain caused by a jejunal submucosal lipoma causing intermittent intussusception.

Methods: This is a video presentation of the laparoscopic jejunal lipoma with intracorporeal resection.

Results: Three ports were used with an umbilical access. An intussusception was identified 20 cm from the Treitz ligament. The proximal bowel segment was suspended onto the anterior abdominal wall to verticalize the interested loop and the lipoma was extroflexed and removed through enterotomy, followed by closure using Heineke-Mikulicz technique. The patient presented some post-operative lower GI bleeding that was treated conservatively and he was discharged on post-operative day five. Histopathology showed a submucosal lipoma of 4.5 cm.

Conclusion: In conclusion, small bowel intussusception, though rare, should be considered in chronic abdominal pain differential diagnosis. This case demonstrates successful treatment of a rare jejunojejunal intussusception with a mini-invasive approach.

A Bifid Gallbladder? A Challenging Laparoscopic Cholecystectomy

A. Jelip, C. Toso, M. J. Sleiman, V. Delaune (Digestive Surgery, Hôpitaux Universitaire de Genève, Geneva)

Background: Acute cholecystitis is due to an obstruction of the cystic duct, usually by a gallstone, followed by distension and subsequent inflammation of the gallbladder. The modern-day gold standard treatment of acute cholecystitis is laparoscopic surgery. It is, however, associated with a higher risk of bile duct injury (0.1%-1.5%) when compared to the open approach (0.1%-0.2%). Factors predisposing to bile duct or vasculo-biliary injuries are related to anatomy, disease-related pathology, structural misidentification and improper techniques.

Aims: We report a case of a patient with an acute cholecystitis with a destabilizing anatomy with what looked like the gallbladder and an unidentified mass,

Methods: We report a case of a patient with an acute cholecystitis in which we performed a laparoscopic cholecystectomy. We faced a destabilizing anatomy with what looked like the gallbladder and an unidentified mass, interpreted as a possible common bile duct cyst. Careful dissection allowed us to determine that what looked like a common bile duct cyst was actually a dilatation of "Hartmann's pouch" due to a large gallstone.

Results: Laparoscopic cholecystectomy reduces length of hospitalization and enhance intra-operative and postoperative morbidity compared with open cholecystectomy. It may increase the risk of bile duct injury, notably in an acute setting due to inflammation and an unclear anatomy. Hartmann's pouch with the infundibulum can sometimes unexpectedly be present beneath the common hepatic duct. In order to avoid bile duct injury, notably in an acute setting, a surgical technique was developed, the Critical View of Safety. It is a method whose sole aim is to secure identification of the cystic structures

Conclusion: Understanding the anatomy allowed for an ultimately safe laparoscopic cholecystectomy. It is strongly advised that, in the event of atypical anatomy, a second opinion is asked of another and/or more experimented surgeon.

Supraclavicular First Rib Resection for Thoracic Outlet Syndrome (TOS): Patient Rated Outcome Measures (PROMs) and Length of Posterior Rib Remnant

C. Bauer (Neurozentrum Oberaargau Langenthal)

Background: There is ongoing debate wether length of the posterior rib remnant after first rib resection for thoracic outlet syndrome (TOS) affects outcome of surgery.

Aims: To assess the impact of length of posterior rib remnant on outcome of supraclavicular first rib resection for TOS using patient rated outcome measures (PROMs) and patients' self assessment.

Methods: In a prospective study all patients undergoing supraclavicular first rib resection for

TOS since 2016 have been enrolled. Patients had to complete CBSQ (Cervical Brachial Symptom Questionnaire) before and 4 to 24 months after operation and report the percentage of improvement after operation. Length of rib remnant was measured on postoperative routine thorax x-ray from costovertebral joint to resection margin in mm.

Results: From 2016 to 2023 a total of 124 supraclavicular first rib resections for TOS have been performed in 103 patients (17% bilateral). 76% were female, average age was 38 years (18-69). Mean observation period was 12 months postoperatively (4-24 months). In 115 cases (93%) patients rated the postoperative outcome as 75% improvement. 3 patients were unable to rate the postoperative outcome, 6 were lost to follow-up. CBSQ scores showed an average improvement of 66% (87 preoperative vs. 30 postoperative). Average length of rib remnant was 21 mm (8 to 38mm). Analysis of subgroups revealed no correlation of length of rib remnant with postoperative CBSQ scores but good correlation of self assessed improvement in percent and percentage of improvement of postoperative scores respectively.

Conclusion: CBSQ is a reliable tool in evaluating outcome after surgery for TOS. Subgroup analysis revealed no correlation of length of posterior rib remnant with postoperative outcome but good correlation of patients' self assessment and improvement of CBSQ scores. More important factors for postoperative outcome than length of rib remnant are pre-existing chronic pain conditions, multiple crush situations, and preexisting peripheral atrophy with functional loss.

Atypical Metachronous Metastases from Pancreatic Adenocarcinoma

I. Hunjan, A. Cristaudi, P. Majno-Hurst (Department of Visceral Surgery, Ente Ospedaliero Cantonale, Lugano)

Background: Pancreatic ductal adenocarcinoma (PDCA) still carries a poor prognosis, with only 10-30% of patients being surgically resectable and recurrences after surgery generally not amenable to operative treatment.

Aims: We report two cases of unusual solitary recurrences of PDAC, i.e. ovary (Krukenberg tumor) and rectal wall, following a previous R0 Whipple resection. Very few similar cases are described in the literature.

Methods: Patient 1: 51-year female (RS) was diagnosed with pancreatic head PDCA, underwent 6-cycle neo-adjuvant mFOLFIRINOX, a Whipple procedure and simultaneous resection of left ovary for a solitary synchronous 0.5 cm mass.

Patient 2: 52-year female (MMR) was diagnosed with pancreatic head PDAC, underwent 6-cycle neo-adjuvant FOLFIRINOX, and a Whipple resection, followed by 3-month Gemcitabine administration. Tumor staging was ypT3, ypN0, L0/V0, Pn1, R0, KRAS and P53 mutations.

Results: Patient 1: The ovarian mass was found to be metastatic only on final pathology, revealing ypT2, ypN0, L1/V0, Pn1, R0, M1, RET mutation, no germ-line mutations. Peritoneal lavage cytology was negative. After 6-cycle adjuvant mFOLFIRINOX and 1-year disease-free-interval (DFI), a solitary right ovarian metastasis was found on follow-up PET and removed surgically, peritoneal lavage cytology was positive for malignant cells. The patient has now re-started 6-month systemic chemotherapy, in view of PIPAC administration.

Patient 2: After 2.5 years of DFI, isolated ovarian metastases were diagnosed and resected, followed by 5-cycle adjuvant CAPOX. After two further years of DFI (4.5 years total), another secondary lesion in the rectal wall was found while performing a colonoscopy for chronic diarrhea. The lesion was removed with a full-thickness anterior rectum resection and the patient is currently undergoing a new chemotherapy regimen.

Conclusion: Isolated ovarian (in women) and rectal metastases from primary PDAC can occur and may not necessarily be manifestations of advanced systemic disease. Surgical treatment, combined with systemic chemotherapy, can offer worthwhile DFIs.

Bowel Fistula to the Thigh after Colon and Bowel Perforation Following a Minor Pelvic Trauma

A. C. Da Silva Costa (Hôpital Riviera-Chablais, Vevey)

Background: Bowel injuries commonly occur following blunt abdominal trauma, typically in high-speed accidents. However, there are limited cases in the literature where bowel injury is caused by a minimally displaced pelvic fracture resulting from minor trauma.

Aims: Our objective is to present a case of small bowel and sigmoid injuries secondary to a pelvic fracture with a fistula extending to the thigh.

Methods: Literature review was conducted to assess the existence of similar cases.

Results: An 86-year-old woman experienced a home fall resulting in fractures of the left ischiopubic and iliopubic branches, managed conservatively.

Two days post-fall, the patient complained of left inguinal pain with functional impairment. A CT scan indicated the presence of a fluid collection in the left thigh, which was initially suspected to be an infected hematoma, and a dehiscence of the small bowel wall adjacent to the fracture without any free abdominal fluid. A subsequent CT scan using oral contrast confirmed the perforation of the sigmoid and small bowel, resulting in a bowel fistula extending to the left thigh. Laparotomy was performed to suture the sigmoid and bowel. The sigmoid suture was protected with a double barrel colostomy, while the orthopedic team managed the drainage of the thigh. Five days later, an additional thigh drainage is performed. Given the unfavorable clinical course, the next day a follow-up scan revealed an ongoing small bowel leakage with peritonitis. A laparotomy was performed, followed by a 7 cm small bowel resection and epiploasty to cover a pubic symphysis bony fragment.

After 28 days of hospitalization, the patient was able to be discharged from the hospital and transferred to rehabilitation.

Conclusion: Intestinal injuries secondary to a minimally displaced pelvic fracture are rare but crucial to recognize and promptly manage to reduce morbidity and mortality.



Figure 1

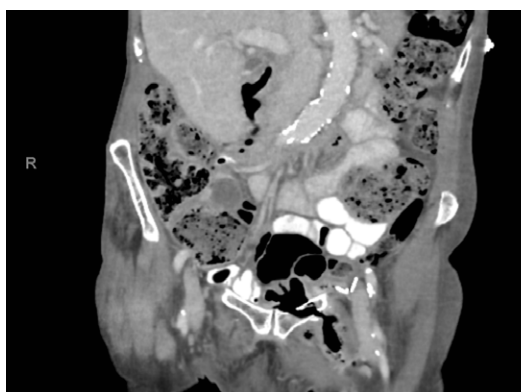


Figure 2

Laparoscopic Treatment of Type II Gastro-Gastric Fistula post Roux-en-Y gastric Bypass: A Case Report Video

A. Petrusic¹, A. Torre¹, S. Popeskou¹, F. Mongelli², F. Garofalo¹ (¹Visceral Surgery, EOC Civico, Lugano, Lugano; ²Visceral Surgery, EOC Bellinzona e Valli, Bellinzona, Bellinzona)

Background: Gastro-gastric fistula (GGF) occurs in 1–6% of patients who undergo Roux-en-Y gastric bypass (RYGB) for morbid obesity. The pathophysiology may be related to gastric ischemia and/or marginal ulcer. Epigastric pain, dysphagia, anemia and weight regain are most common signs of GGF. Combining upper endoscopy and contrast studies is the best method to confirm the diagnosis. Although GGF may be treated conservatively, symptomatic patients will require technically challenging revisional procedures.

Aims: We present a case-report video of a 51 years-old lady with a type II gastro-gastric fistula post RYGB, treated by laparoscopic approach.

Methods: Since the RYGB performed 6 months earlier, the patient has been suffering from significant increasing dysphagia, sometimes associated with vomiting, inability to feed and a loss of about 30 kg. A CT scan of the abdomen with oral and endovenous contrast revealed a gastro-gastric fistula due to anastomotic ulcer, that was confirmed by endoscopy. A laparoscopic surgical revision was then planned.

Results: The patient was placed in a standard foregut position. Four trocars and a liver retractor were used. The alimentary loop was identified and released from the excluded stomach. Because of tenacious adhesions between the gastrojejunal anastomosis (GJA) and the excluded stomach, a resection en bloc of the excluded portion of the stomach, the GJA and the distal part of the pouch was performed. A new GJA was then created with a linear stapler and closed with continuous barbed absorbable 3-0 suture. An intraoperative endoscopy confirmed the patency of the anastomosis. Postoperative course was uneventful and the patient discharged on postoperative day two with no complications. At two months follow-up the patient reported being asymptomatic.

Conclusion: Laparoscopic revisional surgery after GGF post RYGB can be a real challenging operation. Type II GGF must be treated with en bloc resection and redo GJA.

Splenic Rupture, a new Concern Post-Colonoscopy? A Case Report

M. Florent (Hôpital Riviera Chablais, Lausanne)

Background: Complications after a screening-colonoscopy are well known, such as intestinal bleeding and perforation. However, other organ injuries are not frequently identified and could lead to a life-threatening prognosis.

Aims: The aim of this work is to highlight splenic rupture as an unknown and serious complication of colonoscopy, its diagnostic method and treatment.

Methods: In this study, the case of a splenic rupture after a screening colonoscopy and pol-

ypectomy will be illustrated as accurately as possible, from diagnosis to surgical treatment. It will then be discussed along with a systemic review of the literature.

Results: A screening colonoscopy with multiple polypectomies was performed on a 63-year-old female patient with no known health condition. Despite a difficult examination, a full colonoscopy was achieved.

One hour later, the patient presented diffuse and intense abdominal pain with hypotension and was immediately addressed to the emergency department.

On arrival, vital signs showed persistent hypotension with 76/48 mmHg, hemoglobin level at 120 g/L and lactates at 1.3 mmol/L. A point-of-care ultrasound showed free intra-abdominal liquid within the four quadrants, and the CT-scan revealed active bleeding with splenic hematoma with grade IV rupture.

With hypotension and free intra-abdominal liquid, criteria for surgical management were met. The patient was brought to the operating room for a median laparotomy and splenectomy. Approximately three liters of fresh blood and blood clots were among the findings. Regarding the spleen, active bleeding from the splenic artery and from a venous tear in the gastrosplenic ligament were identified.

The patient was discharged on the 8th day post-surgery with post-splenectomy recommendations such as vaccinations.

Conclusion: Splenic trauma after a screening colonoscopy and polypectomy is an unknown and therefore underestimated complication, but also life-threatening. In this aspect, early recognition and surgical management are essential.

An Unusual Case of Intestinal Obstruction after Roux-en-Y Gastric Bypass

B. Barberá Carbonell, F. Abboretti, S. Mantziari (Visceral Surgery, Lausanne University Hospital (CHUV), Lausanne)

Background: Small bowel obstruction (SBO) is a well-known complication after Roux-en-Y gastric bypass (RYGB). RYGB patients are at particular risk to develop an internal herniation, through the Petersen's space or mesenteric defect at the jejunojejunostomy (JJ). However, if SBO is suspected in these patients, a larger differential diagnosis needs to be considered.

Aims: The aim of the present paper is to report an unusual case of SBO after RYGB

Methods: We present a case of a 44-year-old woman, having undergone a laparoscopic RYGB 5 months earlier, who consulted the emergency department with clinical manifestations of SBO. Total post-operative weight loss was 25kg (BMI=28.5kg/m²), in a patient previously free of symptoms.

Results: An abdominal CT was performed and showed an image of SBO near the JJ, without clear signs for an internal hernia. Urgent laparoscopic exploration was performed. Intraoperatively, an SBO was confirmed, as a jejunal segment was strangulated by the stump of a non-absorbable running suture, used to close the mesenteric defect at the JJ. After section of this suture, small bowel was liberated with no signs of ischemia, and no intestinal resection was needed. A small opening of this mesenteric defect was noticed and closed with a non-absorbable suture. No other signs of mechanical twist

or obstruction were found upon laparoscopic exploration. Upon inspection, a defect was found in Petersen's space, which was closed by a running non-absorbable suture. Post-operative course was uneventful, and the patient was discharged in the second post-operative day.

Conclusion: Laparoscopic exploration is mandatory if the clinical status and radiological findings suggest SBO after RYGB. Although internal hernias remain the most common cause of SBO in these patients, unusual causes of SBO have to be considered.

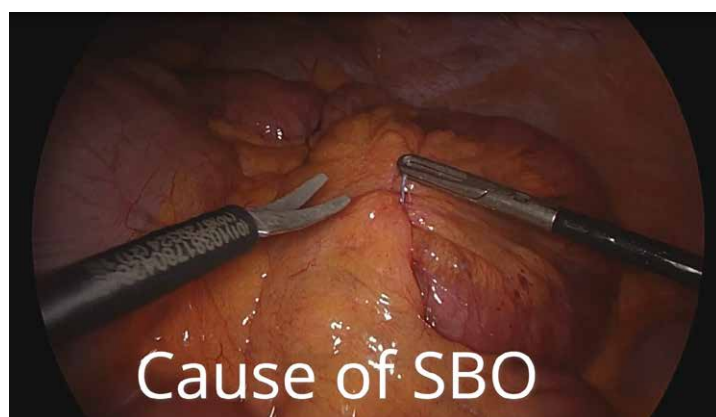


Figure 1. Cause SBO



Figure 2. Cause SBO2 suture

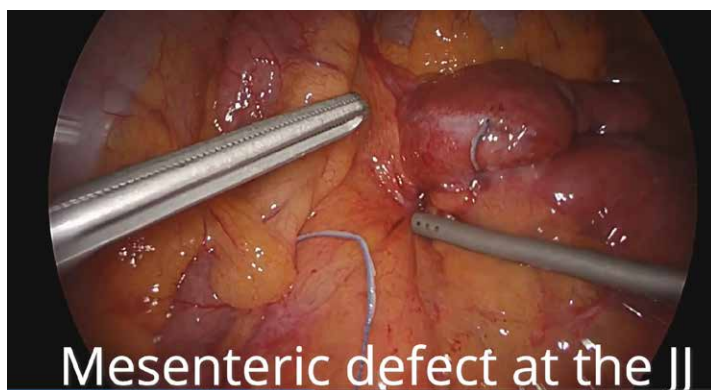


Figure 3. Mesenteric Defect JJ

Splenic Torsion in a Patient with Situs Inversus Totalis and Polysplenia. Challenging Diagnosis and Treatment of a Rare Case – Case Report and Review of the Literature

H. Giron¹, E. Zhu¹, M. Schneider¹, B. Barbera Carbonell¹, M. Matter¹, N. Halkic¹, J. Jurt^{1,2} (¹Department of visceral surgery, CHUV, Lausanne; ²Department of surgery, EHC, Morges)

Background: Situs inversus totalis is a rare condition with incidence of < 1:10'000, characterized by a mirror-image of the normal configuration of major thoracic and abdominal organs. Polysplenia is another rare congenital disease defined by the presence of two or more spleens. Patients with this condition are more prone to develop splenic torsion due to a narrower pedicle. The association of both pathologies is very rare.

Aims: Diagnosis and treatment of splenic torsion in this context can be challenging.

Methods: We report a case of a 18-year-old woman known since birth for situs inversus totalis, who consulted the emergency department of a regional hospital with sudden right abdominal pain associated with vomiting.

Biological examination showed leukocytosis and elevated C-reactive protein. Abdominal CT confirmed the situs inversus totalis and revealed a polysplenia (fig. 1) with multiple accessory spleens and a well delimited hypodense mass suspected to be an infarction of the main spleen due to a splenic vessels' torsion (fig. 2). In this context, the patient was transferred to our tertiary hospital for surgical management.

Results: Hand assisted laparoscopic splenectomy was performed in an emergency setting. Post-operative course was uneventful and patient was discharged in the third post-operative day.

Conclusion: The diagnosis of splenic torsion is challenging due to the unusual incidence and unspecific symptoms. This problem has to be suspected in patients with polysplenia. Abdominal CT is mandatory to obtain a prompt diagnosis and to avoid a delay in surgical treatment. Splenectomy remains the gold standard and laparoscopic approach appears to be a safe option in the context of associated situs inversus totalis.



Figure 1. CT splenic torsion

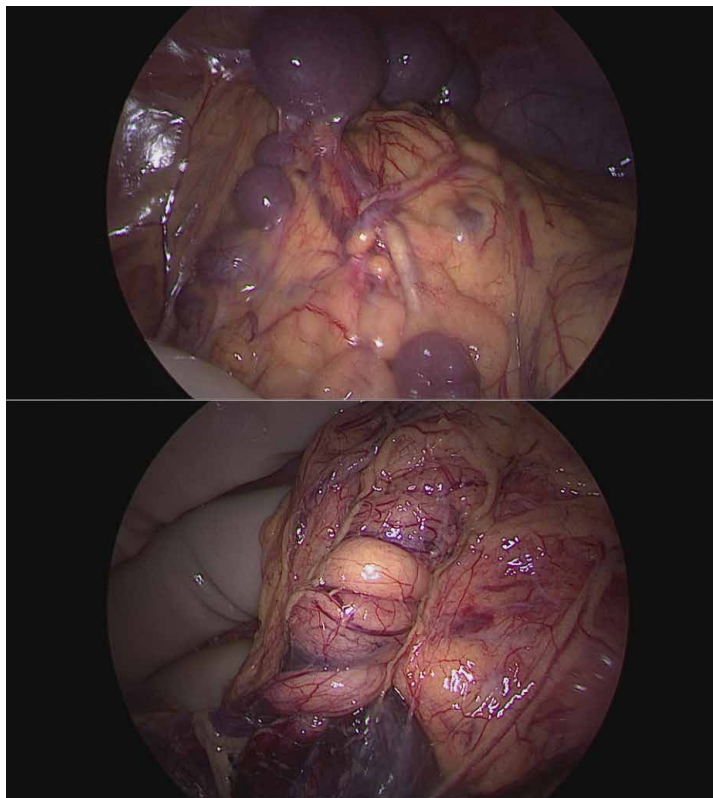


Figure 2. Intra-op findings

Combined Stapled Mucopexy & Milligan-Morgan's Technique in Circumferential 4th Degree Haemorrhoids: Prospective Observational Cohort Study

E. X. Delgadillo¹, P. E. Wuthrich², G. Salgado³ (¹Unité Spécialisée de Chirurgie Colorectale et Proctologie, Centre Médico Chirurgical Volta, La Chaux-de-Fonds; ²Unité Spécialisée de Chirurgie Colorectale et Proctologie, Centre Médico Chirurgical Volta, La Chaux de Fonds; ³Unidad de Coloproctología, Hospital Ruber Internacional, Madrid)

Background: It is well known that a large excisional haemorrhoidectomy could be certain cause of post-operative severe complications like incontinence, ectropion or anal stenosis.

Aims: Our main objective is to reduce post-operative complications avoiding large haemorrhoidectomy in patients suffering of a circumferential 4th degree prolapsed haemorrhoids associated to external piles.

Methods: Prospective, single institution study between January 2017 to December 2019, applying the propensity score matching during a combined stapled excisional mucopexy followed at the same operative time by a classic Milligan-Morgan's technique using LigaSure Precise Triad system. (Figure 1)

Results: Universe of the study = fifty patients, 32 presenting haemorrhoido-mucosal prolapse+piles were included prospectively & consecutively (20 men, 12 women), mean age 51.9 y (range 21-84). 18 patients (33.4%) were excluded because of anatomical prolapse variations (10), associated anal fissures (2), HPV condylomata+piles (2), non-stoppable anti-coagulation treatment (2), immunity treated disease (1), absence of haemorrhoidal piles (1). No immediate postoperative complications were registered. Surgery length 48, 05 min +/- 5, 30 min. Six patients (18,8%) required supplementary haemostasis due to persistent bleeding treated by single sutures (12 men, 5%, 6 women, 3%). The combined procedure allowed faster functional recovery with shorter time off work (weighted mean difference 9.45 d. p < 0.00001), earlier return to normal activities (weighted mean difference, 15.85 d. p < 0.03), better wound healing (odds ratio, 0.1; p < 0.0006). No stenosis, neither ectropion. (Table 1)

Conclusion: Despite of a single limited study including a single operative group, results definitely confirm the strategy, demonstrating that the combined technique drastically reduces the risk of anal stenosis, ectropion, incontinence or recurrence of the prolapse. By the restoration of the anal canal anatomy under visual control & preservation of the required mucosal cutaneous bridges, results are replicable & safe.

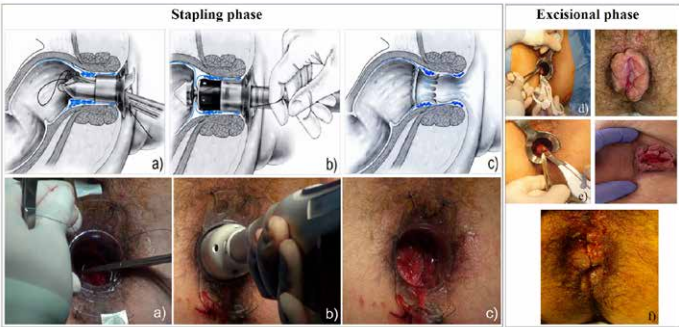


Figure No.1. - Surgical technique: Pictures a)-b)-c) Longo's procedure using HEM-EEA-3335 Stapler by Medtronic®: a) "Purse string", b) Firing the stapler, c) Final stapling results. Drawings modified from: Encyclopédie Médico-Chirurgicale. Pictures d)-e) Milligan & Morgan procedure using LigaSure Precise Triad System - Medtronic®. Final excisional results Picture f).

Figure 1. Surgical Technique

Patient	Sex	Bleeding	Pain	Soiling	Skin irritations (itching, burning, redness)	Surgery	Post-operative follow up					Later symptoms
							Pain VAS	Wound Pain	Urinary retention Catheter placement	Stenosis	Incontinence	
1	♂	+	+	+	+	Combined Stapled mucopexy and Milligan-Morgan's haemorrhoidectomy, in circumferential 4 th degree haemorrhoids (CSM + MMH)	+	+	+	+	+	+
2	♂	+	+	+	+		5	++	+	+	+	+
3	♂	+	+	+	+		8	++	++	+	+	+
4	♂	+	+	+	+		5	++	+	+	+	+
5	♂	+	+	+	+		4	+	+	+	+	+
6	♂	+	+	+	+		4	+	+	+	+	+
7	♂	+	+	+	+		4	+	+	+	+	+
8	♂	+	+	+	+		4	+	+	+	+	+
9	♂	+	+	+	+		4	+	+	+	+	+
10	♂	+	+	+	+		4	+	+	+	+	+
11	♂	+	+	+	+		4	+	+	+	+	+
12	♂	+	+	+	+		4	+	+	+	+	+
13	♂	+	+	+	+		4	+	+	+	+	+
14	♂	+	+	+	+		4	+	+	+	+	+
15	♂	+	+	+	+		4	+	+	+	+	+
16	♂	+	+	+	+		4	+	+	+	+	+
17	♂	+	+	+	+		4	+	+	+	+	+
18	♂	+	+	+	+		4	+	+	+	+	+
19	♂	+	+	+	+		4	+	+	+	+	+
20	♂	+	+	+	+		4	+	+	+	+	+
21	♂	+	+	+	+		6	+	+	+	+	+
22	♂	+	+	+	+		4	+	+	+	+	+
23	♂	+	+	+	+		9	++	+	+	+	+
24	♂	+	+	+	+		4	+	+	+	+	+
25	♂	+	+	+	+		4	+	+	+	+	+
26	♂	+	+	+	+		4	+	+	+	+	+
27	♂	+	+	+	+		4	+	+	+	+	+
28	♂	+	+	+	+		5	+	+	+	+	+
29	♂	+	+	+	+		4	+	+	+	+	+
30	♂	+	+	+	+		4	+	+	+	+	+
31	♂	+	+	+	+		4	+	+	+	+	+
32	♂	+	+	+	+		7	+	+	+	+	+

Table 1. General Results

Intraoperative 3D-fluoroscopy Increases Accuracy of Syndesmotic Reduction in Ankle Fractures with Syndesmotic Instability

S. Duschek, R. Jaeger, A. K. Leucht, F. Aregger, M. Christoph (Orthopedics and Traumatology, Cantonal Hospital Winterthur, Winterthur)

Background: Direct visual control and 2D-fluoroscopy is widely used to achieve an anatomic syndesmotic reduction in ankle fractures with syndesmotic instability. However, significant malreduction rates are reported.

Aims: It was the aim of this study to evaluate the accuracy of conventional syndesmotic reduction and to assess the impact of intraoperative 3D-imaging to improve the quality of syndesmotic reduction.

Methods: Single institution consecutive case series (02/2021 – 12/2023) including all patients undergoing operative treatment for ankle fractures with syndesmotic instability. Syndesmotic reduction was performed following open reduction and internal fixation of the malleolar fractures. Provisional tibiofibular alignment was obtained under visual control and 2D-fluoroscopy. With the ankle held in a neutral position, temporary fibulotibial transfixation was performed with 2 K-wires. 3D-imaging was obtained (Cios Spin, Siemens Healthineers, Forchheim-Germany). Non-anatomical positions of the fibula were divided into anterior, posterior, or rotational malreductions. If reduction was not satisfactory, the reduction was improved and 3D-imaging repeated. Once adequate reduction was obtained, definitive syndesmotic fixation was performed and the K-wires were removed.

Results: A total of 73 patients (mean age 45±16 years, m/f 43/30) were operated for ankle fractures with syndesmotic instability. Intraoperative 3D-imaging confirmed anatomic syndesmotic reduction in 45 patients (62%). In 24 patients (33%) reduction was repeated once, in 4 patients (5%) two additional reduction manoeuvres were necessary to obtain an anatomic result. Thus, a total of 32 malreductions were recorded in a total of 96 105 reduction manoeuvres (3330%). Of these, we observed 22 anterior (69%), 2 posterior (6%) and 8 rotational malreductions (25%).

Conclusion: Syndesmotic reduction under visual control and 2D-fluoroscopy proved to be unreliable with a syndesmotic malreduction in almost one-third of all reduction manoeuvres. With the help of intraoperative 3D-imaging incorrect tibiofibular alignment before definite fixation was identified, reduction corrected and thereby the rate of malreductions reduced.

Metabolomics after Severe Trauma – Results of a Systematic Review of the Literature

F. Klingebiel¹, J. Beck², Y. Kalbas¹, M. Teuben¹, H. C. Pape¹, R. Pfeifer¹, J. Hambrecht¹, S. Halvachizadeh¹, P. Cinelli¹, B. Ganse³ (¹Traumatology Department, University Hospital Zürich, Zürich; ²Cantonal Hospital Münsterlingen, Department of Orthopaedics, Münsterlingen; ³Department of Surgery, Saarland University, Homburg)

Background: It is widely accepted that major trauma leads to systematic dysregulation with concomitant metabolic derangement. While metabolomics measurements are already used in other medical fields such as oncology, we still know little about the specific effects of trauma on human metabolism.

Aims: The impetus for our study was to identify relevant components of the metabolic pathway in the existing literature.

Methods: A systematic literature search of Pubmed and Embase from 2000 to 2022 was performed. Original publications reporting metabolomics measurements after severe trauma in human studies were included. All significant parameters were extracted and evaluated using a reductive procedure. Parameters were stratified according to their biological function and ratios (r) were calculated as N(upregulated)/N(downregulated).

Results: A total of 3878 publications were identified in the databases. Nine publications met our criteria and were included in the systematic review. Overall, 251 different metabolites were reported. After stratification by biological function and time point, an acute posttraumatic upregulation of amino acid (r=2.8), carbohydrate (2.3) and oxidative (3.5) metabolism was observed, whereas more metabolites in lipid metabolism were downregulated (r=0.5). In the intermediate phase, amino acid metabolism switches to a downregulation (ratio 0.3) and lipid metabolism to an upregulation (ratio 2.5). Overall, ornithine, succinate and lactate were the most frequently reported metabolites in the literature.

Conclusion: There is great heterogeneity in the existing literature between study designs, groups and time-points when it comes to metabolomics research. As far as these discrepancies allow, a specific metabolic dysregulation can be observed, with a particular impact on energy-providing systems with a time-dependent dynamic. Identified metabolites and pathways may be of particular interest for future research.

Indications for MusculoSkeletal Temporary Surgery (MUST) in Physiologically Compensated Patients

F. Klingebiel¹, J. Sivriev², Y. Kalbas¹, R. Pfeifer¹, H. C. Pape¹, M. Teuben¹ (¹Traumatology Department, University Hospital Zürich, Zürich; ²Department of internal medicine, Cantonal Hospital Baden, Baden)

Background: Temporary external fixation is an established procedure in damage control surgery to adapt to the patient's physiology. Yet, external fixation is also performed in patients that could also be cleared for early definitive fixation. MUST (MusculoSkeletal Temporary Surgery) describes injury patterns that should be considered for temporary fixation also in isolated musculoskeletal injuries.

Aims: The impetus of our study was to identify patient characteristics that are predictive for external fixation in physiologically compensated patients.

Methods: A retrospective database of patients admitted via trauma bay followed by surgical treatment from 2015–2022 was analyzed. Only physiological compensated patients were included for further analysis. Statistical comparison was performed to test for significant differences in between the groups and logistic regression was performed to identify independent predictive factors for external fixation. Subgroup analysis for patients with and without cerebral injuries was performed.

Results: From 355 initial patients, 204 patients were considered as physiological compensated. 78 patients received temporary external fixation and 126 did not. Patients in the external fixation group presented significant more open fractures, a higher overall ISS and AIS of the lower extremities. Adjusted logistic regression yielded the presence open fractures, elevated AIS of the lower extremities, non-intra-articular fractures and presence of cerebral injuries as independent predictors for external fixation.

Conclusion: The presence of intracranial injuries seems to influence the surgical decision making towards external fixation regardless of the injury severity and morphology. In addition, an open fracture constellation as well as the severity of lower extremity injuries seem to be able to predict external fixation. Further research regarding (temporary) fracture fixation within patients with intracranial lesions should be undertaken.

Endograft Explantation and in-situ Reconstruction with a Self-Made Xenopericardial Graft in EVAR Infection

S. Weiss, C. Gnägi, C. Zielasek, V. Makaloski, D. Kotelis (Universitätsklinik für Gefässchirurgie, Inselspital, Universitätsspital Bern, Bern)

Background: Graft infections after endovascular aneurysm repair (EVAR) are a major challenge in vascular surgery. Definitive treatment requires complete surgical removal of the infected endograft, local debridement and preferably, in-situ reconstruction with a biological graft that is resistant to reinfection.

Aims: To present an educational video showing a step-by-step approach to EVAR explantation and aortic in-situ reconstruction using a self-made xenopericardial graft.

Methods: Seven months after undergoing elective EVAR (Endurant II, Medtronic, Dublin, Ireland), a 69-year-old, highly comorbid patient was admitted with sepsis due to staphylococcus aureus. Imaging, including 18F-fludeoxyglucose positron emission tomography, confirmed abdominal endograft infection. The patient was scheduled for EVAR explantation and in-situ reconstruction with a xenopericardial graft. The graft was sutured during induction of anaesthesia

on a sterile table using an 8 x 14 mm pericardial patch (Supple Peri-Guard, Baxter, Deerfield, IL, USA) and non-absorbable 4-0 polypropylene sutures. After laparotomy and suprarenal clamping, the aneurysm sack was opened and the endograft was explanted. Extensive local debridement and antiseptic rinsing was performed. The previously prepared bifurcated xenopericardial graft was anastomosed to the aorta just below the renal arteries and the flow to the renal arteries was restored. The distal anastomoses were performed to the distal common iliac artery on both sides. Retrocolic pedicled omentoplasty was performed to ensure separation of the new graft from the bowel.

Results: After a complicated postoperative course, primarily due to severe comorbidities, the patient was discharged to a rehabilitation clinic. At three month, computed tomography angiography and laboratory results showed no signs of persistent or recurrent infection and antibiotic therapy was stopped.

Conclusion: Endograft explantation and aortic in-situ reconstruction in EVAR infection requires a high level of experience and a systematic approach. Using the technique presented in this video, a good result was obtained despite severe infection and a highly comorbid patient.

Handmade Pericardial Covered Stent as Interposition Graft in Nutcracker Syndrome : A Case Report

E. Lonfat, L. Arts, E. Côté, S. Déglise (Vascular Surgery, CHUV, Lausanne)

Background: The Nutcracker syndrome is characterized by the extrinsic compression of the left renal vein by the superior mesenteric artery, leading to renal and/or pelvic congestion. Various treatment modalities have been described over the years, and currently, the classical approach involves open surgery with renal vein transposition or bypass to the inferior caval vein. Saphenous vein grafts or PTFE tubes are commonly employed but with some risks of external compression.

Aims: We report the case of a bypass using a handmade pericardial tube sutured on a self-expanding stent as interposition graft to treat a Nutcracker syndrome.

Methods: A 35-year-old female patient presenting pelvic and left lower abdominal pain, along with dyspareunia, underwent duplex ultrasound and phlebography to confirm a pelvic congestion syndrome due to Nutcracker syndrome. She benefitted from coiling of the left ovarian vein and pelvic varicosities. Intraoperative intravascular ultrasound confirmed a Nutcracker syndrome with a 70% stenosis of the left renal vein. Due to increasing postoperative flank pain, open surgical treatment with transposition of the renal vein was planned.

Results: Intraoperatively, a fibrotic middle segment of the left renal vein was resected, leading to shortage of length for direct venous transposition. An interposition graft was created by circumferentially sewing a pericardial bovine patch on a self-expanding Nitinol stent (10x60mm) with a 6.0 Prolene running suture (Figure 1). Postoperative anticoagulation was empirically started for 6 months.

Abdominal ultrasound on the second postoperative day confirmed a patent graft, and the patient reported complete symptoms relief. Follow-up angiographic CT at one month confirmed graft patency.

Conclusion: The use of a handmade pericardial-covered stent as an interposition graft offers a novel alternative in Nutcracker syndrome cases. This technique can be used in the absence of saphenous vein, minimizes surgical incision, facilitates anastomosis, and potentially prevents relapsing compression syndrome due to stent rigidity. Furthermore, stent migration is unlikely due to suture fixation. Further research is essential to evaluate the long-term outcomes and generalizability of this innovative approach.

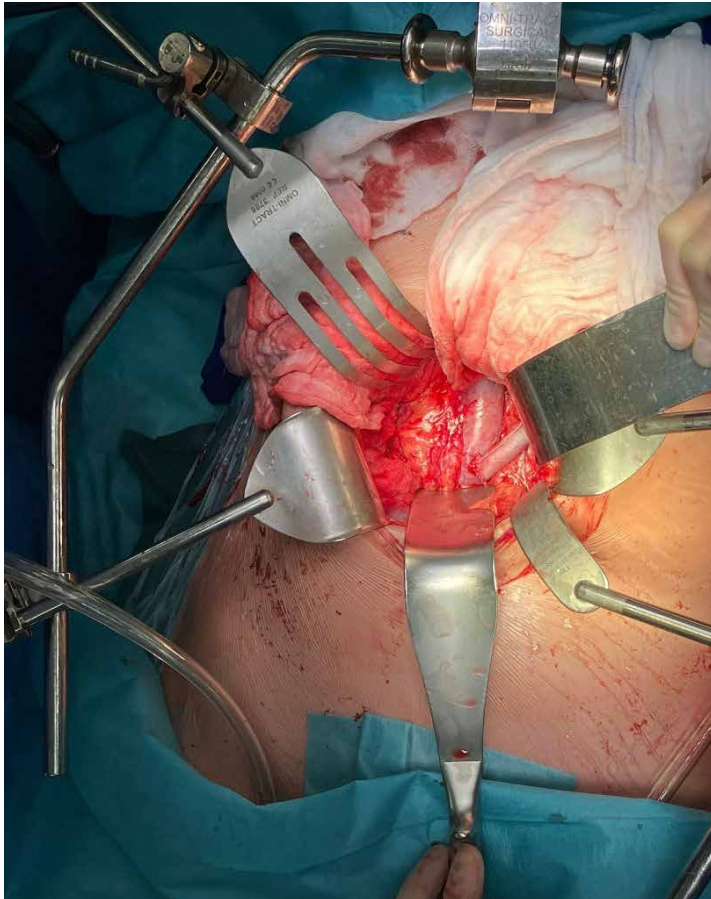


Figure 1. Intraoperative result

Emergency Endovascular Repair of Iatrogenic Subclavian Artery Perforation: A Case Report

F. Schaller, A. Litchinko, H. L. Chan, E. Psathas, M. Menth, B. Egger (Chirurgie, HFR Fribourg, Fribourg)

Background: While rare, iatrogenic subclavian artery perforation is related with considerable risks of morbidity and mortality. It is often attributed to an improper placement of a central venous line. Conventional open surgical repairs in this region pose substantial challenges due to the complex interplay of neural and vascular structures. Endovascular repair using a stent graft represents a much less invasive alternative, provided that the anatomy allows to do it.

Aims: To demonstrate the feasibility and efficacy of emergency endovascular repair of an iatrogenic subclavian artery perforation occurring after accidental puncture during jugular dialysis catheter placement.

Methods: A 50-year-old male with a history of acute myeloid leukemia (in remission), heart failure, and end-stage renal failure required iterative dialysis. A temporary right jugular dialysis catheter was accidentally placed into the right subclavian artery, where its entry point was close to the vertebral artery. Diagnosis was confirmed by CT scan imaging, which also revealed active bleeding with mediastinal hematoma and an arterio-venous fistula.

Results: An immediate endovascular repair was performed via the right femoral artery, involving the placement of an Advanta 10x38 mm stentgraft into the left subclavian artery. Despite partial occlusion of the left internal mammary and vertebral arteries, this approach successfully stopped the bleeding. The patient was discharged home six days later with no neurological or vascular complication. 1 month outpatient's follow-up showed a permeable stent and a diminishing mediastinal hematoma.

Conclusion: This case demonstrates the feasibility and safety of an endovascular repair in such an emergency situation as an iatrogenic subclavian artery injury. Also, in the current literature we found increasing evidence, that an endovascular approach might be the preferred technique in such situations. However, further concerning prospective multicenter studies are mandatory.

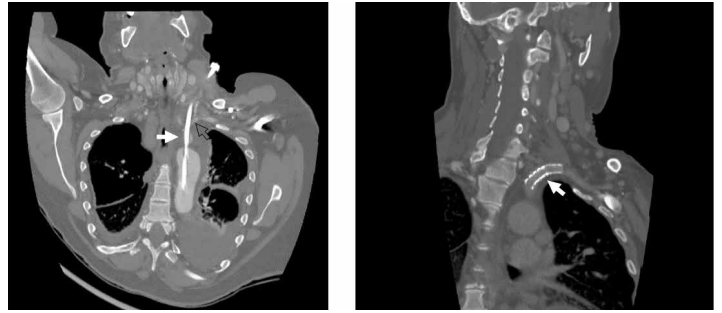


Figure 1. Right picture shows a computed tomographic reconstruction with misplaced dialysis catheter (white arrow) in left subclavian artery (grey arrow). Left picture shows a computed tomographic reconstruction after endoscopic placement of Advanta 10x38 mm stentgraft (white arrow) in left subclavian artery



Figure 2. A = Arteriography with contrast leak from the left subclavian artery; B = Bleeding controlled by balloon insertion; C = Stent deployment into the left subclavian artery with partial obstruction of the vertebral and mammary arteries; D = Final position of the stent with resolution of bleeding; E = Final scopy with visualization of the stent and a temporary dialysis catheter

Long Bone Shaft, Pelvis and Acetabulum Fracture Fixation in Polytrauma: Priorities in Context of Traumatic Injuries of the Head, Chest, Abdomen, Spine, Spinal Cord and Vasculature

F. Klingebiel¹, R. Pfeifer¹, Z. Balogh², F. Beeres³, R. Coimbra⁴, C. Fang⁵, P. Giannoudis⁶, F. Hietbrink⁷, H. Kurihara⁸, T. Lustenberger⁹, I. Marzi¹⁰, M. Oertel¹¹, R. Peralta¹², S. Rajasekaran¹³, E. Schemitsch¹⁴, H. Vallier¹⁵, B. Zelle¹⁶, Y. Kalbas¹, H. C. Pape¹, IMPACT Group (¹Traumatology Department, University Hospital Zürich, Zürich; ²Traumatology Department, John Hunter Hospital and University of Newcastle, Newcastle; ³Orthopaedics and Traumatology Department, Cantonal Hospital of Lucerne, Luzern; ⁴Surgical Department, Riverside University Health System Medical Center, Moreno Valley; ⁵Department of Orthopaedics and Traumatology, Queen Mary Hospital, Hong Kong; ⁶Department of Orthopaedics and Trauma, St. James University Hospital, Leeds; ⁷Department of Surgery, University Medical Center Utrecht, Utrecht; ⁸Department of General and Minimally-Invasive Surgery, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan; ⁹Department of Orthopaedics and Traumatology, University Hospital Bern, Bern; ¹⁰Department of Orthopaedics and Traumatology, University Hospital Frankfurt am Main, Frankfurt am Main; ¹¹Neurosurgery Department, University Hospital Zürich, Zürich; ¹²Department of Surgery, Hamad General Hospital Doha, Doha; ¹³Department of Spine Surgery, Ganga Medical Centre and Hospitals, Coimbatore; ¹⁴Department of Orthopaedics, University of Western Ontario, London; ¹⁵Department of Orthopaedics, MetroHealth Medical Center, Cleveland; ¹⁶Department of Orthopaedics, UT Health San Antonio, San Antonio)

Background: Musculoskeletal injuries are frequently observed in patients with multiple trauma. Determining the appropriate treatment strategy and timing definitive fracture fixation is crucial for systemic outcomes.

Aims: In this regard, this study aimed to provide recommendations for timing and sequence of fracture fixation in multiple injured patients, with an emphasis on concurrent injuries, to the head, chest, abdomen, spine (including spinal cord), vasculature and multiple extremity fractures.

Methods: We formed an international multidisciplinary expert panel consisting of 17 members from 4 continents and 10 countries and developed consensus statements using the Delphi-method. Starting in March 2023, statements were drafted to define conditions for each type of concomitant injury under which fracture fixation can be recommended based on the current literature and underwent repeated modifications until the in-person meeting in September 2023. During this meeting, the statements were discussed and adjusted by the expert panel until greatest possible consensus was reached. The process was supported with a systematic literature review to identify relevant literature.

Results: A total of 20 consensus statements were prepared. Of these, 5 focused on traumatic brain injury; 3 on thoracic trauma; 4 on abdominal trauma; 3 on multiple extremity fractures; 3 on spinal injuries and 2 statements on vascular injuries. Overall, 78 publications were reviewed on whose basis an overwhelming consensus was achieved for all 20 statements.

Conclusion: The panel discussed the conditions and exceptions of definitive fracture fixation. A total of 20 statements were developed on the timing of fracture fixation in patients with concomitant injuries. All statements agree that fracture fixation for major extremity injuries should be initiated within 24 hours of admission and completed within that timeframe, unless physiological or severe concomitant issues prevent the patient from going to the operating room.

Closed Reduction Followed by Percutaneous Fixation of Acute Femoral Neck Fractures in Young Adults is Safe and Feasible: A Retrospective Cohort Study

C. Michelišch¹, B. Jochum¹, A. Baer², S. Haupt³, P. Stillhard¹, J. Copp⁴, C. Sommer¹ (¹Orthopädie und Unfallchirurgie, Kantonsspital Graubünden, Chur; ²Traumatologie, Universitätsspital Zürich, Zürich; ³Orthopädie und Unfallchirurgie, Spital Oberengadin, Samedan; ⁴Orthopaedic Trauma, Forrest General Hospital, Hattiesburg)

Background: Displaced femoral neck fractures (FNFs) in patients under 65 years are relatively rare, accounting for less than 5% of hip fractures. This study examines controversies in the surgical approach for high-energy FNFs, specifically focusing on the feasibility of a closed reduction technique.

Aims: Emphasizing the importance of reduction quality, which significantly influences outcomes, the aim of this study is to explore the correlation between closed reduction and primary bone healing.

Methods: A retrospective cohort study at a level one trauma center included 54 patients (median age 57.5) with FNFs treated between 2012 and 2021. Closed reduction and internal fixation were performed, and outcomes were assessed using various classification systems. Bone union, major complications, conversion to hip arthroplasty, and the relationship between reduction quality and outcomes were analyzed.

Results: Closed reduction demonstrated satisfactory outcomes in over 85% of cases. Major complications occurred in 19%, with 17% requiring conversion to total hip arthroplasty. Unacceptable/borderline acceptable reduction quality correlated significantly with the need for later conversion. Regarding the quality of reduction, the surgeon's overall impression demonstrated the highest inter-rater reliability, whereas the Lowell's criteria and the Garden alignment index only achieved a fair and slight level of agreement, respectively.

Conclusion: The study supports the safety and feasibility of closed reduction for acute FNFs in patients under 65, achieving favorable clinical and radiological outcomes with a low complication rate. Furthermore, it underscored the significance of the surgeon's overall impression in evaluating reduction quality. Enhanced reduction quality achieved through closed methods correlates with a reduced conversion rate to total hip arthroplasty.

Locking Pegs Versus Locking Screws in Volar Plating of Distal Radius Fractures

N. M. van Veelen¹, M. Horvat¹, B. C. Link¹, B. J. van de Wall¹, F. J. Beeres^{1,2} (¹Clinic for Orthopaedic and Trauma Surgery, Luzerner Kantonsspital, Lucerne; ²Faculty of Health Sciences and Medicine, University of Lucerne, Lucerne)

Background: Fixed-angle implants allow volar plating of dorsally displaced and comminuted distal radius fractures by buttressing the subchondral bone which prevents dorsal displacement. As the stability relies on buttressing rather than fixation, some implants use smooth fixed-angle locking pegs instead of locking screws. Biomechanical studies comparing these options have shown contradictory results.

Aims: The aim of this study was to compare the short-term radiological outcome of patients with distal radius fractures, stabilized with a volar plate using either locking screws or pegs.

Methods: Adult patients who received volar plating of a distal radius fracture at a trauma center in Switzerland between 06/2019 and 06/2022 were eligible for inclusion. Only patients who received an implant allowing both locking pegs and screws were included. Primary outcome was radiological loss of reduction. This was defined as a difference in radial inclination >5°, volar tilt >10° or ulnar variance >2mm measured on the standardized intraoperative images and at the 6-week follow-up. Secondary outcome was duration of surgery.

Results: Out of the 521 patients who underwent surgical treatment for a distal radius fracture at the study hospital, 88 were included in this study. Of these 49 were treated with pegs and 39 with screws. Patient demographics between the groups were comparable, however there were more complex fractures in the peg group. There was no significant difference in the occurrence of radiological loss of reduction between the groups (13 vs 11 patients, $p = 0.2$). The duration of surgery was longer for patients who received screws (104 vs 81 minutes, $p = 0.003$).

Conclusion: Regarding secondary loss of reduction at the six-week follow-up both locking pegs and screws show similar results. Considering the potential benefits of pegs, such the smooth surface which may reduce the risk of joint penetration, pegs are a viable alternative to screws.

Routine 6-Weeks Outpatient Visit in Patients Treated Surgically for Upper Extremity Fractures: Is it Truly Necessary?

B. van de Wall^{1,2}, T. Bosch³, F. Peuker⁴, F. Beeres¹, R. Babst², B. Link¹, N. van Veelen¹ (¹Orthopedics and Traumasurgery, Lucerne Cantonal Hospital, Lucerne; ²Health Sciences and Medicine, University of Lucerne, Lucerne; ³Traumasurgery, Leiden University Medical Center, Leiden; ⁴Traumasurgery, University Medical Center Utrecht, Utrecht)

Background: Routine outpatient visits and X-rays six weeks after surgery for upper extremity fractures is an example of an established healthcare standard. Is part of our daily business, but, its usefulness has never been investigated.

Aims: To investigate the usefulness of the routinely planned six week outpatient visit and X-ray in patients treated surgically for the most common upper extremity fractures including clavicle, proximal humerus, humerus shaft, olecranon, radial shaft and distal radius.

Methods: This was a retrospective analysis of all patients treated surgically for upper extremity fractures between 2019 and 2022. The first outcome of interest was the incidence of abnormalities found on the X-ray made at the 6-weeks outpatient visit. In case an abnormality was detected, the hospital records were screened to determine its clinical consequence. The clinical consequences were categorized into requiring either additional diagnostics, additional interventions, change of standard postoperative immobilization, weightbearing or allowed range of

motion (ROM). The second outcome of interest was the incidence of deviations from the local standard post operative treatment and follow-up protocol based on the 6-weeks outpatient visit as a whole. Deviations were also categorized in the same manner.

Results: A total of 267 patients were included. Abnormalities on X-ray at 6-weeks were found in only 10 (3.7%) patients of which only 4 (1.5%) had clinical implications (in three patients extra imaging was required and in one patient it was necessary to deviate from standard weightbearing/ROM limitation regime). The clinical/radiological findings during the 6-weeks outpatient visit led to a deviation from standard in only 8 (3.0%) patients. Notably, the majority of these patients experienced symptoms suggestive for complications.

Conclusion: The routine 6-weeks outpatient visit and X-ray, after surgery for common upper extremity fractures, rarely has clinical consequences. It should be questioned whether these routine visits are necessary and whether a more selective approach should be considered.

Impact of Herpes-Associated Pneumonia on Patient's Outcome after Cardiac Surgery

J. Kolb¹, M. Verch², G. Romano², J. Soethoff², R. Arif², G. Warnecke³, M. Karck², W. Sommer³ (¹Klinik für Herzchirurgie, Universitätsklinikum Heidelberg, Heidelberg DE; ²Klinik für Herzchirurgie, Universitätsklinikum Heidelberg, Heidelberg; ³Klinik für Herzchirurgie, Universitätsklinikum Schleswig-Holstein, Kiel)

Background: Herpes-associated infections after cardiac surgery go along with an increased mortality and morbidity. Especially Herpes-associated pneumonia leads to prolonged mechanical ventilation periods and longer ICU treatment.

Aims: All patients undergoing cardiac surgery in our institution from December 2011-November 2022 that showed positive PCR of bronchoalveolar lavage for Herpes-simplex-Virus and clinical signs of pneumonia, were recorded.

Methods: A retrospective analysis of pre-, peri- and postoperative data was performed in accordance with the local ethics board.

Results: A total of 168 Patients were tested positive for Herpes-simplex-virus and presented with clinical signs of pneumonia after receiving cardiac surgery performed at our institution. Mean age was 65.3±14.7 years and 29.9% of the patients were female. Aortic- or mitral valve replacement or reconstruction was performed in 30.5% (n=51) of patients, 22.7% (n=38) underwent CABG-surgery. Aortic surgery was performed in 12.5% (n=21) patients, the remaining received others.

Elective surgery was performed in 24.5% (n=41) patients, whereas 26.9% (n=45) underwent urgent surgery. Most patients underwent emergency cardiac surgery (48.2% (n=81)). As result, 13.1% (n=22) patients were on mechanical ventilation prior to surgery.

Mean cardiopulmonary bypass time was 188.5±93.7 min, mean cross clamp time in this cohort was 99.1±62.4 min. In n=19 patients, circulatory arrest in deep hypothermia was performed.

Herpes-simplex positive PCR results were obtained after a median of 13(8; 19) days following surgery, antiviral treatment was performed for a median of 15(10; 20.3) days until negative PCR result.

Median length of ICU stay in this cohort was 24(15; 42) days, median length of mechanical ventilation in these patients were 17.1(8.9; 27.8) days. Survival in this cohort was 82.3% at 30 days after surgery, 6-months survival was 55.6%.

Conclusion: Herpes-simplex pneumonia following cardiac surgery is associated with prolonged mechanical ventilation and ICU stay as well as elevated mortality. Emergency surgery appears to be a major risk factor for a Herpes re-activation, suggesting early diagnostics and treatment in patients undergoing emergency surgery on ICU.

Fish Skin Grafts for Paediatric Degloving Injuries

A. Allasia, A. de Buys Roessingh, N. Lutz (CHUV, Lausanne)

Background: Degloving soft tissue injuries typically arise from severe injuries. It creates separation of skin and soft tissue from the underlying muscle and bone. Treatment is often prolonged and complex with a significant challenge for surgeons. As an innovative skin substitute, a novel acellular fish skin graft (Kerecis®) has demonstrated its potential to stimulate wound granulation and epithelialization in various animal and clinical studies.

Aims: We present the case of an effective and complete granulation and acceleration of skin healing after application of Kerecis® Omega-3 wound patch as a dermal substitute in a degloving post-traumatic foot wound.

Methods: A 15-year-old boy was admitted in the paediatric emergency room due to a severe polytrauma resulting from a public road accident (train). The full-body scan revealed a displaced transverse diaphyseal fracture of the left femur and multiple open fractures, including degloving of the right foot. During the initial surgery, devascularized regions were observed on the entire plantar foot surface, with direct visualization of the plantar fascia. Following several sessions of dry dressing and the onset of necrosis, the patient underwent a thorough debridement at the operating room. The application of Kerecis® on the plantar surface and Thiersch Graft fifteen days later on the dorsal portion of the foot were performed.

Results: The definitive outcome was satisfactory with no retraction, no hypertrophic scar and complete wound coverage.

Conclusion: Kerecis® is a therapeutic alternative in the treatment of loss of substance in children.

Closure of a Clagett Window using a Pedicled Omental Flap: Technique Description and Perfusion Control using Indocyanine Green Fluorescence

F. Schaller, F. Cherbanyk, A. M. Mansouri, B. Rouiller, J. A. Lutz (HFR Fribourg, Fribourg)

Background: Postoperative empyema due to bronchopleural fistula may need a Clagett open-window thoracostomy. We describe how such a window was closed using a pedicled omental flap and how indocyanine green (ICG) fluorescence allowed control of perfusion.

Aims: This didactic video demonstrates the harvesting of the flap, the transdiaphragmatic mobilization and the control of adequate perfusion in the thorax using ICG fluorescence.

Methods: A 72 years old woman suffering from rheumatoid arthritis underwent thoracoscopic wedge resection of the right lower lobe for metachronous metastasis of a previously operated non-small cell lung cancer of the right upper lobe. A prolonged air leak due to non-healing of the stapling suture led to an empyema, which finally necessitated a Clagett thoracostomy. An endobronchial unidirectional valve was placed in the segmental bronchus leading to the pleural cavity without improvement. Due to the patient's burden, we finally proposed a surgical closure of the thoracostomy.

Results: The patient was hospitalized for intravenous antibiotic treatment and the thoracic cavity was debrided several times with the use of a negative pressure wound dressing. Once the thoracic cavity was clean and microbiology probes became negative, definitive closure of the thoracostomy was scheduled. We harvested a pedicled omental flap by laparoscopy. Under manual guidance from the thoracic side, the diaphragm was opened and the omental flap slipped through. ICG fluorescence showed a well perfused omentum which filled the airspace well. It was sutured into the thoracic cavity. The thoracostomy was finally closed leaving one chest drain.

Conclusion: An omental flap is probably the best autologous tissue to fill a chronically contaminated pleural airspace. ICG fluorescence adds additional security with direct highlighting of the good perfusion of this voluminous flap.

Giant Anterior Mediastinal Mass – A Case Report

B. Battilana¹, I. Schmitt-Opitz¹, D. Schneider¹, S. Schwarz¹ (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Anterior mediastinal masses can have various causes, including thymoma, lymphoma, germ cell tumor, neurogenic tumor and some less common etiologies. Accurate diagnosis relies on advanced imaging and histopathological examination. A multidisciplinary approach is essential for tailored interventions based on the specific histological subtype. Here, we present a case of a patient with an exceptionally large mediastinal mass.

Aims: –

Methods: –

Results: A 44-year-old patient was referred to our department following the incidental discovery of a substantial mediastinal mass. Remarkably, the patient was entirely asymptomatic despite a history of recurrent lipomas, including a sizable 300g lipoma on the thigh that necessitated surgical resection. Antibody tests (Anti-Musk, Anti-Ach, Anti-Titin) yielded negative results. The chest CT revealed a tent-shaped fatty mass extending from the anterior mediastinum into the basal and anterior bilateral hemithoraces. Fine needle aspiration indicated fatty tissue with focal chronic inflammation, ruling out thymic tissue, thymoma, or malignancy. In our multidisciplinary tumor board discussion, given the extensive size of the mass, a surgical approach was favored. We opted for a robot-assisted thoracoscopic surgery with three access ports, initiated from the right side. Following careful dissection and mobilization of the tumor mass from the anomalous vein and the pericardium, we converted to an anterolateral thoracotomy to completely remove the mass. Histopathological examination proofed benign lipoma.

Conclusion: The approach to the presentation and treatment of anterior mediastinal masses is highly individualized and necessitates thorough discussion in a multidisciplinary tumor board, tailored to meet the unique needs of each patient. This case study highlights the successful resection of a giant anterior mediastinal mass using a combined robotic and open approach within our department.

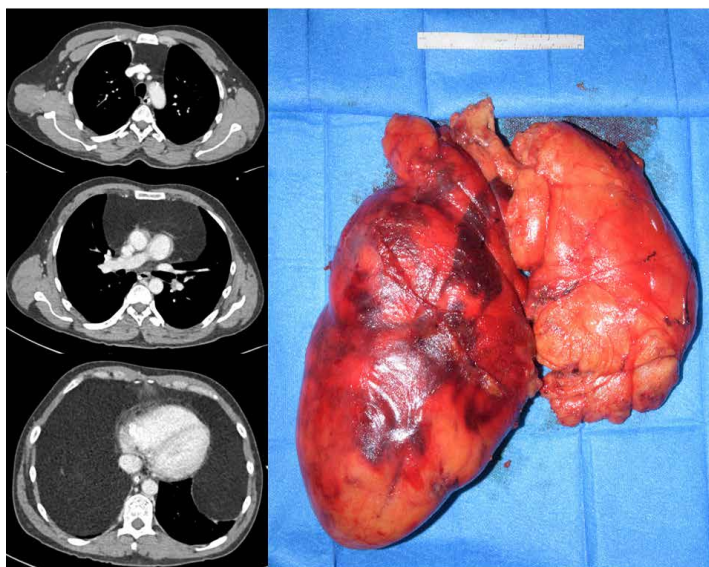


Figure 1. Left: Chest CT scan showing a massive tent-shaped fatty mass originating from the anterior mediastinum reaching into the basal and anterior hemithoraces bilaterally. Right: Mass resected from the anterior mediastinum

Perioperative Outcomes Following Lung Resection in Metastatic Non-Small Cell Lung Cancer: Results of a Large Multicenter Database

R. S. Werner¹, M. A. Eisenberg², S. Ries², T. Papasotiropoulos¹, N. Steinmann¹, M. B. Antonoff², I. Opitz¹ (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich; ²Department of Thoracic and Cardiovascular Surgery, University of Texas MD Anderson Cancer Center, Houston, Texas)

Background: Surgical decision-making in non-small-cell lung cancer (NSCLC) relies on balancing operative risks with oncologic benefits. Recent data have emerged demonstrating survival advantages following pulmonary resection as local consolidative therapy in stage IV NSCLC, yet operative risks for these potentially more challenging surgical procedures are not well-described.

Aims: We sought to characterize perioperative outcomes within a multicenter cohort of patients with resected stage IV NSCLC.

Methods: We retrospectively reviewed patients with metastatic NSCLC who underwent resection of primary lung tumors from 1996-2023 from 2 large academic institutions. Clinicopathologic, operative, and perioperative details were obtained from patient records. Predictors of pulmonary, cardiac, renal, and wound complications were assessed and multivariable regression model performed.

Results: 179 patients were included, at median age of 59.0 (51.8-66.5) years. Neoadjuvant therapy was received by 116 (64.8%), including chemotherapy 73 (40.8%), immunotherapy in 4 (2.2%), and targeted therapy in 48 (26.8%). Most patients underwent thoracotomy (141, 78.8%). Operations included 130 (72.6%) lobectomies, 24 (13.4%) wedges, 7 (3.9%) segmentectomies, 12 (6.7%) bilobectomies, and 6 (3.4%) pneumonectomies. Median blood loss was 150 (62.5-300) mL, and median operative duration was 236 (183-286) minutes. Typical length of stay was 5.0 (3.0-8.0) days. Postoperative complications occurred in 46 (25.7%), including 18 (10.1%) pulmonary, 19 (10.6%) cardiac, 5 (2.8%) renal, and 4 (2.2%) wound-related. MVA did not identify intrathoracic stage, extent of resection, nor neoadjuvant treatment as independent predictors of postoperative complication. All patients survived 30 days, and 2 deaths (1.1%) occurred within 90 days. Complications did not impact 90-day survival ($p=0.36$).

Conclusion: Surgery for stage IV NSCLC is well-tolerated, regardless of receipt of neoadjuvant therapy, intrathoracic stage, or extent of lung resection. Most complications are cardiopulmonary, without downstream impact on survival. These findings inform multidisciplinary and informed consent discussions, setting a baseline for future assessments of outcomes in this patient population.

Unmasking the Hidden Culprit: Post-Operative SGLT2 Inhibitor-Induced Euglycemic Diabetic Ketoacidosis

M. Pannu¹, J. Ehrsam², O. Schöb^{2,3}, I. Inci^{1,2,3} (¹School of Medicine, University of Nicosia, Nicosia; ²Thoracic Surgery Clinic, Hirslanden Klinik, Zürich; ³School of Medicine, University of Zürich, Zürich)

Background: Sodium-glucose co-transporter 2 inhibitors (SGLT2i) are commonly prescribed for diabetes. However, a recent concern involves a serious adverse effect in vulnerable post-operative patients: SGLT2i-induced euglycemic diabetic ketoacidosis (eu-DKA). In these cases, symptoms such as nausea, vomiting, hyperventilation, and abdominal pain are masked by post-operative effects. The SGLT2i further complicates the presentation with reduced polyuria and polydipsia. Recognizing SGLT2i as the hidden culprit is crucial for treatment, given the 2-5% mortality rate associated with eu-DKA in developed countries.

Aims: This case report aims to discuss SGLT2i-induced eu-DKA in post-operative patients, suggest management strategies, and offer recommendations on the ideal timing for withholding

SGLT2i in surgical patients.

Methods: We outline the post-lobectomy clinical course of a patient with type 1 diabetes mellitus on dapagliflozin therapy.

Results: Our patient, a 76-year-old multimorbid woman, underwent an uneventful robot-assisted lung lobectomy due to adenocarcinoma. During monitoring, she developed severe treatment-resistant nausea and tachypnea. Arterial blood gas analysis showed progressive acidosis, peaking at a pH of 7.138 after 12 hours, low bicarbonate (8.8 mmol/l) and a base excess of -21.9 mmol/l. While blood analysis showed normal glucose levels, urine analysis showed elevated ketone levels (>5mmol/l) resulting in admission to the intensive care unit with the diagnosis of SGLT2i-induced eu-DKA. Homeostasis was achieved with glucose, magnesium, phosphate, and sodium-bicarbonate infusions. The patient transitioned to the regular ward on post-operative day 3 and was discharged from the hospital on day 11. The recovery of the lung remained uncomplicated throughout.

Conclusion: Given the half-life of SGLT2i as 11-13 hours, a prudent preventative approach would involve withholding SGLT2i administration 2-3 days before surgery. Substituting SGLT2i with insulin during this period, along with ensuring sufficient fluid replacement, would be a sensible strategy to mitigate the risk of eu-DKA.

Is it Safe to Remove Chest Drains Without a Priori Chest X-ray Following Anatomical Lung Resections in Patients with Non-Small Cell Lung Cancer

I. Iskender, S. Hillinger, D. Schneider, O. Lauk, G. Lang, I. Opitz, C. Caviezel (Thoracic Surgery, University Hospital Zurich, Zurich)

Background: After anatomical lung resections, routine postoperative chest X-rays are common. Advances in chest drain monitoring and enhanced recovery programs in thoracic surgery (ERAS) raise questions about the necessity of these routine X-rays.

Aims: We hypothesize that, for non-small cell lung cancer (NSCLC) patients, chest drains connected to a digital system can be safely removed without consulting prior X-ray findings following anatomical lung resections.

Methods: Patients undergoing anatomical lung resections for NSCLC, excluding wedge resection or pneumonectomy, have been retrospectively analyzed between June 2020 and June 2023. Unless there was a clinical concern, such as prolonged air leak>7days, ICU admission, abnormal pleural effusion, and hypoxia or the decision of consultants, routine post-operative chest X-rays prior to drain removal were intentionally no longer performed.

Results: The cohort consisted of 270 consecutive patients undergoing anatomical lung resections for NSCLC. Twenty-eight patients were excluded, most patients left the theatre with 2 drains (n=24). The remaining 242 patients underwent lung resections mostly via minimal invasive approaches, VATS/RATS (94%). Patients were grouped into three categories. Group 1: No pre-pull X-ray (n=125), Group 2: Pre-pull X-ray routine check (n=71), and Group 3: Pre-pull X-ray due to clinical concern (n=46). Central venous catheter insertion (n=42) and postoperative follow-up (n=29) were the two main indications for pre-pull X-ray in Group 2. The incidence of reoperation, including re-tube and re-VATS was comparable between the groups (Group 1: n=6 (4.8%), Group 2: n=4 (5.6%), Group 3: n=7 (15.2%); p=0.053. The mean duration of chest tube and hospital stay were markedly lower in Group 1 (2+2.7 vs 4.9+4.7 days; p<0.001) than in Group 2 (3.1+3.4 vs 5.8+3.8 days; p=0.011), respectively.

Conclusion: Chest drains can be removed safely without pre-pull X-ray after uneventful anatomical lung resections. Together with other ERAS measures, this practice change helped us to reduce the length of hospital stay significantly.

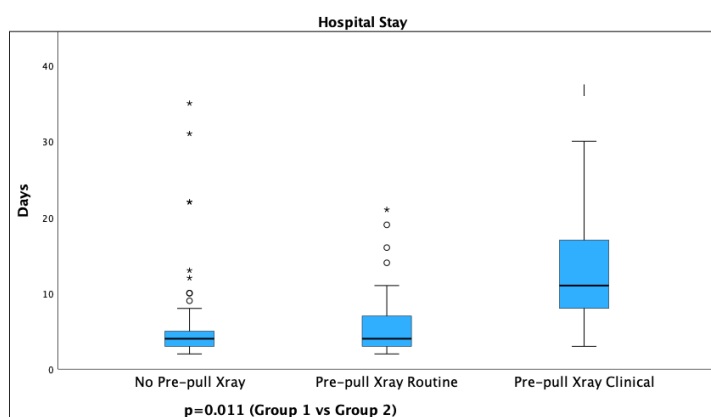


Figure 1. The length of hospital stay

Influential Factors in Intra- and Postoperative Outcomes Following Anatomical Lung Resections: A Comparison of VATS and RATS Procedures

J. Ehram¹, O. Meier², M. Pannu³, S. Ulugöl⁴, I. Inci^{3,5,6}, O. Schöb^{1,6} (1stThoracic Surgery Clinic, Hirslanden Klinik Zurich, Zurich; 2ndCenter for Surgery Zurich, Hirslanden Klinik Zurich, Zurich; 3rdSchool of Medicine, University of Nicosia, Nicosia; 4thCenter for Surgery Zurich, Hirslanden Klinik Zurich, Zurich; 5thThoracic Surgery Clinic, Hirslanden Klinik Zurich, Zurich; 6thSchool of Medicine, University of Zurich, Zurich)

Background: There's a recent shift from video-assisted thoracoscopy (VATS) to robot-assisted thoracoscopy (RATS) in anatomical lung resections.

Aims: We conducted a retrospective analysis of our center's experience with both modalities,

examining intra- and postoperative outcomes.

Methods: We compared 116 patients undergoing VATS resection (2019-2021) with 103 patients undergoing RATS procedure (2022-2023) at our center. Multivariate Cox regression assessed factors affecting intraoperative blood loss, operation duration, postoperative chest tube duration, and hospital stay. To minimize potential confounders, the models were adjusted for Charlson Comorbidity Index, neoadjuvant therapy, re-operation, active smoking, and COPD grade.

Results: Out of the 219 anatomical resections, the distribution was as follows: 22.4% upper lobe (18 vs. 31), 6.4% middle lobe (5 vs. 9), and 15.1% lower lobe (26 vs. 7). Additionally, there were 31.1% apical segments (37 vs. 31), 4.1% lingula (4 vs. 5), 8.2% segment-VI (9 vs. 9), and 12.8% basal segments (17 vs. 11). The distribution of these lobes/segments was comparable between VATS and RATS, respectively.

In intraoperative blood loss, RATS emerged as a protective factor (0.7; 0.6-1.0, p=0.04), while adhesions posed a risk (2.1; 1.6-2.9, p<0.001) according to Cox regression.

For operation duration, VATS versus RATS had no significant impact. However, radical lymph node resection (1.7; 1.3-2.2, p<0.001) and an elevated COPD grade (1.2; 1.0-1.4, p=0.04) prolonged the duration significantly.

RATS significantly increased the chance of early chest tube removal (0.4; 0.3-0.6, p<0.001), as did segment-IV resection (0.5; 0.3-0.9, p=0.01). Conversely, increased comorbidities (1.4; 1.0-2.7, p=0.008) and active smoking (1.5; 1.1-2.1, p=0.007) were associated with prolonged chest tube duration, similarly impacting hospital stay.

Conclusion: RATS, with enhanced exposure, enables precise surgery, reducing intraoperative blood loss, promoting earlier chest tube removal, and shortening hospital stays. Limited sample size prevented identification of additional impacts for different segments and lobes.

Rare Discovery: Partial Pericardial Agenesis Unveiled During Thymectomy – A Case Report

J. Ehram, O. Meier, M. Pannu, I. Inci, S. Ulugöl, O. Schöb (Klinik Hirslanden, Zürich)

Background: Partial pericardial agenesis is an extremely rare congenital condition, thus far only reported 32 times as an incidental intra-operative finding. It can manifest without symptoms, as observed in our case, or exhibit vague symptoms such as chest pain, palpitations, or shortness of breath. The absence of clear symptoms, the presence of ambiguous ones, and the absence of distinctive radiological findings collectively contribute to the complexity of diagnosing this condition.

Aims: We present a case of left partial pericardial agenesis, supported by intraoperative video evidence.

Methods: In the course of investigating a 42-year-old woman presenting symptoms such as sweating, tachycardia, episodes of weakness, and unexplained weight loss, autoimmune thyroiditis was diagnosed. Subsequent imaging revealed the presence of a mediastinal soft tissue mass measuring 21 x 26 mm. Despite the mass showing minimal growth over time and displaying limited metabolic activity in the PET-CT scan, surgical removal of the mediastinal mass was recommended. Notably, there is no historical, clinical, or electrophysiological evidence of myasthenia gravis in this case.

Results: While conducting the robot-assisted thymectomy, partial agenesis of the ventral left pericardium was observed in the overview (Figure 1). Of note, the posterior side remained completely intact. The thymectomy was executed without complications and post-operative histological examination indicated thymoma hyperplasia. The postoperative course was also smooth and uneventful. Given the incidental findings during the surgery, additional cardiac investigations were conducted postoperatively. Fortunately, no significant electrocardiographic abnormalities were detected.

Conclusion: To our knowledge, our case stands as the 33rd documented instance of an intra-operative incidental discovery of pericardial agenesis. The decision to pursue closure of the defect depends on its size. However, in situations where the defect is substantial, as observed in our case, it is not deemed obligatory.

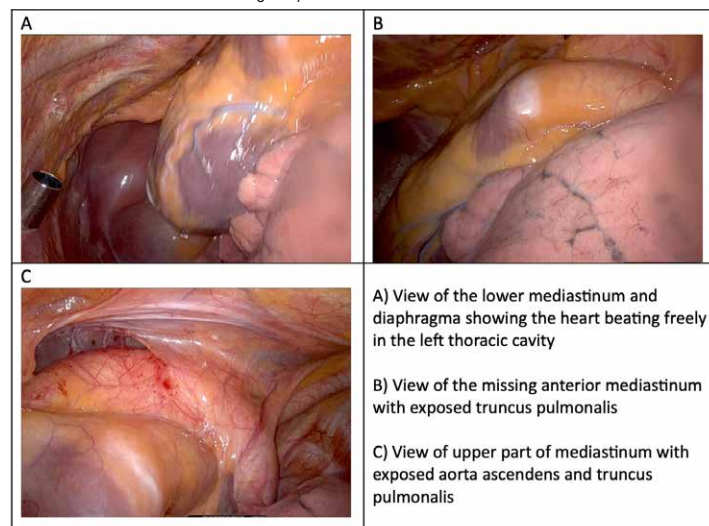


Figure 1

Indirect Recognition HLA Score as a Predictor of CLAD in Lung Transplant

L. Hoyos Mejia, T. Papasotiropoulos, G. Lang, I. Iskender, M. Schuumans, R. Habe, I. Opitz (University Hospital Zurich, Zürich)

Background: The relation between HLA epitope mismatched load and outcomes of transplants such as heart, liver, and kidney has been proven. The Predicted Indirectly Recognizable HLA Epitopes (PIRCHE) score has been proposed to quantify the HLA disparity between donor and recipient.

Aims: We aim to analyze the effect of the PIRCHE model on the development of chronic allograft dysfunction (CLAD) and long-term survival in LTx.

Methods: Patients who underwent LTx between January 2010 and December 2019 with available calculated PIRCHE scores were included in this retrospective multivariate analysis using a prospectively collected database. The primary outcome measures of this study were the incidence of CLAD and long-term survival

Results: 244 LTx were performed in this period. 119 (48.7%) developed CLAD during follow-up. Patient characteristics are summarized in Table 1. Mostly bilateral LTx (97%), the primary indication was Cystic Fibrosis (29%) and COPD (27%). Primary graft dysfunction Grade 3 incidence at 72 hours was 15%. While 30- and 90-day mortality was 3,6% and 7,3%, respectively. Multivariate analysis showed that even though there was a strong correlation between high HLA mismatch and high PIRCHE score (p=0,00248), this would neither translate into a higher rate of PGD (p=0.803), nor earlier (< 2 years) or late-onset onset of CLAD (p 0.544). Furthermore, there was no correlation with one year or overall survival (p=0.971).

Conclusion: While the PIRCHE score displayed a robust correlation with HLA mismatch pre-transplant, this did not manifest in varying incidences of PGD, CLAD, or one-year mortality.

RECIPIENT – N -244		
Variable	Value (Median)	%/ IQR
Age (Median)	52	[32 59.5]
Gender (Male)	137	56%
BMI	21,92	[18.82 26.03]
Diagnosis		
COPD	80	32
Cystic Fibrosis	72	30
Pulmonary Fibrosis	63	25
'Other'	29	11
SPH	88	36%
Sum Charlson Deyo Index	1	[1 3]
PERIOPERATIVE		
Type of Tx Bilateral	239	98%
CIT Right	255	[204 325.5]
CIT Left	347	[298.75 414]
Intra OP ECMO	137	56%
POP ECMO	55	23%
PGD 3 at 72 h	37	15%
Mechanical Ventilation Days	1	[1 5]
ICU Stay Days	4	[3 11.5]
Hospital Stay Days	38,5	[30 56]
30 Days Mortality	9	4
90 Days Mortality	18	7
1 year Mortality	27	11
CLAD Dx	119	49%
Type		
'BOS (Bronchiolitis)'	44	37
'Mixed'	5	4
'RAS (Restrictive)'	37	31
'Undefined'	5	4
Time Dx in days	782	[391.25 1271.75]
PIRCHE score	90,88	[68.34 123.96]
HLA Mismatch	80%	[70 – 90%]
DONOR		
Age media	51,64	[36.81 61.74]
Gender (Female)	94	39%
Donor BMI	24,22	[22.67 26.30]

Table 1. BMI: Body mass index; COPD: chronic obstructive lung disease; SPH: secondary pulmonary hypertension; CIT: cold ischemia time; ECMO: extracorporeal membrane oxygenation; ICU: intensive care unit; In Hos: In-hospital stay; F: Female; Predicted Indirectly Recognizable HLA Epitope (PIRCHE)

Right-Sided Diaphragmatic Hernia in a 37 year old Female

T. Brunn, D. Wagnetz (Stadtspital Zürich Triemli, Zürich)

Background: Catamenial pneumothorax is a relatively rare form of spontaneous pneumothorax in women, usually occurring up to 24 h before or within 72 h after onset of menstruation.

Aims: We report a case of a female with chronic catamenial pneumothorax and herniation of the liver through a diaphragmatic defect, detected in the context of lower abdominal pain without association to menstruation.

Methods: The diaphragmatic defect could be closed thoracoscopically with a reinforced endostapler and histology confirmed the diagnosis.

Results: The post-operative course was uneventful. No relapse occurred.

Conclusion: Larger diaphragmatic defects can be found in catamenial pneumothorax and can safely be closed with a reinforced stapler.

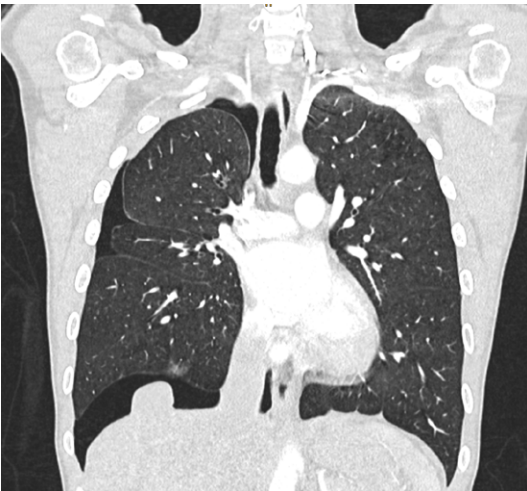


Figure 1. CT

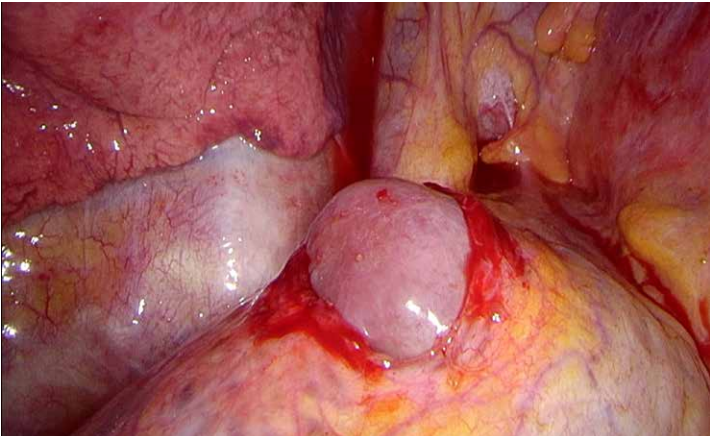


Figure 2. Hernia intraop

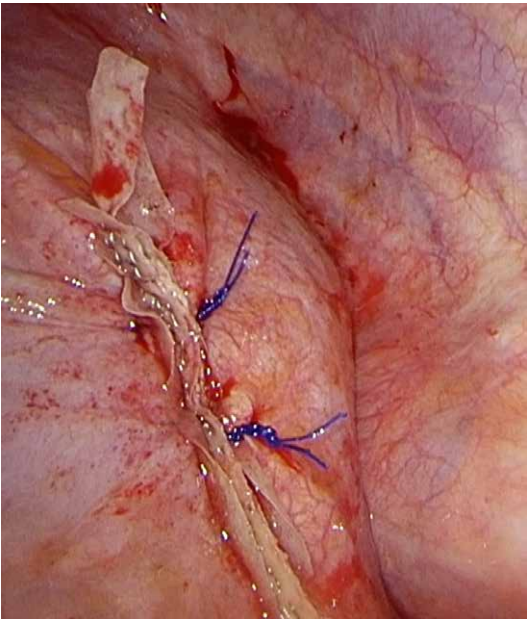


Figure 3. Closed Defect

Catamenial Pneumothorax – A Rare Entity which Should be Kept in Mind!

S. Ulugöl¹, J. Ehrsam¹, O. Schöb^{1,2}, I. Ilhan^{1,2,3} (¹Thoraxchirurgie, Chirurgisches Zentrum Zürich, Klinik Hirslanden, Zürich; ²Medizinische Fakultät, Universität Zürich, Zürich; ³Medical School, University of Nicosia, Nicosia)

Background: Catamenial pneumothorax is a rare finding among menstruating women. It is characterized by pneumothorax occurring 72 hours before or after onset of menses. Pathogenesis remains elusive. One proposed hypothesis is menstrual cycle dependent transdiaphragmatic air passing into the pleura by acquired diaphragmatic defects caused by endometriosis.

Aims: A case of catamenial pneumothorax is presented.

Methods: A 48-year-old woman (non-smoker) was referred to our clinic with the third occurrence of a right-sided spontaneous pneumothorax in just 3 months approximately every 4 weeks. CT scan revealed no lung parenchyma abnormalities. During the last pneumothorax-episode a thorascopic apical wedge resection was performed in another hospital with the intention to seal a proposed pulmonary leak. Nevertheless, pneumothorax remained for 5 post-operative days.

Results: During explorative thoracoscopy several holes of 2 to 3 mm in diameter were found in the tendinous part of the right diaphragm, bordered by a few brownish deposits (Figure 1). A partial diaphragmatic resection with insertion of Veriset™ hemostasis patch was performed, as well as a pleural abrasion. Post-operatively, asymptomatic accumulation of intraabdominal free air was observed for 3 days. The patient was discharged at POD 7. The diaphragmatic biopsy showed granulating fibrosis and macrophage-rich inflammations with fresh and older residuals of hemorrhage. The findings are in accordance with endometriosis. The final follow-up 4 weeks postoperatively showed no signs of a re-pneumothorax.

Conclusion: Our case supports the theory of a trans-diaphragmatic air passage as pathogenesis. Recurrent spontaneous pneumothorax in menstruating woman should raise suspicion for catamenial pneumothorax. In such cases, it is imperative to pursue surgical exploration along with inspection of the diaphragm. Defect closure should then be the goal to prevent recurrence.



Figure 1. Intraoperative finding with multiple perforations of the tendinous part of the right diaphragm

Novel MicroRNAs are Associated with Presence of Pleural Mesothelioma and Response to Chemotherapy

M. B. Kirschner, V. Orlowski, F. Schläpfer, M. Meerang, I. Opitz (Department of Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Several studies have shown that dysregulation of microRNA expression contributes to pleural mesothelioma (PM), including its resistance to chemotherapy. While the majority of studies focused on well-annotated microRNAs, in 2019 previously unknown microRNAs were identified, which distinguished TCGA-MESO from TCGA lung cancer samples with high accuracy.

Aims: In the present study, we aim to evaluate these microRNAs in PM, non-PM and lung cancer tissue using PCR as alternative detection approach.

Methods: We used archived FFPE tissue from a cohort of 51 PM (39 epithelioid, 9 biphasic, 3 sarcomatoid) collected before chemotherapy, 16 non-PM pleural biopsies (9 benign inflammatory reaction, 7 pleural metastases), and 14 lung cancer cases (9 adenocarcinomas). Novel microRNAs were measured using self-designed PCR primers. Independent samples t-test was used to assess expression differences between groups.

Results: We found significantly elevated expression of mpm-miRs-72, -18 and -58 in PM compared to both non-PM and lung cancer (Fig. 1A). Further subdividing the non-PM cases, showed that expression differences remained significant between PM and benign tissue with the highest difference found for mpm-miR-72 (5.4-fold, $p=0.01$). Expression of all three microRNAs was highest in biphasic PM, reaching statistical significance for mpm-miR-18 (1.9-fold, $p=0.036$; Fig. 1B). Since microRNAs have been shown to influence response to chemotherapy, we also compared expression differences based on chemotherapy response for the 33 PM patients for whom mRECIST data was available. Indeed, all three microRNAs showed highest expression in patients with progressive disease, with an expression difference compared to partial responders of 2.8-fold for mpm-miR-58 reaching statistical significance ($p<0.001$).

Conclusion: Our current findings support a diagnostic potential of novel microRNAs in PM for differentiation from benign lesions and lung cancer. Furthermore, higher expression of all three microRNAs in patients with progressive disease suggests a contribution of these microRNAs to chemoresistance, which warrants further investigation.

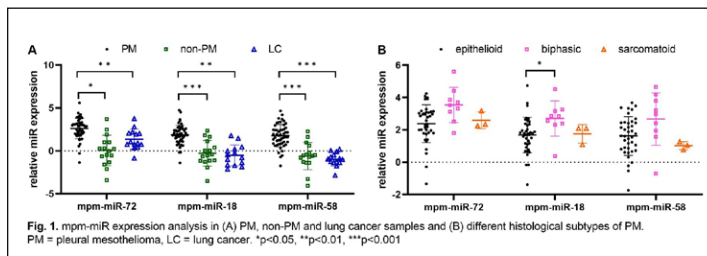


Figure 1. SGC 2024, Novel MPM-miRs

Opioid-free Thoracic Surgery after Intercostal Cryoanalgesia: An initial Experience and Long-Term outcome

B. Bédot¹, B. Vasey¹, M. S. Demarchi¹, A. Bourezg², F. Triponez¹, W. Karenovics¹ (¹Thoracic and endocrine surgery, University Hospitals of Geneva, Geneva; ²Anesthesiology division, University Hospitals of Geneva, Geneva)

Background: Thoracic surgery is considered a painful procedure.

Aims: The purpose of this study was to examine the short- and long-term effects of intercostal cryoanalgesia after thoracic surgery in adults, focusing on opioid consumption and neuro-pathic pain.

Methods: We conducted a single-center prospective analysis of 9 patients who underwent unilateral thoracic surgery in December 2022. Patients received intercostal nerve cryoanalgesia during the intervention involving five intercostal nerves. Visual analog scale (VAS) for pain, opioid consumption, and DN4 score for neuropathic pain were assessed during the early post-operative period and at 1-, 3- and 6-months post-surgery.

Results: Eight patients underwent a video-assisted thoracic surgery procedure for lobectomy (N=5), wedge resection (N=2) or apicectomy and pleurodesis (N=1). One patient underwent thoracotomy and pleuroctomy/decortication for mesothelioma. The median drainage duration was 3 days (IQR: 1-4 days) and the median length of hospital stay was 3 days (IQR: 2-5 days). One patient died after lobectomy due to pneumonia and ARDS.

A maximal VAS ≤ 3 was found in 4/9 patients at postoperative day 1 and in 8/9 patients at day 2. An opioid-free management was possible in 6/9 patients at day 1 and in 7/9 patients at day 2. The deceased patient and the one who had thoracotomy needed opioids. At 1 month, 7/8 patients had VAS between 4-5 and 3 patients required opioids treatment. At 3 months, 7/8 patients had DN4 score ≥ 4 , but only 1 patient required Pregabalin and opioid treatment. At 6 months, 2/6 patients had a DN4 score ≥ 4 and no patient had analgesic treatment.

Conclusion: Our study highlights the potential benefits of intercostal cryoanalgesia in reducing opioid use and pain during the postoperative period after thoracic surgery. However, the observed neuropathic pain raises concerns and suggests the call for a clinical trial with patient-reported outcome measures to consider the benefit-risk ratio of this approach.

First Report of a Completely Portal Robotic Pancoast Tumour Resection (First Rib en bloc with Left Upper Lobe)

G. Kocher, D. Flury, S. Deckarm (Thoracic Surgery, Hirslanden Clinic Beau Site, Bern)

Background: The current gold standard for the treatment of Pancoast tumours is neoadjuvant chemoradiation followed by radical resection of the affected upper lobe en bloc with resection of the chest wall. Surgery is mostly done using a posterior approach (posterolateral thoracotomy as described by Shaw Paulson) or an anterior approach (with partial sternotomy as described by Darvelle and modified by Gruenenwald). In recent years, rare case reports of hybrid approaches of minimally invasive lobectomies combined with limited thoracotomies or sternotomies have been described.

Aims: Since we routinely perform uni-/two-portal robotic anatomic lung resections for lung cancer as well as three-port robotic first rib resections for thoracic inlet/outlet syndrome – the combination of both techniques was only the next logical step. We describe - according to the international literature and to the best of our knowledge - the first completely portal robotic pancoast tumour resection worldwide.

Methods: We herein present the step-by-step video of the first reported case of a fully portal robotic-assisted Pancoast tumour resection, consisting of a left upper lobe resection en bloc with first rib after neoadjuvant chemoradiation therapy in a 76-year old male patient. Three robotic ports and one 12mm assistant port were used (see Figure 1).

Results: Total operating time was 210 minutes. The chest tube was removed on the 2nd postoperative day with the patient being discharged home the day after with the only pain medication needed being paracetamol on demand.

The final histopathological report revealed a complete resection with final tumor stage ypT3 ypN0 (0/22) V1 LO Pn0 G3 R0.

At follow-up 3 months after surgery the patient was in a good physical state without any dyspnea on exertion or pain. Follow up CT-scan showed no signs of recurrence.

Conclusion: The robotic approach proved to be safe and allowed for excellent exposure, especially of the thoracic outlet - possibly rendering the robotic approach a new gold standard for pancoast tumor resection in selected cases.



Figure 1. Access ports after specimen retrieval (through enlarged assistant port)

An Unusual Course of a Duodenal Peptic Ulcer

S. Azarhoush, H. Misteli, L. Jenzer (Spital Uster, Uster)

Background: Perforated peptic ulcer disease is a surgical emergency. Timely diagnosis and prompt surgical intervention can prevent morbidity and mortality, however underestimation of the extent of an ulcer is linked with a complicated course.

Aims: Persistent bilious discharge after primary closure of a peptic duodenal ulcer may not only be result of suture failure but also raise suspicion for a misinterpretation of the extent of the ulcer.

Methods: We present a case of a complicated postoperative course due to misinterpretation of the extent of a duodenal peptic ulcer.

Results: 74-year-old female with a history of chronic alcohol abuse (1/2 litre wine per day), smoking (58 py) and weight loss of 15 kg within 3 months (BMI 16 kg/m²) presented to our emergency department with acute epigastric pain.

A CT-abdomen demonstrated air below the diaphragm with reasonable suspicions of duodenal perforation and subsequent laparoscopic exploration was performed. A perforated peptic duodenal ulcer could be confirmed and was closed with running sutures, a drain was placed. Intraoperative gastro-duodenoscopy showed no sign of malignancy.

Postoperative day 1 the drain revealed bilious discharge and an open surgical revision was undertaken. A clear allocation could not be identified but suspecting the sutures as most reasonable cause a redo of the sutures was done with placement of omental patch for support.

Two days later, again bilious discharge was observed and decision was made for another surgical revision. During open exploration an ulcer extended to the dorsal wall was identified and a distal gastrectomy with roux-en-y reconstruction was carried out. Thereafter no further surgical intervention was needed.

Conclusion: Precise surgical exploration is mandatory in order to correctly assess the extent of a peptic ulcer and prevent morbidity and mortality. Persistent bilious discharge after primary closure may raise suspicion for an extended peptic ulcer.

Spontaneous Resolution of Gallstone Ileus in the Sigmoid Colon with a Post-Diverticulitis Substenosis: A Case Report

D. Schiavi¹, O. Gié² (¹Surgery, Moncucco Hospital Group, Lugano; ²Surgery, Swiss Surgical Practice, Lugano)

Background: Gallstone colonic obstruction resulting from a cholecystocolonic fistula is an infrequent late complication of recurrent cholecystitis. It typically occurs when the gallbladder comes into contact with the hepatic flexure of the colon, allowing gallstones to pass through the fistula. Involvement of the sigmoid colon is exceedingly rare and is often linked to pre-existing colon conditions.

Aims: This study aims to present and analyze a rare case of gallstone ileus, emphasizing the uncommon occurrence of spontaneous resolution and shedding light on the diagnostic and therapeutic challenges associated with this atypical presentation.

Methods: A 78-year-old female patient was admitted with a 5-day history of bowel obstruction, accompanied by nausea. Following initial assessment, a computed tomography scan was performed, revealing a 2 cm gallstone lodged in the sigmoid colon, attributed to a cholecystocolonic fistula.

Results: Spontaneous resolution of the obstruction took place during the first night of hospitalization following antibiotic treatment, leading to the expulsion of the gallstone. A subsequent colonoscopy was performed to confirm the size of the fistula and to identify a substenosis resulting from post-diverticulitis as the root cause of the gallstone blockage.

Conclusion: There are limited documented cases of spontaneous resolution of gallstone colonic ileus in the sigmoid colon. Usually, surgical or endoscopic procedures are necessary for managing such occurrences. The discovery of a cholecystocolonic fistula and its connection to a post-diverticulitis substenosis provides valuable insights into the complex nature of this unusual presentation.

Appendiceal Diverticulitis Mimicking Acute Appendicitis

E. Kalogiannis, M. Burgard, B. Egger (Department of General Surgery, HFR – Fribourg Cantonal Hospital, Fribourg)

Background: Appendiceal diverticulosis (AD) is a rare condition found at 0.004-2% of appendiceal specimens, associated with high risk of perforation, bleeding and almost a 50% probability of appendiceal neoplasm. Due to the latter, appendectomy is indicated even when AD is found coincidentally. Infected AD is the most frequent disease mimicking acute appendicitis (AA).

Aims: To raise awareness of this rare surgical entity and its challenging diagnosis.

Methods: A 41-year-old male patient with no previous medical history presented to our emergency department with right lower quadrant abdominal pain associated with elevated biological inflammatory markers. CT-scan revealed a 13mm-collection associated to AA (Fig.1). Additionally, the patient reported to have repeatedly blood in his stool for about 1 year raising the suspicion of inflammatory bowel disease (IBD). Therefore, we opted for an initial conservative treatment with intravenous antibiotics (Ceftriaxone 2g 1x/d and Metronidazole 500mg 3x/d). The patient was discharged home on day 2 with oral antibiotics for two weeks. An intermediately performed colonoscopy (day 5) was negative for IBD and a control CT scan (day 20) demonstrated that the previously described peri-appendiceal collection turned out to be a diverticulum (Fig.2). Planned surgery was performed 6 weeks after the initial admission.

Results: Laparoscopy confirmed a voluminous diverticulum of the appendix, filled with mucus (Fig.3). Appendectomy was uneventful and the patient was discharged home the next day. Cytology revealed extra-cellular mucus in the context of a serositis and histopathology showed a complicated diverticulum with focal mesothelial hyperplasia, without malignancy.

Conclusion: Infected AD is a rare condition mimicking AA mostly found postoperatively in histopathological analyses; hence, its diagnosis is challenging. Due to high risk of malignancy, preoperative workout is mandatory and appendectomy should be performed within safe resection margins. In our case, AD was detected preoperatively, permitting an orchestrated surgical strategy.



Figure 1. Axial (left) and coronal (right) CT scan on admission demonstrating a 13mm collection (red arrows) with free liquid and appendicitis, suggesting perforated appendicitis with appendiceal abscess

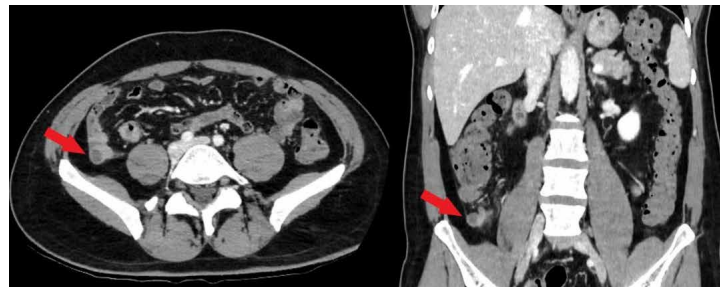


Figure 2. Axial (left) and coronal (right) CT scan on D10 demonstrating regression of the tissular infiltration and appendicitis, clearly depicting an appendicular diverticulum (red arrows)

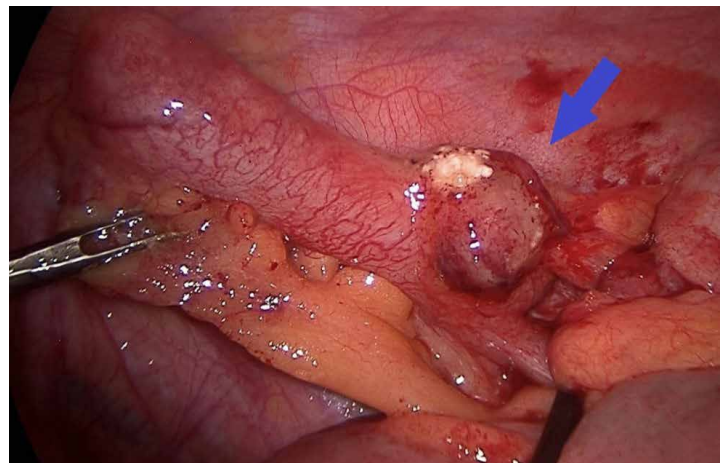


Figure 3. Perioperative image demonstrating a voluminous diverticulum on the antimesenteric part of the appendiceal corps (blue arrow), covered in mucus, without signs of perforation

Acinar Cystic Transformation (ACT) of the Pancreas: Focus on Radiological Imaging and Diagnosis. Presentation of two Cases and Review of Literature

J. Poisson, L. Gamble, I. Fournier (Chirurgie, Hôpital du Valais, Sion)

Background: Acinar cystic transformations of the pancreas (ACT) are rare, benign, cystic lesions of the pancreas. They are often discovered in the context of non-specific abdominal pain or incidentally during imaging for another reason. Diagnosis is difficult by imaging only because of the lack of typical radiological criteria and most diagnoses are made by histopathological examination after surgical resection. Because no risk of malignant transformation is described in the literature, a conservative approach is the treatment of choice for ACT once the diagnosis has been made.

Aims: We report two cases of ACT diagnosed by Magnetic Resonance Imaging (MRI) with typical radiological features for which conservative treatment was proposed.

Methods: The first case is a 65 year-old woman presenting with non-specific abdominal pain. An abdominal MRI was performed and showed multiple cystic lesions throughout the pancreas compatible with the diagnosis of ACT. The second case is a 74 year-old man presenting with diarrhea and weight loss. Abdominal imaging also showed multiple cystic lesions throughout the pancreas with atrophy of the surrounding pancreatic parenchyma. No malignant features were visualized. Both cases were discussed at our multidisciplinary hepatobiliary and pancreatic tumour board. Due to the typical imaging features and lack of malignant characteristics, conservative treatment with radiological follow-up was opted for, therefore avoiding potentially unnecessary surgical resection. Radiological follow-up showed stability of the lesions.

Results: Pre-operative diagnosis of ACT is of great benefit as it can lead to more conservative treatment by radiological follow up instead of extensive surgical resection with its associated mortality and morbidity. This is especially true for asymptomatic patients. Unfortunately, the lack of cases and sufficient data remain an obstacle to establishing guidelines for diagnosis, management and treatment of ACT.

Conclusion: We wanted to share our experience to allow the establishment of radiological diagnostic criteria, which would lead to better management of these patients.

Low Ki-67 Positive Index is a Prognostic Factor for Better Survival Outcomes of Patients Treated with Intracavitary Cisplatin-Fibrin

M. Meerang¹, I. Schmitt-Opitz², M. B. Kirschner¹, N. Bosbach¹, O. Lauk¹, M. Haberecker², J. Mengers¹ (¹Thoracic Surgery, University Hospital Zurich, Zurich; ²Pathology and Molecular Pathology, University Hospital Zurich, Zurich)

Background: Novel therapeutic approaches are needed for patients with pleural mesothelioma (PM). Our phase I and II clinical trials for localized chemotherapy with cisplatin-fibrin after surgery investigated safety and efficacy of this novel approach.

Aims: Here, we aimed to identify biomarkers associated with disease outcomes.

Methods: Tissues collected at diagnosis (pre-CTX) were available from 5 patients. We collected tumor tissues at surgery (post-CTX), before start of localized treatment, from all patients enrolled (n=25). FFPE tissues were immunohistochemically stained for p21 (cisplatin resistance), and Ki-67 (proliferation) 1. Using Qupath software, we classified tumor cells from stroma. Number of positive cells (%) were automatically counted. For p21, we also acquired H-score (sum of intensity x % positive cells) for p21. The association of marker expression with disease outcomes including progression free survival (PFS) and overall survival (OS) from surgery was analysed by SPSS software.

Results: Ki-67 staining index (%) ranged from 1.2 – 60.8 (median 12.8). p21 staining index and H-score (range (median)) are 0 - 96 (21) and 0 - 225 (32), respectively. High Ki-67 labeling index was significantly associated with shorter PFS ($p < 0.001$, median (95% CI): 25.1 (11.3 – 39) vs 8.5 (6.8 - 10.2) months) and OS ($p < 0.001$, 37.8 (26.7 – 48.8) vs 16 (12.6 – 19.3) months) (figure 1). There was no association between clinical parameters with Ki-67 or p21 staining. p21 staining index and H-score showed no association with disease outcomes. For 5 patients of whom pre- and post-CTX tissues were available, we observed reduction of Ki-67 index after CTX in 3 cases. Whether the change in Ki-67 was associated with response to CTX and intracavitary treatment is still under investigation.

Conclusion: Although a small patient cohort, Ki-67 showed significant association with disease outcomes for patients receiving localized cisplatin-fibrin. Ki-67 may be useful for the selection of patients for this treatment regimen.

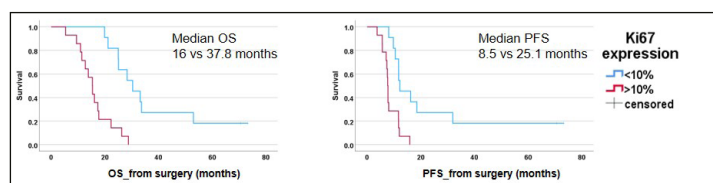


Figure 1. Kaplan-Meier curves showing significant survival differences (both OS and PFS) between patients with low Ki-67 positive index (<10% blue, n=11), and high Ki-67 positive index (>10% red, n=14)

The Complex Setting of Seizure-Induced Humeral Head Fractures

J. Mengers¹, A. Zentner², B. Enodien¹ (¹Klinik für Chirurgie, Kantonsspital Glarus, Glarus; ²Klinik für Chirurgie, Hirslanden Klinik Permanence, Bern)

Background: Although rare, fractures may occur after an episode of seizures in absence of a direct trauma. Forceful muscular contractions as a result of convulsive seizures contributing to

various types of fractures and dislocations have been reported.

Aims: This report explores the complexities surrounding fractures arising from epileptic seizures, a rare but consequential phenomenon.

Methods: We present the case of a 30-year-old male with grand-mal epilepsy and autism who sustained a proximal humerus fracture without direct trauma. The CT scan showed a complex 4-part humeral head fracture including a head-split component with anteroinferior displacement of the surface-bearing articular fragment (Fig. 1).

Results: Surgical intervention comprised of open reduction and internal fixation with an anatomical locking compression plate, addressing the nuanced fracture pattern. The reduction of the dislocated head-split fragment proved to be the critical step in the operation after which the procedure was successfully completed without any further challenges. The patient's early discharge due to social and psychological reasons and a subsequent seizure on the opposite side added a layer of complexity to the case, prompting rigorous clinical and radiological follow-ups (Fig. 2). Despite setbacks, the postoperative phase demonstrated a gradual regression of humeral head depression, fostering the potential for recovery.

Conclusion: This case underlines the imperative for clinicians to consider the biomechanical impact of convulsive seizures and the risk of severe musculoskeletal injuries. Beyond the immediate medical intervention, it highlights the need for comprehensive care and vigilant follow-ups to ensure the optimal recovery of both, neurological and musculoskeletal aspects in patients at the intersection of epilepsy and traumatic fractures.



Figure 1. Preoperative X-ray and CT-Scan



Figure 2. Radiological postoperative follow-up after 3 month

Acute Abdominal Challenges: Surgical Resolution of Adult Congenital Intestinal Malrotation

T. Passon, O. Giè, E. Pastore (Surgery, Gruppo Ospedaliero Moncucco, Lugano)

Background: We present a case of a 52-year-old active man in good health, who experienced severe abdominal pain and food vomiting after a marathon. The patient exhibited abdominal tenderness and distension upon examination, leading to diagnostic investigations. A CT scan revealed a volvulus DD internal hernia, causing gastric distension.

Aims: The aim of this study is to emphasize the importance of recognizing congenital intestinal malrotation as a potential cause of acute abdominal distress in adults. Additionally, the study underscores the necessity of prompt diagnosis, achievable through CT imaging and distinctive signs, and appropriate surgical intervention to prevent serious complications and avoid inadequate interventions.

Methods: The patient's case involved an emergency presentation to the hospital. Diagnostic investigations, including a CT scan, were performed to identify the cause of abdominal distress. Emergency laparoscopy and subsequent laparotomy were conducted to confirm the diagnosis, assess the anatomy of the small intestine and colon, and address the internal hernia and congenital intestinal malrotation.

Results: The diagnostic investigations revealed a volvulus DD internal hernia, and emergency

laparoscopy confirmed ileus, exposing a complete anomalous anatomy of the small intestine and colon. A second reintervention with a laparotomy approach was required to perform definitive treatment and address the structural anomaly known as congenital intestinal malrotation. **Conclusion:** This case highlights the importance of recognizing mesenteric malrotation as a potential cause of acute abdominal distress in adults. It underscores the necessity of prompt diagnosis through CT imaging and distinctive signs, followed by appropriate surgical intervention to prevent serious complications and avoid inadequate interventions. The findings emphasize the significance of considering congenital intestinal malrotation in cases of acute abdominal pain, particularly in active adults.

Mortality and Recurrence Rate of the Martorell Ulcer: Experience in a Secondary Center

DG. Bernardini, S. Engelberger, P. Buntschu (Klinik für Allgemein-, Viszeral- und Gefäßschirurgie, Kanton Spital Baden, Baden)

Background: Ulcus Hypertonicus Martorell (UHM), known as hypertensive leg ulcer, poses significant challenges in surgical management due to chronic nature and relevant associated morbidity and mortality as typically a frail patient cohort is concerned. Little is known about the recurrence rate and possible treatment approaches to reduce it.

Aims: This study aims to analyze UHM's mortality and recurrence rate in a secondary health-care center to optimize patient outcomes.

Methods: A retrospective monocentric analysis included patients with histologically confirmed diagnosis of UHM. Primary endpoints were mortality and recurrence, while secondary endpoints were defined as the rate of non-complete healing, local infection (at the diagnosis and acquired during the follow up) and complications (myocardial, respiratory, renal and stroke).

Results: Eleven patients (median age 77 years old, 72% female) were included. After primary UHM excision, 72.7% of the cases had a local split skin graft reconstruction. The medium follow up was 24 months (1-84 months). The overall mortality rate was 27.3%, primarily due to respiratory infection and cardiac failure. The overall recurrence rate was 27.3%. Reintervention rates were 18.2%, 54.5%, 9.1% and 18.2% at 30 days, 6, 12 and 36 months, respectively. Non-complete healing rate was 45.5%. Local infection rate was 36.4% at the first UHM excision, 27.3% at 30 days and 18.2% at 6 months. Overall complications rates were 45.4%, 45.4%, 9.1%, 9.1% and 9.1% at 30 days, at 6, 12, 24 and 36 months correspondently.

Conclusion: Our study underlines the substantial mortality and recurrence rate associated with UHM, emphasising the need for multidisciplinary management and careful follow up. Further research is warranted to refine treatment approaches and recurrence prevention beyond blood pressure control and wound care.

What Does an Abdominal Vascular Aneurysm, Spondylodiscitis, Psoas Abscess and Coxiella Burnetti Have in Common? A Case Report of a Patient with Chronic Q-Fever

T. Schöb¹, V. Schoenborn², A. Cusini³, S. Hofer Strebel⁴ (¹Department of General Surgery, Cantonal Hospital Graubünden, 7000; ²Department of Trauma and Orthopedic Surgery, Cantonal Hospital Graubünden, 7000; ³Department of Infectiology, Cantonal Hospital Graubünden, 7000; ⁴Department of Vascular Surgery, Cantonal Hospital Graubünden, 7000)

Background: In rare cases vascular aneurysms can be infected with a consuming chronic granulomatous disease, such as tuberculosis or chronic q-fever caused by coxiella burnetti (CB). These patients show a vascular aneurysm with concomitant spondylodiscitis and psoas abscess.

Aims: Despite of the consensus in literature, that CB-infected aneurysm should be treated with open surgery, may an endovascular approach lead to successful treatment of this infection.

Methods: A 68-year-old patient with an abdominal aortic aneurysm monitored since 2007 underwent endovascular aortic repair (EVAR) in our clinic. The postoperative computed tomography (CT) showed an excluded aneurysm with a suspicious L-3 collection infiltrating the psoas major and being in touch to the dorsal aneurysm wall. The lesion was retrospectively noted in the preoperative CT. The patient reported a 20 kilograms weight loss without any signs of infection in the past years. The short-term postoperative course was uneventful and the patient discharged. A subsequent CT-guided biopsy tested negative for microorganisms and tumor.

Results: Four months later, the patient presented with sciatic and lower back pain with CRP elevation. A CT and magnetic resonance imaging were suspicious for spondylodiscitis, a CT-guided drain was placed. Blood serum analysis was positive for CB, antibiotic therapy was started. Percutaneous stabilization of L2-L5, decompression and debridement was performed. The material tested positive for CB. The patient was discharged with an 18-months antibiotic regimen with Doxycycline and Hydroxychloroquine. The 6 and 12 month CT-follow-up showed a shrinking aneurysm sac without infection signs of the prosthesis. Meanwhile the patient is feeling well and has no signs of infection.

Conclusion: Patients with arterial aneurysms are at risk for infections by CB. This case suggests that an endovascular approach with EVAR as bridging or definite solution with orthopedic debridement and long term antibiotic therapy can lead to successful treatment of the infection. Of course, further follow-up is needed.



Figure 1. Preoperative CT-scan

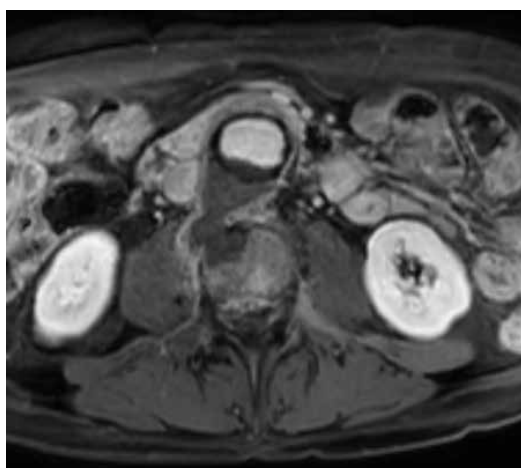


Figure 2. Spondylodiscitis of L4 vertebra

Post Colonoscopy Splenic Injury: A Case Report and Review

G. Mir (Hôpital Riviera Chablais, Lausanne)

Background: Bleeding and perforation are well documented, as common, serious complications of colonoscopy. Splenic injury is, however, an unfrequent and underreported but nonetheless threatening issue.

Aims: We illustrate a case of splenic trauma occurring after routine colonoscopy with particular emphasis on pre/intraoperative findings as well as management. A complete topic review is afterwards presented.

Methods: A case report.

Results: A 63-year-old female underwent a screening colonoscopy. The examination was described as difficult and prolonged, but a complete exploration was performed. A few hours later she presented with intense and abrupt abdominal pain located in the left upper quadrant and radiating to the shoulder.

The patient was thus rapidly transferred to our Emergency center; on initial evaluation blood pressure was 76/48 mmHg with a hemoglobin level of 120g/l. A CT scan revealed massive hemoperitoneum and a grade IV splenic laceration with signs of active bleeding. An immediate median exploratory laparotomy and splenectomy was performed. During surgical exploration, more than 3 Lt hemoperitoneum was found with signs of active, ongoing bleeding from the inferior aspect of the spleen as well as from a short gastric vein tear.

The post-operative course was marked by a segmental pulmonary embolism; the patient was then discharged on postoperative day 8.

Conclusion: A rare but important complication of colonoscopy that needs particular attention and emergent surgery management

Inside out: A Tricky Case of Appendicitis

J. M. Baumkirchner, S. Simões de Almeida, M. Aydin, P. Meyer, M. Zünd (Department of Surgery, Zuger Kantonsspital, Baar)

Background: Appendicitis and abdominal wall hernias are common pathologies in general surgery. A combination of both can be challenging to diagnose in the emergency setting.

Aims: A case report.

Methods: Case Report

An 87-year-old male was admitted to the emergency department with abdominal pain for one week. On physical examination, a painful mass could be palpated in the right lower quadrant, accompanied by local signs of inflammation. Blood tests showed elevated CRP and WBC levels. Due to cardiovascular comorbidities, the patient was on oral anticoagulant therapy. CT revealed a large fluid collection in the abdominal wall, primarily interpreted as infected hematoma. Surgical drainage was performed, unexpectedly releasing pus. The patient was put on antibiotics. During the following days, purulent discharge from the wound continued and the patient

showed signs of sepsis. Abdominal CT was repeated, revealing acute appendicitis inside a Spigelian hernia. The patient was taken back to the operating room. After reduction of the hernia, laparoscopic appendectomy was performed uneventfully. Additionally, open debridement of the abdominal wall was carried out, leading to secondary closure of the wound after one week.

Results/Discussion: Spigelian hernias account for merely 1–2% of all ventral hernias. They are exceptionally hard to diagnose due to their ambiguous presentation and a lack of clinical findings at an early stage. Risk of incarceration is high, caused by a typically small orifice in the Spigelian fascia. However, only a few cases of incarcerated appendices have been reported so far, making this combination an extremely rare cause of abdominal wall abscesses.

Conclusion: Appendicitis inside a hernia can lead to exotic clinical and radiological presentations that are easy to misdiagnose. Incarcerated Spigelian hernias should always be considered as a differential diagnosis in patients with treatment-resistant abdominal wall abscesses.

Large Morgagni Hernia in an Adult Patient with Trisomy 21

M. L. Lüthy, Y. Fringeli, S. A. Käser (Chirurgie, Bürgerspital Solothurn, Solothurn)

Background: Diaphragmatic hernia is defined by a protrusion of a hernia sac and abdominal organs into the chest through a diaphragmatic defect. Congenital diaphragmatic hernia are believed to be caused by a developmental impaired closure of the pleuroperitoneal folds. Currently, nearly all are diagnosed during the perinatal period or childhood. Clinical presentation ranges from asymptomatic patients to serious respiratory, cardiac and gastrointestinal symptoms depending on the size of the hernia. The most common location of congenital diaphragmatic hernia is posterolateral (Bochdalek hernia, 70–75%), followed by anterior (Morgagni hernia, (23–28%) and central (2–7%).

Aims: To discuss the diagnosis and repair of a rare diaphragmatic hernia.

Methods: We report a case of Morgagni hernia.

Results: A 44-year-old female patient with trisomy 21 presented on the emergency department with a 4 day history of cough and progressive dyspnoea. Clinically, the patient presented with obstructive inspiratory and expiratory breath sounds. Laboratory findings showed an elevated CRP (184 mg/l). The computed tomography of the chest revealed a herniation of the right colonic flexure and small bowel into the right hemithorax with compression of the lung and shifting of the mediastinum (Figure 1). A bilateral pneumonia was concomitantly diagnosed. Antibiotic therapy was immediately started and the patient was intubated due to respiratory insufficiency. One day later surgery was performed. Through an open abdominal access, the content of the hernia was replaced into the abdomen, the complete hernia sac was resected, and the diaphragmatic defect closed with a non-absorbable suture reinforced by a large pre-peritoneal mesh. After surgery the right lung showed full expansion and the patient had an uneventful course.

Conclusion: Late presenting congenital diaphragmatic hernia in adulthood can be a life-threatening condition and is treated by surgical repair.

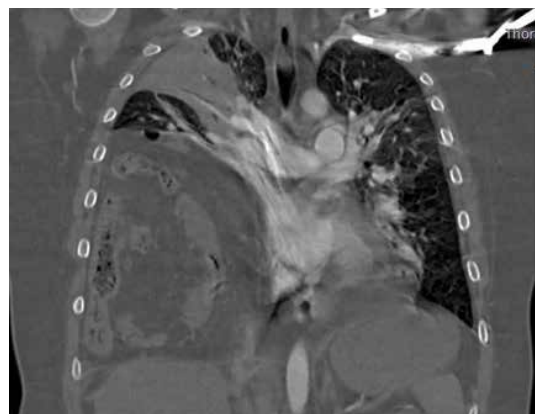


Figure 1. Computed tomography of the chest (coronal view) showing a large herniation of abdominal organs into the chest with compression of the right lung

Spontaneous Perforation of Urinary Bladder on Hereditary Haemorrhagic Telangiectasia (Osler-Weber-Rendu syndrome): A case report

S. Gussago¹, V. Massimo², J. Douissard¹, J. T. Costa Dos Santos², E. Liot¹ (¹Department of Visceral Surgery, Geneva University Hospitals, Geneva IT; ²Department of Urology, Geneva University Hospital, Geneva)

Background: Spontaneous rupture of urinary bladder (SRUB) is a rare condition with no standard of care and significant related morbidity and mortality. Although multiple causes (tumors, cystitis, excessive alcohol consumption, bladder outlet obstruction) including connective tissue disorders have been described, we report the rare association of SRUB and Osler-Weber-Rendu disease.

Aims: A 60-year-old woman, known for Osler-Weber-Rendu disease, 3 previous C-sections and a hystero-annexectomy for benign disease, complains of lower abdominal pain for 4 hours earlier associated with mild dysuria. Blood tests detect no inflammation. Urinalysis shows moderate leukocyturia (24 M/I) without clear erythrocyturia. Free intra-peritoneal fluid is detected on the contrast enhanced CT scan. Exploratory laparoscopy is therefore deemed.

Methods: Exploration reveals moderate clear ascites. A fluid sample found elevated creatinine (1101 µmol/l). After minimal adhesiolysis a perforation of about 1.5 cm of the bladder dome

was found. After margin resection, defect was closed using 3.0 interrupted absorbable suture. Pathology report describes partially abraded squamous mucosa with fibrous changes in the chorion and underlying musculature. A Foley catheter and a surgical drain were left, the latter removed on the third postoperative day, and the patient discharged the same day.

Results: Foley's catheter was removed at day 12, after cystography control. A six-week later cystoscopy found an inflammatory lesion of the bladder dome, compatible with the healing process, associated with 3 other inflammatory lesions.

Conclusion: SRUB is a rare disease associated with morbidity and mortality. Diagnosis is often challenging because signs and symptoms are non specific, particularly at urinary tract. To our knowledge, although association with connective tissue disorders has been described, this represents the first report of an association of spontaneous bladder perforation and Osler-Weber-Rendu disease.



Figure 1. Pre-operative CT image

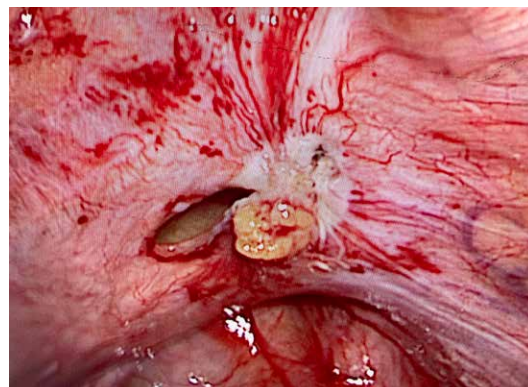


Figure 2. Intra-operative perforation

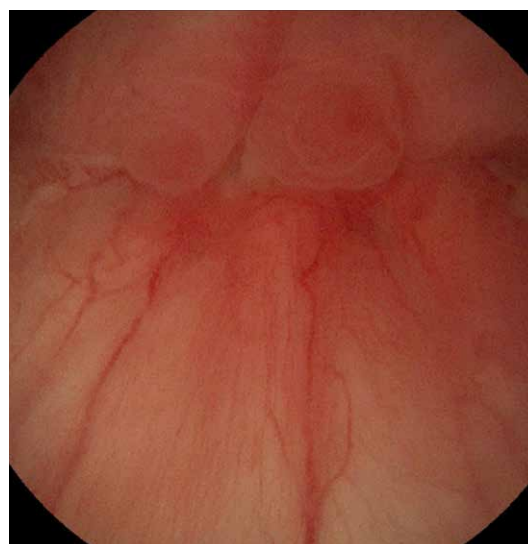


Figure 3. Post-operative cystoscopy (healing perforation)

Surgical Management of Acute Small Bowel Occlusion due to a Suspected Neuroendocrine Tumor

M. Matter¹, F. Cherbanyk¹, M. Burgard², B. Egger¹ (¹Chirurgie Générale, HFR-Fribourg, Fribourg; ²Chirurgie Viscérale, HUG-Genève, Geneva)

Background: Neuroendocrine tumors of the small bowel (SB-NET) have an increasing incidence of up to 1.3 cases/100'000 worldwide. SB-NET's are usually small and slowly growing tumors, leading often to delayed diagnosis. Regional lymph node (LN) and/or distant metastasis

ses are frequent. Treatment consists mainly of radical resection of the primary tumor together with mesenteric LN dissection (MLND). Specific management guidelines in emergency situations are lacking.

Aims: To describe the feasibility and safety of MLND with resection of SB-NET in an emergency setting.

Methods: A 61-year-old male patient presented with vomiting and clinical signs of an acute abdomen. CT scan revealed a SB bowel ileus with a hyper-vascularized mass in the ileum, suggestive for an occlusive SB-NET.

Results: Exploratory laparotomy confirmed a large obstructing nodule in the middle ileum together with another 7 nodules within a 140cm long proximal SB-segment. No other lesions were detected. A 140cm segmental SB-resection with central MLND up to the superior mesenteric vessel root was performed together with prophylactic cholecystectomy and appendectomy. Adequate perfusion of the remaining SB was assessed by indocyanine green fluoroscopy. Histopathology confirmed 14 nodules of a well differentiated SB-NET in the SB together with 2 LN-metastases out of 18 resected LN. Somatostatin receptor subtyp 2A was expressed in 40% of tumor cells on immunohistochemistry. Complementary 68Ga-DOTATATE PET-CT did not prove any other lesions. The postoperative follow-up was uneventful.

Conclusion: If SB-NET is suspected, MLND should be performed at the initial intervention, even in an emergency setting. Careful palpation of the entire SB is mandatory since multifocal SB-NET occur in up to 50% of patients. In cases where the diagnosis is not at all clear and no quick cut diagnosis is possible, early re-operation with MLND has to be performed after diagnosis, even when 68Ga-DOTATATE PET-CT is negative (micro-metastases).

Case report: Salvage Surgery for Recurrent Main Pulmonary Artery Sarcoma

B. Battilana¹, H. Etienne¹, M. Brown², I. Tudorache³, M. Schmiady³, I. Schmitt-Opitz¹ (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich; ²Department of Oncology, University Hospital Zurich, Zurich; ³Department of Cardiac Surgery, University Hospital Zurich, Zurich)

Background: Pulmonary artery sarcomas (PAS) are rare and carry a poor prognosis. We present the case of salvage surgery for PAS recurrence with symptomatic outflow track near occlusion after multimodality treatment.

Aims: A case report.

Methods: A case report.

Results: A 48 year old female patient was admitted for PAS recurrence. Two years prior, she had a bilateral pulmonary tumor endarterectomy, under moderate hypothermia and circulatory arrest, followed by adjuvant chemotherapy. Due to an intracerebral metastasis the patient then underwent a craniotomy for intracerebral tumor resection. Following the surgery the patient underwent radiotherapy of the resection cavity. Due to multiple recurrent metastasis in the left medial frontal gyrus two more resections had to be performed through re-craniotomies. Two-year follow-up PET-CT showed a significant stenosis of the pulmonary artery trunk by a recurrent tumor mass which extended to the right ventricle, causing significant outflow obstruction. Multidisciplinary tumor board opted for salvage surgery. An extensive tumor resection including the pulmonary artery trunk and the pulmonary valve was followed by replacement using an allograft composed of a pulmonary valve with a pulmonary artery conduit. Postoperative course was uneventful and the patient was discharged 9 days after surgery to a rehabilitation center. Four months follow-up found no recurrence on the pulmonary artery trunk: but palliative care was initiated because of progressive cerebral metastasis. The patient later on died at the age of 49 in hospice care.

Conclusion: Salvage surgery for PAS recurrence is feasible in expert centers where close collaborations between thoracic and cardiac surgeons is possible. Potential benefits of such extensive surgery needs to be balanced with the patients' life expectancy and quality of life, which are conditioned by presence of metastases.

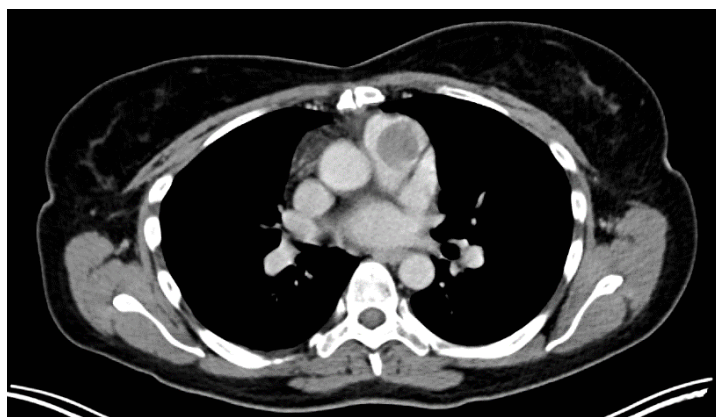


Figure 1. Pre-operative CT scan showing the PAS reaching into the right ventricle

Strangulated Small Bowel Volvulus within a Right Paraduodenal Hernia: Case Report of a Rare Cause Small Bowel Obstruction and Review of the Literature

F. Gobet, A. Litschinko, B. Egger (Hôpital Cantonal Fribourg, Fribourg)

Background: Paraduodenal hernias (PdH) are rare congenital internal hernias caused by abnormal rotation of the midgut during fetal development. Paradoxically, they are the most common type of internal hernia. They are a major contributor to small bowel obstruction in adults

and have the potential for serious complications such as volvulus with ischemia or complete small bowel occlusion.

Aims: This report not only presents a case of a strangulated small bowel volvulus within a right PdH, but also provides a comprehensive literature review to highlight the clinical presentation, diagnostic challenges and management. This dual approach aims to enhance clinicians' awareness of this rare entity and emphasize the need to consider PdH in the differential diagnoses of intestinal obstructions.

Methods: We describe a case of 46-years-old male with symptoms suggestive of small bowel obstruction. Initial imaging was inadequate to identify the cause. Subsequent CT-imaging revealed a small bowel volvulus within a right PdH. The review analyzes the existing literature on PdH and compares diagnostic and management strategies.

Results: Surgical exploration by laparotomy confirmed the PdH with strangulated small bowel volvulus. The hernia was repaired without the need of small bowel resection. The patient recovered well, underlining the efficacy of prompt and appropriate surgical intervention. The literature review highlights the critical diagnostic and therapeutic challenges in the management of small bowel volvulus within a right PdH and highlights the need for increased clinical awareness and timely intervention. Most cases are treated by laparotomy, however, some authors recommend a laparoscopic approach in selected cases.

Conclusion: Paraduodenal hernias are crucial in small bowel obstructions. This case in conjunction with a literature review emphasizes the importance of high clinical suspicion and thorough diagnostic procedures in atypical intestinal obstructions.

Robotic-Assisted Resection of a Large Intrathoracic Sympathetic Chain Schwannoma

S. Erne¹, S. Hillinger¹, D. Schneiter¹, R. S. Werner¹, C. Baron², I. Opitz¹, S. Schwarz¹ (¹Thoracic Surgery, University Hospital Zurich, Zurich; ²Visceral Surgery and Transplantation, University Hospital Zurich, Zurich)

Background: In the posterior mediastinum, schwannomas are the most common nerve sheath tumors. While the majority of all patients are asymptomatic, symptoms usually occur in large lesions and greatly depend on the location. The resection of schwannoma is generally recommended since they can lead to a relevant mass effect and due to the potential for malignant transformation.

Aims: We aim to report the case of a large intrathoracic schwannoma that was resected by robotic-assisted thoracic surgery (RATS).

Methods: We report the case of a 45-year-old male patient presented to his general practitioner with clinical features of Horner's syndrome. Upon magnetic resonance imaging, a large (7.0 x 6.5 cm), heterogeneously enhancing mass with neuroforaminal extension (Th1/2 and Th2/3) was discovered in the left upper hemithorax. A computed-tomography guided biopsy was performed and showed a S100-positive spindle cell neoplasm with no features of malignancy, favoring schwannoma. After multidisciplinary sarcoma board discussion, resection was recommended.

Results: We performed a robotic-assisted thoracoscopic resection of the schwannoma using a 5-port access. The tumor's capsule was densely adherent to the parietal pleura and the tumor resection was performed extrapleurally. For the complete resection, the subclavian and carotid arteries were dissected. The tumor was found to be originating from the sympathetic chain and was excised along with part of the nerve. Upon pathological evaluation, a 7.8 cm measuring schwannoma with no features of malignancy was reported. The patient made an uneventful postoperative recovery and was discharged at the third postoperative day. The Horner's syndrome persisted during clinical follow-up.

Conclusion: The sympathetic chain is a rare origin of intrathoracic schwannomas. Their resection by robotic-assisted thoracic surgery is safe and feasible.

Giant Sclerosing Hepatic Hemangioma Presenting as Bornman-Terblanche-Blumgart Syndrome (BTBS): A Case Report

H. Youssef, N. Fournier, L. Gamble, I. Fournier (General Surgery, Hôpital du Valais)

Background: Hepatic hemangioma (HH) represents the most common benign tumour of the liver, and is most frequently localized in the right lobe. It is formed by clusters of vascular malformations and receives its blood supply from the hepatic artery. The prevalence of HH is estimated between 0.4-20% in autopsy studies. When the tumour exceeds 10cm, in some studies 5cm, it is considered as a giant hemangioma, accounting for 10% of all hemangiomas arising from the liver. The diagnosis is often made fortuitously in asymptomatic patients. Rarely patients are symptomatic and present with right upper quadrant (RUQ) pain and, in very rare cases, can present with complications in the form of BTBS, associated with chronic fever, abdominal pain, weight loss and asthenia. Sclerosing HH, in particular, is an exceedingly rare subtype of hemangioma characterized by the presence of degenerative changes histologically. The ongoing inflammatory process within the hemangioma cavity is the cause of the clinical features of BTBS that require surgical intervention.

Aims: To contribute to the literature by documenting a case of diagnosis and surgical management of a giant sclerosing hemangioma presenting with BTBS, diagnosed in a 43 year old woman, along with a brief review of the literature.

Methods: Case report, and short review of the literature, of HH and BTBS with a description on how to make this challenging diagnosis and the surgical management.

Results: BTBS is one of the complications of a HH that has been rarely addressed in the literature. The current case report documents rare clinical and histological features of a complicated HH along with its surgical management. Diagnostic imaging is carried out by an abdominal CT for the HH, and can be completed by hepatic MRI if a BTBS is suspected. Histologically features of sclerosis are found.

Conclusion: Knowledge about the uncommon complications of HH and BTBS permits the implementation of appropriate investigation, diagnostic imaging and intervention in a timely manner and greatly improves the management and quality of life of patients presenting with this syndrome.

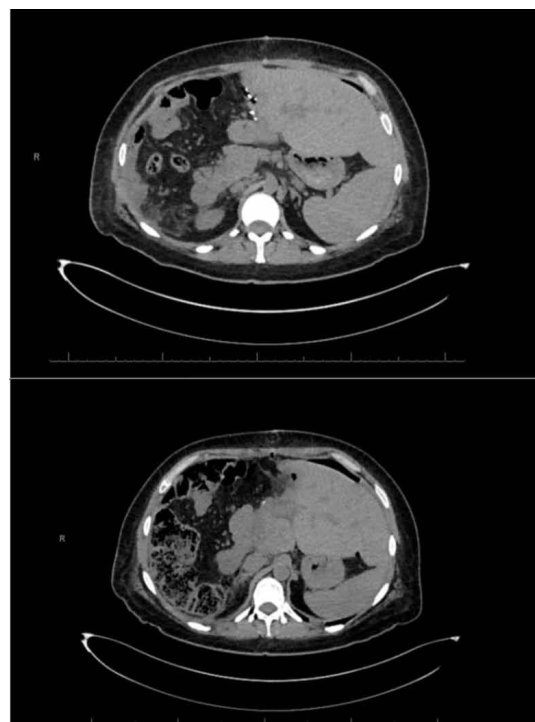


Figure 1

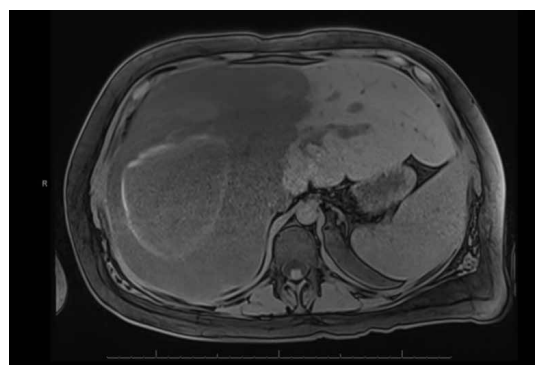


Figure 2



Figure 3. Hernia sac

Is Conservative Management Safe for Mesenteric Venous Ischemia? Two Case reports

F. Latinis¹, B. Matos Santos¹, C. R. Scarpa¹, S. Barelli² (¹Département de chirurgie, EHN V Yverdon, Yverdon-les-Bains; ²Département de médecine, EHN V Yverdon, Yverdon-les-Bains)

Background: Acute venous mesenteric ischemia (AVMI) secondary to porto-mesenteric thrombosis is a rare yet life-threatening condition. Owing to its lack of specific symptoms and subtle clinical signs, a high level of suspicion is required. Enhanced-computed tomography (E-CT) of the abdomen is highly accurate for the diagnose.

Aims: We aim to describe two case report of AVMI and raise awareness of possible late perforation.

Methods: The first case is a 76-years-old female patient who presented with a 3-day history of abdominal, with multiples episodes of vomiting and bloody diarrhea. E-CT revealed a jejunal venous ischemia with lack of bowel wall enhancement and free fluid, due to extended porto-mesenteric thrombosis.

The second patient is a 45-years-old male who presented with a 10-day history of abdominal

pain. E-CT demonstrated an ileal ischemia due to porto-mesenteric thrombosis. In both patient, conservative treatment was started with therapeutic anticoagulation, intravenous antibiotic therapy and bowel rest. They were monitored in the intensive care unit for 48h. **Results:** The first patient improved and had no further complication. The second patient came back in the emergency department twenty days after the first admission, due to the sudden onset of pain. E-CT revealed a covered perforation concerning the previous ischemic small bowel loop. He was immediately brought to the operating room for an exploratory laparotomy where a segmental bowel resection was performed. He had a favorable outcome and was discharged at day 4 post-operative.

Conclusion: AVMI is a rare and unknown diagnosis. Early recognition is essential to initiate prompt treatment. In contrast to arterial mesenteric ischemia, which requires an immediate surgical or interventional radiology interventions, conservative management is a feasible option for this condition but need a close follow up. Unfortunately, late perforation can occur and should be immediately reconized.

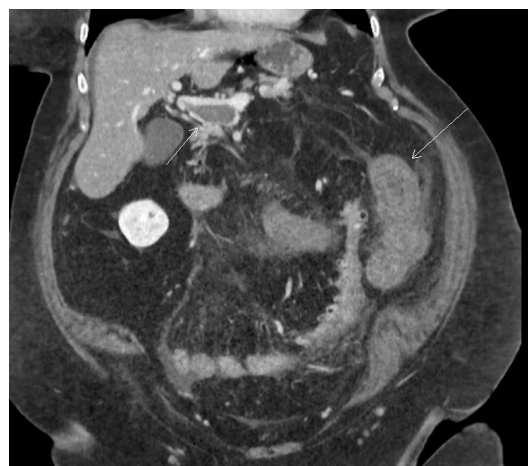


Figure 1. First patient, initial presentation



Figure 2. Second patient, perforation at D+20

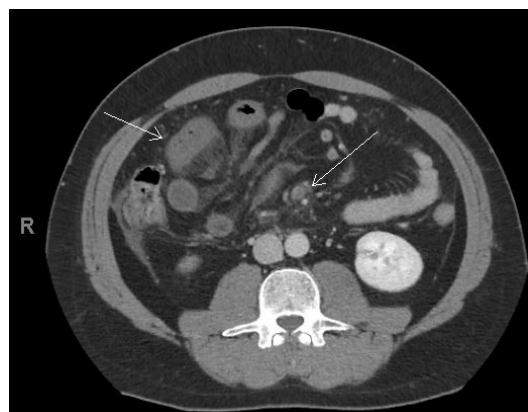


Figure 3. Second patient, initial presentation

A Rare Case of a Small Inferior Lumbar Hernia Initially Misdiagnosed as Subcutaneous Lipoma, Treated with a Mesh Plug Hernioplasty

D. D. Lecoultre, A. Bingisser, U. Derungs, E. Angst (Department of Surgery, Cantonal Hospital Glarus, Glarus)

Background: Lumbar hernias are a rare form of posterior abdominal wall hernia, most common in patients aged 50 to 70 years, with a male predominance. Barbette was the first that suggested the Existence of lumbar hernias in 1672. In 1731, Garangeot reported the first case. The aetiology include congenital (20%) as well as primary acquired (55%) and secondary

acquired (25%) lumbar hernias. There are two types of lumbar hernias described, according to the anatomical location of the hernial neck: the superior lumbar hernia also known as Grynfeltt-Lesshaft hernia and the inferior lumbar hernia also known as Petit hernia. Literature review showed that the most common type is the superior lumbar hernia.

Aims: We report the case of a 66-year-old, overweight male presenting with a small inferior lumbar hernia, initially misdiagnosed as a subcutaneous lipoma. The patient presented with an exacerbated and immobilizing paravertebral lumbar pain as well as a recurrence of deep vein thrombosis despite ongoing oral anticoagulation. The patient initially received pain killer treatment and physiotherapy as well as a change of oral anticoagulant.

Methods: Radiologically, a spinal fracture was ruled out. The lack of treatment response prompted an ultrasound examination, the results of which suggested a diagnosis of subcutaneous lipoma. An outpatient follow-up CT-graphic examination resulted in the diagnosis of a small, symptomatic inferior lumbar hernia with a fascial gap under 1 cm and the decision for a surgical intervention was made.

Results: Due to the recurrence of deep vein thrombosis, the surgical intervention was postponed for 3 months. Then he underwent open approach surgery with a simple and effective mesh plug hernioplasty of inferior lumbar hernia. Subsequently, the patient recovered well without any complications.

Conclusion: A laparoscopic approach was discussed but rejected due to the small fascial gap. This case demonstrates the need to tailor the surgical approach to the individual patient.

Lipiodol® Lymphangiography as a Treatment for Post-Operative Chylous Ascites: A Retrospective Single-Centre Study

A. Litchinko, B. Egger, E. Monnard, C. Tappero (Hopital Cantonal de Fribourg, Fribourg)

Background: Chylous ascites, characterized by the accumulation of lymphatic fluid in the peritoneal cavity, presents significant management challenges due to the lack of standardized treatment protocols.

Aims: This retrospective study aims to evaluate the efficiency and safety of Lipiodol® lymphangiography as percutaneous minimal-invasive intervention in the management of post-operative development of chylous ascites, offering insights into potential standardized treatment protocols.

Methods: We conducted a retrospective review of medical records of four patients developing post-operative chylous ascites at our institution between 2017 and 2023. Three patients had oncological pancreaticoduodenectomy and one had right hemicolectomy with complete mesocolic excision (CME). All patients developed significant post-operative chylous ascites due to radical lymphadenectomy, confirmed by triglyceride dosage and refractory to conservative treatment. The study focused on various aspects: the etiology of chylous ascites, previous conservative management attempts, detailed procedural techniques, and the outcomes of the interventions.

Results: All patients underwent finally percutaneous interventional management with Lipiodol® injection into inguinal lymph nodes. Glue embolization would have been provided in cases where a visible leak was discovered. However, no visible leaks were detected during procedure. Therefore, lymphangiography alone was successful to stop leaking chyle in all patients after first attempt. This may be explained by the viscosity of Lipiodol® contributing already to embolization of the leaks. Furthermore, no complications were reported within 30 days post-procedure.

Conclusion: Our findings suggest that Lipiodol® lymphangiography is safe and effective in treating post-operative refractory chylous ascites. This offers an effective minimal-invasive alternative to traditional surgical approaches. Nonetheless, complex cases may require referral to specialized centers equipped with advanced resources and expertise. This study contributes to the growing body of knowledge of a minimal-invasive intervention in refractory chylous ascites and underscores the need for standardized treatment guidelines.

Strangulated Small Bowel Volvulus within a Right Paraduodenal Hernia: Case Report of a Rare Cause Small Bowel Obstruction and Review of the Literature

A. Litchinko, B. Egger, F. Gobet (Hopital Cantonal de Fribourg, Fribourg)

Background: Paraduodenal hernias (PdH) are rare congenital internal hernias caused by abnormal rotation of the midgut during fetal development. Paradoxically, they are the most common type of internal hernia. They are a major contributor to small bowel obstruction in adults and have the potential for serious complications such as volvulus with ischemia or complete small bowel occlusion.

Aims: This report not only presents a case of a strangulated small bowel volvulus within a right PdH, but also provides a comprehensive literature review to highlight the clinical presentation, diagnostic challenges and management. This dual approach aims to enhance clinicians' awareness of this rare entity and emphasize the need to consider PdH in the differential diagnoses of intestinal obstructions.

Methods: We describe a case of 46-years-old male with symptoms suggestive of small bowel obstruction. Initial imaging was inadequate to identify the cause. Subsequent CT-imaging revealed a small bowel volvulus within a right PdH. The review analyzes the existing literature on PdH and compares diagnostic and management strategies.

Results:

Surgical exploration by laparotomy confirmed the PdH with strangulated small bowel volvulus. The hernia was repaired without the need of small bowel resection. The patient recovered well, underlining the efficacy of prompt and appropriate surgical intervention. The literature review highlights the critical diagnostic and therapeutic challenges in the management of small bowel volvulus within a right PdH and highlights the need for increased clinical awareness and

timely intervention. Most cases are treated by laparotomy, however, some authors recommend a laparoscopic approach in selected cases.

Conclusion: Paraduodenal hernias are crucial in small bowel obstructions. This case in conjunction with a literature review emphasizes the importance of high clinical suspicion and thorough diagnostic procedures in atypical intestinal obstructions.

Treatment of a Huge Inguinoscrotal Hernia with "Loss of Domain"

M. Blaga¹, M. Leimgruber², S. Käser¹ (¹Chirurgie, Bürgerspital Solothurn, Solothurn; ²Chirurgie, Chirurgiezentrum Solothurn, Solothurn)

Background: Hernias are the most common surgical condition encountered by primary care physicians. However, giant inguinoscrotal hernias are rare and pose a challenging postoperative problem because reduction of the hernia contents inside the abdominal cavity may increase intra-abdominal and thoracic pressures. We describe a simple reduction with orchiectomy and mesh repair, without bowel resection, as a viable technique in a giant left inguinoscrotal hernia that extended to the patient's knees with complete loss of Domain containing entire omentum, small and large bowel, and the appendix.

Aims: A 57-year old patient presented with a symptomatic, irreducible, giant left inguinoscrotal hernia for 30 years. Computed tomography revealed a large-volume inguinoscrotal hernia containing a large part of the colon and small intestine. A preoperative cardiac and pulmonary evaluation was unremarkable. The primary method that we sought was the Lichtenstein's hernia repair. However a Consent including left orchiectomy and laparotomy with bowel resection was obtained.

Methods: Intraoperatively a large incision over the left inguinal ligament was made. Blunt mobilization of the hernial sac along the entire circumference and distally towards the scrotum. Because of strong adhesions between the spermatic cord and the hernial sac, a orchiectomy was performed. A sliding indirect hernia was identified. In Trendelenburg Position it was possible to reduce the entire abdominal content. The posterior wall of the inguinal canal was reconstructed and a tension-free mesh was inserted. A drain was placed. The remained scrotal skin was not resected.

Results: The postoperative course was unremarkable and the patient was discharged on the third postoperative day.

Conclusion: Giant inguinoscrotal hernias are rare with challenging postoperative complications due to increase intra-abdominal and thoracic pressure. Therefore, patients undergoing elective herniorrhaphy should go to a thorough preoperatively cardiorespiratory evaluation.



Figure 1. CT Bild



Figure 2. CT-Scout

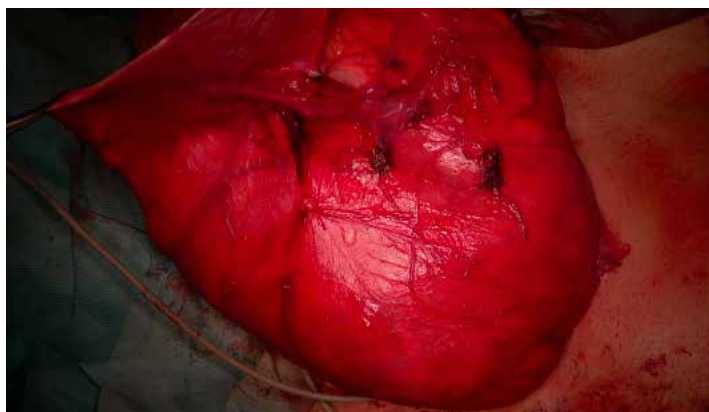


Figure 3. Herniasac



Figure 4. Hernia

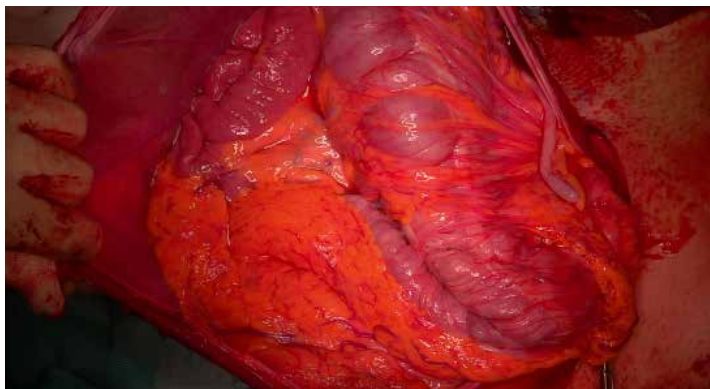


Figure 5. Hernia sac content



Figure 6. Preoperative

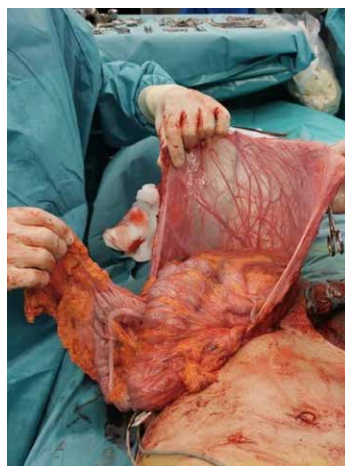


Figure 7. Hernia sac content



Figure 8. Mesh

Case Report of a Double Plate Two Level Open Reduction Internal Fixation (ORIF) of a Trimalleolar Fracture and Insufficient Tibial Plateau Fracture with Immediately Protected Full Weight Bearing (IWB) by a Noncompliant Alcoholic

J. Brtek, R. Schürch, J. Paione, A. Browa (Chirurgie, Spital Lachen, Lachen)

Background: A trimalleolar fracture involves the lateral malleolus, medial malleolus and the distal posterior aspect of the tibia. The trauma is often accompanied by syndesmotic injury. Surgical repair using ORIF is generally required because the ankle cannot bear any weight while the bone knits. Postoperative full weight bearing usually begins after the fractures have started to heal and a cast has been removed. This process typically takes six weeks for a healthy person.

Aims: This case aims to show that an immediately protected full weight bearing due to non-compliance by a severely compromised patient after double plate ORIF is possible.

Methods: We present a 73-year-old male with chronic alcohol consumption, diabetes mellitus type II, advanced atherosclerosis and cardiac surgery two years ago. A two-level injury; a dislocated trimalleolar fracture with a syndesmotic injury and insufficient fracture of the medial tibial plateau, states poor clinical outcome with the nonsurgical therapy. The traditional surgical treatment would be single plate lateral malleolus ORIF with two threaded screws for the medial malleolus with one or two syndesmotic screws. However, due to the malcompliance, we performed the double plate ORIF on the lateral malleolus, single plate ORIF plus tension-band wiring on the medial malleolus with four tibiofibular positioning screws. The medial tibial plateau fracture was fixed with a single locking compression plate. IWB in a walking boot immediately after the surgery was implemented.

Results: Despite the low pre-operative odds such as malnourishment, noncompliance and reduced bone stock the clinical and radiological follow-ups are showing very satisfactory results. A radiological scan 6 weeks after the operation confirmed a persisting anatomical reconstruction.

Conclusion: Our case showed that the double plate ORIF with more than the two tibiofibular positioning screws and IWB by polymorbid patients could be a viable option. Randomized controlled trials comparing single vs. double plate ORIF with IWB are needed.



Figure 1. Rx OSG preop



Figure 2. Rx OSG ap postop



Figure 3. Knie ap 12.01.24

Spread Through Air Spaces (STAS): A Growing Clinical Challenge in Resectable Early-Stage Non-Small Cell Lung Cancer

C. Baron, S. Erne, R. Werner, S. Stefan, S. Hillinger, D. Schreiner, I. Opitz (Thoracic Surgery, University Hospital Zurich, Zurich)

Background: In non-small cell lung cancer (NSCLC), spread through air spaces (STAS) is a relatively novel concept describing an infiltration of cancer cells within air spaces beyond the borders of the main tumor. Previous studies have demonstrated a significantly increased risk of locoregional recurrence in STAS-positive NSCLC and lobectomy is therefore recommended over sublobar resection also in T1 tumors.

Aims: We aim to report the challenge in the management of STAS-positive early-stage NSCLC based on two clinical cases.

Methods: We report the cases of two patients who underwent sublobar resection for clinical T1 NO MO NSCLC. Patient 1 is an 80-year-old female patient with good performance status and sufficient functional reserve who underwent robotic-assisted left S6 segmentectomy and systematic mediastinal lymphadenectomy.

Patient 2 is a 57-year-old male patient with chronic obstructive pulmonary disease who underwent video-assisted thoracoscopic S1+3 segmentectomy and mediastinal lymphadenectomy. In both patients, the intraoperative frozen section revealed an adenocarcinoma, but STAS was not detected. Due to the size of the primary tumor and the absence of signs of hilar or mediastinal lymph node metastases, we decided not to proceed to lobectomy.

Results: In both patients, the definitive pathological analysis revealed a poorly differentiated early stage adenocarcinoma (TNM stage, 8th edition: pT1b pNO cMO) without signs of angioinvasion. However, STAS was present in both specimens. After discussion at the multidisciplinary tumor board, a completion lobectomy was recommended for both patients.

Conclusion: During intraoperative frozen section, STAS is often underdiagnosed in early-stage NSCLC. Thoracic surgeons should therefore be aware of this clinical challenge and explicitly ask for signs of STAS when receiving the frozen section report. In addition, further research is required for a fast and intraoperative detection of STAS to increase the learning curve.

Consequences of COVID-19 on the Epidemiology of Child Burns in Lausanne: A Retrospective Observational Study

M. Avoyer¹, A. de Buys Roessingh² (¹Pully; ²Pediatric surgery, CHUV, Lausanne)

Background: In most cases pediatric burns are domestic accidents and occur in the presence of the parents. In 2020, schools were closed from March 13 to May 11 due to COVID-19 pandemic. Parents also spent more time home due to telecommuting and travel restrictions.

Aims: The purpose of this study is to determine whether this period of school closure and, consequently, the increase in children's home time with their parents, had an influence on the occurrence of pediatric burns.

Methods: Patients under 18 years old who visited the CHUV for burns during the period between March 13 and May 11 of 2020, 2019, 2018 and 2017 were included. They were separated into a COVID-19 group (2020) and a pre-COVID-19 group (2017-2018-2019) for comparison. We collected the children's age and sex, the mechanism, localization and depth of the burn, the percentage of body surface area burned, the need for hospitalization or skin graft, the place of occurrence, whether an adult was present, and the time from burn to consultation.

Results: 97 patients aged from 4 months to 17 years were included. Statistical analyses showed no significant differences. However, in the COVID-19 group, there was a higher proportion of boys, contact burns and lower limb burns, and a lower proportion of hospitalizations and burns involving the face and neck. Patient ages and burn severity were similar. We highlighted that some information was often missing in the consultations report, such as the place of occurrence, the presence of an adult and the time from burn to consultation.

Conclusion: Other studies that have looked at the impact of the lockdown on the epidemiology of childhood burns show highly variable results. We wanted to insist on the importance of fully documenting the report of a burned child and of systematically looking for signs that may raise suspicion of abuse.

Exploring the Anatomy of the Piriformis Muscle: A Comprehensive Study Using MRI, Ultrasound and Dissection

I. Ilavsky¹, S. Major Schumacher¹, A. Larionov¹, F. Schmaranzer², B. Jung³ (¹Anatomy, University of Fribourg, Fribourg; ²Radiology, Uniklinik Balgrist, Zürich; ³Diagnostic, Interventional and Paediatric Radiology (DIPR), Inselspital, Universitätsspital Bern, Bern)

Background: Our previously published anatomy study describes different variations in the origin of the piriformis muscle around the second and third anterior foramen of the sacrum. The most common variation is located medially to the foramen. Whereby, the ventral branches of the sacral spinal nerves may be entrapped, potentially leading to corresponding piriformis and pelvic pain syndromes.

Aims: The present study investigates the use of ultrasound and magnetic resonance imaging (MRI) to visualize the origin of the piriformis muscle and associated structures. Subsequently, the study compares the imaging findings obtained with those derived from anatomical dissection.

Methods: For this study, Thiel-embalmed bodies (3 female and 1 male) were used. Ultrasound and MRI were employed as imaging techniques. Additionally, anatomical dissection was conducted to facilitate a comparative analysis.

Results: Ultrasound imaging proved unfeasible as the structures of interest are located too deep within the pelvis. Thiel-embalming makes MRI investigation difficult because of different ion-water distribution in the body. However, despite these challenges, good resolution of the

structures of interest was achieved, making it possible to compare the MRI images with the results of the dissection. This approach facilitated the identification of the relationship between the sacral nerves and the piriformis muscle, particularly in reference to the ventral origin of the piriformis muscle.

Conclusion: MRI is a recommendable approach for investigating the potential entrapment of the ventral branches of the sacral spinal nerves in cases involving the piriformis muscle in pelvic pain syndrome.

Heterotopic Pancreas in the Stomach Wall

A. Lammer, L. Braschler, Y. Fringeli, A. Ringger, S. A. Käser (Klinik für Allgemein-, Viszeral-, Plastische, Thorax- & Gefässchirurgie, Bürgerspital Solothurn, Solothurn)

Background: Heterotopic pancreas is a rare finding defined as pancreatic tissue without any anatomic or vascular connection to the normally localized pancreas. Most frequently found in the stomach, duodenum or proximal jejunum, it is usually asymptomatic but can cause abdominal pain, gastrointestinal bleeding, ulceration, pancreatitis, and gastric outlet obstruction. Diagnosis and distinction from neoplasms can be challenging. Therapeutic management should consider existing symptoms as well as potential malignancy. Endoscopic removal of heterotopic pancreas is feasible, but surgical resection is advisable in individual cases to achieve complete resection.

Aims: To raise awareness on an infrequent pathology and discuss its clinical significance and therapeutic options.

Methods: We report a case of incidental gastric heterotopic pancreas in the context of recurrent episodes of acute pancreatitis.

Results: A 41-year-old female patient suffering from recurrent epigastric pain was treated at our institution for three episodes of acute interstitial pancreatitis within one year. She had a history of daily alcohol consumption currently suspended for 6 months. After the second episode, diagnostics showed an acute calculous cholecystitis and a laparoscopic cholecystectomy was performed, yet three months later a third episode of pancreatitis occurred. The patient underwent endosonographic follow-up for peripancreatic cystic formations, which confirmed early signs of chronic pancreatitis and incidentally revealed a polypoid tumor in the antrum (Figure 1). After an unsuccessful attempt of endoscopic removal, it was resected by gastroscopy-guided laparoscopic wedge-resection of the antrum with an uneventful postoperative course (Figure 2). Histopathologic analysis revealed heterotopic pancreas with dilated pancreatic ducts containing concretions and erosive inflammation (Figure 3). Despite complete resection of the heterotopic pancreatic tissue, the patient continued to suffer from recurrent episodes of pancreatitis.

Conclusion: Although rare, heterotopic pancreas belongs to the differential diagnosis of gastric tumors. It can develop the same diseases as the main pancreas, including pancreatitis, abscesses, lithiasis, cystic changes, and adenocarcinoma.

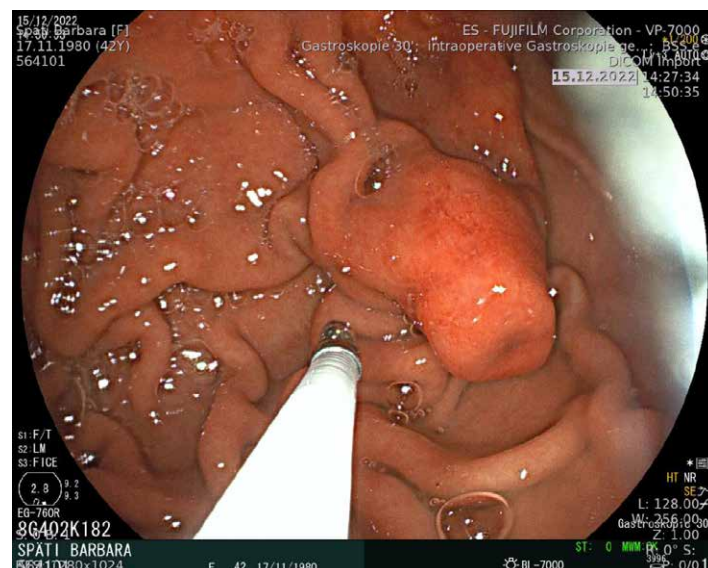


Figure 1

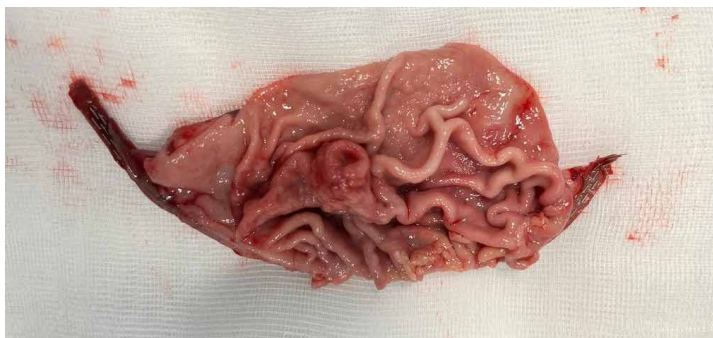


Figure 2

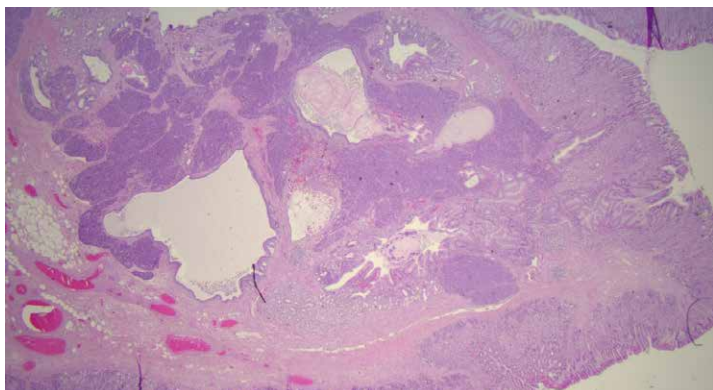


Figure 3

Recurrence of Perforated Duodenal Ulcer after Roux-en-Y Gastric Bypass: A Case Report

A. Petrusic¹, A. Vanoni-Colombo¹, V. Sitta¹, F. Mongelli², F. Garofalo¹ (¹Visceral Surgery, EOC Civico, Lugano, Lugano; ²Visceral Surgery, EOC Bellinzona e Valli, Bellinzona, Bellinzona)

Background: Perforated duodenal ulcer (PDU) is a rare complication of Roux-en-Y gastric bypass (RYGB), with few cases reported in the literature. Diagnosis of perforation is difficult because of the lack of free air in radiologic images. *Helicobacter pylori* (HP) screening and consideration for additional risk factors such as smoking and non-steroidal anti-inflammatory drugs are recommended.

Aims: We present a case of a 54-year-old patient who had a recurrence of a PDU, three months after first surgical repair and 12 years after RYGB.

Methods: Following the first surgery for laparoscopic repair of a PDU, the patient missed all the out-patient appointments and failed to take prescribed proton-pump inhibitors (PPI). Three months later, she presented in the emergency department with an acute abdomen. Abdominal CT scan showed abundant extradigestive fluid without the presence of free air. An emergency laparoscopy was planned.

Results: Laparoscopic exploration revealed biliary fluid and fibrin in all four abdominal quadrants. Adhesions among the transverse colon, gallbladder and duodenal bulb were dissected, revealing a perforated ulcer at the level of the duodenal bulb. The ulcer was 5 mm in diameter, at the same location of the first operation. The margins of the ulcer were harvested and sent for histological analysis. The defect was sutured and reinforced with an omental patch. The postoperative course was complicated by dermo-hypodermatitis and a retroperitoneal abscess, both of which were successfully managed by radiological drainage. The ulcer biopsy results were negative for HP or malignant tumor.

Conclusion: PDU is a rare complication after RYGB. Diagnosis may be difficult because of the absence of free air on CT scan. Fundamental is to exclude the presence of risk factors and to continue PPI treatment in the postoperative period, in order to avoid early recurrence.

Comparative Efficacy of Laser Hemorrhoidectomy Versus Traditional Milligan-Morgan and Recto Anal Repair Techniques in Treating Stages I-III Hemorrhoids: A 3-Year Progressive Study

L. R. El Ghorayeb, L. Regusci (EOC, Ospedale Beata Vergine di Mendrisio (OBV), Mendrisio)

Background: Hemorrhoids, a prevalent colorectal condition, have traditionally been managed with surgical interventions like Milligan-Morgan and Recto Anal Repair (RAR). With advancements in medical technology, laser hemorrhoidectomy has emerged as a potential alternative for stages I to III, promising reduced operative times and improved patient outcomes.

Aims: This longitudinal study, spanning from June 2021 to December 2023, was designed to systematically evaluate the efficacy of laser hemorrhoidectomy compared to the established Milligan-Morgan and Recto Anal Repair (RAR) surgical techniques in managing stages I-III hemorrhoids.

Methods: In this comprehensive analysis, various outpatient hemorrhoidal interventions were considered, including laser therapy, Milligan-Morgan, RAR, and their combinations. The surgical approach for each of the 149 patients was determined based on the individual's hemorrhoidal status, ensuring an appropriate treatment corresponding to hemorrhoid stages I to IV. This methodology included both exclusive laser procedures and combined surgical treatments, al-

lowing for a thorough evaluation across a broad spectrum of hemorrhoidal conditions.

Results: The data revealed a significant difference in median operative time, with laser-only procedures averaging 20 ± 10 minutes, compared to the 50 ± 10 minutes typically required for Milligan-Morgan, RAR, or their combinations. Additionally, patients treated with laser reported notably lower levels of immediate post-operative pain. This observation was further supported by lower pain scores on the Visual Analogue Scale (VAS) at one and four weeks post-operation, suggesting a more rapid recovery and earlier resumption of daily activities.

Conclusion: The study corroborates the superior efficacy of laser hemorrhoidectomy for stages I-III hemorrhoids, particularly in terms of reduced operational time, pain management, and recovery speed, compared to traditional Milligan-Morgan and RAR procedures. While traditional methods remain the preferred surgeries for higher-grade hemorrhoids, the extended recovery periods and increased pain associated with these techniques emphasize the advantages of laser treatment as a more suitable alternative for lower-grade hemorrhoidal conditions.

Is the Expectance of a Low Dose CT Scan Associated with Psychological Distress in Lung Cancer Screening?

S. Hillinger¹, I. Opitz¹, K. Chiffi¹, T. Frauenfelder², L. Jungblut², E. Sostero¹ (¹Thoracic Surgery, University Hospital Zürich, Zürich; ²Diagnostic and Interventional Radiology, University Hospital Zürich, Zürich)

Background: Lung cancer constitutes the leading cause of cancer-related deaths in Switzerland. There is evidence, that early detection through screening programs could reduce mortality. Since 2019, a study evaluating the feasibility and efficacy of low-dose CT lung cancer screening (LCS) program in Switzerland is ongoing.

Aims: One potential risk associated with screening programs, is the psychological burden of the participants.

Methods: 204 Subjects (125 males, median age: 62 years) smokers or ex-smokers were included in the lung cancer screening consisting of an interview and a low-dose CT. CTs were assessed according to the LungRAD 1.1. In a subset of 59 participants (38 males, median age: 61 years) psychological distress was assessed using a visual analog scale (Range: 0-10) and the Impact of Event Scale (Score: 0-120).

Results: Negative screening (LungRADs 1) results were seen in 46.04% of participants (n=93). Benign (LungRADs 2) or probably benign (LungRADs 3) nodules occurred in 38.61% and 12.38% of participants (n = 78 and 25). Suspicious (LungRADs 4A) or very suspicious nodules (LungRADs 4B) were observed in 3.96% (n = 8) of participants. Seven patients (3.43%) had malignancies (four adenocarcinomas, one squamous cell carcinoma, one thymoma, one thyroid cancer).

In the visual analogue scale, a psychological distress of 1.7 ± 2.14 was reported. In the Impact of Event Scale a value of 10.14 ± 15.93 was observed. Higher psychological distress values were occasionally reported, see Figure 1. A significant correlation between both scales was observed ($p < 0.001$, $R^2 = 0.53$, Figure 1).

Conclusion: In this investigation, it was observed that employing low-dose CT scans as a screening modality led to the detection of multiple malignancies. A majority of the subjects experienced minor psychological distress. Nonetheless, instances of significant stress were reported. Additional studies are warranted to quantify the magnitude and determinants of psychological distress associated with this screening process.

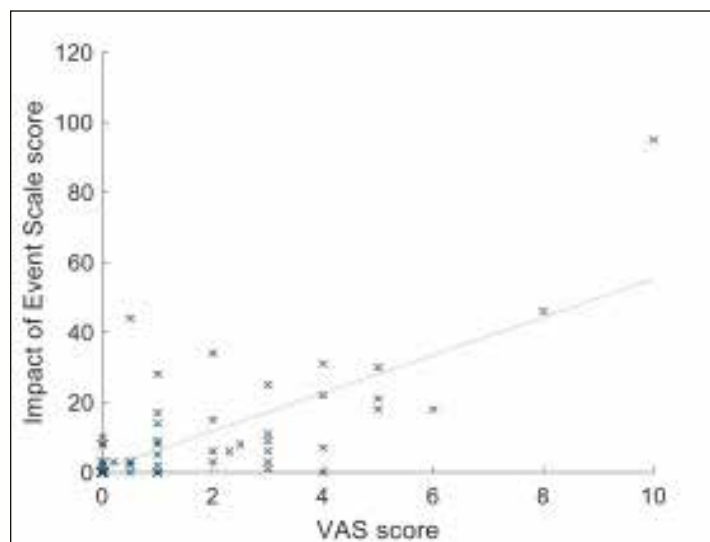


Figure 1. Correlation of expecting a low dose CT scan with psychological distress

Impact of the Establishment of a Multidisciplinary National Chronic Thromboembolic Pulmonary Hypertension (CTEPH) Board on a Monocentric Surgical Endarterectomy Program
B. Battilana¹, M. Lichtblau², L. Mayer³, T. Frauenfelder³, T. Pfammatter³, S. Franckenberg³, G. Puippe³, J. D. Aubert⁴, B. Lechartier⁴, A. M. Darie⁵, S. A. Guler⁶, J. F. Deux⁷, J. M. Fellrath⁸, Y. Patrick⁹, F. Lador¹⁰, S. Ulrich², I. Schmitt-Opitz¹¹ (¹University Hospital Zurich, Zurich; ²Department of Pulmonology, University Hospital Zurich, Zurich; ³Department of diagnostic and interventional Radiology, University Hospital Zurich, Zurich; ⁴Department of Pulmonology, Lausanne University Hospital, Lausanne; ⁵Department of Pulmonology, University Hospital Basel, Basel; ⁶Department of Pulmonary Medicine, Allergy and Clinical Immunology, University Hospital Berne, Berne; ⁷Department of Radiology, University Hospital Geneva, Geneva; ⁸Department of Pulmonology, Regional Hospital Neuchâtel, Neuchâtel; ⁹Department of Cardiology, Lausanne University Hospital, Lausanne; ¹⁰Department of Pulmonology, University Hospital Geneva, Geneva; ¹¹Department of Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare and debilitating disease, marked by diagnostic complexities leading to delays in diagnosis and treatment. The need for a national multidisciplinary evaluation board was recognized given the disease rarity and the mid-size population of Switzerland. The Swiss CTEPH board was inaugurated in January 2018, supported by the Swiss Society of Pulmonary Hypertension. The board comprises an interdisciplinary team uniting their expertise to deliberate on cases involving potential CTEPH and ensure comprehensive patient care.

Aims: We aimed to evaluate the impact of the multidisciplinary national CTEPH Board on a monocentric surgical endarterectomy program.

Methods: The patients discussed in the national CTEPH Board were retrospectively analyzed for the diagnosis of CTEPH and subsequent treatment allocation with focus on pulmonary endarterectomy (PEA).

Results: From January 2018 to May 2023, our national CTEPH board received a total of 198 referrals. Among these, diagnosis of CTEPH was confirmed in 160 (81%) patients. Out of these patients, 73 (46%) were directed to PEA, while 56 (35%) were referred for BPA. Notably, 8 patients (11%) underwent both PEA and BPA. The annual median number of PEA procedures performed was 12, with a range of 10 to 17. Among the patients undergoing PEA, there was a significant improvement in their median mean pulmonary artery pressure (mPAP) from 43mmHg (preoperatively, range: 19 – 76mmHg) to 23mmHg at 6 months postoperatively (range: 12 – 51mmHg) ($p<0.05$). Additionally, the median 6-Minute Walking Distance showed improvement, increasing from 481m (preoperatively, range: 60 – 696m) to 517m postoperatively (range: 237 – 780m) ($p<0.05$).

Conclusion: Establishing an interdisciplinary CTEPH board is essential for addressing the unique diagnostic and management challenges in CTEPH. The Swiss national CTEPH board has played a crucial role in accurately diagnosing and identifying operable patients who benefit from surgical interventions leading to a considerable increase in PEA procedures since its establishment.

	Preoperative	Postoperative (6 Months)	p-value
mPAP (mmHg)	43 (19-76)	23 (12-51)	<0.05
median (range)			
PVR (WU)	6.7 (1.9-15)	2.5 (0.6-8.8)	<0.05
median (range)			
6MWD (m)	481 (60-696)	517 (237-780)	<0.05
median (range)			
PAWP (mmHg)	11 (2-40)	10 (3-17)	0.21
median (range)			

Table 1. Pre- and postoperative mean pulmonary artery pressure (mPAP), Pulmonary vascular resistance (PVR), 6-minute walking distance (6MWD), Pulmonary artery wedge pressure (PAWP)

Understanding the Contribution of Different Cell Types in the Development of Chronic Thromboembolic Pulmonary Hypertension (CTEPH)
B. Battilana¹, I. S. Martinez Lopez¹, M. Haberecker², D. Kracun¹, M. B. Kirschner¹, I. Schmitt-Opitz¹ (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich; ²Department of Pathology and Molecular Pathology, University Hospital Zurich, Zurich)

Background: Chronic Thromboembolic Pulmonary Hypertension (CTEPH) is a rare and severe form of pulmonary hypertension marked by persistent obstruction in pulmonary arteries (PA) caused by fibroobstructive tissue (FO), which may originate from unresolved thromboembolic material. The precise triggers for inadequate resolution of pulmonary emboli in CTEPH are not understood. The only curative treatment is the removal of FO and diseased intima by Pulmonary Endarterectomy (PEA). The FO in CTEPH may result from intimal damage, prompting mesenchymal transition and fibroblast proliferation. Understanding CTEPH development necessitates a focused exploration and characterization of the involved cell types was the aim of the present project.

Aims: We aim to stratify the cellular composition and determine the presence of ECs in the fully organized FO and diseased intima, in CTEPH patients.

Methods: The fully organized FO and diseased intima, were resected in PEA. Thereafter, tissues were macerated, digested, and obtained cell suspensions were cultured in a medium sustaining the growth of ECs. Propagated cell populations were analyzed for their cyto-morphological properties (shape size, morphology) by light microscopy.

Results: Analysis of the obtained cultured primary cell populations from FO identified four different morphologies solely or in combination: fibroblast-, cobblestone-, squamous- and dendritic-like cells. Interestingly, on a limited number of resected intimal tissues we could identify a mixture of mainly cobblestone- and squamous cell-like cells.

Conclusion: As expected, cells isolated from intimal tissue contained more epithelioid cell types, while FO tissue predominantly contained fibroblast-like cells. These data imply that different cells populations are contributing to development of FO in CTEPH pathogenesis, pointing to their complex interactions being a key for deciphering the development of CTEPH. Further studies in this direction are warranted, in which the obtained cell types will be characterized, with an ultimate goal of establishing primary cell lines for further therapy studies either solely or in co-culture.

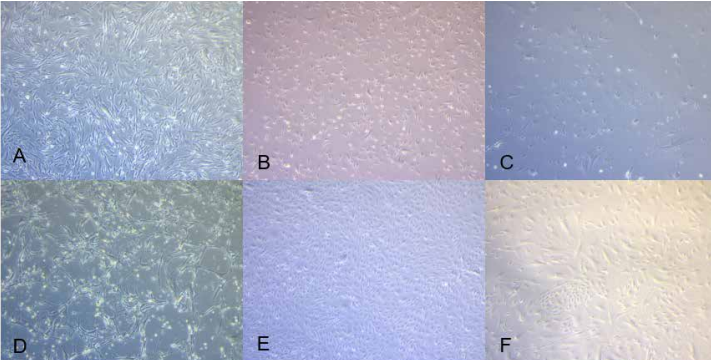


Figure 1. Microscopic images of different cell morphologies from the tissue resected from CTEPH patients during PEA. From left to right: A) Fibroblastic-like, B) Cobblestone-like, C) Squamous cell-like, D) Dendritic-like, E) Multiple populations: Cobblestone- and Squamous cell-like, F) Multiple populations: Cobblestone- and Squamous cell-like

RATS Extended Pneumonectomy for T4 (Aortic Adventitia) NSCLC after Induction Treatment Following Prophylactic Aortic Stent Implantation – A Case Report
B. Battilana¹, O. Theisen-Lauk¹, A. Zimmermann², B. Reutersberg³, D. Schneiter¹, I. Schmitt-Opitz¹ (¹Department of Thoracic Surgery, University Hospital Zurich, Zurich; ²Department of Vascular Surgery, University Hospital Zurich, Zurich; ³Department of Vascular Surgery, University Hospital Zurich, Zurich)

Background: A 66-year old patient with a diagnosis of cT4N0M0 left central squamous cell carcinoma invading the descending aortic wall without any signs of lymph node involvement. His personal history includes a COPD Class I Group A, yet with a sufficient pulmonary function for an extensive resection or even pneumonectomy. The multidisciplinary tumor board recommended induction immunochemotherapy treatment due to the unique nature of the case.

Aims: A case report.

Methods: A case report.

Results: The patient demonstrated a partial response after the induction immunochemotherapy treatment so we proceeded to surgical intervention. For protection of the aortic wall we followed our protocol in these situations to insert upfront an aortic stent graft - GORE cTAG 28x28x150mm (landing zone 4-5) with a day before surgery – an extended left pneumonectomy including lymphadenectomy using the Robotic-Assisted Thoracic Surgery (RATS) approach. Notably, during the procedure, a meticulous separation of the tumor from the aorta was achieved (Figure 1). The patient's postoperative course was uneventful, with a hospital stay of six days. The final pathology revealed a Stage IIIA disease, characterized by ypT2a ypN2 cM0. The first CT scan 3 months after surgery revealed regular postoperative changes with no evidence of local recurrence, lymph node or distant thoraco-abdominal metastases.

Conclusion: This successful management highlights the effectiveness of a multimodal approach, combining innovative induction treatments, precise surgical techniques, and meticulous postoperative care. The presented case demonstrates the importance of collaborative decision-making within a tumor board setting and the successful application of advanced surgical interventions to achieve optimal outcomes in complex oncological cases.

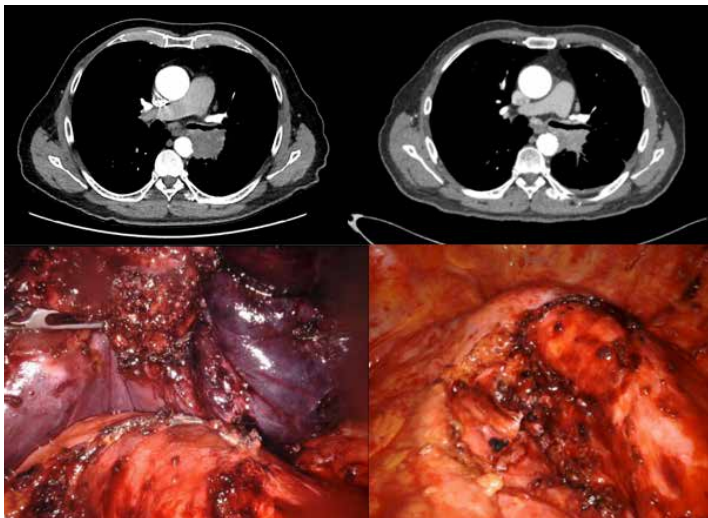


Figure 1. Preoperative CT Scan and intraoperative images showing the infiltration of the tumour into the aortic wall and intraoperative image after resection of the tumor



Figure 2. Rx ap

Silent Compartment Syndrome

P. Pellegrino¹, C. Michelitsch², C. Sommer² (¹Allgemeine Chirurgie, Kantonsspital Graubünden, Chur; ²Unfallchirurgie, Kantonsspital Graubünden, Chur)

Background: Compartment syndrome (CS) is a serious, potentially limb-threatening condition characterized by increased pressure within a closed muscle compartment, leading to decreased tissue perfusion. In cases of tibial shaft fractures, there is a significant risk of developing CS, typically marked by pain out of proportion. In this case report we present an atypical manifestation of CS in a competent, sensate patient. The diagnosis of silent compartment syndrome (SCS) is scarcely covered in literature, with only a few case reports available.

Aims: Our aim is to deepen the understanding of SCS, highlighting its rarity and diagnostic challenges, and stressing the importance of awareness among clinicians.

Methods: –

Results: A 16-year-old patient, with a non-displaced spiral tibial fracture (AO/OTA 42A1), underwent uneventful intramedullary nail osteosynthesis without pre- or postoperative CS symptoms. The patient's pain was well monitored and -managed (max. NRS 5/10) with oral analgesics. On the second postoperative day, the patient was unable to contract the tibialis anterior and extensor hallucis longus muscles and experienced decreased sensation in the dermatome of the deep peroneal nerve. Despite the absence of severe pain, an elevated intracompartmental pressure of 65mmHg was detected, leading to an urgent lateral fasciotomy. This revealed necrotic muscle tissue in the anterior compartment. Postoperatively, the patient showed improved sensitivity but remained unable to contract the muscles.

In our hospital, we have recorded 1377 cases of tibial fracture osteosynthesis over the past 10 years, with 60 (4.4%) cases necessitating a fasciotomy. All patients undergoing this procedure reported significant pain with typically no relief from analgesics.

Conclusion: SCS can occur without pain in sensate, cooperative, and otherwise healthy patients, causing delayed CS diagnosis and therefore requiring heightened vigilance, emphasizing the clinical examination as a crucial component. The exact cause of absent pain, be it nerve damage, low subjective pain perception, or another factor, remains unclear.



Figure 1. Necrotic muscle

Hepato-Colic Fistula in a Patient with Crohn's Disease: A Case Report

A. Misar, A. Litchinko, B. Egger, M. Chilcott (Department of Surgery, HFR Fribourg, Fribourg)

Background: Crohn's disease (CD) is an inflammatory bowel disease often causing fistulous tracts between the gastrointestinal tract and other organs. Hepato-colic fistulas, which are pathological connections between the liver and colon, represent a rare but significant complication in CD.

Aims: We report a rare case of a hepato-colic fistula in a CD patient. It highlights the successful combination of conservative treatment in the acute phase followed by elective surgery.

Methods: A 59-year-old female patient with a known history of CD presented to our emergency department with right-sided abdominal pain for the last ten days. The pain persisted despite antibiotic treatment, administered by her gastroenterologist. Her personal history included CD-related ileo-ileal and ileo-sigmoid fistulas treated by ileo-cecal resection with ileo-colic anastomosis in 2017. At presentation, the patient was undergoing prednisone tapering. Our diagnostic investigations, including contrast-enhanced computed tomography (CT), revealed a hepato-colic fistula with a 3-4 cm hepatic abscess in segment V of the liver. (Figure 1-2)

Results: The patient's initial management involved conservative treatment with radiological drainage, leading to improvement in clinical symptoms. A follow-up CT-scan four days post-drainage confirmed abscess disappearance. However, fistulography through the drainage catheter revealed a fistulous connection between the liver and the former ileo-colic anastomosis. The patient was discharged home on day 10 with the catheter in place and re-admitted for elective laparotomy one month later. She underwent resection of the ileo-colic anastomosis with an ileo-transverse re-anastomosis and catheter removal. The post-operative management included treatment for paralytic ileus, and she was finally discharged home in good condition 11 days after the intervention.

Conclusion: Hepato-colic fistulas are an exceptional yet critical complication of CD. This case emphasizes the importance of early diagnosis and the successful combination of multidisciplinary conservative and surgical treatment leading to favorable outcome.



Figure 1



Figure 2

A Rare Complication of an Unusual Procedure: Phytobezoar on LINX

A. Misar¹, M. Burgard^{1,2}, B. Egger¹ (¹Department of Surgery, HFR Fribourg, Fribourg; ²Division of Digestive Surgery, HUG, Genève)

Background: Gastroesophageal reflux disease is one of the most common gastrointestinal disorders, especially in industrialized nations, with an increasing burden of disease. The first line of treatment consists of lifestyle changes, weight loss and medical therapy. About 10-40% of all patients will not respond to this treatment and eventually need surgical intervention. Although fundoplication remains the gold standard, an increasing variety of different and less invasive techniques are nowadays available.

Aims: To present a unique case of late complete esophageal obstruction after LINX device implantation, also referred to as magnetic sphincter augmentation. (Figure 1)

Methods: A 72-year-old female patient was admitted to our emergency department for aphagia. Vomiting upon food or liquid intake was reported without other symptoms. Her medical history was bland except for LINX Reflux Management System implantation seven years prior for refractory gastroesophageal reflux disease (rGERD). CT-scan of the abdomen showed a properly positioned LINX with a big mass located in the esophagus just above the device. (Figure 2)

Results: Emergency endoscopy revealed the presence of a big occlusive phytobezoar just above the device which was safely removed. Immediately after the intervention the patient reported complete resolution of all symptoms and oral food intake was well tolerated. The patient was discharged home the next day with an intact LINX device in place.

Conclusion: Fundoplication remains the first choice for patients with rGERD. Even though performed in few institutions, LINX device seems to be a safe alternative to surgical procedures in selected patients. Early dysphagia is a common problem but usually resolves spontaneously. Late complications are rare and treatable, the need for urgent intervention for severe dysphagia or aphagia is highly uncommon. To our knowledge, this is the only reported case with bezoar formation after LINX device implantation.

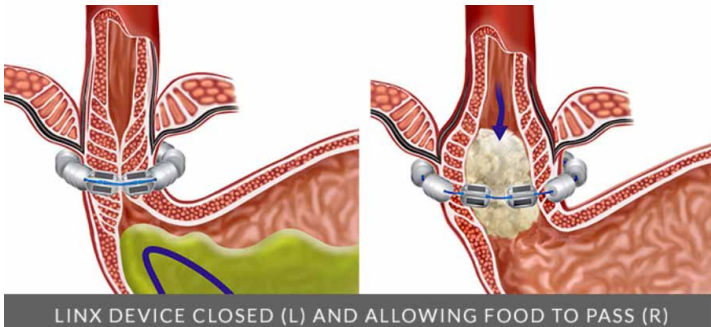


Figure 1

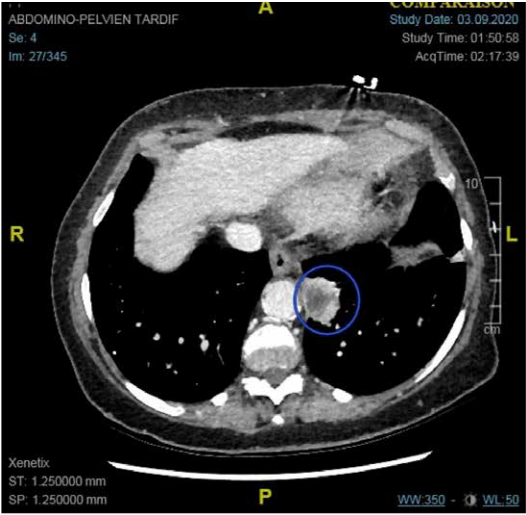


Figure 2

Molecular Characterization and Validation of Live Cell Biobank for Pleural Mesothelioma

M. Meerang, M. B. Kirschner, I. Schmitt-Opitz, E. Felley-Bosco, M. Ronner, F. Schlaepfer (Thoracic Surgery, University Hospital Zurich, Zurich)

Background: The use of primary cells cultivated from fresh patient material for research approaches, especially for in vitro drug testing, can overcome the drawbacks of long-term cultures of cell lines.

Aims: Here we aim to fully characterize 196 pleural mesothelioma (PM) low passage primary cell lines generated over the past 16 years at our hospital.

Methods: For the identification of tumor cells, we performed a stepwise characterization. To exclude fibroblasts, we evaluated epithelial cell origin by immunohistochemical staining (IHC) of pan-Cytokeratin (pan-CK) in FFPE cellblocks. Pan-CK staining intensity was scored as weak (1), moderate (2) and strong (3). Finally, histo (H)-score (sum of intensity multiplied with % positive cells, range 0-300) was calculated. We performed cell growth characterization using colorimetric assay for cell metabolic activity (MTT assay).

Results: We have taken all the frozen stock cell lines to grow in culture using our established workflow. 117 cell lines (60%) grew after thawing and we could generate more frozen aliquots. Median pan-CK H-score analyzed from 67 cell lines was 49 and ranged from 0-300 (figure 1a). Among them, 23 cell lines have an H-score over 100. The doubling time, analyzed from 14 cell lines so far, ranged from 37-292 hours (median 83.6 hours) (figure 1b).

Conclusion: We have successfully re-cultured a large number of primary cell stocks, and shown that the doubling time of those of epithelial origin is within a good range for future experiments. Only pan-CK high expressing cell lines (H-score >100) will be selected for further staining with additional PM tumor markers by IHC compared to the original tumor tissues. The cell lines with concordant marker expression compared to the original will be further selected for assessment of copy number variation assay for the final validation. These primary cells represent an invaluable tool for the future use as translational research model for PM.

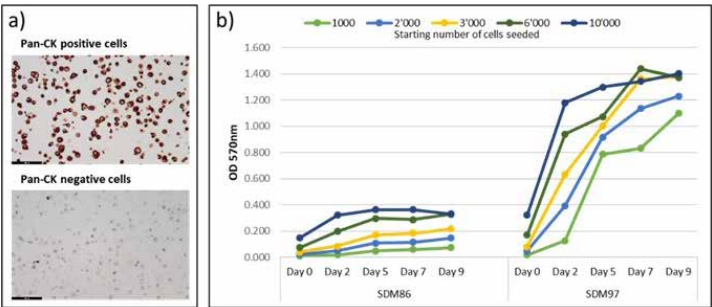


Figure 1. a) Examples of pan-CK staining in positive (H-score 300) and negative (H-score < 100) cell lines b) Growth curve of 2 cell lines performed over 9 days with MTT assay (optical density measurement with 570nm light). We show here examples of slow growing (SDM86) and fast growing (SDM97) cell lines

Another Case of Common Cholestasis?

M. Rajah, U. Derungs, E. Angst (Cantonal Hospital Glarus, Glarus)

Background: Lemmel syndrome is a rare condition with upper abdominal pain and jaundice due to a periampullary duodenal diverticulum compromising the common bile duct and/or the pancreatic duct. Magnetic resonance cholangiopancreatography (MRCP) and esophago-gastroduodenoscopy (EGD) are considered diagnostic gold standards. Endoscopic retrograde cholangiopancreatography (ERCP), diverticulectomy or observational management are possible treatment options.

Aims: –

Methods: –

Results: A 74-year-old woman was admitted to our hospital with fever, scleral icterus, and upper abdominal pain. Bloodwork showed elevated hepatic, cholestatic and pancreatic enzymes. We saw marginally wide bile and pancreatic ducts in the MRCP. The EGD with biopsy confirmed a highly inflamed duodenal diverticulum. We started the patient on intravenous antibiotics and opted for watchful waiting. She showed clinical improvement and laboratory regression, and we discharged her after nine days without further intervention. The endoscopic ultrasound after 3 months showed no signs of inflammation or complications due to the duodenal diverticulum, therefore we abstained from any surgical interventions.

Conclusion: We should be aware of rare pathologies like Lemmel syndrome in patients presenting with jaundice and upper abdominal pain, especially in the absence of bile stones. At first occurrence, conservative management is a viable option. In case of clinical recurrence ERCP and diverticulectomy may be considered.

Febrile Intestinal Obstruction in a Child Caused by a Meckel's Diverticulitis: A Case Report

M. Poget, S. Vasseur Maurer (Pediatric Surgery, Lausanne University Hospital, Lausanne)

Background: Meckel's diverticulum is the most prevalent congenital abnormality of the gastrointestinal tract. Gastrointestinal bleeding is the most common presentation in children, followed by intestinal obstruction and diverticulitis. Intestinal obstruction caused by a volvulus or an intussusception of the Meckel's diverticulum into the bowel is well described. Contrastingly, obstruction related to an inflamed diverticulum's pedicle strangulating the small bowel has rarely been described.

Aims: This case report aims at describing an unusual presentation and treatment of a complicated Meckel's diverticulum in a child.

Methods: We report a case of a 5-year-old girl with signs of intestinal obstruction and fever with a non-peritoneal abdomen. Laboratory findings showed strongly elevated inflammatory markers. Computed tomography scan revealed small bowel obstruction with signs of bowel suffering in the right upper quadrant and the inability to visualize the appendix (Figure 1). Moderate left pleural effusion was observed in the absence of underlying pulmonary affection. Signs of internal hernia in the right upper quadrant were found on magnetic resonance imaging (Figure 2). Upon laparotomy, an inflamed, necrotic Meckel's diverticulum was found, which distal extremity was enlarged and adherent to the transverse colon (Figure 3). The small bowel underneath was obstructed by the thin pedicle of the diverticulum, although without signs of suffering. A wedge resection of the diverticulum was performed.

Results: The postoperative course was uneventful.

Conclusion: Although acute appendicitis is the most common cause of small bowel obstruction of infectious origin in a child, Meckel's diverticulitis should be considered as an alternative diagnosis in the presence of atypical presentation and/or imaging of a febrile intestinal obstruction. The responsible mechanism can be a mesodiverticular band arising from an inflamed diverticulum or less commonly, in our case, a band formed by the pedicle of the inflamed diverticulum itself. Wedge resection of the diverticulum is a safe option.

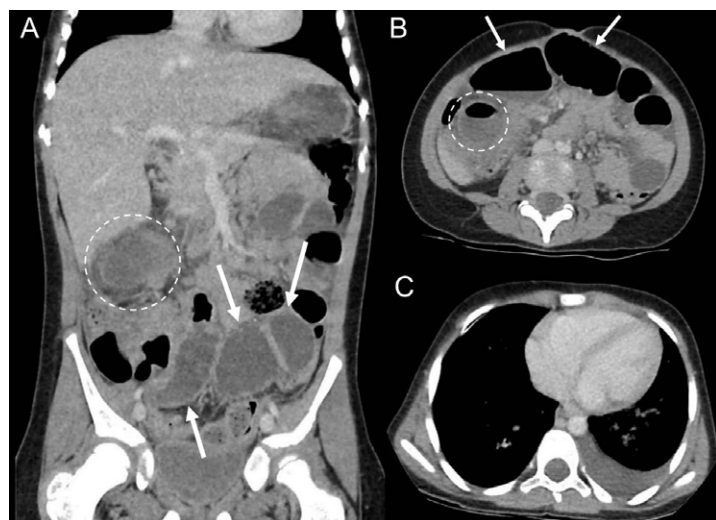


Figure 1. Contrast-enhanced computed tomography scan showing small bowel obstruction (arrows) and signs of small bowel suffering (dotted circle) on coronal (A) and axial (B) sections. Moderate left pleural effusion on axial section (C)

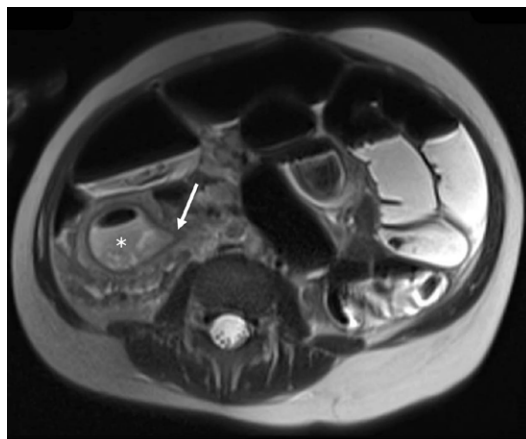


Figure 2. Magnetic resonance imaging showing signs of internal hernia with supposed strangulated bowel; its lumen (asterisk) and the bowel wall pinched by an intestinal loop (arrow)

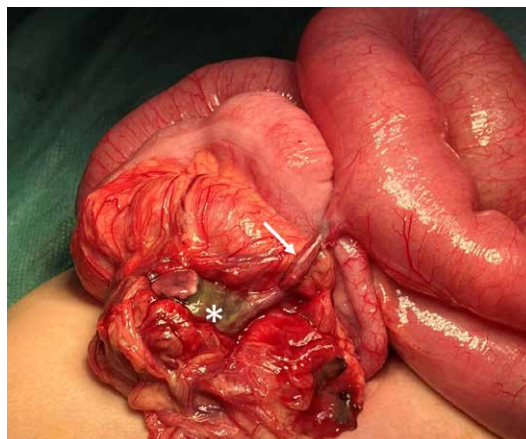


Figure 3. Perioperative findings showing small bowel obstruction along with an inflamed, necrotic Meckel's diverticulum adherent to the transverse colon; the thin pedicle (arrow) and the distal extremity of the diverticulum (asterisk) are displayed

Additional Femoral Neck Screw in Gamma Nail Osteosynthesis for Combined Femoral Neck Fractures and Pertrochanteric Fractures

C. Caffier, A. Haller, D. Schraffl, C. von der Lippe (Herisau)

Background: In approximately 10% of cases, fracture extensions occur in femoral neck fractures, reaching up to the per- or subtrochanteric region. These fractures are not listed in the classification developed by AO/OTA, as they represent a combination of 31A and 31B fractures. Typically, hip arthroplasty is considered as the primary surgical strategy for femoral neck fractures. However, for these combined fractures, we have developed an alternative and new strategy. In order to enable early full weight-bearing and mobilization of patients, we treated such combined fractures with a Gamma nail osteosynthesis, which is considered the strategy of choice for per-subtrochanteric fractures. Additionally, to achieve adequate rotational stability in combined femoral neck fractures, we employ an additional anti-rotation screw.

Aims: For this specific combination of fractures, as far as we know, no uniform operative methods have been described in the literature. We recommend the use of an additional anti-rotation screw to prevent failure of the gamma nail osteosynthesis in these combined fractures. Additionally, in pertrochanteric fractures, a medial femoral neck component should always be sought with extended imaging using CT-scan.

Methods: We have examined five cases of these rare fractures. The data were collected from the Hospital Herisau and the Cantonal Hospital Zug. Postoperative follow-up assessments at 6 weeks have been conducted for all patients.

Results: In all 5 cases, correct alignments are observed 6 weeks post-operation. There has been no dislocation of the fractures in relation to the postoperative radiological assessments during full weight-bearing. The achieved stability of the osteosynthesis, coupled with significantly reduced operative time and reduced intraoperative blood lost compared to hip arthroplasty, presents a clear benefit for older patients. This, in turn, helps reduce perioperative mortality, especially in higher ASA (American Society of Anesthesiologists) stages.

Conclusion: An additional femoral neck screw for gamma nail osteosynthesis in combined femoral neck fractures and pertrochanteric fractures is a good option for maintaining a rotationally stable osteosynthesis which would otherwise not be given with a medial femoral neck fracture component.

A Permanent Thoracic Window Model for Real-time Imaging of Non-Small Cell Lung Cancer in its Orthotopic Setting

D. Marie, L. E. Chriqui, E. Abdelnour, M. Gonzalez, T. Krueger¹, S. Cavin, J. Y. Perentes (Thoracic Surgery, CHUV, Lausanne)

Background: Real-time imaging is a powerful approach allowing longitudinal observation of tumors and their microenvironment, providing cancer progression insights. In the context of NSCLC, understanding changes in tumor immune content is crucial for evaluating its response to immunotherapies. However, intravital imaging studies on NSCLC are infrequent and impeded by technical challenges.

Aims: We present here a novel murine thoracic window model combined with a breathing artifact correction method, enabling high-resolution real-time imaging of immune, vascular, and tumor compartments of orthotopic NSCLC.

Methods: Two lung adenocarcinoma (LAD) cell lines, CMT167-GFP (KRASG12V mutant, syngeneic to C57BL/6 mice) or 344SQ-GFP (KrasG12D; p53R172HΔG mutant, syngeneic to 129/Sv mice), were orthotopically injected into the lungs of 17 C57BL/6 mice, and tumor growth was monitored using micro-CT. The thoracic window was permanently implanted on the chest 10 days post-injection allowing repeated observation using an upright 2-photon microscope. The combination of a frame stabilizer and a respiratory gating monitoring pad integrated with the imaging system minimized breathing artifacts enabled high-resolution imaging of tumor cells (GFP), vasculature (Pacific Blue-Dextran angiography), and leukocytes (Rhodamine-6G) over a three-week period.

Results: The surgical window implantation protocol was successfully performed within 60 minutes with a 95% success rate (n=18). Micro-CT data guided accurate window placement, and the frame design combined with stabilization enabled repeated high-resolution imaging of a surface area measuring 800 μm² and 300 μm depth of tumor bulk, vasculature, and leukocytes with limited breathing artifacts. Finally, the monitoring of LAD three times weekly over three weeks revealed increased vascular density (9%), tumor progression (55%), and leukocyte recruitment (13%) at the tumor site.

Conclusion: We successfully established a reproducible NSCLC permanent thoracic window model with an orthotopic approach. Longitudinal assessment of treatment-induced modulation of the TME and particularly on the immune cell homing may bring valuable information in the future.

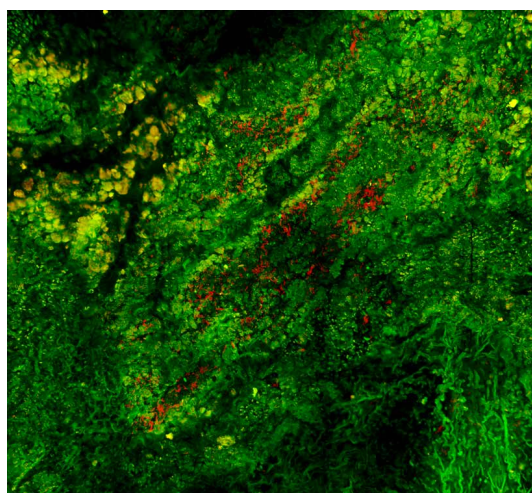


Figure 1. LAD TME Intravital Microscopy

Topic Tacrolimus: an Important Tool to Diagnose and Treat Pyoderma Gangrenosum

A. Otten, B. Egger, M. Menth (Department of Surgery, HFR Fribourg Cantonal Hospital, Switzerland, Fribourg)

Background: Pyoderma gangrenosum (PG) is a rare, slowly progressing and painful ulcerative skin disorder, often associated with underlying systemic problems. Its estimated incidence is 0.3 – 1 cases per 100'000 people annually. Since PG manifests and evolves in various forms, misdiagnosis is frequent.

Aims: To emphasize the diagnostic work and therapeutic strategies, especially to facilitate earlier diagnosis in clinical practice.

Methods: We present a challenging evolution of a histologically proven Necrotic Angiodermatitis in an 80-year-old male with a history of long-term arterial hypertension and type 2 diabetes. After excision and skin grafting, the wound healed only partially. The anterior aspect evolved unfavorable to a painful large ulcer despite several surgical debridements, and the use of negative pressure wound therapy (Figure 1). A concomitant staphylococcus infection was treated with antibiotics.

Results: The turning point in treatment occurred with the initiation of topical Tacrolimus application after biopsy results, which suggested PG as a differential diagnosis. Following that, the patient experienced a remarkable swift and substantial improvement in pain and wound healing. This extraordinary response to topical Tacrolimus strongly supported the diagnosis of PG, even in the absence of proving biopsy result. The therapy was intensified by adjunction of Adalimumab injections and finally conducted to a complete healing of the wound within 4 months (Figure 2).

Conclusion: This case highlights the complexity of the evolution, diagnosing and managing PG, especially when complicated by previous surgical interventions and concomitant infections. Long-term follow-up with tailored multidisciplinary therapeutic strategies remains essential to obtain favorable clinical outcomes in PG patients. The outstanding response to topical Tacrolimus application in our patient underlines its properties as a valuable diagnostic and therapeutic tool for PG. Early correct diagnosis is most important and this may be achieved with

empiric topical Tacrolimus application.



Figure 1. Anterior view with pyoderma on medial side (red arrow) and skin graft laterally



Figure 2. After three months

periOPTIME – The New Kid on the Block – A Refined Enhanced Recovery Program

F. Fehlmann¹, C. Caviezel², I. Schmitt-Opitz¹ (¹Thoraxchirurgie, Universitäts Spital Zürich, Zürich; ²Thoraxchirurgie, Kantonsspital Graubünden, Chur)

Background: With the advent of enhanced recovery programs (ERP) length of hospital stay (LoS) were shortened substantially. However, program refinements may have additional impact. Patients participating with periOPTIME are motivated to stay active during the preoperative period and profit from streamlined referrals to specialist counselling.

Aims: The program aims for minimal invasive approaches and strict reduction of unneeded examinations with emphasis on enhancing patient experience and QoL.

Methods: Patients undergoing anatomical lung resection between May 2022 - December 2024 are treated within a modified ERP and compared to a historical control group (2018-2020).

To study prospectively the effect of a modified enhanced recovery program within a patient population undergoing anatomic lung resection. The primary objective is to assess LoS. Preliminary data from May - November 2022 was analysed.

Results: The preliminary analysis included 19 patients with 58% male and 42% female participants and median age of 65 years. Most participants suffered from NSCLC (N=16) including UICC stage I-IV, followed by patients with Metastasis from other primary tumors (N=2) and one case with Cryptogenic Organising Pneumonia. Resections were scheduled as VATS (42%) or VATS (58%). Two VATS UL resections were converted to open surgery. Median LoS was 4 days (2-17) compared to 9 days in the historical group for VATS/RATS lobectomy. Open surgery was related to higher LoS. No major complications related to the study protocol occurred. Main reasons for prolonged LoS was airleak (N=5), chylothorax (N=1), pleural effusion (N=1) and social reasons (N=2). Median time to first mobilisation in the ERP group was 7 hours (3-24; sd=7.4). Median time for thoracic drainage was 23 hours (17-360; sd=90)

Conclusion: Preliminary data showed a shorter LoS in the ERP group, without the occurrence of major complications. The sample is too small to detect significant change in LoS. However, the results are promising.

Necroptosis Induced by Prolonged Cold Static Preservation Involves The cGAS/STING Pathway and Calcium Handling in Cellular and Rat Models of Cold Lung Preservation

J. Lugin^{1,2}, R. Parapanov^{1,2}, A. Debonneville^{1,2}, M. Allouche^{1,2}, Y. Perentes¹, M. Gonzalez¹, E. Abdelnour¹, L. Liaudet³, T. Krueger¹ (¹Service of Thoracic Surgery, Centre Hospitalier Universitaire Vaudois – CHUV, Epalinges; ²Service of Intensive Care Medicine, Centre Hospitalier Universitaire Vaudois – CHUV, Epalinges; ³Service of Intensive Care Medicine, Centre Hospitalier Universitaire Vaudois – CHUV, Lausanne)

Background: Prolonged cold static preservation (CSP) of lungs is known to induce a programmed cell death named necroptosis. The cGAS/STING system recognizes cytosolic DNA

released in stressed or damaged cells, like mitochondrial DNA, and triggers inflammatory responses.

Aims: Using rat lung epithelial cells and lungs exposed to a 4°C temperature in preservation solution, we assessed the activation of cGAS-STING and its potential role on necroptosis induced by prolonged CSP.

Methods: Rat lung epithelial cell line and primary macrophages were incubated in preservation solution at 4°C for 4 to 18 hours to mimic lung CSP in the presence of drugs blocking the cGAS-STING/TBK1 axis or calcium fluxes. Rat lungs were preserved at 4°C for 18h directly after procurement. cGAS-STING activation was analyzed by western blot and confocal microscopy for the phosphorylation of TBK1, a marker of cGAS-STING activation. IFN- β production, a signature of cGAS-STING activation, was monitored by ELISA. Necroptosis was detected by western blot of phosphorylated MLKL which is responsible for the formation of pores and membranes rupture during necroptosis. Cell damage was measured by LDH activity in cell supernatants and BALF.

Results: TBK1 phosphorylation, a kinase downstream of STING, happened after 4 hours of cold preservation and persisted after 18 hours in cells and lungs. The addition of cGAS or STING inhibitors in the preservation solution blunted TBK1 phosphorylation and reduced LDH activity in cell supernatants and BAL. Cold preservation promoted a phosphorylation of MLKL and LDH release, hallmarks of necroptosis. Remarkably, inhibitors of cGAS and STING drastically reduced phosphorylation of MLKL. Chelation of intracellular calcium or depletion of calcium in the preservation solution reduced both necroptosis and cGAS-STING activation.

Conclusion: A previously undescribed crosstalk is engaged between cGAS-STING signaling and necroptosis during lung cold static preservation. Our results suggest that calcium could be the common trigger of these two processes.

A case of Untreated Papillary Thyroid Cancer for 37 Years

S. Canovi, S. Kecman, A. Polutak, M. Hartel (Viszeralchirurgie, Kantonsspital Aarau, Aarau)

Background: This case report describes a large thyroid carcinoma with multiple bleeding skin ulcers in a 63-year-old patient.

Aims: The patient first reported a diagnosis of a thyroid nodule in 1986. She refused further investigations until 2011. Symptomatic hyperthyroidism led to a biopsy in 2011, which diagnosed a papillary thyroid carcinoma (4.3x2.3x5 cm); the patient was informed, although she refused surgical discussion of the case, and she never visited a general practitioner again.

Methods: The 63-year-old woman with a history of untreated papillary thyroid cancer was admitted in May 2023 to the emergency department of our hospital with multiple bleeding ulcers within a palpable large mass in the neck (Figure 1) and without any other symptoms. The CT scan (Figure 2) revealed a 9.2x8.7x11.2 cm inhomogeneous mass with muscle (sternocleidomastoid muscle) and vascular infiltration (left internal jugular vein). After an interdisciplinary discussion of the case, another fine needle aspiration was performed, showing a papillary carcinoma, Bethesda VI. The patient decided to undergo surgical treatment.

Results: We were able to perform a complex total thyroidectomy with partial resection of the injured and excess skin to ensure a better aesthetic result. There were no vascular or nerve injuries. The final pathological result showed a papillary thyroid carcinoma without any sign of degeneration into anaplastic, with microscopic evidence of infiltration into the underlying muscle tissue. A further interdisciplinary discussion followed and radioiodine therapy was recommended.

Conclusion: Papillary thyroid carcinoma is a typical non-aggressive tumour with, in literature, possible transformation into an anaplastic form. Furthermore, well-differentiated papillary thyroid carcinoma may precede or coexist with anaplastic carcinoma in about 50% of cases. Our case represents a rare case of papillary thyroid cancer that hasn't mutated to a non-differentiated form in 37 years and hasn't given any symptoms except for ulcerations.



Figure 1

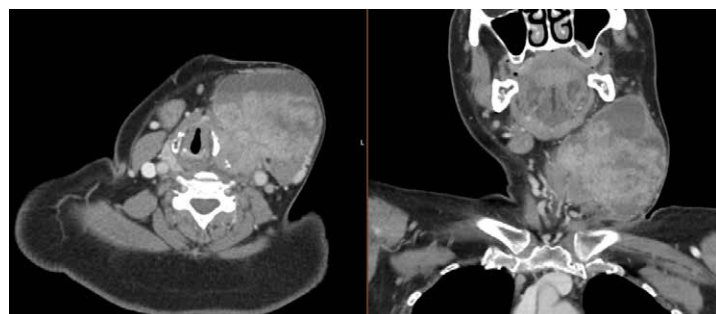


Figure 2

Appendicitis Within an Amyand Hernia: Case Report of a Rare Surgical Entity

M. Lagger, E. Kalogiannis, A. Lopez, B. Egger (Chirurgie, HFR Fribourg, Fribourg)

Background: Amyand hernia (AH) is a rare condition where the appendix protrudes through an inguinal hernia (IH). Clinical manifestations can vary from hernia complications to acute appendicitis, intestinal obstruction or peritonitis. When AH is found during elective IH repair, less than 40% of patients undergo appendectomy. However, in case of emergency onset, appendectomy is more frequent and IH repair with mesh is usually avoided. Hereby, we present the case of an acute appendicitis, where AH was coincidentally discovered.

Aims: To raise awareness of this rare surgical entity and its challenging surgical decision making.

Methods: We present the case of a 40-year-old male patient with no previous surgical history who presented to our emergency department with right lower quadrant pain associated with diarrhea and nausea. Clinical assessment revealed a positive McBurney's sign. Blood tests showed an elevated CRP (22 mg/L) without increase in white cell count. A CT scan demonstrated uncomplicated acute appendicitis protruding into a right inguinal hernia sac (Figure 1).

Results: Intravenous antibiotics were administered (Ceftriaxone 2g, Metronidazole 500mg) and the diagnostic laparoscopy confirmed the diagnosis (Figure 2). A left IH was also found intra-operatively. Appendectomy was uneventful, antibiotics were discontinued postoperatively and the patient discharged home on day 1. Histopathology confirmed acute ulcero-hemorrhagic appendicitis with focal fibrinous serositis. In view of the fortuitous discovery of bilateral IH in an asymptomatic patient, we did not proceed with immediate repair. The patient was therefore addressed to our outpatient's clinic 6 weeks postoperatively and planned for elective repair.

Conclusion: Decision making in AH with appendicitis is not easy. We suggest to perform first the appendectomy and later on the hernia repair. This also allows to perform the hernia mesh repair utilizing the total extraperitoneal patch plastic (TEPP) technique.



Figure 1. CT images demonstrating an Amyand hernia; a) axial (arrow: appendiceal tip) b) coronal (arrow: appendiceal tip) and c) sagittal (arrow: appendix in inguinal canal)

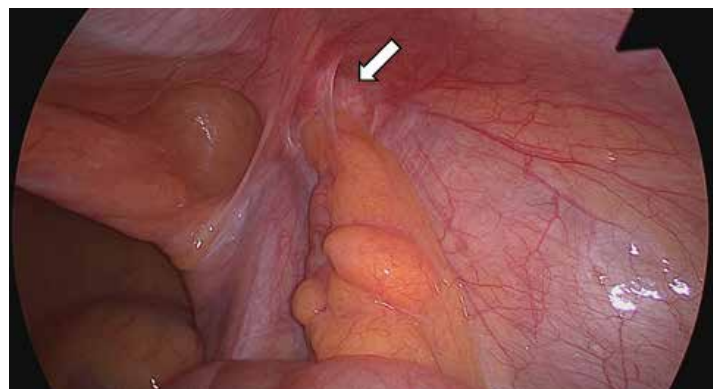


Figure 2. Intraoperative photograph (arrow: inflamed appendix entering the deep inguinal ring)

Case Report: Azygos Vein Aneurysm, a Chameleon Lesion Difficult to Clarify Without Invasive Diagnostic Tools

A. Kunz¹, P. Dumont², J. A. Lutz³, A. Mansouri¹ (¹HFR Fribourg, Pulley; ²Pneumology, HFR Fribourg, Fribourg; ³Thoracic surgery, HFR Fribourg, Fribourg)

Background: Azygos vein aneurysms are rare and most of the time asymptomatic. They are typically discovered incidentally during imaging studies conducted for unrelated reasons. Since they can mimic more severe diseases, they need definitive diagnosis.

Aims: We aim to present a case of an azygos vein aneurysm and to highlight the importance of accurate diagnosis and appropriate management.

Methods: We present the case of a 50-year-old male who was referred after a paratracheal lesion was incidentally discovered on a computed tomography (CT) of the chest performed for an episode of shortness of breath. Subsequent CT confirmed the persistence of the lesion, raising suspicion of a paraganglioma or an enhancing lymphnode without excluding a beginning lymphoma. Following multidisciplinary discussions, a combined endo-esophageal and endo-bronchial ultrasonography was performed. However, this yielded inconclusive results: at ultrasonography a saccular lesion was seen and the biopsy showed an organized thrombus. After novel discussion in the multidisciplinary board, we decided to go ahead with more invasive diagnostic measures.

Results: A multi-port exploratory thoracoscopy was performed: a lesion firmly attached to the azygos vein was identified. After mobilization from the esophagus and trachea, successful removal was achieved through resection of the azygos arch. The postoperative course was uneventful. Pathology confirmed the venous malformation in form of a saccular aneurysm of

the azygos vein, containing organized thrombus.

Conclusion: Azygos vein aneurysm is a rare condition that can mimic a chest neoplasm, necessitating thorough investigations to rule out alternative diagnoses. Endoscopic ultrasound provided a strong diagnostic suspicion that was finally confirmed by thoracoscopy.

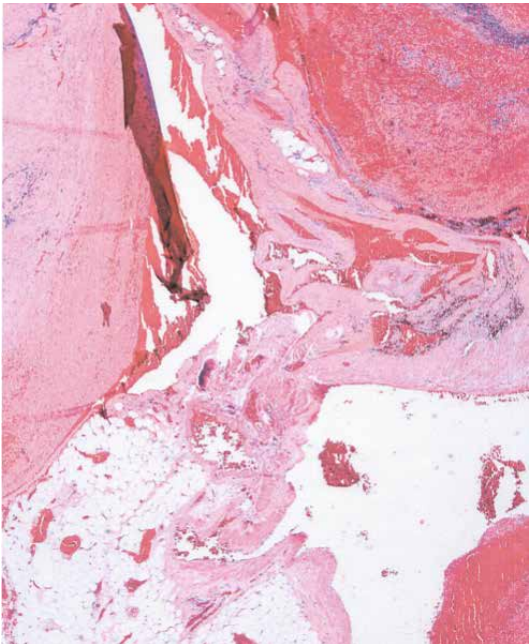


Figure 1. Pathology image



Figure 2. CT image

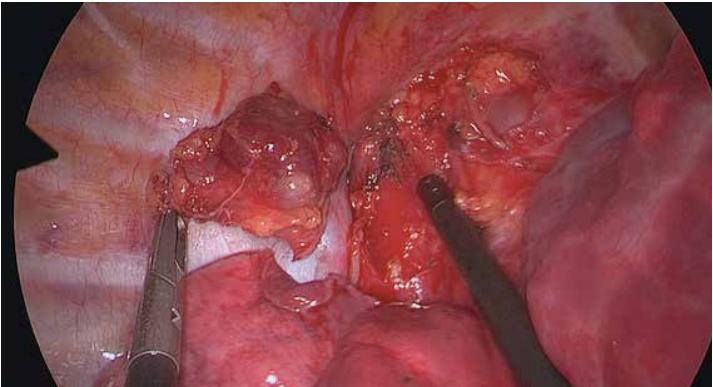


Figure 3. Per-Operative image

Multidisciplinary Treatment of a Complex Type 1 Mirizzi Syndrome

E. Capuano^{1,2}, A. Cristaudi², V. Sitta², A. Ferrario Di Tor Vajana^{1,3} (¹surgery, Clinica Luganese Moncucco, Lugano; ²Visceral Surgery, EOC Ente Ospedaliero Cantonale, Lugano; ³Surgery, Swiss Surgical Practice, Lugano)

Background: Mirizzi syndrome (MS) occurs when a gallstone lodged in the cystic duct or Hartmann pouch causes extrinsic compression of the common bile duct (CBD) or common hepatic duct. Due to the risk of intraoperative complications, high conversion rates, and biliary duct injury, surgical management is challenging.

Aims: This case report aims to explore the multidisciplinary management and therapeutic chal-

lenges of a type 1 Mirizzi syndrome, discussing the decision-making process and outcomes following complex endoscopic and surgical treatments.

Methods: A retrospective analysis of a single patient case was performed, including clinical data, imaging and invasive procedures. A literature review was conducted using Pubmed and Scopus databases with specific keywords focusing on cystic duct stones leading on Mirizzi type 1.

Results: A patient with obstructive jaundice and elevated hepatic enzymes underwent a Magnetic resonance cholangiopancreatography (MRCP) detected a CBD stone with MS features, including an elongated cystic duct (figure 1).

An Endoscopic retrograde cholangiopancreatography (ERCP) with biliary drain placement initially cleared the biliary tract, but post-procedural pancreatitis ensued.

Deteriorating symptoms led to a CT scan, uncovering a residual gallstone.

Another ERCP was conducted, it was not technically possible to remove the stone, a biliary stent was placed, clinical conditions improved.

The patient was then transferred to a specialized center for hepatobiliary surgery. A laparoscopic cholecystectomy with the rendez- vous technique was planned.

The procedure was complicated due to stone migration into the left intrahepatic biliary system, which was managed with a biliar stent. After three weeks, endoscopic removal of the intrahepatic stones was successfully performed (figures 2 and 3). A follow-up MRI at two months confirmed the absence of residual stones and a normal biliary tree, with full recovery.

Conclusion: MS may require a multidisciplinary approach and individualized treatment. The complexity of this case highlights the importance of specialized hepatobiliary centers for achieving optimal outcomes.

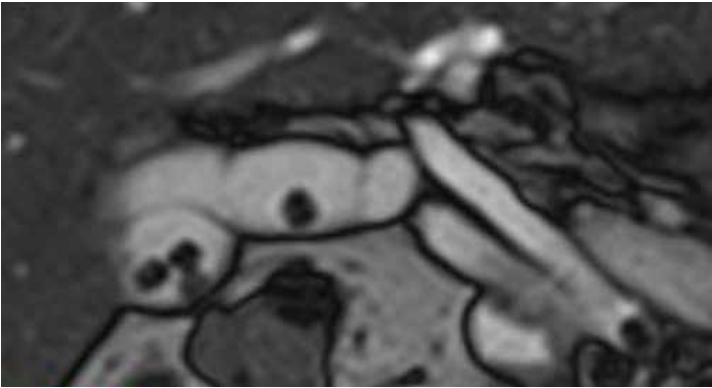


Figure 1. Endocholedochal calculus at the confluence of the cystic duct



Figure 2. Endoscopic view showing the successful removal of gallstones from the biliary tract

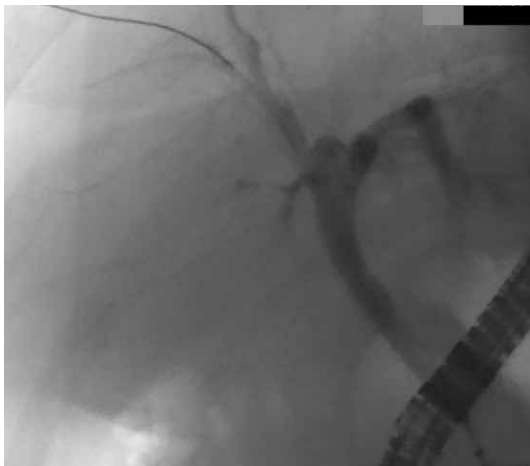


Figure 3. ERCP image demonstrating the patency of the intrahepatic bile ducts..

Complete Thoracic Endovascular Aortic Repair with Insitu-Fenestration Under Cerebral Perfusion with ECMO – A Case Report

B. Reutersberg, D. Reitnauer, L. Meuli, A. Zimmermann (Universtiy Hospital Zurich, Zurich)

Background: Advanced endovascular aortic therapy now utilizes laser probes to seamlessly incorporate individual patients supra-aortic branches via in-situ fenestration into endoprostheses. This offers treatment alternatives for patients ineligible for classic open cardiothoracic surgery due to anticipated high morbidity and mortality rates.

Aims: We present Switzerland's first complete thoracic endovascular aortic repair (TEVAR) with insitu fenestration in form of a case report.

Methods: Patient gave informed consent.

Results: A 71-year-old female patient presented with infective native aortic aneurysms of the ascending (zone 0) and descending aorta (zone 5), most likely after treated intraspinal empyema and haematogenous dissemination of *Streptococcus pneumoniae*. Following an interdisciplinary case discussion with cardiac surgery, the perioperative risk of a completely open biological (xenological) procedure was deemed too high. The decision was made in favour of a minimally invasive alternative in the form of a TEVAR with insitu fenestration for the supraaortic branches under cerebral ECMO protection, as well as long-term antibiotic suppression therapy. The operation was performed at the beginning of 2024, starting with a transposition of the left common carotid artery to the left subclavian artery (LSA). A TEVAR was then implanted percutaneously transfemorally in zone 0 to zone 3, which was subsequently provided with in-situ laser fenestrations for the brachiocephalic trunk and the LSA under cerebral ECMO perfusion (via right axillary artery Dacron-conduit). The fenestrations were lined with bridging stentgrafts. Finally, a distal extension was performed with two further thoracic endoprostheses landing just above the coeliac trunk. The postoperative course was uneventful, especially with no neurological deficit. CTA detected a small endoleak type 3, which was already regressing in the further course.

Conclusion: In limited cases, where alternatives are associated with significantly increased morbidity and mortality, the method described offers a relatively safe alternative. Long-term results are not yet available.



Figure 1. Total insitu endo arch repair

Surgical Management of Refractory Venous Ulcers in a Patient with Extensive Dystrophic Subcutaneous Calcifications: A Case Report

D. Da Rocha, E. Psathas, M. Menth, H. L. Chan, B. Egger (HFR, Belfaux)

Background: Dystrophic subcutaneous calcifications (DSC) are rare and may occur in injured or devitalized soft tissue of patients with a normal calcium and phosphate metabolism. DSC are often associated with chronic venous disease (CVD). DSC have also been known to inhibit wound healing and to increase the risk of refractory venous leg ulcers (VLU), since calcium deposits in the wound bed support an ongoing inflammatory response.

Aims: We describe here the surgical management and outcome of a patient with a refractory VLU due to extensive DSC.

Methods: An 82-years old female patient was referred to our hospital due to bilateral chronic, non-healing leg ulcers. Her medical history consisted in arterial hypertension, morbid obesity (BMI=51 kg/m²), lower extremities lipolymphedema and CVD with recurrent ulcerations over the past 15 years. Initial assessment revealed a 30.8 cm² wound of the lateral aspect of the left tibia and a 6.9 cm² wound of the right lateral malleolar region. All wounds presented a severe inflammatory reaction of the skin around it with multiple areas of calcifications in the wound bed. Both legs were incompressible with a circumferential wooden-like sensation on palpation. (Figure 1). Serum Ca²⁺ and PO₄ levels were normal. Plain radiographies of both legs revealed extensive subcutaneous calcifications (Figure 2). Surgical treatment consisted in repeated surgical cleaning/removal of all calcifications from the wound bed and application of negative pressure wound therapy (NPWT). Secondary wound closure was achieved by meshed split-thickness skin grafts (STSG). (Figure 3)

Results: 3 weeks after admission the patient could be dismissed home and was followed then in our outpatient wound clinic for another 3 weeks until complete healing. (Figure 4)

Conclusion: Aggressive surgical cleaning/removal of all calcifications from the wound bed together with NPWT and secondary STSG application is an effective treatment for VLU due to DSC.



Figure 1. Venous leg ulceration of the left (a-b) and the right (c-d) tibial region, with presence of multiple areas of calcification in the wound bed, producing chronic periwound inflammation



Figure 2. Plain radiographies of lower extremities with extensive circumferential subcutaneous calcification, compatible with DSC



Figure 3. Left: Wounds presentation after surgical debridement and treatment with NPWT. Right: Excised calcified tissue from the wound bed



Figure 4. Clinical result 3 weeks after skin grafting

Adrenocortical Oncocytic Neoplasm: A Case Report

B. Picut¹, J. B. Dubuis², I. Fournier^{1,2} (¹General & Visceral Surgery Department, Valais Hospital, Sion; ²Visceral Surgery Department, Geneva University Hospitals, Geneva)

Background: Adrenocortical Oncocytic Neoplasms (ACONs) constitute approximately 10% of Adrenocortical Carcinomas (ACC), which is a rare disease with an estimated incidence of 0.7 to 2 cases per million per year. Traditionally perceived as non-functioning, recent data indicate that nearly 30% of ACONs exhibit hormone production, giving rise to manifestations such as Cushing's syndrome, virilization, and various other symptoms. This poses a significant challenge for the medical community in accurately diagnosing these cases.

Aims: This case report delineates a unique manifestation of ACONs in a 67-year-old woman with a decompensated metabolic syndrome and psychotic outbreak. The patient's clinical profile encompassed refractory hypertensive crisis, weight gain, and psychotic symptoms, necessitating a comprehensive medical investigation. Despite an initially inconclusive medical workup, the patient later reported abdominal symptoms conducting to abdominal computed tomography (CT). This showed a bilobed left adrenal mass measuring 8.5x1.8x2.2cm. The hormonal workup indicated only marginally elevated urinary catecholamines, prompting suspicion of a pheochromocytoma. This led to the decision for laparoscopic left adrenalectomy. Histological analysis revealed an oncocytic adrenocortical carcinoma, with a subsequent complete resolution of the patient's clinical symptoms.

Methods: –

Results: This case report highlights an oncocytic adrenocortical carcinoma characterized by a fully decompensated metabolic syndrome and psychotic symptoms, emphasizing the potential diverse hormonal secretions associated with this entity. In the backdrop of limited literature on ACONs, it underscores the necessity of a multidisciplinary approach in their management. Physiological normal hormonal panels may not definitively exclude the secretory nature of an adrenal mass, necessitating complementary assessments in cases of clinical suspicion.

Conclusion: In conclusion, ACONs present a substantial challenge for clinicians due to their varied clinical manifestations and the limitations of preoperative diagnostic modalities. A comprehensive biological workup is essential for establishing an optimal treatment plan. Emphasizing the efficacy demonstrated in this case, complete resection remains the primary approach to managing ACONs.



Figure 1. Preoperative Computed-Tomography ACONs

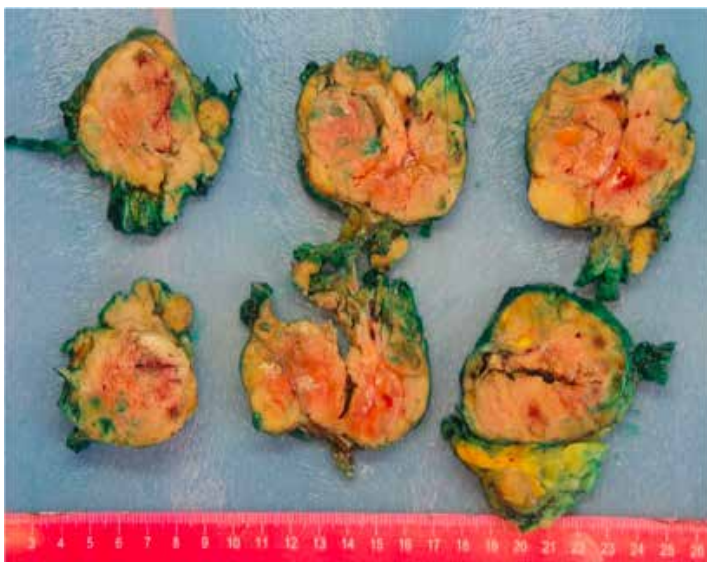


Figure 2. Macroscopic aspect of the left adrenal showing a 12cm mass



Figure 2. Intraoperative photograph depicting the cyst of the canal of Nuck following dissection from the round ligament

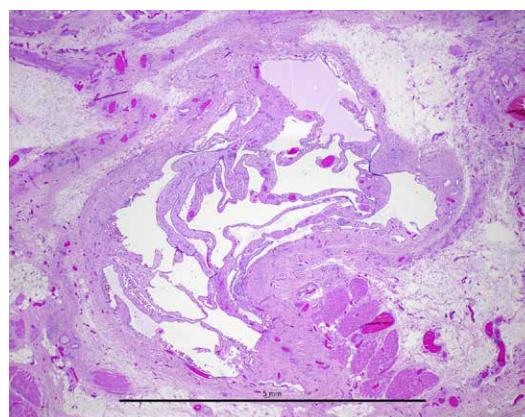


Figure 3. Histology hematoxylin and eosin staining: cystic structure localized within fibromuscular and adipose tissue, demonstrating a flat and rarely cuboidal mesothelial lining, consistent with a cyst of the canal of Nuck

Cyst of the Canal of Nuck in an Adult Female Patient: A Case Report

C. Nava¹, B. Geng¹, A. Litichinko¹, C. Jaccard², B. Egger¹ (¹Surgery, HFR Fribourg Cantonal Hospital, Villars-sur-Glâne; ²Pathology, Promed Medical Laboratory, Marly)

Background: The cyst of the canal of Nuck is an infrequent cause of inguino-labial swelling. Given its rarity in female adults and limited clinician awareness, misdiagnosis and mistreatment are common.

Aims: To raise surgeons' awareness and emphasize diagnostic considerations for this rare pathology necessitating surgical intervention.

Methods: A 21-year-old female patient presented with a two-month history of painful inguino-labial swelling on the right side, leading to multiple doctors' consultations. Radiological investigations, including ultrasound, computed tomography, and Magnetic Resonance Imaging (MRI), unveiled a 4x2.6x1.7cm multiloculated cystic lesion not connected to the peritoneal cavity (Figure 1). The patient was subsequently referred to our outpatient's clinic. Due to our suspicion of a cyst of the canal of Nuck, we proceeded to a surgical groin exploration.

Results: Surgical exploration revealed a cystic lesion in the round ligament without an associated hernia (Figure 2). Histological analysis confirmed a multi-locular cyst with a mesothelial lining, consistent with a Nuck's canal cyst (Figure 3). The postoperative follow-up was completely uneventful.

Conclusion: The cyst of the canal of Nuck results from an anomalous closure of the processus vaginalis along the round ligament, situated between the uterus and the labia majora. Anton Nuck documented this pathology already in 1691. The processus vaginalis typically closes within the first 5 years of life. Canal of Nuck cysts are rare, predominantly discovered within the first years of life. Since its occurrence in adulthood is rare, misdiagnoses are frequent due to lack of clinician's awareness. Accurate diagnosis mandates a comprehensive clinical examination and appropriate radiological imaging, with ultrasonography as the primary diagnostic tool and MRI reserved for complex cases. Treatment involves surgical exploration with complete excision, possibly combined with repair of a concomitant hernia. Awareness of clinical characteristics and diagnostic approaches is essential for timely and accurate management in both pediatric and adult populations.

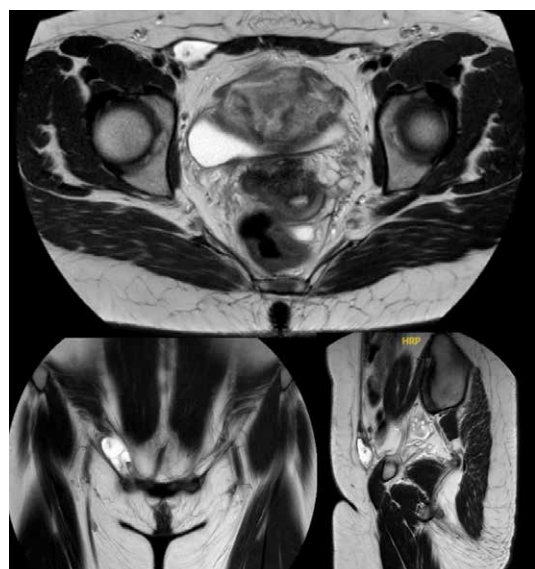


Figure 1. Magnetic Resonance Imaging showing a 4x2.6x1.7cm multiloculated cystic lesion not connected to the peritoneal cavity

Trauma-Related Still Asymptomatic Sigmoid Volvulus

T. M. Strati¹, A. Dontschev², B. Egger², M. Kauper² (¹HFR-Fribourg, Villars-sur-Glâne; ²HFR-Fribourg)

Background: The sigmoid colon is the most frequent colonic site for volvulus formation, found in 60%-75% of volvulus cases. Common etiologies include chronic constipation, routine use of laxatives, dolicho-sigmoid and psychiatric disorders. Trauma remains an extremely rare cause of sigmoid volvulus, only described once in the literature.

Aims: To report a still asymptomatic trauma-related sigmoid volvulus and its management.

Methods: A healthy 48-years old male patient was admitted to our emergency department after a 4-meter ladder-fall. Clinical assessment revealed a lumbar point tenderness but no abdominal pain, tenderness or distension. Focused Assessment with Sonography for Trauma (FAST) was negative, complete blood count and biochemistry values were completely normal. A whole-body trauma CT-scan did not show any other lesions than a complete sigmoid volvulus based on a dolicho-sigmoid. The patient underwent successful colonoscopic decompression and contrast enema demonstrated complete devolvulation.

Results: In-hospital follow-up was uneventful and since the asymptomatic-remaining volvulus was trauma-related, together with no previous history, no indication were found to proceed to a sigmoidectomy. Additional complete colonoscopy 6 weeks after the event did not show any signs of a persisting volvulus or other pathology. During a 11-months follow-up no signs of recurrence were present.

Conclusion: For anatomical reasons, the sigmoid colon is the most frequent colonic site for colonic volvulus formation. Mostly, it becomes apparent in frail and chronically-constipated patients, often suffering from concomitant psychiatric or neurologic disorders. In order to prevent recurrence in such patients, sigmoidectomy is usually offered. However, a still asymptomatic trauma-related sigmoid volvulus, which can immediately be decompressed, might be another entity, which is probably not an indication to proceed to surgery. The clinical course of our patient up to now – 11 months without recurrence – proves us right.

Transient Heat Stress Protects from Endothelial Injury during Prolonged ex-vivo Perfusion of Warm Ischemic Rat Lungs

R. Parapanov¹, A. Debonneville¹, J. Luginz², M. Allouche¹, L. Liaudet², T. Krueger¹ (¹Chirurgie thoracique, Centre Hospitalier Universitaire Vaudois, CHUV, Lausanne; ²Médecine intensive adulte (SMIA), Centre Hospitalier Universitaire Vaudois, CHUV, Lausanne)

Background: Ex-vivo lung perfusion (EVL) is a validated technique allowing evaluation and preconditioning of lung graft before transplantation (LTx). Moderate hyperthermia is recognized to induces cytoprotective effect, by increased production of specific proteins, well known as

heat shock proteins (HSPs).

Aims: We hypothesized that moderate heat stress applied during EVLP could improve lung graft function in a prolonged ex-vivo perfusion model via protection of lung endothelial function.

Methods: Rats were assigned into two groups: Control (n=5) or Heat stress (n=5). In both group, lungs were kept in situ for 1h at room temperature, warm ischemia, then heart-lung blocks were flushed with cold Perfadex® and kept for 1h at 4°C. Heart-lung blocks were mounted on the EVLP system for 6h. In Ctrl group, the temperature of perfusion solution was kept at 37°C during EVLP. In the HS group, perfusion solution was warmed to 41.5 °C for 30 min, (HS) then cooled down to 37°C to the end of EVLP. At the end of EVLP Perfusates and lung tissues were collected and frozen at -80°C for further analysis.

Results: Lungs exposed to HS displayed improved lung function with reduced edema, associated with increased production of HSPs, less oxidative stress and preserved lung endothelial function confirmed by protection of endothelial junctions (Claudin-5, VE-Cad), decreased release of endothelial markers (vWF, SDC-1, sPECAM-1). Moreover, perfusate level of cell damaged markers (HMGB1 and S100A8) and cytokines (IL-18, and TNF-α) were decreased in the HS group.

Conclusion: The application of mild heat stress improved functional outcomes of damaged donor lungs in an extended EVLP model via protection of lung vascular endothelium, decreased cell death and lung inflammation. These findings demonstrated that HS application during EVLP could be a promising therapeutic tool targeting lung endothelium, known to play important role in induction of primary graft dysfunction following lung transplantation.

Doege potter Syndrome: A Giant Solitary Fibrous Pleural Tumor Causing Severe Hypoglycemia

C. de Vico¹, C. M. S. Tappero², E. Fontana³, J. A. Lutz⁴, B. Rouiller⁴ (¹General Surgery, HFR, Fribourg, Fribourg; ²Radiology, HFR, Fribourg, Fribourg; ³Endocrinology, HFR, Fribourg, Fribourg; ⁴Thoracic surgery, HFR, Fribourg, Fribourg)

Background: Doege-Potter syndrome constitutes a rare entity induced by a paraneoplastic production of Big-IGF2 causing hypoglycemia mainly due to a solitary fibrous tumor (SFT) of the pleura. The disease onset occurs in most people between 40 and 60 years old. Complete excision of the tumor is the treatment of choice. For larger tumors, preoperative embolization may be useful to minimize blood loss. The microscopic features for malignant potential are high mitotic activity, high cellularity, pleomorphism and presence of necrosis.

Aims: We present the case of a patient with Doege-Potter syndrome with concomitant SFT of the pleura resected en bloc with a diaphragmatic patch and a lung wedge resection.

Methods: A 44 years old woman with no prior medical history presented few months earlier with severe hypoglycemia. Outpatient workup showed suppressed insulin secretion and a thoracic CT-scanner revealed a large tumor of the right chest suggesting SFT. We decided for embolization followed next day by surgery through a hemi-clamshell. The en bloc resection with diaphragmatic patch and lung wedge resection was followed by reconstruction of the diaphragm with a Prolene mesh.

Results: Pathological examination showed a SFT of 17.5cm in diameter with sound margins. No further features of malignancy was found, especially in the immunohistochemical examination (Mitotic activity, ki67, CD34, S100 and CK116). Recovery from hypoglycemia was observed slightly after the embolization and then clearly postoperatively. Big-IGF2 results are still in process.

Conclusion: Surgical management preceded by embolization allowed a safe removal of the tumor through a hemi-clamshell. Histology confirmed the suspicion of SFT with no malignant features and return to normal glycemic levels was consistent with Doege-Potter syndrome.

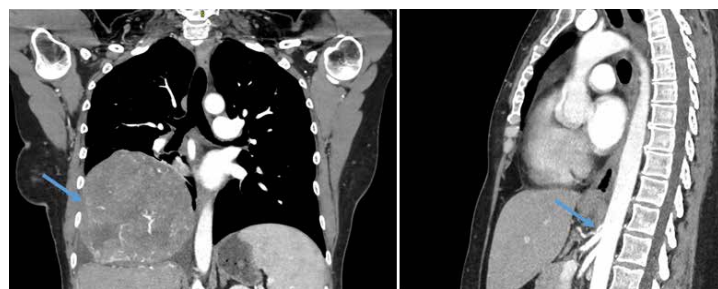


Figure 1. CT abstract

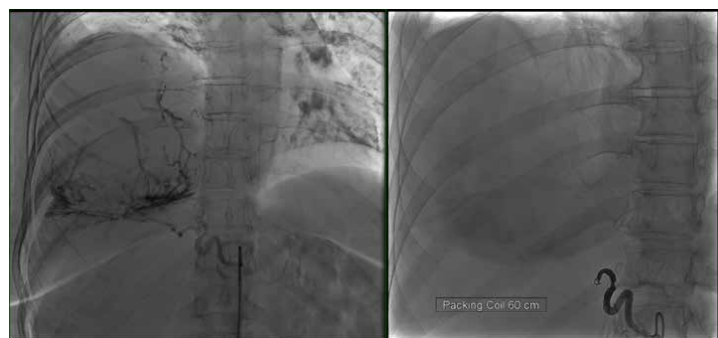


Figure 2. Embolisation abstract



Figure 3. OP abstract

Preoperatively Elevated C-Reactive Protein Level as an Independent Risk for Postoperative Complications After Pelvic Exenteration: A Single Center Retrospective Study

C. Pfisterer¹, C. Engerer², M. Al-Saeedi², A. Brandl², E. Khajeh², M. Loos², A. Mehrabi², C. Kahlert² (¹Universität Heidelberg, Freiburg DE; ²Klinik für Allgemein-, Viszeral- und Transplantationschirurgie, Universitätsklinik Heidelberg, Heidelberg)

Background: The main indications for oncologic pelvic exenteration (PE) with curative intention are locally advanced and recurrent malignant pelvic tumours. These complex and often multivisceral resections require surgical expertise as well as an interdisciplinary approach and are often associated with a high postoperative morbidity and mortality rate.

Aims: The aim of this study was to identify potential predictors for postoperative complications.

Methods: This is a monocentric, retrospective study of consecutive patients (n=412) undergoing PE due to pelvic malignancies between 2008 and 2022. Patient-, disease-, and surgery-related factors were investigated. The primary endpoint was major complications during the hospital stay (Clavien-Dindo≥3b). The secondary endpoint was 90-day postoperative mortality. Statistical analyses were conducted using Chi-Square test and binary logistic regression model.

Results: A total of 412 patients were included in the analysis, with colorectal cancer as the most common tumour site (n=299). The majority of patients underwent posterior PE (n=341), while 71 were treated with total PE. The mean age was 62.6 (±12) years. Major complications occurred in 149 patients (36.2%); 90-day mortality rate was 4.6%. Patient age (p=0.038, OR1.021), ASA score ≥3 (p=0.012, OR1.823), preoperative CRP>16mg/dl (p=0.007, OR1.945) and blood loss during surgery (p=0.001, OR1.340) were identified as independent risk factors for major complications in regression model. Predictors associated with increased 90-day mortality were patient age (p=0.002, OR1.126), preoperative CRP>16mg/dl (p=0.019, OR4.096) and long operation time (p<0.001, OR1.509).

Conclusion: The present study revealed preoperative CRP>16mg/dl as an independent risk factor for an inferior postoperative outcome after pelvic exenteration, despite the already known predictors such as patient age, ASA score, and blood loss. CRP is known to be a marker for malignant potential and co-morbidities. It might be valuable to consider preoperative CRP level as part of the preoperative risk assessment for patients treated with PE.

Laser Hemorrhoidectomy: A Preliminary Single Center Results of 78 Patients

L. Regusci, K. Galetti, P. Giacomelli, F. Salmoiraghi, L. El Ghorayeb (Surgery, EOC, Ospedale Regionale di Mendrisio, Mendrisio)

Background: Laser hemorrhoidectomy is an innovative, minimally invasive technique for treating hemorrhoids stages I to III. Utilizing a laser diode, it aims to minimize bleeding and reduce operation time. This technique is emerging as a strong competitor to more conventional methods such as the Milligan-Morgan (MM) and Recto Anal Repair (RAR) procedures, which are often associated with significant pain and prolonged recovery periods.

Aims: We report our data on laser haemorrhoidectomy and discuss the results.

Methods: We analyzed data from patients who underwent outpatient hemorrhoid treatment (Laser, MM, RAR, or a combination) over a three-year period, from June 2021 to December 2023. The study's primary outcomes included operation time, immediate post-operative pain (assessed using the Visual Analogue Scale (VAS) from 0 to 10), and pain evaluations at one and four weeks post-surgery, as well as the time to return to daily activities. The Patient Generated Index (PGI) was used for quality of life.

Results: During the study period, a total of 78 laser hemorrhoidectomy procedures were performed, 42 of which were exclusively laser surgeries. The median surgery time was 40 ± 10 minutes for the conventional techniques (with or without laser treatment), compared to 20 ± 10 minutes for the laser-only. The energy delivered was on average 300 J per pile. Patients receiving laser treatment reported negligible immediate post-operative pain, in contrast to those undergoing combined/standard techniques, who often required complex pain management strategies, including hospitalization. Pain assessments at 1 and 4 weeks post-operation revealed significantly lower scores in the laser-only group, indicating a quicker return to daily activities. Complications consisted of minimal bleeding in 4 patients (5%), severe pain and acute fissure in one patient (1%) and early recurrence in one patient (1%).

Conclusion: Laser treatment for hemorrhoids stages I-III demonstrates lower overall pain and faster recovery times, making it a viable option over conventional methods. Despite the established role of traditional techniques in clinical practice, their higher pain assessments warrant consideration of laser treatment as a preferable alternative.

Ceecal Volvulus in a Tetraplegic Patient

A. Osterwalder, Y. Fringeli, S. Reck, S.A. Käser (Klinik für Allgemein-, Viszeral-, Plastische, Thorax- & Gefäßchirurgie, Bürgerspital Solothurn, Solothurn)

Background: Colonic volvulus represents a rare cause of intestinal obstruction in adults, and caecum is involved in one quarter of cases. In patients with spinal cord injuries (SCI), its incidence is higher (2.6%) and its diagnosis often delays due to mimicking coexisting conditions, like obstipation or Ogilvie syndrome, inconclusive clinical findings and lack of subjective complaints. Typical clinical signs of peritonitis can be completely absent in tetraplegic patients. The fibres responsible for the visceral pain origin at the level T1-L3 and the vagus nerve serve primarily for the transmission of reflexes.

Aims: To highlight the difficulties to diagnose an acute abdominal condition in patients with SCI due to impaired sensation and concomitant co-morbidities, which can mislead the exact diagnosis.

Methods: We report a case of ceecal volvulus in a tetraplegic patient.

Results: A 60-year-old female patient with an 11-year-history of incomplete tetraplegia (sub C4) who presented on the emergency department with progressive abdominal distension, loss of appetite and slight abdominal pain since one week. Diminished faeces noticed during the regularly performed manual emptying over the last days. Clinically, the patient presented with a massive abdominal distension without signs of peritonitis. Laboratory findings showed leucopenia (2.6 G/l), elevated CRP (83 mg/l) and hyperlactatemia (6.0 mmol/l). The computerized tomography of the abdomen revealed a colonic volvulus with a coffee bean sign (figure 1). An urgent laparotomy was performed and confirmed a ceecal volvulus with necrosis (figure 2).

Conclusion: Spinal cord injuries represent a risk factor to develop colonic volvulus. Due to unreliable clinical signs and symptoms, early use of computerized tomography or magnetic resonance imaging is advocated in unclear abdominal conditions.



Figure 1. Thoraco-abdominal computed tomography scout view with a typical coffee bean sign

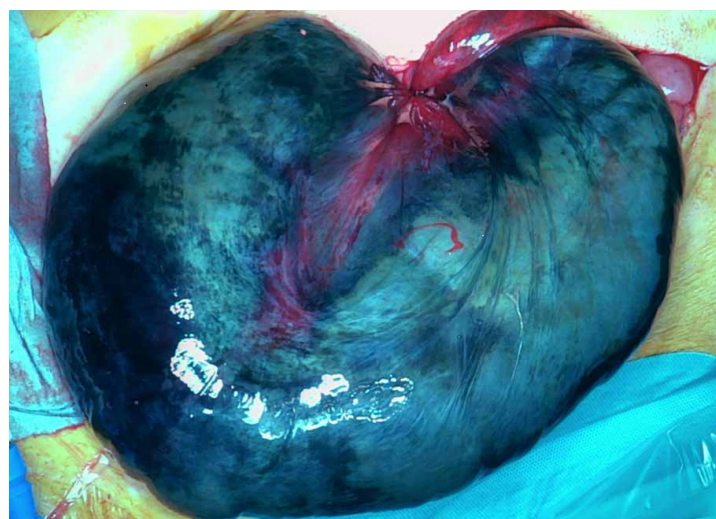


Figure 2. Intraoperative finding with necrosis of the distal ileum, caecum and proximal ascending colon

Giant Unknown Abdominal Tumor in Emergency Department

E. Capuano¹, A. Donadini^{2,3,4} (¹Surgery, Clinica Luganese Moncucco, Lugano; ²Visceral Surgery, Swiss Surgical Practice, Lugano; ³Visceral Surgery, Clinica Luganese Moncucco, Lugano; ⁴Visceral Surgery, CHUV: Centre Hospitalier Universitaire Vaudois, Lausanne)

Background: Gastric cancer, particularly adenocarcinoma, poses a substantial health burden with its high mortality rate.

Aims: We report a rare case of a large tubular papillary gastric adenocarcinoma with multi-organ abdominal invasion, emergent due to mass size and suspected active hemorrhage, in the absence of preceding symptoms.

Methods: A detailed retrospective analysis of a single patient case was performed, including clinical data, imaging, surgical procedure, and histopathology. A targeted literature review was conducted using Pubmed and Scopus databases with specific keywords focusing on huge asymptomatic gastric cancer and the emergency surgery for gastric adenocarcinoma.

Results: A patient with no known history of gastric tumors presented with abdominal pain and anemia. Medical imaging (Figure 1) revealed a substantial mass adjacent to the stomach, transverse colon, and small intestine, with indications of active bleeding. Under typical circumstances, such tumors are evaluated with gastroscopy and addressed laparoscopically; however, the tumor's dimensions and the suspected active bleeding necessitated immediate open surgery. The patient underwent successful en-bloc resection (Figures 2 and 3) and intestinal reconstruction. Postoperative recovery was uneventful. Histopathological examination confirmed a well-differentiated tubulo-papillary gastric adenocarcinoma with lymph node metastasis, expressing CK7, HER2, and microsatellite instability markers. Despite recommendations for adjuvant chemotherapy, the patient opted for surveillance only.

Conclusion: This case highlights diagnostic and therapeutic challenges in managing asymptomatic gastric cancer and underscores the need for early detection strategies. The deviation from standard management due to tumor size and active bleeding emphasizes the necessity for a flexible approach in surgical emergencies. The patient's refusal of adjuvant therapy raises questions regarding postoperative care and patient autonomy, warranting further exploration in clinical and ethical research domains.



Figure 1. Round mass in the central abdomen with an axial diameter of 13x11 cm and a longitudinal diameter of 11 cm, showing contrast enhancement of the lesion after contrast agent injection

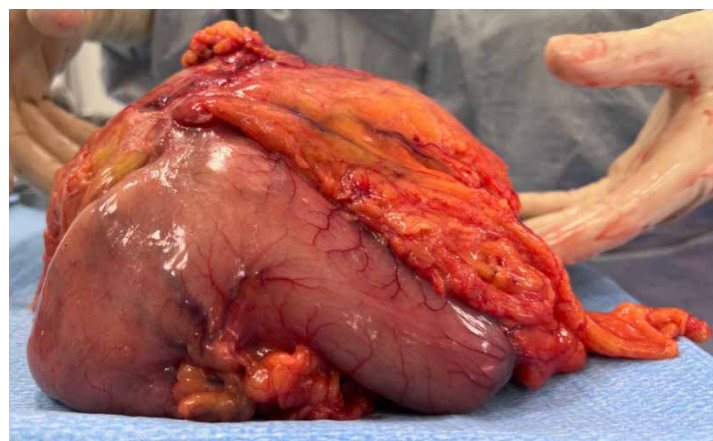


Figure 2. Macroscopic aspect of the mass with the invasion of stomach



Figure 3. Macroscopic aspect of the mass with the invasion of stomach, transverse colon right portion and small intestine

Complex Penetrating Transmediastinal Flagpole Injury

J. Schumacher, G. Lang, I. Opitz, D. Schneider (Department of Thoracic Surgery, University Hospital Zurich, Zurich)

Background: Management of transmediastinal penetrating injuries (TMI) is challenging, and outcome is associated with mortality rates up to 60%.

Aims: Herein, we report a case with a complex TMI caused by a long flagpole.

Methods: A 61-year-old woman was helicoptered to our trauma center with a transthoracic impalement injury after a boating accident in which she fell on a flagpole. The rescue team brought in a stable patient. Primary survey revealed no further injuries. Initial chest x-ray showed an approximately 30-centimeter radiopaque foreign body penetrating the left thorax. Based on the trajectory, we assumed involvement of mediastinal organs in addition to injury of the lungs.

Results: CT confirmed that the flagpole entered the left thorax through the 3rd ICS, pierced the left upper lobe, and penetrated the mediastinum just above the aortic arch. The flagpole then passed between the trachea and esophagus before settling in the apex of the right lung. In order to perform the CT, the flagpole had to be shortened on the entrance side with a cold welder. We performed bronchoscopy and esophagoscopy before surgery. Despite extrinsic compression on the ventral esophageal wall and minor tracheal deviation, no evidence of an endoluminal lesion was found. The flagpole was manually stabilized throughout the management. We performed a clamshell incision in the 4th ICS. As suspected, the flagpole penetrated both upper lobes and the mediastinum just above the aortic arch. The flagpole was carefully withdrawn, after which the aortic arch was found to be uninjured. The pulmonary lacerations and one segmental artery of the left upper lobe were sutured. The patient was extubated after 7 hours and remained in the ICU for three days.

Conclusion: This case of complex TMI emphasizes the importance of shortening impalement objects exceeding CT length limits, and the critical role of multidisciplinary trauma management.

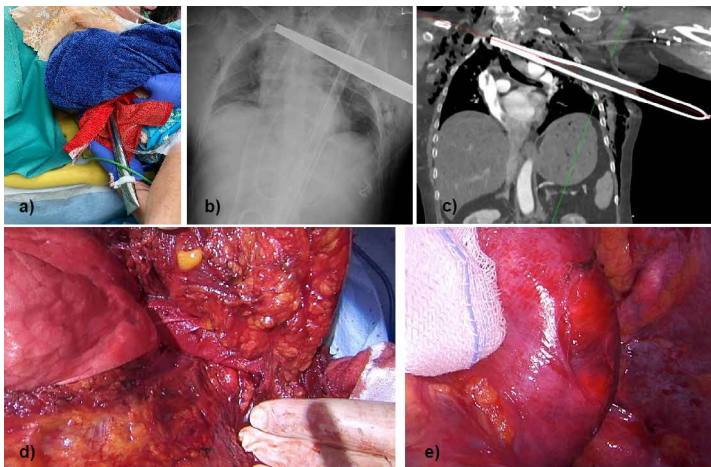


Figure 1. a) Penetrating swiss flagpole b) Initial chest x-ray c) whole body CT d) Flagpole penetrating the left upper lobe e) Aortic arch

Perforated Femoral Richter's Hernia: A Case Report

A. López Sivilat, B. Egger (Chirurgie générale, Hôpital Cantonal de Fribourg, Villars-sur-Glâne)

Background: Richter's hernia is defined as an abdominal hernia in which only a portion of the circumference of the bowel is entrapped in the hernial orifice. It occurs most often in the sixth and seventh decade and is more frequently in females. The most common site is the femoral

ring followed by the inguinal ring. Richter's femoral hernia represents 15% of all strangulated hernias with a mortality rate of 17% - 62%.

Aims: We present here the case of a perforated femoral Richter's hernia of the small bowel, which was treated with segmental small bowel resection and primary mesh repair through an inguinal approach.

Methods: A 73-years old patient presented at our emergency department with acute abdominal pain associated with nausea and vomiting for the last 4 days. Physical examination revealed a slightly distended abdomen with a small, round and painful right inguinal mass. Performed CT-scan showed a mechanical small bowel ileus due to an incarcerated right femoral hernia. The patient underwent surgery by a direct inguinal approach. On opening the hernia sac, a Richter's hernia was found, showing necrosis of the incarcerated anti-mesenteric small bowel wall with a small perforation. Segmental small bowel resection with latero-lateral 2-layer anastomosis was performed. After closure of the peritoneum, a trans inguinal repair with pre-peritoneal placement of a Parietex™ Hydrophilic Anatomical mesh was done.

Results: Recovery was uneventful and the patient discharged home 3 days later. At a 6-weeks outpatient's control the patient was asymptomatic with no evidence of recurrence.

Conclusion: Perforated Richter's hernia is a rare but misleading entity with a high mortality rate, which might be reduced by quick diagnosis and early surgery. In cases of clean or little contaminated wounds, primary repair with mesh implantation should be considered during the same operation.



Figure 1. Abdominal CT axial view showing a right femoral hernia (arrow)



Figure 2. Abdominal-CT sagittal view showing a right femoral hernia associated with a mechanical ileus



Figure 3. Richter's hernia with millimetric perforation (arrow)

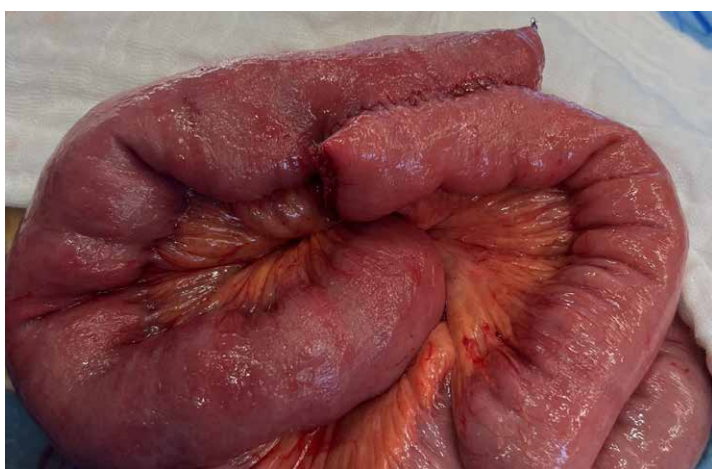


Figure 4. Bowel resection with latero-lateral two layers anastomosis

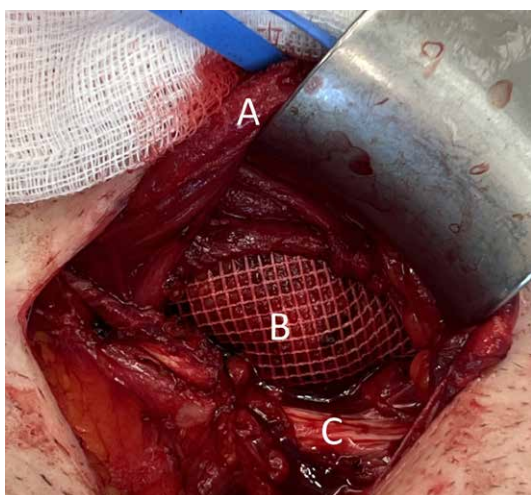


Figure 5. Pre-peritoneal mesh placement. A: inguinal cord; B: mesh; C: inguinal ligament

specifically designed questionnaires. Patient outcomes were compared with healthy controls. Independent factors associated with poor digestive performance were identified by multivariable analysis.

Results: Sixty-five postoperative patients and 50 healthy volunteers participated in this study. Compared with controls, patients had worse outcomes for dysphagia, GERD, DS, and HRQL, but not for DGCE. Multivariate analysis showed a significant correlation of reduced digestive performance with ASA score, squamous cell carcinoma, open or hybrid surgical approach. Low serum iPTH at the end of surgery is the earliest predictor of postoperative hypocalcemia after total thyroidectomy and (neo)adjuvant therapy. In contrast, no individual patient factor was found to be associated with dumping syndrome.

Conclusion: Digestive function and HRQL are substantially impaired after Ivor Lewis esophagectomy for cancer. Comorbid patients undergoing multimodal treatment and open access surgery for squamous cell carcinoma have the highest risk of poor functional outcome.

Quality of Life and Independent Factors Associated with Poor Digestive Function after Ivor Lewis Esophagectomy

V. Dirr¹, D. Vetter¹, T. Sartoretti², M. A. Schneider¹, F. Da Canal¹, C. A. Gutschow¹ (¹Visceral Surgery and Transplantation, University Hospital Zurich, Zurich; ²Institute of Diagnostic and Interventional Radiology, University Hospital Zurich, Zurich)

Background: Transthoracic esophagectomy results in a radical change in foregut anatomy with multiple consequences for digestive physiology.

Aims: The aim of this study was to identify factors associated with poor functional outcomes by assessing multiple dimensions of digestive performance and health-related quality of life (HRQL).

Methods: Patients with cancer-free survival after Ivor Lewis esophagectomy were included. Four functional syndromes (dysphagia, gastroesophageal reflux disease (GERD), delayed gastric conduit emptying (DGCE), and dumping syndrome (DS)) and HRQL were assessed using

