cIONM in intrathoracic goiter – different decision of sternotomy
(Associate ID: 52)

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**Background:**

In about 1-15% of thyroidectomies, the goiter is intrathoracic with higher rates of complications and a somewhat different management. In the literature sternotomy should only be performed in cases of previous cervical thyroidectomy, invasive carcinoma and truly intrathoracic location.

**Materials and methods:**

We retrospectively analyzed 160 patients (269 nerves at risk) with thyroid surgery for intrathoracic goiter between 2001 - 06/2017. Intrathoracic goiter was defined when the retrosternal part exceeded 50% of the whole goiter. There were 83 women (52%) and 77 men (48%) with a median age of 63 years (range 34 to 98 years). 32 patients (20%) presented with a recurrent goiter. cIONM was used in 26 patients (16.2%).

**Results:**

A cervical approach was used in 126 patients (75%). 38 patients required median sternotomy and in two patients a lateral thoracotomy was performed (25%). In our collective most recurrent intrathoracic goiters were in the posterior left mediastinum. Indication for sternotomy was the complicated nerve course on the right side, whereas the size of the tumor on the left side was the reason for sternotomy.

The preoperative decision for sternotomy was only in one case in the group of cIONM, whereas without cIONM in 60% of operations.

Postoperative complications in these 160 patients were 16 transient hypocalcaemias, 10 transient and 3 permanent recurrent nerve palsies and 3 patients with collar secondary bleeding. There was no increasing complication rate in recurrent intrathoracic goiters. There was no significant difference between both groups.

**Conclusion:**

cIONM doesn’t reduce the rate of sternotomy actually, but it changed the operation strategy of sternotomy. It reduced the preoperative decision of sternotomy in case of intrathoracic goiter.
Duodenal and ampullary neuroendocrine neoplasms
(Abstract ID: 160)

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Background:

Neuroendocrine neoplasms of the gastroenteropancreatic system (GEP-NEN) are a heterogeneous entity of increasing incidence. Duodenal NEN (dNEN) are extremely rare and account for about 4% of all GEP-NEN. Clinical management of dNEN remains controversial. In this study we aimed to assess the outcome of surgical management, with a focus on small-sized and well differentiated (G1) dNEN.

Materials and methods:

We conducted a retrospective study on all patients undergoing surgery for dNEN at our institution between 2002 and 2017. Clinicopathologic features, perioperative outcome and survival were analyzed.

Results:

A total of 27 patients were identified. Out of 25 patients presenting with their primary tumor, 22 patients (88%) underwent formal oncological resection whilst 3 patients (12%) received local resection. One (3.7%) patient presented with recurrent disease after endoscopic resection and one with diffuse metastatic disease. Surgical 90-day mortality was 1 of 27 (3.7%). The 5-year overall survival rate was 71% in the entire cohort, 74% in patients undergoing resection for primary pNEN, 79% for patients undergoing formal oncological resection, 100% after formal resection for pN0 and 73% for pN1 tumors. Out of 22 patients undergoing formal lymphadenectomy, 17 (77%) patients had lymph node metastasis (pN1). The rate of metastases correlated with the size of the tumor. Of patients presenting with tumors <1cm, 1-2cm, >2cm, 2 of 5 (40%) patients, 9 of 11 (82%) patients, and 6 of 6 (100%) patients had metastases (pN1 or pM1), respectively. Furthermore, 8 of 13 (62%) patients with G1 dNEN had lymph node metastases and 2 of 13 (15%) had liver metastases.

Conclusion:

Our data show that even well differentiated and small dNEN have a considerable risk of metastases. These data challenge the concept of surveillance or of local resection even for small and/or well differentiated dNEN.
CRP promotes proliferation and metastasis in pancreatic neuroendocrine neoplasms 
(Abstract ID: 220)

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Background:
Elevated pre-operative C-reactive protein (CRP) serum values have been reported to be associated with poor overall survival for patients with pancreatic neuroendocrine neoplasms (pNEN). The aim of this study was firstly to prove this statement and secondly to investigate mechanisms connecting CRP and malignant behavior in pNEN, since reasons for this phenomenon are unclear.

Materials and methods:
Patients who underwent pancreatic resections for pNEN between 10/2001 and 03/2016 were identified from a prospective database. Clinicopathological parameters such as serum CRP and tumor grading as well as overall (OS) survival (DFS) were analyzed. The human pNEN-cell-line BON1 as well as tumor tissue (n = 14) and 76 pNEN patient sera were analyzed using Western blot, ELISA of cell line supernatant and patient serum, invasion assays, PCR and immunocytochemistry upon exposure to pro-inflammatory mediators including IL-6 and CRP.

Results:
Pre-operative serum CRP of 411 pNEN patients was analyzed. 5-year OS of patients with CRP <5 mg/l was 83.4%, between 6 and 19 mg/l was 77.4% and above 19 mg/l 31.3% (p<0.001). Although CRP was significantly associated with grade (mean CRP; G1: 5 mg/l, G2: 7.6 mg/l, G3: 22.3, p<0.001), significant differences in 5-year survival were also seen within G2 pNET, (n=157; CRP <5: 82.8%, 5-19: 75.7%, >19: 29.2%, p<0.001). In BON1 cells, inflammation (exposure to IL-6) up-regulated CRP expression and secretion. CRP stimulation of BON1 cells increased IL-6 secretion. Both CRP and IL-6 promoted proliferation and invasion of BON1 cells. This was accompanied by activation/phosphorylation of the ERK, AKT, and/or STAT3 pathways. Although known CRP receptors - such as CD16, CD32 and CD64 - were not detected on BON1 cells, internalization of CRP was shown. In patients, increased pre-operative CRP-levels (>=5 mg/L) were associated with significantly higher serum levels of IL-6 and G-CSF, as well as with increased CRP-expression and ERK/AKT/STAT3-phosphorylation in pNEN tissue.

Conclusion:
Pre-operative serum CRP is associated with unfavorable outcome in pNEN. Possible molecular reason may be CRP and IL-6 promoting ERK/AKT/STAT pathways activation as well as proliferation and invasion in pNEN, thus linking systemic inflammation and poor prognosis.
Synchronous antithyroid drug induced agranulocytosis and Fournier’s gangrene

(About ID: 309)

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Background:
Antihyroid drugs (ATD) such as thioimidazoles (methimazole = thiamazole, carbimazole) and propylthiouracil are commonly used for the treatment of hyperthyroidism. A life-threatening adverse reaction is agranulocytosis with an incidence of 0.1% to 0.5%. There are very few cases in literature showing that the intake of ATDs finally led to sepsis with accompanying tissue necrosis.

Materials and methods:
We present an unusual case of severe symptomatic agranulocytosis with sudden development of Fournier’s gangrene in a patient, who was treated with ATDs for hyperthyroidism due to Graves’ disease.

Results:
A 69-year-old female was referred to our hospital with fever and a sore throat. For 6 weeks she was treated with methimazole. Laboratory examinations revealed an agranulocytosis (leucocytes 0.5*10⁹/l (normally 4-10*10⁹/l), granulocytes 0.2%, lymphocytes 81.3%). The bone marrow aspirate showed markedly reduced mature form of granulocytes. In peripheral blood cultures pseudomonas aeruginosa was isolated. A perianal and perineal inflammation became visible and worsened within hours, spreading to the right gluteal region involving the genital, suprapubic and bilateral inguinal region. This case of Fournier’s gangrene required intensive medical care and multiple surgeries.

Conclusion:
Albeit being a rare case, the history of this patient emphasizes the importance of being aware of the adverse effects ATDs can provoke and underlines the necessity of a structured clinical management if they do occur. To our knowledge, this is the first report on synchronous antithyroid drug induced agranulocytosis and Fournier’s gangrene.
Transoral Endoscopic Thyroid Surgery: Tips and Tricks from First Clinical Series
(Abstract ID: 439)

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Background:
Promising new endoscopic transoral approaches to the anterior neck (TOETVA) have been described with good results and few complications, and the first access is key. A new device is proposed to allow the safe entrance of trocars in the subplatysmal space. This study describes the key steps in performing transoral thyroidectomy in clinical series.

Materials and methods:
The study shows the technique performed for unilateral thyroidectomies. The technical steps consisted of a 10 mm incision made at the center of the oral vestibule, followed by subplatysmal hydrodissection. The blunt dissector stick was inserted creating a space below the platysma to the anterior neck and the strap muscles. The blunt dissector is a metallic stick with an olive at the end and promotes progressive gain in subplatysmal space enlarging the operative field. Three trocars were inserted in the vestibular area. For better exposure, strap muscles were retracted laterally by external sutures. The isthmus was dissected and transected. Anatomical structures as the superior thyroid artery, parathyroid glands and the recurrent laryngeal nerve could be easily identified with magnified vision.

Results:
Preliminary clinical experience with transoral thyroidectomy after cadaver study showed optimal operative field due to subplatysmal dissection by the device with good exposition of thyroid and parathyroid glands. The cosmetic results were excellent.

Conclusion:
Transoral thyroid and parathyroid surgery through the vestibular approach is a growing promising technique for benign indications. Further studies in clinical series are needed to evaluate the broad indication of this technique.
Access for endoscopic transoral thyroidectomy in clinical series. Three laparoscopic trocars were inserted in the vestibular region gaining transoral access under the platysma muscle.
Transoral Endoscopic Thyroid Surgery: - New Introduction Device for producing Operative Field: a Feasibility Cadaver Study and First Clinical Series
(Abstract ID: 442)

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Background:

Today, minimally invasive thyroid and parathyroid resections for both benign and malignant tumors are rarely performed. Recently, promising new endoscopic transoral approaches to the anterior neck (Transoral endoscopic thyroidectomy vestibular approach; TOETVA) have been described with good results and few complications. A new device is proposed to allow the safe entrance of trocars in the subplatysmal space. This study evaluates the blunt dissection device in performing TOETVA in a cadaver model and the translation of the technique in performing clinical cases.

Materials and methods:

The technique was performed for 4 unilateral thyroidectomies in female cadavers with no preexisting neck operations. The technical steps consisted of a 10 mm incision made at the center of the oral vestibule, followed by subplatysmal hydrodissection. Then the blunt dissector stick was inserted creating a space below the platysma to the anterior neck and the strap muscles. The blunt dissector is a metallic stick with an olive at the end and promotes progressive gain in subplatysmal space enlarging the operative field. Three trocars were inserted in the vestibular area. For better exposure, strap muscles were retracted laterally by external sutures. The isthmus was dissected and transected. Anatomical structures as the superior thyroid artery, parathyroid glands and the recurrent laryngeal nerve could be easily identified with magnified vision.

Results:

Preliminary clinical experience with transoral thyroidectomy after cadaver study showed optimal operative field due to subplatysmal dissection by the device with good exposition of thyroid and parathyroid glands in all cases. Unilateral thyroidectomy was performed in a mean of 54min. The device allowed for good exposure in the clinical and cadaver experience. The cosmetic results were excellent.

Conclusion:

The new device is a promising feature to improve feasibility of transoral thyroid and parathyroid surgery through the vestibular approach. Further studies in clinical series are needed to evaluate the indication and broad application of this technique.
Transoral thyroidectomy. Introduction of three trocars in the vestibular area, gaining access in the subplatysmal space.
Ultrasonography alone is sufficient in the localization of enlarged parathyroid glands in patients with primary hyperparathyroidism  
(Abstract ID: 450)

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Background:

Technetium-sestamibi scintigraphy and ultrasonography (US) of the neck are the standard first line localization techniques in patients with primary hyperparathyroidism (pHPT). More recently computed tomography and magnetic resonance imaging have been adopted for cases with uncertain localization. The aim of this study was to analyze the accurateness of preoperative US as the only localization modality in patients with pHPT without intraoperative PTH measurement.

Materials and methods:

All patients with a pHPT who underwent parathyroidectomy between 10/1999 and 02/2017 and who had a preoperative ultrasonography as the only localisation technique were included in this retrospective observational study. A total number of 229 patients (177 females and 52 males) with a mean age of 58.6±13.7 years were included. Perioperative PTH levels and the clinical course were recorded.

Results:

In 220/229 patients the preoperative localisation revealed to be correct by the intraoperative finding (96%). Nevertheless, a significant perioperative drop of PTH levels of more than 50% was observed in only 216 cases (94%). In 4 of the remaining 13 cases the PTH levels on the first postoperative day confirmed healing. Nine patients showed a persistent disease. Six of them patients underwent a reoperation during the same hospital stay in our department and were healed as confirmed by normal PTH values after the reoperation. The remaining 3 patients were lost to follow-up.

Conclusion:

The overall cure rate of focused parathyroidectomy based on the finding of preoperative US was 96%. Ultrasonography should be considered the first preoperative localisation study in patients with pHPT. Major reasons therefore are the equal accuracy, the ease of performance, the ability to identify a coincidental thyroid disease and its cost-effectiveness compared with sesta-MIBI-scintigraphy.
Enhanced visualization of parathyroid glands during video-assisted neck surgery.
(Abstract ID: 470)

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Background:

Visualization and precise dissection of the parathyroid glands is a crucial step of thyroidectomy. Moreover, identification of parathyroid adenoma in patients with pHPT can be challenging due to the variable location of the abnormal parathyroid tissue. Near-infrared (NIR) fluorescence with or without indocyanine green (ICG) injection can be adopted during video-assisted neck surgery in addition to standard endoscopic magnification to enhance the visualization of the parathyroid tissue.

Materials and methods:

Between July and August 2017, 5 patients (1m, 4 w) underwent video-assisted neck surgery using a 5 mm 30° ICG-endoscope and the Modular IMAGE1 S™ Camera Platform with OPAL™ technology for NIR/ICG imaging (Karl Storz Endoskope, Tuttingen, Germany Ò). One patient suffered from primary hyperparathyroidism and underwent focused parathyroidectomy. The four remaining patients underwent thyroidectomy for multinodular goiter. The parathyroid glands were visualized first by near infrared autofluorescence due the endogenous fluorescence of the parathyroid tissue. Low-dose (2.5 mg/ml) indocyanine green was administered to visualize the vascular supply during and/or after the dissection of the parathyroid gland(s).

Results:

An endogenous parathyroid autofluorescence could be visualized by the NIR camera in all patients. The right upper parathyroid adenoma could be detected prior to fully dissection of the gland from the surrounding tissue guiding the surgeon for further dissection. Twelve out of 16 parathyroid glands have been visually identified during four total thyroidectomies. Eleven glands showed an autofluorescence prior to ICG injection. Further, ICG injection has been used for guiding the dissection of the gland in three cases and for confirmation of the vascular supply at the end of the procedure in the remaining cases. There were no intra or postoperative complications.

Conclusion:

The 5 mm 30° NIR camera allows enhanced visualization of the parathyroid tissue. This promising tool can became standard for video-assisted neck surgery. Nevertheless, further studies are needed to evaluate the results in larger cohort of patients.
Results of surgery for Graves’ disease in patients with persistent hyperthyroidism.  
(Abstract ID: 645)

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Background:

Antithyroid drugs are the first-line treatment for hyperthyroidism in Europe and Asia while radioiodine therapy is the preferred therapy in North America. Thyroidectomy remains the only treatment option in case of persistent hyperthyroidism due to failure of medical therapy or contraindication to radioiodine ablation. In this study we present the result of thyroidectomy performed in patients with manifest hyperthyroidism.

Materials and methods:

Between January 2000 and December 2016, 985 patients (801w, 184m; mean age 41±14 years) with Graves’ disease have been operated at our department. Among them, 69 patients (19 m, 50 w; mean age: 37.4 years) were referred to surgery by persistent hyperthyroidism. The data, including postoperative complications rate, were collected from a prospectively maintained database. Treatment with inorganic iodide was not performed prior to surgery. Pre- and postoperative laryngoscopy was routinely performed. Symptomatic patients for postoperative hypocalcaemia underwent calcium and/or PTH level control and were substituted with calcium and/or Vitamin D.

Results:

The incidence of postoperative numbness and/or tingling was 33%. Six patients underwent calcium therapy. In 17 cases Vit d substitution was necessary. Nevertheless, only four patients showed PTH levels consistent with a postoperative hypoparathyroidism (PTH <10pg/ml). The incidence of postoperative transient recurrent laryngeal nerve palsy calculated for nerves at risk was 2.9 %. Two patients required revision because of postoperative bleeding. The mean operating time was 73.6 minutes (range: 35-195 minutes). The mean hospital stay was 2.3 days (range: 2-6 days). One patient required postoperative observation for 24 hours at the intensive care unit because of self-limiting paroxysmal atrial fibrillation.

Conclusion:

Surgery for Graves’ disease under hyperthyroidism condition is associated with a significant incidence of symptoms of hypocalcaemia in the immediate postoperative course. The incidence of RLN palsy is tolerable and comparable to that of surgery for other thyroid conditions.
Evaluation of 18 years of adrenal vein sampling at the University Clinic of Leipzig – Is AVS still the adequate method to differentiate unilateral from bilateral adrenocortical hyperplasia?

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Background:

Primary hyperaldosteronism (PA) is the most common cause for secondary arterial hypertension. Gold standard in differentiating between bilateral adrenocortical hyperplasia and a unilateral aldosterone-producing adenoma, that can be treated by adrenalectomy, is the selective adrenal vein sampling (AVS). AVS is an invasive procedure that requires experience on the side of the investigator and that entails radiation exposure for patient and investigator.

Materials and methods:

We retrospectively analyzed the data of 50 AVS procedures, performed between January 1999 and May 2017 at the Department for Diagnostic and Interventional Radiology at the University Clinic of Leipzig, concerning fluoroscopic time, area dose product, difficulties during the procedure and examination results.

Results:

27 women and 21 men at the average age of 50 years (range: 30 to 74 years) were examined. 2 patients underwent two AVS procedures at different time points during the considered period. The fluoroscopic time lay between 0.8 min and 40.43 min (mean: 19.66 min). The range of the area dose product was 1002,00 µGy/sqm to 28783,00 µGy/sqm (mean: 6553,88 µGy/sqm). No laterization of aldosterone secretion was reported in 15 examinations, indicating a bilateral adrenocortical hyperplasia. Another 17 examinations showed an aldosterone laterization towards one side, leading to an adrenalectomy in 14 cases. The examination reports of 23 procedures stated difficult conditions, out of which in 13 cases the right adrenal vein could not be catheterized.

Conclusion:

Almost one third of AVS procedures reported difficulties during the examination. Only 32 examinations led to clear results concerning the laterization of aldosterone secretion. Both fluoroscopic time and area dose product varied widely between the 50 examinations, underlining the fact, that this procedure is highly dependant on the investigator's experience. Since PA is a rare diagnosis, it is difficult to gain the required expertise. Alternative, less invasive diagnostic methods for the differentiation of unilateral and bilateral adrenocortical hyperplasia are lacking. A promising approach could be the [123I]iodometomidate imaging, currently being developed at the University Clinic of Würzburg.
Frequency of postoperative dysphagia and vocal changes after thyroid and parathyroid gland operations
(Abstract ID: 823)

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Background:
Swallowing difficulties and vocal changes are one of the most frequent postoperative side effects after thyroid and parathyroid gland operations in the medium to long term. The prevalence and influence of possible risk factors were investigated in patients undergoing surgery at Ulm University Hospital.

Materials and methods:
Between May 2013 and October 2014, 399 patients with thyroid and parathyroid glands were operated at Ulm University Hospital. Excluded from the evaluation were 27 patients with already preoperatively existing (n = 10) or postoperative (n = 17) temporary or permanent paralysis of the recurrent nerve, since swallow complaints and vocal changes are to be expected in these patients. Patients were questioned at least 6 months post-operatively using a questionnaire. The age, the BMI, the diagnosis, the type of operation, the size of the resected tissue, the nicotine consumption and the subjective postoperative swallowing and vocal changes were examined.

Results:
222 of 372 questionnaires returned, 198 of them were complete filled. 219 sheets could be included in the evaluation. The median age of the patients was 56 years (range: 17 to 92 years), 73% were female and 26% male. Long-term postoperative dysphagia were reported by 17.6% of respondents. There was no relationship between postoperative swallowing problems with age, sex, nicotine abuse, resected tissue volume or BMI. The extent of the intervention and the diagnosis, however, had an influence on the postoperative swallowing difficulties. A third of the patients reported postoperative swallowing difficulties after lymph node dissection and 40% in Graves’ disease. Vocal changes were reported postoperatively by 23% (mostly quieter or deeper voice and hoarseness).

Conclusion:
Postoperative dysphagia and vocal changes are frequent. Particularly after lymph node dissection and surgical treatment for Graves’ disease, postoperative dysphagia occurs.
Hemodynamic instability during surgery for pheochromocytoma  
(Abstract ID: 833)

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\textbf{Background:}

Intraoperative hemodynamic instability is one of the most commonly adverse events in patients undergoing adrenalectomy for pheochromocytoma. Aim of this study was to analyse perioperative episodes of severe hypertension and hypotension in regard of postoperative complication and potential risk factors.

\textbf{Materials and methods:}

Retrospective Analysis of all consecutive Patients undergoing elective open or laparoscopic adrenalectomy from 2005 until 2016. Severe Hypertension and Hypotension was defined as rapid blood pressure increase or decrease of more than 30\% respectively.

\textbf{Results:}

A total of 53 patients underwent laparoscopic (n=37) or open (n=16) adrenalectomy. Preoperative alpha blockade was employed in 49 patients. Intraoperative episodes of severe hypertension and hypotension occurred in 18 and 49 patients respectively. In the latter, a mean of 5.8\±6.9 episodes for severe hypotensive episodes and a mean of 1.9\±1.4 episodes for hypertensive episodes occurred. Patients with more than five severe hypotensive episodes were more likely to require additional support with vasopressor infusions, ICU admission and had a longer total hospital stay. Complication was not correlated with perioperative hemodynamic instability.

\textbf{Conclusion:}

Predominantly hypotensive episodes rather than hypertensive episodes occurred perioperatively during adrenalectomy and perioperative alpha blockade. As a result more additional support with vasopressor infusions and ICU admissions was noted.
Prevention of Reflux after Ivor-Lewis Esophagoectomy with a new double-lumen Open-pore Film Drainage (OFD) Device

(Abstract ID: 280)

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²Katholisches Marienkrankenhaus Hamburg gGmbH

Background:

After Ivor-Lewis esophagoectomy reflux compromises anastomotic healing and is known as a risk for pulmonary aspiration. We developed a new small-bore open-pore double-lumen film drainage (OFD) which enables complete drainage of reflux with intestinal nutrition simultaneously.

Materials and methods:

For construction of the new double-lumen OFD device a strip of a very thin open-pore double layered film (Suprasorb ®CNP, Drainage Film, Lohmann & Rauscher International GmbH & Co.KG, 56579 Rengsdorf) is wrapped around the gastric openings of a trilumina tube (Freka® Trilumina, CH/Fr 16/9, 150 cm, Fresenius Kabi AG). Double-lumen OFD has a diameter of 5 mm.

It is inserted trans-nasally similar to placing a gastric or intestinal feeding tube, and then pushed into the stomach and grasped with endoscopic forceps. Then the intestinal feeding tube is guided into the duodenal lumen, the gastric film part of the tube is placed into the stomach. The ventilation channel of the tube is blocked, then OFD is connected to an electronic vacuum device and negative pressure applied to the gastric openings and the film. We use standard negative pressure of 125 mmHg, continuous suction, intensity 10.

Results:

Application of vacuum results in complete evacuation of the stomach while enteral nutrition works along the intestinal feeding tube. The principle of new device will be presented in a case of Ivor-Lewis operation. Because of increasing inflammation parameter endoscopic examination of the anastomosis was done on day 4 post op. We found an anastomosis.Reflux was flouting the intrathoracic anastomosis up to the upper esophageal sphincter. We started to drain the reflux in an active manner with the new drainage. Vacuum treatment period was 10 days in total. After a few days of treatment infection signs at the anastomosis had disappeared. Anastomosis healed with out leak or stenosis.

Conclusion:

Double lumen open-pore film drainage is an easy tool to prevent reflux after Ivor-Lewis resection and enteral nutrition is possible along the feeding tube. We started to drain our patients with esophagoectomy intraoperatively in an active manner in order to eliminate the gastric reflux immediately after performing the anastomosis.
Construction of new double-lumen Open-pore Film Drainage (OFD) with intestinal feeding tube (iFT) by wrapping the double layered open-pore film (oF)(Suprasorb® CNP, Drainage Film, Lohmann & Rauscher International GmbH & Co.KG) surround a trilumia tube (Freka® Trilumina, Fresenius Kabi AG), ventilation channel has to be blocked (X)
Endoscopic Vacuum Therapy - Adaptation of the innovative Method to treat duodenal leaks
(Abstract ID: 282)

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Background:
Duodenal leaks are difficult to treat and often require surgical intervention for their repair. We were able to adapt EVT to treat duodenal defects, that otherwise would have required surgery or more invasive methods to be repaired. We report EVT in a series of 10 patients with duodenal leakages.

Materials and methods:
EVT was performed with open-pore polyurethane foam (OPD) and with open-pore film drainages (OFD).

OPD devices were constructed out of a piece (1,5 cm x 1,5 cm x 3 cm) of open-pore polyurethane-foam which was fixed surrounding the tip of a nasogastric drainage tube. Small bore OFD devices were constructed with a strip of a very thin fragment open-pore double layered film (Suprasorb ®CNP, Drainage Film, Lohmann & Rauscher International GmbH & Co.KG, 56579 Rengsdorf). The film (2 x 2-10 cm) was wrapped around the tip of a nasogastric drainage tube. Advantage of OFD is its small diameter of 4-6 mm, which enables placement through the nose and small openings.

The drainages are placed by endoscopic means into the duodenal lumen. OPD is inserted transorally. The foam is grasped with endoscopic forceps and guided to the duodenal lumen.

OFD insertion is similar to placing a naso-gastric or naso-intestinal feeding tube. After nasal insertion into the esophagus OFD is grasped with forceps and advanced into the stomach, and guided into the duodenal lumen. We also used the pull-through technique in a case of duodeno-cutaneous fistula and in one case we used intraoperative rendezvous technique.

After placement the vacuum drainages are connected to an electronic vacuum device. Application of negative pressure (-125 mmHg, continuous suction, and high intensity) results in active drainage of duodenal secrets and closure of the defect zone.

Results:
10 patients were treated with EVT because of a duodenal leakage. Reason of duodenal defects were: rupture of operative suture (n=8), iatrogenic perforation during ERCP (n=1), perforation due to an operative drain (n=1). Nine patients were treated with intraluminal and one patient with intracavitary variant of EVT. In 7 patients we used the OPD device, in one patient OFD, and in two patients OPD and OFD.

All leakages (100%) were successfully closed after a treatment period of 11 days in median (range 7-19 days).

Conclusion:
Vacuum drainages can be placed in the duodenum with common endoscopic technics. Placement of small-bore OFD is an easy procedure to drain duodenal secrets. EVT has been adapted to treat...
duodenal leaks with OPD and new small OFD devices. EVT is an innovative effective measure to treat duodenal leaks.

**Picture:**

Construction of new open-pore vacuum drainages which can be used for pullthrough technic in endoscopic vacuum therapy. Open-pore polyurethane foam (OPD), open-pore polyurethane foam coated with double layered open-pore film (OPFD) and open-pore film drainage (OFD). The distal ends of two gastric tubes (t: 18 Char and t: 12Char) have been connected, open-pore material is positioned in the middle part of the tube. Diameter is sized down from 1.5 cm (OPD) to 5 mm (OFD).
Comparison between Endoscopic Vacuum Therapy and Conventional Treatment for Anastomotic leakage after Rectal Resection
(Abstract ID: 294)

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Background:
Endoscopic vacuum therapy (EVT) has become the treatment of choice for anastomotic leakage after rectal resection in several institutions in Germany and commercially available systems are now distributed in over 30 countries worldwide. Published case series report on average success and stoma reversal rates of more than 80%. However, so far, there is no evidence that EVT is superior to any other treatment for anastomotic leakage after rectal resection.

Materials and methods:
Twenty-one patients treated with EVT for anastomotic leakage after rectal resection were retrospectively compared to a historical cohort of 41 patients that received conventional treatment. Inclusion criteria were rectal resection and leakage of anastomosis or rectal stump. Patients treated in other hospitals primarily, chronic fistulas or iatrogenic perforations were excluded. Modalities of conventional treatment are presented in table 1. Primary endpoints were death, treatment success and long term preservation of intestinal continuity. Secondary endpoints were length of hospital stay and duration of treatment. Statistical analysis was performed using SPSS.

Results:
Patients characteristics and outcome of treatment are shown in Table 1. There was no difference in mortality (p=0.624). The overall success rate was higher in patients treated with EVT (95.2% vs. 65.9%, p=0.011). EVT was associated with preservation of intestinal continuity in a significant higher percentage of patients than patients undergoing conventional treatment (71.4% vs. 31.7%, p=0.003). Conventional treatment trend to shorter length of hospital stay (31.1 vs. 42.2 days, p=0.066).

Table:

<table>
<thead>
<tr>
<th>Patients (n)</th>
<th>EVT (%)</th>
<th>Conventional treatment (%)</th>
<th>p-value</th>
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<tr>
<td>Primary disease</td>
<td>21</td>
<td>41</td>
<td>&lt; 0.001</td>
</tr>
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<td>Rectal Cancer</td>
<td>52.4</td>
<td>92.7</td>
<td></td>
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<tr>
<td>Sigmoid Cancer</td>
<td>4.8</td>
<td>4.9</td>
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Innov Surg Sci 2018; 3, (Suppl 1): s1–s231

**Sigmadiverticulitis**

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<th>19.0</th>
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**Other**

| Age (years) | 64.9 | 62.0 | 0.359 |
| Diagnosis of insufficiency (days) | 7.1 | 9.3 | 0.240 |
| Rectal stump insufficiency | 28.6 | 2.4 | 0.005 |
| Neoadjuvant radiochemotherapy | 30.7 | 53.7 | 0.008 |
| UICC (cancer only) | 0.002 |

| Cancer (n) | 12 | 40 |
| 0 | 0 | 7.5 |
| I | 41.7 | 25.0 |
| II | 8.3 | 20.0 |
| III | 33.3 | 30.0 |
| IV | 16.7 | 17.5 |

**Initial treatment in conventional group**

| Drainage | 40.0 |
| Diverting stoma | 22.5 |
| Revision | 17.5 |
| Discontinous resection | 20.0 |
| Death | 4.8 | 2.4 | 0.624 |
| Successful treatment | 95.2 | 65.9 | 0.011 |
| Preservation of continuity | 71.4 | 31.7 | 0.003 |
| Length of postoperative hospital stay (days) | 42.2 | 31.1 | 0.066 |
| Length of treatment (days) | 26.1 | 27.2 | 0.589 |
| Time until closing of protective ileostoma (months – LAR only) | 10.2 | 9.4 | 0.721 |

**Conclusion:**

Conventional therapy and EVT are both options for the treatment of anastomotic leakage after rectal resection. EVT might be more effective in terms of definite healing and preservation of intestinal continuity whereas conventional treatment seems to be associated with a shorter length of hospital stay.
Quality of life assessment after endoscopic vacuum therapy of upper gastrointestinal defects
(Abstract ID: 316)

M. Laukötter¹, S. A. Dhayat¹, R. Schacht¹, R. Mennigen¹, N. Senninger¹, T. Vowinkel¹

¹Universitätsklinikum Münster

Background:
Anastomotic leakages and perforations of the upper gastrointestinal (uGIT) tract cause high morbidity and mortality rates. Accumulating evidence in recent years indicates that defects of different etiology in the upper GI tract can be treated successfully with endoscopic vacuum therapy (EVT). So far, no data are available regarding the long-term quality of life (QoL) after EVT of defects in the upper GI tract.

Materials and methods:
A prospective single-center survey on long-term QoL of 52 consecutive patients treated by EVT for defects in the uGIT versus 63 of 221 patients treated by esophagectomy without anastomotic insufficiency (w/o EVT) or major post-operative complications between 12/2011-12/2015 was carried out in 11/2016. The Gastrointestinal Quality of Life Index (GIQLI) score was determined by a 36-item questionnaire containing five response categories and correlated between the two study groups and with potential cofactors influencing quality of life.

Results:
The response rate was 78.95% (75/95) including 25 survey respondents who were treated with EVT for anastomotic insufficiency secondary to esophagectomy or gastrectomy (n = 19), iatrogenic esophageal perforation (n = 4) and Boerhaave syndrome (n = 2) and 50 respondents with complication-free esophagectomy without EVT. The median follow-up was 19 months (range 13.2 to 52 months) for EVT patients and 21 months (range 11.1 to 47 months) for patients w/o EVT. Except for "social function" (p= 0.009) in favour for patients w/o EVT, the median GIQLI score did not differ significantly between both study groups concerning the categories "symptoms", "emotions", "physical functions", and "medical treatment" resulting in a total median GIQLI score of 83 (range 42-131) in EVT versus 96.5 (range 43-134) in patients w/o EVT (p= 0.185). Spearman Rho analysis revealed that a high GIQLI score correlated with a low ASA score (Spearman's rank correlation coefficient r= -0.530; p=0.000), a benign pathology (r= 0.374, p=0.001), and a hospital stay less than 21 days (r= -0.648, p= 0.000) but not with age, gender or body mass index.

Conclusion:
Long-term quality of life after EVT of defects in the upper GI tract does not differ significantly from the long-term quality of life of patients with esophagectomy accompanied by a complication-free postoperative course. EVT in the uGIT is accompanied by a satisfactory long-term QoL and well tolerated by the EVT patients. EVT can be regarded as a life-saving therapeutic tool for perforations and anastomotic leakages of the upper GI tract.
Indications and limitations of endoscopic vacuum therapy in the upper GI tract
(Abstract ID: 327)

T. Vowinkel¹, R. Mennigen¹, N. Senninger¹, M. Laukötter¹

¹Universitätsklinikum Münster

Background:

The aims of endoscopic management of perforations in the upper gastro-intestinal (GI) tract are an increased healing rate and a reduction in morbidity and mortality. Here we report on our experience with endoscopic vacuum therapy (EVT) in different locations of the upper GI tract, from the hypopharynx to the duodenum.

Materials and methods:

Since 2010 we treat patients with perforations in the upper GI tract of any kind (eg spontaneous, iatrogenic, postoperative) with EVT. 2 patients showed perforations in the hypopharynx, 62 patients in the esophagus or esophago-gastric junction, 4 patients in the stomach and 3 patients in the duodenum. Each patient was diagnosed by endoscopy plus contrast enema and CT scan initially. EVT sponges were changed and the patient critically re-evaluated every 3-4 days.

Results:

EVT did not work for perforations in the hypopharynx because it was impossible to sustain negative pressure in this location. Patients with perforations in the esophagus or esophago-gastric junction, the stomach and the duodenum showed a healing rate of 95%, 100% and 66%, respectively. The median duration of the therapy was 21 days with a median of 6 EVT changes. However, 2 patients died due to hemorrhagic shock most likely associated with EVT placed in both cases close to intrathoracic vascular structures. In one patient with a gastric and 1 patient with a duodenal perforation a surgical approach was favoured initially but due to severe adhesions surgery was not successful and EVT was started immediately with a complete healing in both patients.

Conclusion:

Technically EVT in the hypopharynx is momentarily impossible. In contrast EVT for perforations in the esophagus, stomach and duodenum shows excellent results and can even be started if the site of the perforation is surgically not accessible. Nevertheless EVT needs to be critically re-evaluated with each change particularly when CT scan shows proximity to vascular structures. The promising results of EVT for complications in the upper GI tract may broaden its use for further indications, such as pre-emptive and prophylactic therapy.
Pouch salvage in a case of severe ischaemia and leak by NPWT (Endo-SPONGE)  
(Abstract ID: 576)  
S. Galler¹, J. Heidemann¹, G. Schürmann¹  
¹Klinikum Bielefeld  

Background:  
Introduction Negative pressure wound therapy (NPWT) is a widely used technique in the treatment of surgical site infections. It has proven to be effective in superficial as well as in intracavitary placement and offers a new approach to the treatment of anastomotic leaks. We present a case of severe ischaemia of the pouch and concurrent leak following colectomy with ileal pouch-rectal anastomosis (IPRA) in a patient with ulcerative colitis (UC) that has successfully been treated with NPWT.  

Materials and methods:  
Case presentation A 57-year-old male patient with a history of UC of 8 month was admitted for colectomy and IPRA formation. He had received medical treatment with infliximab and steroids which was not sufficient to achieve a stable remission. Stool frequency was 20 per day, the patient was dependent on parenteral nutrition at the time of surgery. We performed a total colectomy with ileal pouch-rectal anastomosis and loop ileostomy as part of a two-stage IPRA. An intraperitoneal drain was placed. On the 8th postoperative day we observed a purulent drainage, endoscopic evaluation showed an ischaemic pouch with multiple ulcerations. There were no clinical signs of sepsis or peritonitis. We decided against surgical intervention and started a treatment with transanal placement of a drain in the pouch. Two days later there was a regress of the ischaemia in the endoscopic control, but a leak within the pouch with a diameter of 1 cm was detected as a new finding. After another 3 days, we saw no satisfactory healing of the leak and decided to apply NPWT by placing a transanal sponge (Endo-SPONGE®, Fa. B. Braun) into the pouch in close proximity to the leak. Following this procedure, we achieved a rapid and complete healing within 8 days.  

Results:  
Discussion Ischaemia and anastomotic leak of the pouch are rare but serious complications following ileal pouch formation. Surgical intervention occasionally results in the loss of the pouch with definitive ileostomy. While there are single case reports of the use of NPWT in pouch anastomosis leaks, our observation describes for the first time a severe case of both, ischaemia and leakage in the pouch with complete healing being achieved by this method. This shows that NPWT might be successful even under unfavourable circumstances for anastomotic healing, such as ischaemia, and should be considered as an early stage-treatment of a complication similar to its increasing use in anastomotic leaks after oesophageal or rectal resection.  

Conclusion:  
Conclusion Given the favourable outcome compared to relaparotomy for the correction of severe complications following ileoanal-pouch formation, we suggest NPWT with an transanal sponge as a useful tool in the management of complications after pouch formation.
Endoscopic Vacuum Therapy for Defects of the Lower Gastrointestinal Tract
(Abstract ID: 733)

F. Becker¹, A. S. Mehdorn¹, T. Vowinkel¹, N. Senninger¹, R. Mennigen¹, E. Rijcken¹, M. Laukötter¹

¹Universitätsklinikum Münster

Background:
Defects of the lower gastrointestinal (GI)-tract continue to be a feared but frequent complication following colorectal surgery. While the treatment of choice for anastomotic leakage (AL) or rectal stump insufficiency (RSI) was previously re-operation, recently intracorporal endoscopic vacuum therapy (EVT) has been demonstrated to be a safe and effective alternative to surgical management. However, data on a) possible indications for EVT, b) success rates and c) duration of therapy remain inconclusive. We analyzed outcomes in the currently largest lower-GI EVT cohort to date.

Materials and methods:
For this retrospective single-center study, we analyzed data from patients who underwent EVT treatment at our surgical department, between January 2006 and December 2016, due to acute defects of the lower GI tract of various etiologies following different surgical procedures. We divided our cohort based on the indications for EVT into four groups: AL, RSI, pouch leakage (PL) after ileal pouch-anal anastomosis, and other (iatrogenic perforation, cavity following rectal extirpation). EVT was composed of an open-cell polyurethane sponge, which was cut down until minimum size, depending on the size of the defect. The dimension of the defects were defined by endoscopic inspection. The sponge was connected to a draining vacuum system producing continuous negative pressure. The sponge was kept in place by the negative pressure applied to the sponge.

Results:
We identified 70 patients (77.1% male) with a median age of 57.2 ± 14.3 years and an average BMI of 25.0 (IQR: 23.3; 28.0). Most frequent indications for surgery were malignancy (61.4%) and inflammatory bowel diseases (15.7%). Indications for EVT were AL in 40 patients, followed by RSI (n=20), PL (n=7) and other (n=3). Median duration of therapy was: 27.0 (IQR: 15.0; 38.8) days for AL; 18.0 (IQR: 14.0; 27.0) days for RSI; 29.0 (IQR: 22.0; 43.0) days for PL and six days for the reaming patients. Lower GI-tract defects were successfully treated in 59 patients (84.3%). EVT failure was due to progressive insufficiency in 6 patients, bleeding in 3 patients and death, non-related to EVT, in two cases.

Conclusion:
We report, to our knowledge, the worldwide largest single-center experience of EVT for for defects of the lower gastrointestinal tract. EVT is a safe and effective treatment option for lower GI defects of various etiologies avoiding revision surgery.
Permanent Meshes for the Treatment of Open Abdomen
(Abstract ID: 125)

M. Jakob1, C. Schwarz2, T. Pinworasarn1, T. Haltmeier1, P. Starlinger2, D. Candinas1, G. Beldi1

1Inselspital Universitätsspital Bern
2Universitätsklinikum Wien

Background:
Open abdomen (OA) may be required in patients with abdominal sepsis or compartment syndrome. Restoration of the abdominal wall is crucial to prevent both, short- and long-term morbidity.

Materials and methods:
In this retrospective case control study consecutive patients with open abdomen from two tertiary referral centers (University hospital Bern and AKH Vienna, Austria) with and without permanent mesh implantation were compared. Primary outcome parameter was incisional hernia. Secondary outcome parameter was mesh-related morbidity.

Results:
A total of 139 patients were included in the study in which a permanent mesh was implanted in 50 (36.0 per cent) patients and 89 (64.0 per cent) patients without permanent mesh implantation. Inhospital mortality (22.5 vs 18.0 per cent, p=0.665) and intestinal fistula (22.5 vs 18.0 per cent, p=0.665) did not differ between groups. Mesh implantation decreased the incidence of incisional hernia (p=0.041) significantly. Mesh implantation was associated with reduced re-reoperations leading to an incidence risk ratio of 0.48 per ten person days (0.39 to 0.58, p<0.001) and reduced duration of stay on intensive care unit (20 vs 11 days, p<0.001) and hospital stay (66 vs 49 days, p=0.007) . During follow up, 20 per cent of meshes (n=10) had to be partially removed.

Conclusion:
Implantation of a permanent meshes decrease re-operations, hospital stay and the incidence of incisional hernia.
Redo Surgery after initiation of open abdomen until discharge

IRR 2.05 (95 CI 1.74 to 2.42), p<0.001
Polypropylene but not polyester meshes are safe to prevent incisional hernia in patients with fascial dehiscence
(Abstract ID: 129)

M. Jakob¹, D. Spari¹, J. Zindel¹, T. Pinworasam¹, D. Candinas¹, G. Beldi¹

¹Inselspital Universitätsspital Bern

Background:
Primary closure of postoperative fascial dehiscence (FD) is associated with a high incidence of incisional hernia. This study reports the outcome after implantation of non-resorbable, synthetic meshes for closure of FD with subgroup analysis of types of mesh material used.

Materials and methods:
A total of 119 consecutive patients with FD were operated (70 mesh and 49 no mesh) between 2001 and 2015. Primary outcome parameter was incisional hernia. Secondary outcome parameter was mesh related morbidity such as intestinal fistula and surgical site infection (SSI). In order to obtain valid comparators for this rare condition both historic controls and published data were assessed.

Results:
No difference of intestinal fistula, SSI, and mortality was observed between patients with and without mesh implantation. Hernia-free survival was significantly higher after mesh implantation vs no mesh (p=0.005). Adjusted Poisson regression revealed fewer re-operations if a mesh was implanted (IRR 0.435 (95% CI 0.204 to 0.929, p=0.032). The incidence of chronic SSI was significantly higher if a polyester mesh was used with an adjusted odds ratio of 8.1 (95% CI 1.27 to 51.00, p=0.027).

Conclusion:
Implantation of a polypropylene but not polyester based mesh in patients with FD allows to decrease incisional hernia with a low rate of mesh related morbidity.
Hernia-free survival

Picture:

- No mesh
- Mesh

Follow-up, d

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<th>N</th>
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<td>49</td>
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</tr>
<tr>
<td>70</td>
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Endoscopic anterior component separation with a precostal access and a new cylindrical balloon trocar
(Abstract ID: 152)

G. Köhler1, I. Fischer1, R. Kaltenböck1, M. Lechner1, B. Dauser1, L. Jorgensen1, R. Függer1

1 Ordensklinikum Linz Barmherzige Schwestern

Background:
Endoscopic anterior component separation techniques (ECS) facilitate tension free midline closure of wide ventral hernia defects. We describe a novel approach with a precostal incision and a new cylindrical balloon trocar.

Materials and methods:
A single-center analysis of 19 patients undergoing ECS between 01.01.2014 and 02.08.2017 was performed with regard to improvement of technique. We currently start with a lateral precostal incision. This access in a low-fat and stable area allows for easy identification of the external oblique muscle with the ribs functioning as dorsal abutment for entering the correct plane between external and internal oblique muscles. Then a trocar is inserted with a cylindrical balloon, thus providing sufficient pneumatic widening of the dissection plane. A second 5mm port is inserted under direct vision below the 12th Rib. From there an unidirectional incision of the external oblique aponeurosis is performed from subcostal to the inguinal ligament. If necessary, the cephalad muscular parts of the external oblique can be transected over several centimeters in both directions starting from the precostal incision.

Results:
We documented no procedure-related complications apart from two hematomas that required no interventions. Four procedures were carried out on one side and the remaining ones bilaterally. In one case a conversion to conventional open component separation was required due to extensive scarring after open cholecystectomy. There were no notable abdominal bulgings or lateral hernias during a structured postoperative follow-up period of one year postoperatively.

Conclusion:
The technique described offers advantages in terms of determination of the correct entry point for ECS regardless of abdominal wall conditions and the precostal access allows for unidirectional dissection towards the inguinal ligament with only two trocars in total. The cylindrical shape of the balloon trocar provides adequate widening of the working space and ensures good overview for safe dissection.
A novel hybrid technique for parastomal hernia repair with a 3D mesh of 4cm funnel length  
(Abstract ID: 153)

G. Köhler¹, H. Wundsam¹, I. Fischer¹, R. Függer¹

¹Ordensklinikum Linz Barmherzige Schwestern

Background:

The aim of this study was to evaluate a new method of parastomal hernia (PSH) repair by using a hybrid approach with a novel cylindric shaped mesh of 4cm funnel length. We also report on outcome of 56 patients who underwent PSH repair with 3D meshes of 2.5cm funnel length.

Materials and methods:

In a pilot prospective case series 12 patients underwent surgical repair of parastomal hernias with a combined laparoscopic and ostomy-opening approach. After laparoscopic adhesiolysis, the ostomy opening was excised from outside and the bowel was closed. The hernia sac was excised after reduction of its content. Then the bowel was guided through the funnel of the mesh and the implant was manually transferred into the peritoneal cavity through the hernia defect. Then the fascial margins were narrowed with sutures. Laparoscopy was continued and the mesh with 4cm funnel length was placed and fixed with absorbable tacks in the proper position. Finally, the diverted bowel was shortened outside of the abdomen and the stoma was matured on its original location.

Results:

We documented no mesh associated complications. Only one superficial peristomal wound defect occurred. No unplanned conversions were needed and median duration of the operations was 72 minutes. There was no recurrence during short time follow up of median 4 months (ranged from 3 to 8 months).

Conclusion:

The technique described gives several advantages such as a minimally invasive hybrid approach creating a real 3-D mesh covered barrier between the trephine and stomal limb and optional shortening of a concomitant prolapse. When needed due to a concomitant incisional hernia, a second flat mesh can be laparoscopically placed in an intraperitoneal position. Changing mesh construction according to lengthening the funnel led to reduction of recurrence in short term follow up.
First experiences: BIOLAP - Biological versus synthetic mesh in laparoscopic hernia repair
(Abstract ID: 233)

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¹Krankenhaus Merheim - Kliniken der Stadt Köln gGmbH
²IFOM - Universität Witten/Herdecke, Köln

Background:
Inguinal hernia repair is one of the most common surgical operations globally, more than 20 million groin hernias are repaired annually worldwide. Recurrence after inguinal hernia operation is a considerable clinical problem. Another remaining problem after hernia surgery is the occurrence of chronic pain. Up to now, the use of synthetic meshes is the standard procedure, but there is raising evidence that biological meshes could be of an advantage concerning occurrence of chronic pain due to a different postoperative remodelling without the disadvantages of a life-long implant.

We hypothesize that the use of a biological mesh in laparoscopic inguinal hernia repair (TEP or TAPP) reduces postoperative pain without being inferior in terms of recurrence rate compared with a synthetic mesh.

Materials and methods:
BIOLAP is a blinded trial with self-controlled design meaning every patient is his/her own control. This is possible in bilaterally occurring diseases, preventing from confounding factors such as surgeon’s experience and patient factors such as metabolic diseases, ability of wound healing etc. Biological mesh is used in hernia repair for one of the bilateral hernias. The other side will be operated with a synthetic mesh.

496 patients will have to be analysed, at least 15 centers will participate.

Primary endpoints will be the incidence of postoperative local pain separately evaluated for each operated side per patient and the incidence of recurrent hernia within the first 2 years after operation.

Results:
Results cannot be shown yet since the trial has not finished. We present our first experiences with the use of biological meshes in laparoscopic hernia repair, focussing on surgical challenges and pitfalls.

Conclusion:
There is no trial that assesses the use of biological meshes in laparoscopic hernia repair.

Our study design is really innovative as it allows a direct comparison of the two meshes with only very few confounding factors.
Elastic TPU mesh as abdominal wall inlay significantly reduces defect size in a minipig model
(Abstract ID: 253)

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¹Universitätsklinikum der RWTH Aachen

Background:
The open abdomen with mesh implantation followed by early reoperation with fascial closure is a modern surgical approach in difficult clinical situations such as severe abdominal sepsis. As early fascial closure is not possible in many cases, mesh-mediated fascial traction is helpful to minimize ventral defect size after open abdomen. The aim of this study was to evaluate the clinical utilization of an innovative elastic thermoplastic polyurethane mesh (TPU) as an abdominal wall inlay in a minipig model.

Materials and methods:
Ten minipigs were divided in two groups either receiving an elastic TPU mesh or a nonelastic PVDF mesh in inlay position of the abdominal wall. After eight weeks, mesh expansion and abdominal wall defect size were measured. Finally, pigs were euthanized and abdominal walls were explanted for histological and immunohistochemical assessment.

Results:
Eight weeks after abdominal wall replacement, transversal diameter of the fascial defect in the TPU group was significant smaller than in the PVDF group (4.8cm vs. 7.4cm; p=0.049). Immunohistochemical analysis showed increased Ki67 positive cells (p=0.003) and a higher amount of apoptotic cells (p=0.047) after abdominal wall replacement with a TPU mesh. Collagen type I/III ratio was increased in the PVDF group (p=0.011).

Conclusion:
Implantation of an elastic TPU mesh as abdominal wall inlay is a promising approach to reduce the size of the ventral hernia after open abdomen by mesh-mediated traction. However, this effect was associated with a slightly increased foreign body reaction in comparison to the non-elastic PVDF.
Incisional hernia at the site of the previous stoma after lateral pararectus abdominis compared to transrectus abdominis muscle temporary loop ileostomy placement and reversal – a follow up study of the PATRASTOM trial cohort

(Abstract ID: 304)

J. Hardt¹, V. Lucas¹, C. Weiß¹, P. Kienle²

¹Universitätsmedizin Mannheim
²Theresienkrankenhaus und St. Hedwig-Klinik Mannheim

Background:

Incisional hernia at the ostomy site is a common problem after stoma reversal occurring in up to one third of the patients according to a recent systematic review. Moreover, about 50% of the detected ostomy-site incisional hernias require reoperation for hernia repair. Since damage to the rectus abdominis muscle during ostomy placement and reversal might be a risk factor for the development of ostomy-site incisional hernias, we hypothesized that a stoma position lateral to the rectus abdominis muscle might prevent incisional herniation after stoma reversal.

Materials and methods:

To investigate whether a lateral pararectal stoma position lowers the incidence of incisional hernias after stoma reversal compared to transrectal stoma placement, we conducted a follow up study of the PATRASTOM RCT (https://www.ncbi.nlm.nih.gov/pubmed/26713666). All patients were invited for a clinical and sonographic follow up visit. In patients not able to attend the follow up visit the electronic chart as well as MRI and CT scans were reviewed in regard to the presence of incisional hernias.

Results:

Follow up - either clinical or radiological - was available for 49 of the 60 patients initially constituting the PATRASTOM study population (9 were lost to follow up, 2 died shortly after the index operation). Median duration of follow up was 3.5 years. Incisional herniation at the previous ostomy site occurred in 3 of 23 patients (13%) status post lateral pararectal stoma placement compared to 7 of 24 patients (29%) in the transrectal (control) group (p=0.29). 4 of the 10 patients diagnosed with incisional hernias at the ostomy site had already undergone hernia repair. The incidence of incisional hernias at the site of laparoscopic trocar incisions or laparotomy was 2 in the lateral pararectal group versus 1 in the transrectal group (p=0.61). Of the patient and procedure characteristics which may have an impact on the development of incisional hernias (age, gender, previous abdominal surgery, history of parastomal herniation, operative approach, duration of the operation, postoperative surgical site infection) only older age was a significant risk factor for ostomy-site incisional herniation (p=0.046).

Conclusion:

Ostomy-site incisional hernias are frequent and may require reoperation for repair. In this follow up study of the PATRASTOM trial the lateral pararectal stoma position had a lower incidence of ostomy-site incisional hernias compared to the transrectal position, although this did not reach statistical significance. Further research on preventive measures to reduce ostomy-site incisional herniation is warranted.
Recurrence after intraperitoneal onlay mesh procedure (IPOM) in ventral and incisional hernia repair, is it only the mesh? A monocentric retrospective cohort study of 717 cases.

(Abstract ID: 360)

S. Wais¹, B. J. Lammers¹, A. Bär¹, P. E. Goretzki¹

¹Städtische Kliniken Neuss - Lukaskrankenhaus

Background:

Since June 2016, PhysioMesh™ flexible composite mesh is unavailable for the use in laparoscopic surgery because of a product recall. Recall was due to a report of published by the Food and Drug Administration (FDA), which referred to unpublished data of two hernia registers that could show that the use of PhysioMesh™ Flexible Composite Mesh lead to an increased change of recurrence.

The aim of our retrospective cohort study was hence; to gather the data of all IPOM-operations carried out between 2011 and 2016 and, to investigate these regarding the likelihood of recurrence.

Materials and methods:

In our implemented retrospective cohort study at the surgical clinic I of the Lukas Krankenhaus Neuss (Prof. Goretzki), a total of 717 patients (umbilical hernia = 252, incisional hernia = 429, epigastric hernia = 36; Age: 59.5 ± 10.7; BMI: 31.2 ± 4.7) were operated over a period of 6 years via IPOM-technique.

Data collection was done based on Operationen- und Prozeduren schlüssel (OPS) coding and patient files. Subsequently the patient collective was sorted based on the implanted mesh into two groups, PhysioMesh™ and other meshes (Proceed Surgial™, C-Qur Mesh™, Symbotex Composite™, C-Qur FX light™, Proceed Ventral Patch™, MotifMesh™, Dulex Mesh™, Parietene Composite™, DynaMesh IPOM™, DualMesh Plus BIO™, Ventralight ST Mesh™).

Using appropriate descriptive statistics, the patient collective, as well as the choice of mesh, was analysed to identify a correlation between the development of recurrences.

Results:

Collectively 717 IPOM operations were carried out between January 2011 and December 2016. Of these, 425 were performed laparoscopically (59 %) and 292 conventional (41%). Overall, 75 of the follow-up examined patients (10.4 %) had recurrence. In 454 (63.3 %) of 717 IPOM-operations, PhysioMesh™ was used for the reconstruction of the abdominal wall. In the remaining 262 operations (36.7 %), meshes of other manufacturers were used.

In the PhysioMesh™ group, 54 of all clinical post examined patients (11.8 %) showed recurrence, 25 patients (5.6 %) presented with early recurrence. In the laparoscopic non- PhysioMesh™ group (n=118), 5 patients (4.2%) exhibited early recurrence.

Based on our data, no significant correlation (p = 0.099) between the occurrence of hernia recurrence and choice of mesh (e.g. PhysioMesh™ vs. other meshes) could be found.

The analysis of the laparoscopic IPOM operations showed that 31 of the clinical post examined patients (10.1%) out of the PhysioMesh™ group (n=307) had a recurrence, with 14 patients (4.6%) exhibiting early recurrence. In the laparoscopic non- PhysioMesh™ group (n=118), 5 patients (4.2%) had a recurrence, of which 4 patients (3.4%) exhibited early recurrence.
Likewise, in the laparoscopic data set, no significant correlation ($p = 0.051997$) between mesh choice (e.g. PhysioMesh™ vs. other meshes) and hernia recurrence could be found.

**Conclusion:**

Our monocentric data shows that, despite the current registry data and publications, no significant correlation exists between a hernia recurrence after an IPOM operation and the use of specific types of mesh.

Hence, other possible factors e.g. fixation, mesh size or operation technique need to be studied to identify other potential factors causing recurrence.
Gender discrimination in endoscopic groin hernia repair. Are female patients not good enough for laparoscopic groin hernia repair
(Abstract ID: 566)

M. Stodolski¹, H. Zirngibl¹, P. C. Ambe¹

¹HELIOS Klinikum Wuppertal

Background:

Inguinal hernia repair represents the most commonly performed surgical procedure. Endoscopic repair is now considered state of the art. Our clinical experience suggests that female patients are mostly managed using an open technique. A comparison of gender specific rates of endoscopic hernia was performed. Only patients managed via transabdominal preperitoneal repair (TAPP) were included in the endoscopic repair group.

Materials and methods:

A retrospective analysis of the data of patients undergoing inguinal hernia repair in a university hospital within the three-year period from 2013 to 2015 was performed. The rate of endoscopic inguinal hernia repair via TAPP was calculated and compared for each gender.

Results:

Within the three years of investigation 572 patients (including 66 females and 506 males) with groin hernias were managed in our department. The hernia was classified as medial in 37.2%, lateral in 45.6%, combined in 12.9%, while femoral hernia was seen in 4.2% of cases. Endoscopic repair was performed in 53.5% of cases in the general population. There was no statistically significant difference between both groups with regard to BMI and age. Endoscopic repair was performed significantly more often in the male cohort compared to the female cohort, 57.5% vs. 22.7%, p = 0.001.

Conclusion:

The results from this study confirm a gender discrimination amongst patients undergoing minimal invasive inguinal hernia repair. Endoscopic repair is offered significantly more often to male patients compared to female patients.
Routine MRSA screening prior to mesh associated hernia closure. It is really necessary?
(Abstract ID: 567)

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Background:

Mesh associated hernia closure has been shown to be associated with the lowest risk of recurrence. Thus hernia closure with a prosthetic mesh represents the gold standard of hernia surgery. Equally, mesh infection is the most feared complication following mesh associated closure. MRSA screening prior to surgery is thought to reduce the risk of mesh infection. We questioned the necessity of routine MRSA screening prior to surgery.

Materials and methods:

Data of patients undergoing mesh associated hernia closure in a university hospital from 2013 to 2015 was retrospectively abstracted. Results of routine MRSA swabs were analyzed and the rate of positive MRSA screening was calculated.

Results:

Within the three-year period of investigation 681 patients underwent hernia repair using a prosthetic mesh including 108 females and 573 males. The mean age of the study population was 59.8 ± 16.5 yrs and the mean BMI was 26.3 ± 4.2 Kg/m2. MRSA screening was not performed in 17.5% of cases. Screening was negative in 81.8%, while positive screening results were recorded in 0.7% of cases.

Conclusion:

Our results suggest that routine MRSA screening might not be necessary in all patients undergoing mesh associated hernia repair. Screening programmes should be tailored following the risk of MRSA colonization.
Anatomical and functional reconstruction of incisional hernias without component separation - the corset technique
(Abstract ID: 584)

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Background:

Incisional hernia development following laparotomy represents one of the most frequent complications, with an incidence described in the literature of up to 13%. Mesh repair alone has shown recurrence rates as high as 36%. Commonly, hernia reconstruction with mesh repair results in persistent rectus diastasis. While component separation, as described by Ramirez, may achieve successful medialising of the rectus muscles, simultaneous weakening of abdominal wall integrity occurs. Our retrospective study describes a new method which enables the surgeon to anatomically and functionally reconstruct (recurrent) large incisional hernias without component separation and with preservation of abdominal wall layer integrity.

Materials and methods:

Between 2013 - 2017 a total of 16 patients with (recurrent) incisional hernias were operated on using the corset technique. In 6 cases (multiple) previous mesh repairs had failed. In 5 other patients resorbable mesh and split thickness skin grafts (STSG) had been applied for abdominal closure. In some of these patients previous non-resorbable mesh repair had been unsuccessful. The remaining 5 cases had not received mesh repair. Rectus diastasis in this patient series was measured 3-20 cm. Follow-up was 24 months.

Results:

The great majority of patients demonstrated very promising functional outcomes. Complete mid line union of rectus muscles was achieved in 14/16 cases (88%). Failure was seen in 2 desolate cases with persistent fistula. Recurrence rate of functional relevant hernia formation was seen in 3/16 patients (19%). A supplemental mesh implantation was used in 5/16 of cases. The corset technique successfully centralised the rectus muscles anatomically in the midline without persistent rectus diastasis. Prerequisites for successful reconstruction should include intact rectus abdominis muscles and strong sutures.

Conclusion:

The corset technique for incisional hernia repair achieves an anatomical reconstruction with adequate functional outcomes and relinquishment of component separation.
Corset-Technik
CONTINT: continuous versus interrupted abdominal wall closure after emergency midline laparotomy - a randomized controlled multicenter trial [NCT00544583]
(Abstract ID: 586)

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Background:
Currently there is no standard technique for abdominal wall closure in patients undergoing emergency and no recommendations can be given on the optimal closure technique. The CONTINT randomized controlled trial evaluated the efficacy and safety of two commonly applied abdominal wall closure strategies in patients undergoing primary emergency midline laparotomy.

Materials and methods:
CONTINT was a multi-centre pragmatic intra-operatively randomized, controlled two-group parallel trial. The objective was to compare the frequency of complications after two different abdominal fascia closure strategies in patients undergoing primary midline laparotomy for an emergency surgical intervention with a suspected septic focus in the abdominal cavity. The continuous, all-layer suture technique and the interrupted suture technique of abdominal wall closure after midline laparotomy were compared. The primary endpoint was burst abdomen within 30 days after surgery or incisional hernia within 12 months. A follow-up of 5 visits was performed for up to 12 months after randomization. As reliable data on this primary endpoint was not available for patients undergoing emergency surgery, an adaptive design with interim analysis was conducted.

Results:
In total 119 patients were randomized and analyzed in the intention-to-treat (ITT) analysis. Baseline data did not differ between groups; Burst abdomen after 30 days (13.45% for continuous and 15.13% for interrupted; p=0.728) and incisional hernia after 12 months rates (13.6% for continuous and 6.9% for interrupted; p=0.423) did not show significant difference in the intervention groups. The time needed for fascial closure was significantly reduced in the continuous suture group (12.8 +/- 4.5 minutes) in comparison to the interrupted suture group (17.4 +/- 6.1; p<0.001). The rate of re-operation (8.9% for continuous and 4.3% for interrupted; p=0.383) and the rate of re-operation due to incisional hernia (3% for continuous and 11.1% for interrupted; p=0.196) were also not significantly different. A logistical regression identified BMI as a significant factor for burst abdomen during the first 30 days with an OR of 1.169 (CI: 1.036:1.318).

Conclusion:
In this randomized controlled multicenter trial no difference was observed in terms of the efficacy and safety of two commonly applied abdominal wall closure strategies in patients undergoing primary emergency midline laparotomy.
Abdominal Wall Expanding System (AWEX) Obviates the Need for Lateral Release in Giant Incisional Hernia and Laparostoma
(Abstract ID: 656)

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Background:

In large incisional hernias and after laparostoma midline closure may be impossible. A novel abdominal wall expander system (AWEX) is proposed. In this pilot Study the feasibility and effectiveness of the novel operation technique is evaluated.

Materials and methods:

In patients with large incisional hernias and laparostoma where primary midline closure was impossible, AWEX was used. Patients undergoing abdominal wall reconstruction using AWEX between May 2012 and December 2015 were included. Intraoperative the abdominal wall was stretched by attaching the midline fascia borders to a retraction system under tension for 30 minutes. Length and width of the hernia defect were measured in preoperative computed tomography and intraoperatively. Width gain after AWEX procedure, operative time, morbidity, and presence of remaining midline gap was evaluated. Patients were also followed for hernia recurrence.

Results:

Ten patients with incisional hernias (N = 4) and grafted laparostoma (N = 6) underwent abdominal wall reconstruction using AWEX. Median (interquartile range) length and width of the hernia defect was 18.0 (15.0-20.5) and 12.0 (11.8-13.3) cm. Width gain after AWEX was 8.5 (8.0-10.5) cm. Operative time was 270 (135-379) minutes. The major morbidity was 20%. In 4 patients a gap of 4 (4-5) cm was bridged by intraperitoneal onlay mesh. After a median follow-up of 21 (7-36) months no hernia recurrence was observed. No method-specific complications were reported.

Conclusion:

The use of AWEX during abdominal wall reconstruction allowed successful intraoperative stretching of the muscles and fascia enabling approximation of the midline. The same effect has been demonstrated before by techniques like progressive restressed retention sutures or progressive preoperative pneumoperitoneum (PPP). However the time needed to stretch the abdominal wall is reduced from days and weeks in restressed retention and PPP to only 30 minutes in AWEX. AWEX is also a promising alternative to component separation in repair of large incisional hernias. After refinement of the system prospective evaluation is required.
Intraoperatives Setting
Does the demographic perspective including Quality of Life survey change our view on the tailored approach in inguinal hernia repair?
(Abstract ID: 689)

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**Background:**
Chronic pain is the most serious long-term complication after inguinal hernia repair and is one of the parameters that significantly influences patient’s quality of life (QoL). The ongoing increase of life expectancy has severe implications for our everyday surgical care and has to be taken into account when talking about QoL. The aim of this preliminary research was to assess the QoL before and after guideline-adherent therapy in inguinal hernia repair including long-term follow-up.

**Materials and methods:**
The study analyses the data of 311 patients (80 preop./231 postop.) which were collected in the setting of a University Medical Center. Technical details and outcomes were determined by physical examination and physician’s chart review. Patient chronic pain (visual analogue scale) and health-related quality of life (EQ-5D) were preoperatively evaluated at the physician consultation and postoperatively with a mailed survey at a median of 20 months after repair. The effects on duration back to work and satisfaction were examined subsequently.

**Results:**
Statistically significant improvement in physical pain (2.22 preop. vs. 1.66 postop.; \(p<0.01\)) and general health scores (VAS 70 preop. vs. 76 postop.; \(p<0.05\)) were detected in all subgroups reaching the reference level of the normal German population (\(p<0.01\)). Patients with a high preoperative activity level had a benefit from minimally invasive surgery (TAPP) as compared to open techniques (Lichtenstein) while older patients were brought back to their individual level of activity equally efficient by open approach as well (\(p>0.05/\text{n.s.}\)). Even "pure tissue" (P) repair significantly improved the QoL and was shown to be similar effective to mesh repair in the aspect of the duration to get back to work (median 21 days for TAPP resp. "pure tissue" [Desarda], \(p<0.01\)) and general satisfaction (P: 90%, T: 90%, L: 86%).

**Conclusion:**
Different hernia types and individual parameters go along with significant limitations in daily activities. Distinguishing between several independent aspects of QoL allows us to identify interrelations of our heterogenic patient cohorts to provide an appropriate treatment approach. The age and biographic criteria should get a higher impact on the proposed treatment in the guidelines for hernia repair.
The impact of surgical reconstruction techniques after Whipple’s procedure on patients’ outcome – A systematic review with meta-analysis
(Abtract ID: 57)

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Background:
Mortality and morbidity after Pancreaticoduodenectomy/PD remains high with an incidence of 5% and 60%, respectively, even in highly specialized centers. To improve patients’ outcome several reconstruction techniques have been introduced including 1) the Child’s reconstruction defined as pancreatojejunostomy/PJ followed by hepaticojejunostomy/HJ and the gastrojejunostomy/GJ ("the standard Child"), 2) the Child reconstruction with an additional Braun enterenterostomy ("BE-Child"), or 3) Isolated-Roux-En-Y-pancreaticojejunostomy ("Iso-Roux-En-Y"), with a separate loop of the PJ after the GJ. Yet, the impact of these reconstruction methods on surgical morbidity and mortality has not been sufficiently compared in a systematic manner.

Materials and methods:
Therefore, using the Preferred-Reporting-Items-for-Systematic-review-and-Meta-Analysis/PRISMA-guidelines, a systematic review with meta-analysis was conducted by screening relevant medical databases. Afterwards, articles meeting predefined criteria were extracted and meta-analysis were performed.

Results:
A total of 20 studies could be identified and pooled in meta-analysis comparing BE-Child or Isolated-Roux-En-Y vs. standard Child’s reconstruction. Whereas no effect on postoperative mortality could be observed (BE-Child: p=0.44; Iso-Roux-En-Y: p=0.47), morbidity was strongly decreased in patients with BE-Child compared to standard Child’s reconstruction (p=0.0002). Whereas no effect on postoperative pancreatic fistula/POPF was visible for both reconstruction techniques (BE-Child: p=0.27; Iso-Roux-En-Y: p=0.45), solely BE-Child as associated with a slight decrease of delayed gastric emptying/DGE (p=0.06) and a strong decrease of clinically relevant POPF (p<0.00001), clinically relevant DGE (p=0.02), bile leaks (p<0.01), a decreased hospital stay (p=0.05) but also an increased operation time (p=0.0002).

Conclusion:
BE-Child but not Isolated-Roux-En-Y is associated with a decreased risk for surgical morbidity, particularly a decreased risk for clinically relevant DGE, POPF and bile leaks. Therefore, BE seems to be a valuable surgical method to improve patients’ outcome after PD.
Curation of gallbladder cancer – Data of 1037 cases of “CAES/CAMIC/AIO-Registry” of incidental gallbladder carcinoma
(Abstract ID: 65)

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Background:
In most cases an immediate radical re-resection (IRR) after simple cholecystectomy in incidental gallbladder carcinoma (IGBC) is needed. The S3 guidelines valid till 2015 have recommended IRR in T2 and more advanced stages. The new S3- guidelines will recommend more aggressive surgery even in T1b, due to German- Registry (GR) data. According to the data of the GR the indication for IRR depends more on the experience of the hospitals in liver surgery than on complying with the guidelines, so most of IGBC- patients are staged incorrectly and not treated oncological sufficient. In practice, the following questions are of interest. Depends treatment of IGBC on the surgical or oncological expertise of the clinics? Which technique of liver resection (LR) is meaningful in which stage? What is important regarding lymph node ratio (LNR). What`s about multimodal therapy aspects and the importance of preoperative diagnostic.

Materials and methods:
For data analysis we used the GR. The GR includes 1037 cases of IGBC and is the largest gbc registry in Europe.

Results:
To date 1037 cases of IGBC in the GR have been registered. In T1b- T3 cases there was an a significant survival benefit for patients with immediate radical re-resection (IRR). Comparison of LR showed good results for the wedge resection technique (WRT) in T1b and T2. For T3 more radical techniques showed better results. Less than 50% of T2-3 tumors in the registry have been re-resected. LR was performed significantly more often in High- volume (HV) clinics. Statistic showed that lymph node ratio LNR is a significant prognostic factor. The results show that the referral of patients from a LV to a HV has no practical relevance. In 269 T2 and 164 T3 patients there are data about chemotherapy, with a highly significant survival benefit after chemotherapy in T2 and a trend for a survival benefit in T3 carcinomas. Positive effect of systemic therapy exists in the subgroup with and without re-resection but was more evident in patients without radical resection.

Conclusion:
IGBC`s up to T1b needs a radical surgery. The WRT is an attractive procedure for T1b / T2 IGBC. Also the count of retrieved lymph nodes is essential. Systemic therapy has an impact on outcome in T2-3 IGBC especially in cases without radical surgery. For further increasing the cure rate in T2-3 GBC patients a multimodal therapy (GAIN-) trial has already been planned by the investigator of the GR under the support of more than 300 clinics in Germany. Furthermore data of the preoperative diagnostics and tumor localization of the 1037 patients will be shown at the meeting.
Enoxaparin in the management of severe acute pancreatitis in experiment and clinic
(Abstract ID: 140)

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Background:

Acute pancreatitis (AP) is a complex disease that if accompanied by organ failure can cause serious complications and death. The problem of acute pancreatitis treatment in the present time remains unsolved, and the main difficulty is to assist patients with severe disease. Recently, interest increased in the use of heparin in the treatment of acute pancreatitis patients. Anticoagulation mechanism of heparin is also linked to its anti-inflammatory effect in the inhibition of the secondary stimulation of macrophages and monocytes.

Materials and methods:

For the experiment were used 42 Wistar albino rats. Acute necrotizing pancreatitis was induced by intraperitoneal injection with 3 g/kg L-ornithine-HCl in 26 rats. 16 rats served as control. After induction of acute pancreatitis in 10 rats we administered them the 100 U/kg enoxaparin during 5 days. The effect of enoxaparin was evaluated by determining the levels of serum amylase, serum creatinine, serum hydrogen sulfide, fibrinogen, time of recalcification, activity of NO-synthase and myeloperoxidase (MPO) in pancreas. We used enoxaparin in the treatment of 35 patients with moderate severe acute pancreatitis (MAP) (control group included 63 patients) and 31 patients with severe acute pancreatitis (SAP) (control group included 26 patients).

Results:

In experimental pancreatitis there was a positive impact of enoxaparin on the course pathological process both in the pancreas and in the major target organs. The enoxaparin is normalized serum creatinine, fibrinogen, amylase, MPO, H2S, the longer time recalcification of plasma, decreased activity of iNOS in rats with pancreatitis. The use of enoxaparin in patients with MAP contributes to the improvement of hemostasis and had an anti-inflammatory effect. One patient is died (2.86%) from 35, which received enoxaparin treatment, and 5 (7.94%) from 63, in which LMWH treatment is not ($\chi^2=1.01; p=0.3149$). The enoxaparin improved the condition of patients, reduced the severity of the pathological process of APACHE II from 9.54±1.01 to 5.52±1.31 (in the control group from 9.48±1.01 to 7.49±1.58) ($p<0.05$). Four (11.42%) patients from 35 patients, which received enoxaparin, and 19 (30.16%) patients from 63 control group ($\chi^2=4.39; p=0.0361$) are required the open necrosectomy. Enoxaparin is improved the condition of SAP patients, considering APACHE II assessment (from 11.94 ± 1.39 to 6.96 ± 1.63; control group from 12.42 ± 1.42 to 10.18 ± 1.44, $p<0.05$) and severity of organ dysfunction (SOFA) (from 5.74 ± 1.39 points to 1.04 ± 1.60; control group from 5.38 ± 1.36 to 3.05 ± 1.21; $p<0.05$). Three (9.68%) patients with SAP in enoxaparin group are died, and 8 (30.77%) patients in control group ($\chi^2=4.04; p=0.0445$). We operated the 14 (45.16%) patients in main group, and 9 (34.62%) patients in control group ($\chi^2=0.65; p=0.4149$). Two patients (14.29%) died in enoxaparin group, and 3 (30.00%) in control group ($\chi^2=0.87, p=0.35$).

Conclusion:

The use of enoxaparin in the experiment reduces morphological signs of damage both in the pancreas and in target organs, reduces the intensity nitrosative stress and inflammation, normalize plasma level indicators of hemostasis. Enoxaparin improves outcomes in patients with severe acute pancreatitis.
Pancreatic fistula after splenectomy: Incidence and treatment
(Abstract ID: 162)

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Background:

Indications for splenectomy vary, ranging from pathologies of the spleen and traumatic rupture to technical necessity during upper GI resections. Splenectomy is carried out via laparotomy or laparoscopically. Postoperative pancreatic fistula (POPF) is a well-known complication after splenectomy, which can either be treated conservatively, interventionally or surgically. This study investigates risk factors for the development of POPF, its treatment and its associated complications in order to create a framework for risk assessment and a treatment guideline.

Materials and methods:

All patients having undergone splenectomy at the University Hospital of Muenster from 2006 to 2016 were included in a retrospective analysis. Patient characteristics including age, sex, BMI, ASA-score, smoking, previous surgery, surgical procedure, intra- and postoperative complications were analysed for correlation with POPF incidence. In case of POPF, treatment regime and morbidity, mortality and length of hospital stay were analysed. Statistic analysis was performed using IBM SPSS® Statistics.

Results:

410 patients underwent splenectomy from 2006 to 2016. 75 patients (18.29%) developed POPF. 29 POPF (38.67%) occurred after primary splenectomy. Most fistulas were diagnosed on days 2 and 3 after surgery due to elevated enzyme activity in drain fluids. Of these fistulas, 61.33% were grade A (endothelial leakage), 30.67% grade B and 8.00% grade C. Technical splenectomy appeared to be a risk factor for POPF (48.00%). There was a higher tendency for POPF after emergency surgery than after elective operations (32.8% vs. 18.7% fistula) Open splenectomy was significantly correlated with the development of POPF (p=0.03). 90.67% of POPF were successfully treated conservatively without further morbidity. Conservative treatment for POPF had to be performed for 23.73 days on average. 9.33% required further treatment. 2 patients were treated by positioning of an interventional CT-guided drain or stent implantation. 5 patients had to undergo re-operation due to POPF. Mortality was lower in the non-POPF group (8 % vs. 18.79%). No mortality was recorded due to POPF. POPF had no significant influence on length of hospital stay. BMI, age, sex, smoking, previous surgery and ASA-score as well as operation time showed no significant influence on the development of POPF. Day or night surgery and total vs. partial splenectomy had no influence as well.

Conclusion:

POPF is a rather common complication after splenectomy. Most of the fistulas are Grade A fistulas and they can be successfully treated conservatively. Risk factors for POPF appear to be technical splenectomy, emergency surgery as well as open surgery.
Validation of the New Resection Margin Status Definition (1mm margin) for Adenocarcinoma of the Pancreas Body and Tail
(Abstract ID: 163)

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Background:

The definitions for R0 and R1 resection margin status for pancreatic cancer are controversial. A new definition of R0 requiring a 1-mm free margin has been used in Europe, but is not accepted internationally. Reported R0/R1 rates and associated survival are highly heterogeneous. While a 1-mm margin is an independent predictor of survival after resection for pancreatic head cancer, its relevance in adenocarcinoma of the pancreatic body and tail remains unclear. This study aimed to validate the R-Status (1mm margin) as a prognostic factor for resected adenocarcinoma involving the pancreatic body and tail.

Materials and methods:

A new protocol of margin evaluation and new R-status definitions were introduced into clinical routine in 2005. From a prospective database, patients undergoing resection for adenocarcinoma involving the pancreatic body and tail between 01/2006 and 12/2014 were identified. The rates of R0, R1 (<=1mm) and R1 (direct) status and associated survival were assessed.

Results:

Of 455 patients 107 (23.5%) had R0 and 348 (76.5%) had R1 resections, including 104 (22.9%) R1 (<=1mm) and 244 (53.6%) R1 (direct) resections. The R0 rate was 30.7% after distal and 18.4% after total pancreatectomy. With R0, R1 (<=1mm) and R1 (direct) status the median survival times and five-year survival rates were 62.4, 24.6 and 17.2 months and 52.6, 16.8 and 13.0 %, respectively (p<0.0001). In multivariable analyses the margin status was independent associated with survival.

Conclusion:

The R-status (1mm free margin) is confirmed as an independent determinant of survival after resection of pancreatic adenocarcinoma of the body and tail.
Collision tumor composed of pancreatic adenocarcinoma and retroperitoneal liposarcoma: a case report
(Abstract ID: 164)

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Background:
Collision tumors are rare cases with two different tumor entities growing synchronously. While adenocarcinoma of the pancreas is the most common pancreatic tumor with an incidence of 10 per 100,000, retroperitoneal liposarcoma remains very rare. This is the first report of a collision tumor between these two tumor entities.

Results:
Patient history: The tumor was diagnosed in a 64 year old, male Caucasian patient. Besides atrial fibrillation, arterial hypertension and a hypothyroidism there is no relevant medical history especially no history of cancer.

Diagnostic: During a routine check-up an unclassified tumor of the pancreatic tail was diagnosed. The lab showed no pathologies. Tumor markers were negative for CA 19-9, CA 72-4 and CEA. Alpha-fetoprotein and NSE were both elevated (AFP 97kU/l, (<5,8kU/l) and NSE 30,0µg/l (16,4µg/l)). A CT-guided biopsy was performed which revealed a low-grade liposarcoma (G1). A CT scan showed no metastases. A surgical resection was recommended by the interdisciplinary tumor board.

Treatment: A systematic left sided retroperitoneal compartment resection including en-bloc-left sided pancreatectomy, splenectomy, nephrectomy, hemicolectomy, adrenalectomy, partial gastrectomy and partial resection of the diaphragm was performed.

Pathology: The pancreatic adenocarcinoma was classified pT3, pN2 (11/33 ece+) L1 V0 Pn0, R0; G2 [UICC Stage III] and the liposarcoma pT2, pN0 (0/33) L0 V0 Pn0, G1 [UICC Stage Ib].

Conclusion:
This is the first description of a collision tumor composed of pancreatic adenocarcinoma and a retroperitoneal liposarcoma.
Outpatient drain management in patients with clinically relevant postoperative pancreatic fistula (POPF) - current status in Germany.

(Abstract ID: 174)

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Background:
Postoperative pancreatic fistula (POPF) is a common complication after pancreatic surgery associated with extended hospitalization, increased medical costs, and reduced quality of life. The aim of the present study was to assess the treatment of postoperative pancreatic fistulas in Germany with a special focus on the outpatient drain management in patients with clinically relevant POPF.

Materials and methods:
A questionnaire evaluating the postoperative management once a clinically postoperative pancreatic fistula is diagnosed -especially focusing on ambulatory drain management- was developed and sent to 211 German hospitals performing >12 pancreatic surgeries per year. Statistical analysis was carried out using SPSS 21.

Results:
The final response rate was 62% (131/211). An outpatient drainage management is performed by most of the responding hospitals (n=100, 76.3%). However, 30% of hospitals perform an ambulatory treatment only in 5% of their cases with clinically relevant POPF. A correlation between caseload of the pancreatic centers and frequency of outpatient drain management was not seen. Mostly discharge criteria for patients with drained POPF (74.8%), the drain management itself (74.8%) and criteria for drain removal (56.5%) are not standardized but made individually. In centers with a standardized drain management criteria for drain removal contain drain amount <20 ml (29.8%), no fluid collection (25.2%), no elevation of drain amylase/lipase (25.2%) and no specific symptoms (22.1%).

Conclusion:
This is the first national survey in Germany evaluating outpatient drain management in patients with clinically relevant POPF. Although the data in the literature are rare, the majority of German pancreas surgeons perform outpatient drain management. However, discharge criteria for patients with an inlaying drain, the outpatient care und the drain removal is standardized only in the minority of centers. Therefore, we recommend the evaluation of discharge criteria and a management algorithm for patients with drained POPF to improve the perioperative course.
There is no impact of numeric age on outcome in resectable pancreatic cancer  
(Abstract ID: 221)

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Background:

In resectable pancreatic ductal adenocarcinoma there is no reasonable alternative to operative treatment despite advanced age. From a clinical viewpoint we sometimes see individual cases where complications may lead to delay in chemotherapy receipt. Some cancer patients may also receive the standard of care in the operating theatre but for some reasons will never qualify for adjuvant chemotherapy. We wanted to assess the situation at our department and answer the question if numeric age alone has a significant impact on outcomes.

Materials and methods:

To adjust for extremes we identified n=121 consecutive pancreatic resections for ductal adenocarcinoma in patients ≥ 60 years from our prospectively maintained database. Study period were 10 years from 2005-2015. Age, tumor stage according to UICC, BMI, type of operation, vascular resection, gender, ASA, nodal status, R status, type of adjuvant chemotherapy regimen, duration of adjuvant chemotherapy and any reintervention or reoperation were entered into a stepwise Cox Regression model by a certified statistician using SPSS (IBM Inc.). We could provide follow up and survival data for all patients. Furthermore we performed a matched pair analysis with 1:1 matching for primary matching criteria tumor stage according to UICC, reinterventions and reoperations. Secondary matching criteria were BMI, operation date and ASA. These two groups A (≥ 60 < 75 years) and B (≥ 75 years) each comprised n=42 patients. Primary endpoints for the matched pair analysis were receipt and timing of adjuvant chemotherapy.

Results:

Stepwise Cox Regression showed a significant impact of tumor stage according to UICC, duration of adjuvant chemotherapy and R status. Numeric Age was not a significant factor. Matched pair analysis showed that significantly fewer patients over 75 years received adjuvant chemotherapy, although there was no difference in time to adjuvant chemotherapy between the two groups.

Conclusion:

Numeric age alone does not have a significant impact on outcome
Stage adjusted therapy of HCC – Influence of liver function on therapeutic outcome after surgical treatment or TACE
(Abstract ID: 231)

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Background:
Stage adjusted therapy of HCC is guided by the BCLC Guidelines. Here tumor stage, underlying disease and liver function are of special significance. In this regard we evaluated the HCC patients treated in our center over the last 15 years.

Materials and methods:
Between 2001 and 2016 780 HCC patients were treated. 374 (48%) patients underwent surgical treatment and 212 received a TACE (27%). Retrospectively we examined the influence of MELD score on therapeutic outcome and overall survival depending on surgical procedure or TACE.

For this purpose the therapeutic subgroups LTX (51; 7%), resection (159; 20%), surgical ablative procedure (RFA, MWA) (164; 21%) and TACE (212, 27%) were analyzed according to their liver function. A MELD of 15 or higher was chosen as a cut off to compare groups with good and impaired liver function.

We further evaluated average levels of Creatinine (mg/dl) and Bilirubin (mg/dl), INR and platelet count in the therapeutic subgroups surgical procedures (SP) and TACE with MELD >15 compared to subgroups with MELD <15.

Results:
The 2-year overall survival in patients with good versus impaired liver function (MELD score >15) resulted as follows: resection: 60% versus 58%, surgical ablative procedure: 58% versus 57% and for TACE: 35% versus 20%.

As expected liver transplantation showed the best overall survival in our collective (2-year 78%; 5-year 58%).

Average blood levels for patients with MELD > 15 were: Creatinine: 1.06 (SP) and 1.09 (TACE); Bilirubin: 1.26 (SP) and 1.98 (TACE); INR: 1.14 (SP) and 1.19 (TACE); platelets: 160.000 (SP) and 128.000 (TACE).

Average blood levels for patients with MELD <15 were: Creatinine: 0.74 (SP) and 0.75 (TACE); Bilirubin: 0.57 (SP) and 0.54 (TACE); INR: 1.02 (SP) and 1.03 (TACE); platelets: 201.000 (SP) and 202.000 (TACE).

Conclusion:
Even in patients with moderately impaired liver function liver resection seems to be first choice for treatment of HCC patients regarding to overall survival. If liver transplantation is no alternative surgical ablative procedures showed comparable results as resection regardless of the liver function.
Volume-outcome effects in major hepatic surgery in Germany - an observational study of hospital discharge data
(Abstract ID: 235)

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Background:

Objective: Several studies have found strong volume-outcome relationships in high risk surgery, such as pancreatectomy, with high mortality in low-volume facilities. However, reliable data on volume effects are missing for Germany situation. Therefore, we aimed to determine the effect of hospital volume on in-hospital mortality following major hepatic resections using hospital discharge data of every inpatient case in Germany.

Materials and methods:

Methods: We studied all inpatient cases of major hepatic resections (bisegmentectomy, multiple segmentectomy, hemihepatectomy, trisectorectomy, in-situ-split) in Germany from 2009 to 2015, using nationwide administrative hospital data (n = 31609). We determined the absolute number of patients and the in-hospital mortality for subcategories such as medical indications, concomitant surgical procedures, and interventions required for complications according to hospital volume quintiles. Multiple regression models were used to assess the effects of hospital volume on in-hospital mortality, adjusting for age, sex, selected coexisting conditions, year of resection and concomitant procedures.

Results:

Results: Overall in-hospital mortality was 7.5%. The majority of all hospitals that performed major hepatic surgery in Germany had a caseload below 20 resections per year. There was no significant relationship between hospital volume and in-hospital mortality.

Conclusion:

Conclusions: Hospital volume does not affect perioperative outcomes in major hepatic surgery in Germany. As overall mortality is relatively high, further investigations are necessary to elucidate the underlying causes.
Outcome after resection of hepatocellular adenomas prior to reclassification according to the revised classification of Bordeaux

(Abstract ID: 279)

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Background:
Hepatocellular adenomas are rare benign liver tumors, which mainly develop in young women. Although benign there are serious complications such as hemorrhage and malignant transformation, which led to the recommendation to resect all HCA > 5cm. In 2017 Nault et al. suggest a revised classification of HCA with one more subtype described. According to this, we plan a reclassification of all tumors resected between 2000 and 2017.

Prior to the pathological reclassification an analysis of all surgical interventions for HCA which were performed between 2000 and 2017.

Materials and methods:
We screened all patients with liver resection and a diagnosis of benign or unclassified liver tumor leading to 12 patients with HCA and 13 resections performed in this period. Biometrical and lifestyle data was assessed from the database.

For all patients we performed an immunohistochemical analysis of the liver tumor. Furthermore we will perform Next Generation Sequencing.

Results:
11 out of 12 patients were female. One was taking oral contraceptives at the time of operation. There were no HCA with signs of bleeding prior to surgery. The median BMI was 26.0 kg/m² with a range from 19.5 to 40.6 kg/m². Three patients classified as obese. Pre-operative diagnostic MRI was performed in 9 out of 13 cases. In 3 cases CT scan was performed. In one case the diagnosis was established by sonography and liver biopsy. The average size of the maximum diameter of the biggest HCA was 7 cm with a range from 4 to 10 cm in the preoperative imaging. 5 were located in the left lateral lobe, while the rest were located in the right lobe and 1 HCA partly in segment IV. 7 patients were resected by non-anatomical resections and 4 patients received a left lateral hepatectomy. 9 out of 13 resections were performed laparoscopically. One had to be converted to an open resection due to technical failure of the Stapler. The R0-resection rate was 100%. There were two patients with bleeding complications (one intraoperative and one postoperative) with no suspected link to the type of HCA. In the preoperative MRT-scans no HCA showed potential signs of malignancy.

In our patient collective 46% were classified as HNF1A HCA, 23% as inflammatory HCA and 30% were analyzed as unclassified. There were no cases with β-catenin mutation.

Three patients showed 5 or more HCA and 2 patients classified as adenomatosis. Malignant transformation was not seen in the follow up.

Conclusion:
HCA type had no influence on post-operative course. Malignant transformation was not seen after resection. Potential malignant HCA showed no signs of malignancy in the pre-operative MRI-Scan.
In our study collective we plan to establish the diagnostics to analysis all HCAs according to the revised Bordeaux-Classification.
Metastases of renal carcinoma to the pancreas: a rare indication for pancreatic surgery
(Abstract ID: 289)

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¹Universitätsklinikum Jena

Background:

Metastases from renal cell carcinoma are rare events during follow-up. Most metastases to the pancreas appear late in the history of the primary tumor and are considered as having a good prognosis after curative resection.

Materials and methods:

We retrieved the indications for pancreatic resections documented in our clinical tumor registry between 1997 and 2016 for patients operated for metastases of renal cell carcinoma. Clinical and pathological as well as survival data were extracted and analyzed.

Results:

We found 17 patients (9 male/8 female) complying with the requirements. The median age of the patients was 70 years (range 36-79 years). The median time interval between resection of pancreatic metastases and resection of the primary tumor was 7 years (range 1-26 years). Four patients had a second malignancy (colon, prostate, ovary, urinary bladder) after resection of the renal primary and before diagnosis of the pancreatic metastases. Four patients had pulmonary metastases resected, two patients had adrenalectomy, one patient had orchiectomy, and another thyroidectomy for metastases of the renal carcinoma before the pancreatic metastases were detected. We performed four pancreatoduodenectomies, ten distal resections, and three total pancreatectomies. One patient needed a revision because of bleeding, hospital mortality was 0%.

In all cases the diagnosis was confirmed by the pathologist. Twelve patients had solitary pancreatic lesions; five patients had two or more. The lesions had a median diameter of 3 (1-8) cm. Surgical margins were microscopically positive in three patients, negative in the others. No positive lymph nodes were seen in the resected specimens.

Our median follow-up time for all patients is 58 (12 -153) months. At date of last contact, 9 patients were alive. Five of them showed no evidence of disease, four had metastatic disease. Of the eight deceased patients one died 65 months after pancreatic resection from metastases of her ovary carcinoma, two patients died of comorbidities, the others had recurrence of their renal cell carcinomas.

Observed 5- and 10-year survival rates after pancreatic resection were 71% and 41%, respectively for all patients (Figure A). Till now, no patients with multiple pancreatic metastases survived five years (Figure B).

Conclusion:

The resection of renal cell carcinoma metastatic to the pancreas gives patients a good chance for long term survival with a reasonable perioperative risk, even if they have a history of other metastases from renal cell carcinoma or other malignant diseases.
Survival after pancreatic resection
Incidence and therapy of biliary fistulae after liver surgery  
(Abstract ID: 329)

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Background:

Biliary fistulae are seen in patients after liver resections in 6-30% of all cases according to the literature. The therapy of a biliary fistula can be conservative, interventional with either endoscopy and stenting or with radiological drainage, and finally also operative. Aim of the following study was to analyze the management and outcome of biliary fistulae in our patient cohort with regard to the chosen therapy.

Materials and methods:

Patients who underwent a liver resection in our clinic between 2001 and 2015 were included in the study. In the retrospective analysis patients with a biliary fistula were identified and their clinical history was followed until the fistula was healed completely. Data analysis was performed with SPSS statistics 22 using Pearson and Spearman-Roh as statistical tests.

Results:

In the study period 932 patients received a liver resection in our clinic. 60 patients (male 63.3%, female 36.7%) developed a biliary fistula postoperatively which was an incidence of 6.44%. The highest frequency of a biliary fistula was seen after a right hemihepatectomy (17.11%), followed by extended right hemihepatectomies with 15.6%. 78% of the biliary leaks were observed within the first 7 days after the operation. We performed a retrograde endoscopic cholangiopancreaticography (ERCP) for diagnosing the location of the leak and implanted an endoprothesis therapeutically in 42.4% of the patients. Endoscopic therapy was successful in 56% of all patients, followed by a primary success rate of 42.9% when an immediate reoperation with suturing of the leak was performed. In contrast, the placement of an interventional drain with help of computed tomography (CT) showed a primary success rate of only 20% and patients suffered significantly longer from biliary fistulae in this group compared with primary operation or stenting (126 days vs 58 days and 74 days, respectively, p<0.05). The earlier and the more invasive the primary therapy was initiated, the more successful this therapy resulted in a complete and speedy healing. Superinfected biliary fistulae healed significantly slower compared with non-infected biliary fistulae.

Conclusion:

Particularly following major liver resections biliary fistulae are observed. Important for a successful primary therapy appears to be firstly the immediate diagnosis and secondly the also immediate, causal and preferably invasive therapy with either endoscopic stenting or operative revision, ideally before the fistulae get superinfected.
Liver macrohemodynamics predict ascites and liver failure after hepatectomy: A prospective Study
(Abstract ID: 342)
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Background:
Large-scale ascites and posthepatectomy liver failure (PHLF) remain clinical challenges in the postoperative period after partial hepatectomy. The aim of this study was to assess hepatic macrohemodynamic changes, in particular a possible hepatic arterial buffer response, after hepatic resection and their association with ascites and PHLF.

Materials and methods:
The study was registered at ClinicalTrials.gov, number NCT01073345. One hundred patients were enrolled in a prospective study between February 2010 and October 2011. Portal vein pressure (PVP; mmHg), portal vein flow (PVF; ml/min) and hepatic artery flow (HAF; ml/min) were assessed directly before mobilization of the liver and 15 minutes after completion of parenchymal transection to allow liver macrohemodynamics to reach an equilibrium. Risk factors for ascites and PHLF were analyzed using Fisher’s exact, t-test or Wilcoxon rank sum test for univariate and logistic regression models for multivariate analyses. For hepatic macrohemodynamics preoperative and postoperative values were evaluated in these analyses as well as their intraoperative kinetics (i.e. Δ).

Results:
A major hepatectomy (i.e. more than 2 segments) was performed in 67% of patients and 8 patients underwent preoperative portal vein embolization (PVE). PHLF occurred in 12% of patients. Minor resections had little effects on hepatic macrohemodynamics. Major liver resection increased PVP by 26.9% (P = 0.001), markedly decreased HAF by 40.7% (P < 0.001) and slightly decreased PVF by 13.4% (P = 0.011). There were no significant changes of hepatic macrohemodynamics in patients with preoperative PVE. Further analyses revealed the extent of resection of being associated with ΔPVP (P = 0.001), post-resection HAF (P = 0.002) and ΔHAF (P = 0.002), whereas grade 3/4 fibrosis and platelets were associated with PVP before (P = 0.006; P = 0.001) and after (P = 0.057; P = 0.044) resection. On multivariate analysis, post-resection PVP (P = 0.036) was associated with large-scale ascites. Post-resection PVP (P = 0.015) and the extent of HAF decrease (P = 0.038) were associated independently with PHLF on multivariate analysis.

Conclusion:
The present study for the first time demonstrates a hepatic arterial buffer response in patients undergoing hepatic resection. The changes of hepatic macrohemodynamics and their association with outcome suggest novel approaches for the prevention and treatment of large-scale ascites and liver failure after partial hepatectomy.
Single center experience with a step up approach for 302 patients with acute pancreatitis leading to low mortality rates.

(Abstract ID: 366)

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¹Ordensklinikum Linz Barmherzige Schwestern

Background:

Management of acute pancreatitis has changed significantly over the last decades. The step up approach using either flexible endoscopy or a minimal invasive retroperitoneal access has reduced mortality and morbidity in patients with acute necrotising pancreatitis. For the endoscopic approach, the use of self expending covered metal stents facilitates necrosectomy and drainage of walled off necrosis (WON).

Materials and methods:

From 01/2014 to 07/2017 a total number of 302 patients with acute pancreatitis have been treated in our institution. We retrospectively analysed the data of these patients. Mortality and morbidity, interventions, complications and new onset of diabetes have been recorded. The evolution of endoscopic necrosectomy from initial balloon dilatation and plastic stents as well as self expanding metal stents to the use of lumen opposing fully covered metal stents with internal plastic double pigtail drainage is described.

Results:

Out of 302 patients treated with acute pancreatitis 30,8% (93 pat.) developed pancreatic fluid collection.

41,9% (39/93) of these resolved spontaneously and 58,1% (54/93) needed intervention.

36,5% (34/93) were treated endoscopically: 11,8% (11/93) received double pigtail drainage. 24,7 % (23/93) were treated with an endoscopic metal stent. 5,4% (5/93) needed retroperitoneal surgical necrosectomy alone, 2,2% (2/93) received only radiological drainage. 14% (13/93) were treated radiologically a/o endoscopically a/o surgically.

Overall 90-days-mortality rate was 3,70%, 1-year-mortality rate was 5,6%. Stent related bleeding occurred in 7,4%.

No transperitoneal necrosectomy was needed.

Conclusion:

Treating acute pancreatitis with a step up approach including stent in stent procedures leads to low mortality rates and low stent associated bleeding complications. Moreover it helps to minimize the necessity for open transperitoneal surgical necrosectomy.
Reproducibility of preoperative endoscopic injection of botulinum toxin into the sphincter of Oddi to prevent postoperative pancreatic fistula
(Abstract ID: 369)

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Background:
A postoperative pancreatic fistula (POPF) is the most common and potentially life-threatening surgical complication in pancreatic surgery. One possible pharmacological treatment could be the endoscopic injection of botulinum toxin (BTX) into the sphincter of Oddi to prevent POPF. Promising data reported a significantly reduced rate of clinically relevant POPF. We analyzed the effect of botulinum toxin injection in our patients undergoing distal pancreatectomy (DP).

Materials and methods:
A retrospective analysis of patients undergoing DP was performed. Patients with preoperative endoscopic injection of BTX into the sphincter of Oddi were included. Endpoints were postoperative outcomes including POPF. Botulinum toxin patients were compared with a historical cohort and matched in a 1:1 ratio using a propensity score.

Results:
Some 19 patients were treated with endoscopic injection of BTX before open (n=8) or laparoscopic (n=11) DP. The median age of the patients was 67 years and the mean BMI was 25.9 kg/m2. In median, the intervention was performed 1 day before the operation. There were no intervention-related complications. The incidence of POPF was not statistically different between the two groups: a clinically relevant POPF Grade B/C occurred in 32 % (BTX) and 42 % (control; p=0.737). Likewise, there were no significant differences in postoperative drain fluid amylase levels, morbidity and mortality.

Conclusion:
The present study could not reproduce the published results of a significant lowering of Grade B/C POPF. Explanations could be the timing of BTX injection before surgery and endoscopic technique of BTX injection. However, the conflicting results after BTX injection in two high-volume centers prompt a randomized controlled multicenter trial with trained endoscopists.
Prognostic Impact of Bacterobilia on Morbidity and Postoperative Management after Pancreatoduodenectomy  
(Association ID: 373)  
T. Welsch¹, B. Müßle¹, S. Hempel¹, C. Kahlert¹, M. Distler¹, J. Weitz¹  
¹Universitätsklinikum Carl Gustav Carus Dresden

Background:

Intraoperative bile analysis during pancreatoduodenectomy (PD) is performed routinely at specialized centers worldwide. However, it remains controversial if and how intraoperative bacterobilia during PD affects morbidity and its management. The aim of the study was a systematic review and meta-analysis of intraoperative bacterobilia and its impact on patient outcome after PD.

Materials and methods:

Five relevant outcomes of interest were defined and a systematic review of the literature with meta-analysis was performed according to the PRISMA guidelines.

Results:

A total of 28 studies (8,523 patients) were included. The median incidence of bacterobilia was 58 % (interquartile range: 51-67 %). The most frequently isolated bacteria were Enterococcus species (51 %), Klebsiella species (28 %) and E. coli (27 %). Preoperative biliary drainage was significantly associated with bacterobilia (86 % versus 25 %; RR 3.27; 95 % confidence interval [CI]: 2.42-4.42; P<0.001). The incidence of surgical site infections (SSI) was significantly increased in cases with bacterobilia (RR 2.84; 95 % CI: 2.17-3.73; p<0.001). Postoperative pancreatic fistula, overall postoperative morbidity, and mortality were not significantly influenced. Identical bacteria in bile and the infectious sources were found in 48 % (interquartile range: 34-59 %) of the cases.

Conclusion:

Bacterobilia is detected during almost every second PD, and is associated with an increased rate of SSI. The microbiome from intraoperative bile and postoperative infectious sources match in ~50 % of patients, providing the option of early administration of calculated antibiotics and the determination of resistance patterns.
Intraoperative endoluminal pyloromyotomy for reduction of delayed gastric emptying after pylorus preserving pancreaticoduodenectomy
(Abstract ID: 386)

M. Schrempf¹, D. Pinto¹, M. Anthuber¹

¹Klinikum Augsburg

Background:

Delayed gastric emptying (DGE) is a common complication after pylorus preserving pancreaticoduodenectomy (ppPD) with an incidence ranging from 3 to 61% depending on reconstruction technique and applied definition. DGE after major pancreatic surgery has an adverse influence on oral intake, patient quality of life, length of hospital stay and can even delay further treatment in severe cases. In order to reduce DGE after ppPD we introduced sharp endoluminal dissection of the pyloric muscle prior to creation of the duodenojejunostomy during ppPD. The aim of this study was to investigate the effect of endoluminal pyloromyotomy on DGE.

Materials and methods:

We retrospectively reviewed all cases of ppPD performed at our institution between January 2015 and June 2017. Outcomes and incidence of DGE between patients who underwent ppPD with endoluminal pyloromyotomy and without endoluminal pyloromyotomy prior to creation of the duodenojejunostomy were compared and tested for statistical significance. The International Study Group of Pancreatic Surgery (ISGPS) definition of DGE was applied for this study. Pyloromyotomy was performed at the discretion of the surgeon in charge using electrocautery to dissect mucosa, submucosa and the circular pyloric muscle anteriorly and posteriorly at the 12 and 6 o’clock position (Figure 1). If pyloromyotomy was not performed either a Gross-Maier dressing forceps was used to apply atraumatic multidimensional stretching to the pyloric muscle or no stretching at all was applied prior to the creation of duodenojejunostomy. Reconstruction was performed in an antecolic fashion.

Results:

Between January 2015 and June 2017 93 patients underwent ppPD at our institution. 4 cases were excluded from the study due to incomplete clinical data. Among the remaining 89 patients endoluminal pyloromyotomy was performed in 35 cases. Postoperative DGE occurred in 51 cases (57%). 15 (42.9%) patients in the pyloromyotomy group experienced DGE compared to 36 (66.7%) patients in the non-pyloromyotomy group. The incidence of postoperative DGE was significantly lower in the pyloromyotomy group compared to the non-pyloromyotomy group (Odds Ratio [OR] 0.38; 95% confidence interval [CI] 0.16 - 0.90; P = 0.027) (Figure 2).

Conclusion:

Despite limitations due to its retrospective character, this study shows that endoluminal pyloromyotomy can effectively reduce DGE after ppPD. Due to its simplicity endoluminal pyloromyotomy appears to be a promising technique that contributes to the improvement of postoperative outcomes after a commonly performed procedure in pancreatic surgery. A randomized controlled trial will further investigate our findings (DRKS00013503).
Minimal-invasive versus open hepatectomy for hepatocellular carcinoma: comparison of postoperative outcomes and long-term survivals using propensity score matching analysis
(Abstract ID: 395)

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¹Charité - Universitätsmedizin Berlin

Background:

Minimal invasive hepatectomy (MIH) for liver tumors has been increasingly performed with most promising results. However, the role of MIH for the treatment of patients with hepatocellular carcinoma (HCC) needs further investigation.

Materials and methods:

Clinicopathological data of patients who underwent liver resection for HCC between 2005 and 2016 were assessed. Postoperative outcomes und long-term survivals of patients after MIH were compared with those of patients undergoing conventional open hepatectomy (OH) after 1:1 propensity score matching.

Results:

During the study period, 421 patients underwent liver resection for HCC with curative intent. Fifty-six patients underwent MIH and were compared with a matched cohort of 56 patients who underwent OH. MIH was associated with lower complication rate (32 % vs. 54%, p = 0.022), lower major complication rate (14% vs. 30%, p = 0.041), lower liver insufficiency rate (0% vs. 7%, p = 0.042), lower 90-day mortality rate (0 vs. 7%, p = 0.042), and shorter length of hospital stay (9 vs. 12 days, p = 0.009) compared to OH. The rate of patients with fibrosis/cirrhosis (82% vs. 86%, p = 0.959), multiple lesions (32% vs. 32%, p = 1.00), tumor size > 30 mm (61% vs. 55%, p = 0.566), and major resection (16% vs. 16%, p = 1.00) was comparable between the two groups (MIH vs. OH). After a median follow-up time of 51 months, MIH and OH showed comparable overall survival rates (54 % vs. 41%, p = 0.151), and disease free-survival rates (50% vs. 38%, p = 0.956).

Conclusion:

MIH for HCC is associated with a lower postoperative morbidity, mortality and length of hospital stay, resulting in oncologic outcomes similar to those achieved with the established OH. Our findings suggest that MIH should be considered as the preferred method for the treatment of curatively resectable HCC.
Female laparoscopic cholecystectomy – results of the german national registry 2010 - 2014
(Abstract ID: 400)

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Background:

Until 2015 the german healthcare system employed a mandatory collection of perioperative quality assurance (QA) data for cholecystectomy for hospitals regulated by Code of Social Law part V §108. The governing body (Gemeinsamer Bundesausschuss, G-BA) stopped data collection until further notice for reasons of developing quality assurance. We present the data of the last five years of these surveillance data.

Materials and methods:

QA data are presented over five years whereas data have so far been published yearly only. An official application in 2013 led to approval for data inquiry from the data repository via a SPSS syntax. The SPSS syntax was tested, refined and run repeatedly to assure stable results. Data reported here include female patients only, operated on via laparoscopic cholecystectomy with or without intraoperative revision of the choledochus duct (OPS operation and procedure code 5-511.11/12) excluding NOTES procedures (natural orifice transluminal endoscopic surgery). Preoperative, intraoperative and postoperative data are presented as numbers, percentage of numbers, mean values and standard deviation (SD).

Results:

Female patients in this analysis showed a stable mean age of 53.5 years (SD 17.6) over five years. Over five years there were 504431 cholecystectomies in women with the OPS code 5-511/12. Compared to 2010, case numbers had steadily increased in 2014. There were 6000 cases more in 2014 then in 2010. Preoperative diagnostic methods have not changed over five years apart from a small increase in computed tomography. Preoperative clinical features of patients show an increase of inflammatory signs and symptoms. The numbers of intraoperative laparoscopic revision of the choledochus duct decreases further. According to the preoperative increase in signs and symptoms of inflammation, intraoperative findings of inflammation increased too (hydrops, acute cholecystitis, empyema). Numbers of postoperative complications like pneumonia, pulmonary embolism, thrombosis and urinary tract infection remained stable. But numbers of re-interventions (endoscopic, laparoscopic or open surgery) increased. In contrast hospital stay decreased further over the last five years. All cause mortality remained stable at 0.25% per annum.

Table:

<table>
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<td>age mean (SD)</td>
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<td>53.5 (17.6)</td>
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<td>acute inflammation N (%)</td>
<td>24044 (24.8)</td>
<td>25087 (24.8)</td>
<td>25678 (25.5)</td>
<td>26557 (26.0)</td>
<td>27816 (26.9)</td>
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<td>intraoperative N (%)</td>
<td>14946 (15.4)</td>
<td>16075 (15.9)</td>
<td>16424 (16.3)</td>
<td>17288 (16.9)</td>
<td>17619 (17.1)</td>
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hydrops
intraoperative N (%)  25151 (25.9)  26386 (26.1)  26709 (26.5)  28062 (27.5)  28755 (27.8)
cholecystitis
postoperative complications N (%)  1382 (1.4)  1481 (1.5)  1449 (1.4)  1457 (1.4)  1441 (1.4)
Re-
Intervention N (%)  1086 (1.1)  1138 (1.1)  1447 (1.4)  1467 (1.4)  1623 (1.6)

Demographic, pre-, intra- and postoperative data in female laparoscopic cholecystectomy

Conclusion:

Results of the german QA survey for cholecystectomy show changes in several items over the last five years. Numbers of cases operated on increased over five years whereas age mean did not. Concomitant there is a rising number of female patients with increased perioperative risk. The increased rate of re-intervention procedures is a possible effect of increased perioperative risk. In contrast, typical perioperative complications remain stable. This could be interpreted as an improvement in perioperative management. There was no effect on all-cause mortality from increase of perioperative risk. Laparoscopic cholecystectomy ist he most frequent surgical procedure in female patients in germany in general surgery. Hence laparoscopic cholecystectomy is an indicator surgical procedure for QA. Mandatory data collection allows assessment of the patient population. Development of the patient population influences health politics decision. Halt of QA data collection for indicator procedures should be discussed by surgeons.
Postoperative pancreatic fistula can be reliably precluded by measurement of serum amylase and lipase on postoperative day 1 and CRP on day 4 in patients without an intra-abdominal drain

(Abstract ID: 422)

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Background:

A recent randomized controlled trial showed that pancreatic resections with a pancreaticojejunal anastomosis can be safely performed without routine drainage. However, without an intra-abdominal drain, surgeons lack a diagnostic tool to preclude postoperative pancreatic fistula (POPF) and other surgical complications, which is key to early discharge in modern fast-track concepts. Therefore, the objective of the current analysis was to assess the diagnostic value of CRP, white blood cells (WBC), amylase and lipase after pancreatic surgery.

Materials and methods:

Within a randomized controlled trial comparing routine drainage to no drainage in a total of 395 patients (202 drain / 193 no drain) CRP, WBC, serum amylase and lipase values were prospectively collected preoperatively and on PODs 1, 2, 4 and 10. Diagnostic accuracy was assessed by the area under the curve (AUC) applying the receiver-operating characteristics methodology.

Results:

A total of 165 patients (41.8%) experienced surgical complications, 36 (9.1%) developed POPF and 78 (19.8%) developed fistula-associated complications. There was no difference in CRP, WBC, amylase or lipase values between patients with and without drainage. CRP value on POD 4 showed the best diagnostic accuracy for the detection of POPF particularly in cases without a drain (AUCCRP 0.78, 95% CI 0.68 - 0.90) with an optimal (Youden’s index) cutoff of 123 mg/l. Furthermore, serum amylase with an optimal cutoff > 160 U/l and lipase > 207 U/l on POD 1 showed good diagnostic accuracy (AUCamyl 0.76 [0.67-0.85]; AUClip 0.77 [0.66-0.88]). The negative predictive value regarding POPF for CRP on POD 4 as well as amylase and lipase on POD 1 in the group without a drain was 1.0 (0.95-1.0). AUC values regarding overall surgical complications or fistula-associated complications were all lower than 0.75 and were thus not further explored.

Conclusion:

Serum amylase and lipase on POD 1 and CRP level on POD 4 can aid in the implementation of modern fast-track concepts in pancreatic surgery. In patients without an intra-abdominal drain after pancreatic resection with a pancreaticojejunal anastomosis lower values than the above mentioned cutoffs reliably preclude POPF, whereas higher values should raise the surgeon’s attentiveness for POPF or other surgical complications.
Duodenum-preserving pancreatic head resection is not superior to partial pancreatoduodenectomy in the treatment of chronic pancreatitis: results of a multicenter randomized controlled trial
(Abstract ID: 424)

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Background:

Surgery has been shown to be superior to medical treatment for chronic pancreatitis but the optimal surgical treatment option remains unclear. Smaller randomized controlled trials showed superiority in short-term outcomes for duodenum-preserving pancreatic head resection (DPPHR) compared to partial pancreatoduodenectomy (pPD).

Materials and methods:

A patient and observer blinded, randomized, controlled superiority trial allocating patients planned for elective surgery due to chronic pancreatitis to either DPPHR or pPD was conducted in 18 European centers. In a pragmatic approach, all modifications of DPPHR (Beger, Frey, Berne) and pPD (pylorus-preserving or classical Whipple’s procedure) were legitimate within the randomized groups. The primary endpoint was mean quality of life (QoL) within two years after surgery assessed by the ‘physical functioning’ scale of the EORTC QLQ-C30 questionnaire. Secondary endpoints included other QoL scales, mortality, morbidity, postoperative pancreatic function (endocrine/exocrine), length of hospital stay, readmissions and reoperations due to chronic pancreatitis.

Results:

Over a period of four years, 250 patients were randomized to either DPPHR (n=125) or pPD (n=125). 115 patients in the DPPHR group and 111 patients in the pPD group were finally analyzed in the modified intention-to-treat analysis. Mean QoL within two years after surgery showed no significant difference between the two groups (DPPHR 73.0 ± 16.4; pPD 75.3 ± 16.4). Several QoL and pain scales of the EORTC QLQ-C30 and PAN26 showed significant postoperative improvement in both groups. While mortality, morbidity and other secondary endpoints did not differ between the groups, DPPHR showed a significantly higher rate of rehospitalization due to chronic pancreatitis compared to pPD.

Conclusion:

Results from single-centre trials demonstrating superiority of DPPHR over pPD in the treatment of chronic pancreatitis were not confirmed in the multicenter setting. DPPHR and pPD showed no difference in QoL, mortality and morbidity after surgery for chronic pancreatitis. However, pPD seems to represent the more definitive treatment, as shown by the lower rate of rehospitalisation.
Prognostic value of preoperative dynamic liver function on disease-free survival in HCC patients after curative liver resection

(Abstract ID: 440)

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Background:

Hepatocellular carcinoma is the fifth most prevalent cancer worldwide. High tumour recurrence is the most common cause of the impaired 5-year survival rate of 26 - 58% after hepatectomy. The aim of this study was to investigate the impact of preoperative liver function capacity determined by LiMAx test on long-term outcome.

Materials and methods:

A total of 146 patients that underwent curative resection for HCC at our department from 2005 - 2016 were analysed. Univariate analysis of prognostic variables was performed using a survival analysis according to Kaplan-Meier. Multivariate analysis was carried out with Cox proportional hazards model.

Results:

The cumulative 1-, 3-, 5-year survival rates were 83 %, 42 % and 14 %, respectively. Multivariate Cox regression yielded that overall survival depends on disease recurrence, haemoglobin, number of tumours, liver cirrhosis, lymphatic vessel invasion, UICC stage and postoperative complications.

The corresponding 1-, 3-, 5-year disease-free survival rates were 73 %, 32% and 10%, respectively. Multivariate analysis yielded preoperative liver function capacity (p = 0.015), vascular invasion (p = 0.035) and UICC stage (p = 0.038) as risk factors associated with decreased disease-free survival. A subanalysis with respect to the degree of functional impairment implicated that severity of liver function impairment is correlated with the disease-free survival rate.

Conclusion:

This study shows that preoperative dynamic liver function capacity assessed by LiMAx test as well as severity of underlying liver disease have a significant impact on recurrence-free survival after curative hepatectomy. Patients presenting with impaired liver function determined by LiMAx test should be evaluated for other treatment e.g. liver transplantation or receive closer oncological follow up.
Fig 1: Disease-free survival depending on dynamic liver function (LiMAX) - Impaired liver function capacity assessed by the LiMAX test correlates significantly with the disease-free survival rate (A) Severity of functional impairment correlates significantly with the disease-free survival rate (B)
Liver resection after selective internal radiation therapy (SIRT) Histopathological changes in tumour and liver tissue
(Assert ID: 479)

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Background:
Selective internal radiation therapy (SIRT) has emerged as an effective therapy for patients with primary or secondary liver malignancies. Here, we report our analysis of the histopathological changes in liver tumours and healthy liver tissue after internal radiotherapy and liver resection. Besides the mapping of the used microspheres, our main intent was to find out if there are specific histopathological changes in both the tumour and normal liver tissues after SIRT.

Materials and methods:
We identified 17 patients in whom SIRT was applied to achieve liver resectability. Following liver resection, samples were taken from the resected liver tissue. The sections were stained with haematoxylin and eosin (HE) and examined using transmission light microscopy. In the microscopic evaluation, the tumour, the tumour peripheries and the tumour-free tissue were examined. The number and localisation of SIRT- microspheres (per high-power-field), the presence of necrosis and fibrosis and morphological changes of the liver vessel were recorded. Furthermore, the content of vital tumour was quantified. The tumour regression in colorectal liver metastasis was graded according to the classification by Rubbia-Brandt and Dworak.

Results:
Microspheres were identified in the vascular tumour bed, in the tumour-free liver, in the interlobular and perineural tissue and in the portal tract. Notable was the inhomogeneous distribution of microspheres in the examined tissue samples. More microspheres were detected in the tumour than in the healthy liver tissue.

In all patients, we found tumour necrosis and fibrosis together with viable tumour cells. Other treatment effects were dystrophic calcifications and vessel alterations. When comparing tissue samples from colorectal metastasis of patients before and after SIRT, we found minimal or partial tumour responses (TRG 4 (Rubbia-Brandt); TRG 2 (Dworak)). However, performing statistical analyses, we did not find any correlation between tumour regression, fibrosis/necrosis and the patients’ age, gender, chemotherapeutic treatment, administered activity, two-staged liver resection or the time-interval between SIRT and resection.

Specific histopathological changes could not be described. We did not find any typical signs of radiation-induced hepatitis in normal liver tissue.

Conclusion:
Our findings support the clinical experience of effective tumour control after SIRT together with minimal impairment of the healthy liver. The observed histopathological changes after SIRT suggest that the combination of SIRT with modern liver surgery enables new therapeutic options.
H&E section of liver tissue in a patient with metastatic colorectal cancer before (A) and 50 days after SIRT (B). 1B shows characteristic microspheres and residual vital tumour cells (<1%), fibrosis (15%) and necrosis (acellular mucin lakes) (84%).
External evaluation of the mdaac clinical classification system for pancreatic cancer patients in an european upfront surgery multicenter cohort

(Abtract ID: 483)

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Background:

The MDACC group proposed an extended borderline classification system for pancreatic cancer to factor in prognostic and medical characteristics (Type A: resectable/borderline tumor anatomy, Type B: resectable/borderline resectable tumor anatomy with clinical findings suspicious for extrapancreatic disease, Type C: marginal performance status/severe pre-existing comorbidity profile, age>80). This study intents to evaluate the clinical borderline classification system in a multicentered upfront surgery patient cohort.

Materials and methods:

Evaluation was based on a multicenter database of pancreatic cancer patients undergoing upfront surgery from 2005 to 2016 (n=1020). Complications were classified based on the Clavien-Dindo classification. c2-test, Kaplan-Meier estimator and Cox regression hazard model were used for statistical analysis.

Results:

Most patients (55.1%) were assigned as type A patients, followed by type C (35.8%) and type B patients (9.1%). Neither the complication rate, nor the mortality rate revealed a correlation to any subgroup. Type B patients had a significant worse progression free (11.9 vs. 16.9 and 17.1 month in type A and type C, p<0.001) and overall survival (25.4 vs. 32.6 and 28.1 month in type A and type C, p=0.005). Type B classification was identified as an independent prognostic marker for progression free survival (p=0.005, HR 1.47).

Conclusion:

The MDACC group recommends extending the current anatomic borderline classification. The evaluation of the proposed classification in an upfront surgery cohort did not justify an additional medical borderline subgroup. A new subgroup based on prognostic borderline patients might be the target group for neoadjuvant protocols in future.
Determinants of Prolonged Intensive Care Unit Stay after Pancreatoduodenectomy: Multivariable Single Center Analysis
(Abstract ID: 485)

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Background:

Introduction: Morbidity remains substantial after pancreatoduodenectomy. Intensive care unit (ICU) resources are a major determinant of health care management and cost. Data on the factors contributing most to ICU stay is scarce.

Materials and methods:

Methods: Retrospective single center analysis of patients receiving pancreatoduodenectomies from 2013 to 2016. Contributing factors of prolonged ICU stay were identified by univariable and multivariable linear regression modeling in R software.

Results:

Results: In an analysis of 142 included patients, there were multiple, mostly intra- and postoperative factors associated with prolonged ICU stay in univariable analysis (colon and liver resection, OP time, pancreatic fistula (POPF C), arrosion bleeding (PPH C), delayed gastric emptying (DGE C), reoperation, and respiratory complications (pleural effusion, reintubation, pneumonia). In multivariable analysis of preoperatively assessible factors however, only presence of COPD was an independent predictor of ICU stay.

Conclusion:

Conclusion: Among preoperatively assessible factors, COPD was the only independent determinant of ICU stay after pancreatoduodenectomy.
Preoperative thrombocytopenia may predict poor surgical outcome after extended hepatectomy
(Abstract ID: 502)

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Background:

It is a novel idea that platelet counts may predict the postoperative outcome following liver surgery. This may help in planning an extended hepatectomy (EH), which is a surgical procedure with high morbidity and mortality. The aim of this study was to evaluate the predictive potential of platelet counts on the outcome of EH.

Materials and methods:

A series of 213 consecutive patients underwent EH (resection of >= five liver segments) between 2001 and 2016. The postoperative surgical outcomes were evaluated and compared between patients with a normal preoperative platelet count. The ability of preoperative platelet counts to predict posthepatectomy liver failure (PHLF), morbidity (based on Clavien-Dindo classification), and 30-day mortality was evaluated using multivariate analysis.

Results:

A total of 213 patients who underwent EH were included in our analyses. PHLF were detected in 26.3% of patients, complications in 45.5% of patients, and 30-day mortality in 11.3% of patients. Multivariate regression analysis revealed that the preoperative platelet count is an independent predictor of PHLF (odds ratio [OR] 4.4, 95% confidence interval [CI] 1.3-15.1, p=0.019) and 30-day mortality (OR 6.3, 95% CI 1.4-27.9, p=0.015).

Conclusion:

Preoperative platelet counts correlated with PHLF and mortality following extended liver resection. This predictive role was independent of other related parameters. Prospective studies are needed to further evaluate this predictive role and to determine the impact of preoperative correction of platelet count on postoperative outcomes after EH.
Predictive role of perioperative platelet count on posthepatectomy liver failure and mortality: a systematic review and meta-analysis

(Abstract ID: 503)

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Background:

Despite remarkable advances in liver surgery, posthepatectomy liver failure (PHLF) and mortality remain challenging issues, especially following extended hepatectomy. To predict these conditions, some authors have recently focused on the potential of perioperative platelet count. A systematic review and meta-analysis of published studies was conducted to evaluate the impact of perioperative platelet count on PHLF and mortality following hepatectomy.

Materials and methods:

A systematic literature search was performed using PubMed and Web of Science. All studies comparing patients with perioperative low and high platelet count with outcomes of PHLF or mortality were included into our meta-analysis. Random effects meta-analyses were calculated and presented as odds ratio (OR) with corresponding 95% confidence intervals (CI).

Results:

Thirteen studies containing 5260 patients were subjected to our analysis. Cut-off level of platelet was 150/nL in 5 studies with 1627 patients, and in 7 studies comprising 1536 patients, the cut-off level of 100/nL was determined for platelet. One study evaluated both cut-off levels in 2097 patients. Compared with perioperative platelet count >150/nL, patients with perioperative platelet count <150/nL had higher PHLF (OR 4.79, 95% CI 2.89-7.94) and mortality rate (OR 3.92, 95% CI 1.52-10.06). Similarly, patients with platelet count <100/nL had a significant increased risk of PHLF (OR 3.21, 95% CI 1.92-5.35) and mortality (OR 7.15, 95% CI 3.31-15.44) compared to patients with perioperative platelet count >= 100/nL.

Conclusion:

For the first time in a meta-analysis, we showed that perioperative low platelet count correlates significantly with higher PHLF and mortality after liver resection. Approximately all of the studies provided retrospective analysis or included minor hepatectomy with low risk of PHLF and mortality. Therefore, further prospective studies focusing on extended hepatectomy with high risk of PHLF and mortality are needed to highlight the predictive role of perioperative platelet.
Does acid-base equilibrium correlate with remnant liver volume during stepwise liver resection?
(Abstract ID: 504)

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Background:

Small for size and flow syndrome (SFSF) is one of the most challenging complications following extended hepatectomy (EH). After EH, hepatic artery flow decreases and portal vein flow increases per 100 g of remnant liver volume (RLV). This causes hypoxia followed by metabolic acidosis. A correlation between acidosis and posthepatectomy liver failure has been postulated but not studied systematically in a large animal model or clinical setting.

Materials and methods:

In our study, we performed stepwise liver resections on nine pigs to defined SFSF limits as follows: step 1: segment II/III resection, step 2: segment IV resection, step 3: segment V/VIII resection (RLV: 75, 50, and 25%, respectively). Blood gas values were measured before and after each step using four catheters inserted into the carotid artery, internal jugular vein, hepatic artery, and portal vein.

Results:

The pH, HCO³⁻, and base excess (BE) decreased, but HCO³⁻ values increased after 75% resection in the portal and jugular veins. EH correlated with reduced BE in the hepatic artery. PCO² values increased after 75% resection in the jugular vein. In contrast, arterial PO² increased after every resection, whereas the venous PO² decreased slightly.

Conclusion:

There were differences in venous HCO³⁻, BE in the hepatic artery and PCO² in the jugular vein after 75% liver resection. Because 75% resection is the limit for SFSF, these noninvasive blood evaluations may be used to predict SFSF. Further studies with long-term follow-up are required to validate this correlation.
Impact of patient age on outcome following major hepatectomy for perihilar cholangiocarcinoma  
(Abstract ID: 505)

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Background:

Major hepatectomy for perihilar cholangiocarcinoma is still associated with a considerably high perioperative morbidity and mortality. The aim of this study was to analyze the perioperative outcome and overall survival after major hepatectomy for perihilar cholangiocarcinoma in elderly patients.

Materials and methods:

We retrospectively analyzed data of all consecutive patients undergoing major hepatectomy for perihilar cholangiocarcinoma between 2005 and 2015 at the Department of Surgery, Campus Virchow-Klinikum, Charité-Universitätsmedizin Berlin. Perioperative outcome as well as 1-year and 3-year overall survival of patients \(\geq 70\) years (group 1) were compared to those of patients \(< 70\) years (group 2).

Results:

In the study period, 264 patients underwent major hepatectomy for perihilar cholangiocarcinoma, including 90 patients (34.1%) who were \(\geq 70\) years old (group 1). No differences were evident between both groups with regard to the type of tumors according to Bismuth-Corlette, UICC-stage or rate of microscopically free margins. Of note, elderly patients were characterized by significantly less lymphatic vessel infiltration (group 1, 38.0%; group 2, 51.7%, \(p=0.04\)) and less organ metastases at time of resection (group 1, 1.8%; group 2, 10.3%, \(p=0.04\)). ICU stay, but not total length of hospital stay (\(p=0.2\)), was significantly longer in elderly patients (group 1, 12.5 days; group 2, 8.7; days, \(p<0.004\)), with a trend towards more major complications (Dindo-Clavien IIIb-V) (group 1, 42.2%; group 2, 30.9; \(p=0.5\)). There were no differences found between both groups with regard to tumor recurrence (group 1, 28.9%; group 2, 34.3%; \(p=0.2\)) as well as 1-year and 3-year overall-survival (group 1, 62.0% and 32.0%; group 2, 66.0% and 36.0%; both \(p=0.4\)).

Conclusion:

Major hepatectomy for perihilar cholangiocarcinoma in elderly patients \(\geq 70\) years) appears to be associated with perioperative outcome and survival rates comparable to those of patients \(< 70\) years. Extended surgical approaches to the liver should not be considered a contraindication for well-selected elderly patients.
Laparoscopic major hepatectomy – single center experience with 51 consecutive patients
(Abstract ID: 506)

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Background:

Focus has shifted towards extending the indications for laparoscopy in hepatobiliary surgery in recent years. As such, selected high volume centers nowadays perform both left and right hepatectomy minimally-invasively. We here report our single-center experience with laparoscopic major hepatectomy.

Materials and methods:

We retrospectively analyzed data of all consecutive patients undergoing minimally invasive major hepatectomy between April 2014 and August 2017 at the Department of Surgery, Campus Charité-Mitte and Virchow-Klinikum, Charité-Universitätsmedizin Berlin with regard to the perioperative outcome.

Results:

In the study period, 51 patients (male, n = 27; female, n = 24) with a median age of 61 years (median 13 - 83) underwent minimally invasive major hepatectomy. Indications included colorectal liver metastasis (n=22), hepatocellular carcinoma (n=11), cholangiocarcinoma (n=3), echinococcosis (n=3), Caroli-disease (n=3), hemangioma (n=1), adenoma (n=2) and focal nodular hyperplasia (n=2). CHILD A liver cirrhosis was evident in 7 of 51 patients (14%). Right and left hepatectomy was indicated in 38 patients (75%) and 13 patients (25%), respectively. In 12 patients (24%) hepatectomy was extended or combined with atypical resections of the contralateral lobe. Approaches included pure laparoscopic and hand-assisted techniques in 19 (37%) and 32 patients (63%), respectively. Median operating time was 354 minutes (range 186 min - 602 min). Median length of ICU stay and length of hospital stay was 1 (range 1d - 23d) and 10 days (range 6d - 58d), respectively. Major complications (IIIb-V) according to Dindo-Clavien were noted in 11 patients (21.5%).

Conclusion:

Laparoscopic major liver resections are technically safe and associated with an acceptable postoperative morbidity. Minimally invasive techniques have become the preferred approach for anatomical right and left hepatectomy at our center.
Prediction of postoperative morbidity and PHLF development after liver resection of HCC in cirrhosis by future liver remnant function

(Abstract ID: 509)

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Background:

Surgical procedures in patients with underlying liver disease are still burdened by a higher rate of postoperative morbidity, especially posthepatectomy liver failure (PHLF) ranging from 1.2 to 33.8 %. The aim of this study was to investigate the predictive value of volume/function analysis for the prediction of hepatectomy-related morbidity in cirrhotic patients with hepatocellular carcinoma.

Materials and methods:

Clinicopathological data were analysed in 287 patients who underwent liver resection for HCC between 2001 and 2014. Future liver remnant volume (FLRV) and future liver remnant function (FLRF) based on LiMAx test was obtained retrospectively. A subgroup analysis for a high-risk group defined by cirrhosis and extended resection was conducted. Univariate and multivariate regression was performed to define risk factors for major complications Dindo >= IIIb and PHLF grade >= B.

Results:

Postoperative major complications were identified in 44 patients (15.3%). PHLF grade >= B occurred in 50 patients (17.4%). FLRF was independently associated with major complications and FLRV, resected liver volume and FLRF with PHLF development in total cohort. Multivariate analysis revealed FLRF as the only independent risk factors for major complications and PHLF development in high-risk group.

Conclusion:

These results suggest the superior value of FLRF to FLRV in predicting postoperative complications as well as PHLF in patients with underlying liver disease. Preoperative calculation of FLRF should be recommended as a standard of care in high-risk situations to improve postoperative outcome.
The stand of portal vein arterialization in hepatobiliary surgery: a systematic review
(Abstract ID: 517)

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Background:
Hepatic artery (HA) reconstruction during liver resection can be impossible due to arterial infiltration or anatomical limitations. Portal vein arterialization (PVA) is discussed to improve the hepatic oxygenation and provide a new chance for the patients with dearterialized liver. The aim of this study is to review the clinical application of PVA in hepatobiliary surgeries.

Materials and methods:
A systematic review was performed according to the PRISMA guidelines. PubMed, Embase, and Web of Science databases were searched using the keywords: portal vein arterialization; arterioportal shunt; liver resection; hepatectomy. Experimental studies, review articles, letters, and also articles published in languages other than English were not included.

Results:
A total of 20 studies, involving 57 patients, were included. According to the anatomical location, hilar lesions (38 patients, 70.4%) were the most common indication of the surgery. The reasons for performing PVA were excision of lesions abutting HA (32 patients, 56.1%), HA ligation (11 patients, 19.3%), HA thrombosis (six patients, 10.5%), iatrogenic injury (four patients, 7.0%), and failure of HA reconstruction (four patients, 7.0%). An end-to-side anastomosis between celiac trunk branches and portal vein (PV) is the main performing technique for PVA (35 patients, 59.3%). An anastomosis between mesenterial artery and vein (20 patients 33.9%), and also end-to-side anastomosis between the splenic artery and PV (three patients 5.1%) are the other PVA methods. The most common complication of PVA is portal hypertension (12 of 57, 21.1%). 35 patients (61.4%) survived during the follow-up period of 1 to 87 months in different studies.

Conclusion:
PVA may provide a chance of cure for patients with the unresectable lesions. To prevent portal hypertension and liver injuries due to thrombosis or over-arterialization, calibrating and timely closure of PVA should be considered.
Establishing a Porcine Model of Small for Size Syndrome following Liver Resection
(Abstract ID: 521)

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Background:
Small for size syndrome (SFSS) is responsible for a high proportion of mortalities and morbidities following extended liver resection. The aim of this study was to establish a porcine model of SFSS.

Materials and methods:
Twenty-four Landrace pigs underwent liver resection with a remnant liver volume of 50\% (group A, n = 8), 25\% (group B, n = 8), and 15\% (group C, n = 8). After resection, the animals were followed up for 8 days and clinical, laboratory, and histopathological outcomes were evaluated.

Results:
The survival rate was significantly lower in group C compared with the other groups (p < 0.001). The international normalized ratio, bilirubin, aspartate transaminase, alanine transaminase, and alkaline phosphatase levels increased shortly after surgery in groups B and C, but no change was observed in group A (p < 0.05 for all analyses). The histopathological findings in group A were mainly mild mitoses, in group B severe mitoses and hepatocyte ballooning, moderate congestion, and hemorrhage, along with mild necrosis, and in group C extended tissue damage with severe necrosis, hemorrhage, and congestion.

Conclusion:
Combination of clinical, laboratory, and histopathological evaluations is needed to confirm the diagnosis of SFSS. 75\% liver resection in porcine model results in SFSS. 85\% liver resection causes irreversible liver failure.
Laparoscopic hepatobiliary surgery in patients with a history of abdominal surgeries
(Abstract ID: 525)

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Background:

Laparoscopic techniques have been used increasingly for liver resections in recent years. As there are no evidence-based guidelines as to determine whether laparoscopy is feasible and beneficial for patients with previous abdominal surgeries, we herein investigated the outcome for the respective patients.

Materials and methods:

We retrospectively analyzed data of all consecutive patients undergoing laparoscopic liver resections between September 2008 and September 2017 at our Department. We compared patients with (group 1) and without (group 2) prior abdominal surgery with respect to ASA score, postoperative complications (Dindo-Clavien score), length of operation, length of ICU stay and length of hospitalization.

Results:

We here report on 194 patients, of which 63 patients (32%) had a history of abdominal surgeries (group 1). Those patients had similar pre-operative mean ASA scores, when compared to patients with no prior surgeries (group 1, 2.4 vs. group 2, 2.3, respectively, p=0.41). There were no significant differences in mean length of operation (group 1, 259 vs. group 2, 249 minutes, p=0.56). In the postoperative course, both groups showed comparable rates of complications (IlIa-V; group 1, 16.1% vs group 2, 12.1%, p=0.5). Consequently, length of ICU stay (group 1, 1.5 vs group 2, 1.7 days, p=0.45) was comparable, with a trend towards a longer hospital stay of patients with prior surgery, but this did not reach statistical significance (group 1, 10.3 vs group 2, 8.9 days, p=0.08).

Conclusion:

Our data suggest that history of prior abdominal surgery is not an impediment to laparoscopic liver surgery as the respective patients have a similar outcome when compared to patients without previous surgeries.
Laparoscopic liver surgery is safe in elderly patients – single center experience
(Abstract ID: 527)

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Background:
Laparoscopic liver surgery has become a well-accepted alternative to conventional open approaches; however, it remains unknown, which patients benefit most from minimal-invasive approaches. As the average patient in western countries is becoming older, the aim of this study was to analyze the perioperative outcome after laparoscopic liver surgery in elderly patients.

Materials and methods:
We retrospectively analyzed data of all consecutive patients undergoing laparoscopic liver resections between September 2008 and September 2017 at the Department of Surgery, Campus Charité-Mitte and Campus Virchow-Klinikum, Charité-Universitätsmedizin Berlin. Perioperative outcomes of patients >70 years (group 1) were compared to patients <=70 years (group 2).

Results:
In the study period, 227 patients underwent laparoscopic liver resections, of which 78 patients (34%) were >70 years and 149 patients (66%) were <=70 years. Sixty-two (79%) and 124 (83%) anatomical resections were performed in group 1 and 2, respectively, of which 15 (19%) and 36 (24%) represented major liver resections.

The median ASA score was 3 and 2 (p=ns) and the BMI was 27 kg/m² and 25 kg/m² (p=0.0014) in groups 1 and 2, respectively. There were no differences found between both groups with regard to major complications (Dindo-Clavien IIIb-V; group 1, 16.7%; group 2, 12.1%; p=ns). The median ICU stay was 1 day in both groups, whereas the hospital stay was two days longer in elderly patients (group 1, 11 days; group 2, 9 days; p=0.014).

Conclusion:
In experienced hands laparoscopic liver resections can be performed safely in elderly patients. Despite being characterized by slightly higher BMI values and reduced physical status, major complication rates were not significantly increased. We hypothesize that elderly patients might benefit most from minimal invasive approaches.
Surgical treatment of mucormycosis
(Abstract ID: 529)

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Background:
Mucormycosis is a rare aggressive invasive fungal disease with 90 day-mortality rate from 50% to 90%. Immunosuppression due to hematologic malignancies, solid organ transplantation or diabetes is the main risk factor. Pulmonary manifestation is most common. Additional abdominal organ manifestation seems to worsen the prognosis. Early antifungal therapy in combination with lung resection in case of a pulmonary infection improves the outcome. For surgical treatment of abdominal organ manifestation the evidence is very limited. Aim of this study was to evaluate the outcome after surgical treatment for abdominal mucormycosis.

Materials and methods:
A retrospective study was performed analyzing all cases of invasive mucormycosis at the university hospital of cologne from 2010-2016.

Results:
16 Patient could be identified with invasive mucormycosis. 76% had a hematological malignancy. 14 (88%) patients showed a pulmonary, 5 (11%) patients an abdominal manifestation. 3 of them a combination of lung and liver/spleen affection. 8 lung resections, 3 atypical liver resections and one splenectomy were performed. 4 patients were not treated surgically at all. Median survival after lung resection was 110 ± 25 days and after abdominal resections (liver/spleen) 426 ± 222 days.

Conclusion:
Surgical resection for abdominal organ manifestation of mucormycosis seems to be feasible and could improve patient survival.
The influence of preoperative endoscopic stent insertion into the common bile duct on postoperative outcome after a Traverso-Longmire Whipple surgical reconstruction: Analysis of prospectively collected data of a certified pancreatic center (Abstract ID: 532)

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Background:

Surgical resection for pancreatic cancer offers the only chance for cure. About 40% of the patients undergo a preoperative biliary stent insertion. The role of preoperative biliary drainage in patients with biliary obstruction prior to pancreatic surgery with reconstruction remains controversial. The aim of this study was to test the following hypotheses: Preoperative biliary drainage with the implantation of an endoprosthesis by means of ERCP leads to higher rates of positive bile duct cultures, predominantly with Enterococcus spp. Preoperative biliary drainage with the implantation of an endoprosthesis by means of ERCP leads to higher rates of postoperative cholangitis. Preoperative biliary drainage with the implantation of an endoprosthesis by means of ERCP leads to lower complication rates.

Materials and methods:

At the department of General and Visceral Surgery, Pius-Hospital, Oldenburg, Germany, a cohort of 152 patients undergoing either (pylorus-preserving) Traverso-Longmire, classic Whipple or total pancreaticoduodenectomy from January 2009 up to and including July 2015 was analyzed. The research design is a retrospective analysis of the influence of bile duct stenting in patients prior to pancreaticoduodenectomy on various outcomes. Patients with external or surgical pre-operative biliary drainage were excluded. The main study endpoint of the presented study was the comparison between patients with and without preoperative bile duct stenting with regards to the intraoperative bile duct cultures and postoperative outcome in patients undergoing pancreatic surgery, and to analyze the rates of postoperative cholangitis for patients with or without preoperative bile duct stenting. The frequency and the outcome of bile duct infections were evaluated, to analyze which patients are at risk for bacterial contamination of the biliary tract and to determine, if these micro-organisms affect postoperative complications after pancreatic surgery. It was investigated if bacterial contamination and postoperative cholangitis affect postoperative morbidity and mortality after pancreatic surgery.

Results:

Forty percent (62 out of 152) of the included patients underwent preoperative biliary drainage for a median time period of 26 days (range 1 to 215) prior to resection. Retrospectively, bile duct cultures in 17 out of 152 patients were missing, and a total of 135 patients were used for the analysis of bacteria. In 53% (71 out of 135) bile duct cultures were positive, whereas 47% (64 out of 135) of bile duct cultures remained sterile. Enterococcus spp. were the most frequent bacterial isolates in bile (49%) in common. After preoperative biliary stenting 98% of the participants show a positive intraoperative gathered bile duct culture in comparison to 21% in the group without preoperative bile duct stenting. In 59% of the group with a common bile duct stent enterococcus spp. was found. A statistically significant higher incidence of definite cholangitis on the first postoperative day was found in patients with stents compared with patients without stent placement (Fig 1). No difference for postoperative surgical complications between stented and non-stented patients was found.
Conclusion:

Preoperative biliary drainage leads to positive bile duct cultures in 98% of all cases (often Enterococcus spp.). Preoperative biliary drainage leads to 4-times higher rates of early postoperative cholangitis. After stent insertion, antibiotic prophylaxis is required to prevent post-operative infections of the bile ducts. An antimicrobial therapy with anti-enterococcal activity should be chosen.

Picture:

Presence of cholangitis on the first (a), third (b), or fifth (c) postoperative day for patients with and without prior stent insertion
Preoperative biliary stenting increases perioperative morbidity of pancreatoduodenectomy for pancreatic cancer - an analysis from the German DGAV-StuDoQ|Pancreas registry

(Abstract ID: 542)

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Background:

The impact of preoperative biliary stenting (PBS) on postoperative complication rates in patients undergoing pancreatoduodenectomy (PD) for pancreatic cancer is controversially discussed. We aimed to assess perioperative morbidity of PBS prior to PD for pancreatic ductal adenocarcinoma in a large-scale multi-center DGAV-STUDOQ registry study.

Materials and methods:

Patients undergoing PD with or without PBS for pancreatic ductal adenocarcinoma were identified from the DGAV-STUDOQ registry pancreas. Propensity score-based matching was performed according to pancreatic texture and preoperative serum bilirubin level. Postoperative complications were defined following the ISGPS guidelines and Clavien-Dindo Classification.

Results:

A total of 922 patients were included, and 480 patients were undergoing PBS. Baseline parameters such as age, sex, BMI, ASA score, co-morbidities, preoperative jaundice, pancreatic texture and technical resection parameters were well-balanced. In PBS patients, preoperative sepsis rates were higher as compared to patients not receiving PBS (5.9% vs. 1.2%, HR 5.150, 95%CI 3.38-7.86, p<0.001). Regarding postoperative complications, rates of clinically relevant postoperative pancreatic fistula (11.4% vs. 7.9%, HR 1.504, 95% CI 1.23-1.84, p<0.001), surgical site infections (17.7% vs. 8.9%, HR 2.205, 95% CI 1.84-2.64, p<0.001), rates of wound reopening (4.0% vs. 1.1%, HR 3.687, 95% CI 2.35-5.79, p<0.001) and Clavien Dindo grade IIIa to V complications (31.3% vs. 26.3%, HR 1.278, 95% CI 1.12-1.45, p<0.001) were higher in PBS patients as compared to patients not undergoing PBS. Leakage of the gastro-enteric anastomosis (1.5% vs. 0.8%, HR 1.770, 95% CI 1.00-3.14, p=0.050) and postoperative pneumonia (9.0% vs. 6.5%, HR 1.431, 95% CI 1.15-1.79, p=0.001) were more frequent in the PBS group. In multivariate risk factor analysis PBS qualified as independent risk factor of all before mentioned complications. In patients not undergoing PBS, rates of bile leakage (4.5% vs. 3.1%, HR 0.690, 95% CI 0.51-0.94, p=0.018) and pulmonary embolism (1.7% vs. 0.8%, HR 0.485, 95% CI 0.28-0.84, p=0.009) was increased as compared to PBS patients.

Conclusion:

PBS prior to PD for pancreatic cancer is associated with significantly increased perioperative morbidity and should not be performed routinely.
Hepatocellular adenoma  Proposal for a german-wide registry  
(Abstract ID: 544)

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Background:
Hepatocellular Adenoma (HCA) are rare benign liver tumors which appear in most of times clinically unapparent. In former studies, five subtypes of HCA were detected by using immunohistochemistry. Nevertheless, there are two serious risk factors associated with the tumor subtype: malignant transformation and haemorrhage. As a function of subtype, a specific therapy is preferable. Unfortunately, there is neither a registry nor a guideline for treatment of liver adenoma in Germany.

Materials and methods:
In this study, we included 30 patients with diagnosed Hepatocellular Adenoma from 01.01.2005 to 01.10.2017 in a German single center. We collected all paraclinical data and reevaluated the diagnostical and therapeutic pathway for each patient. Furthermore, we subtyped the adenoma by using immunohistochemistry.

Results:
From 30 included patients -7 male and 23 female-, 24 underwent resection because of enhanced diameter and number, increased risk of bleeding, suspected malignancy or heterogeneity in diagnostic imaging. In three cases liver transplantation was performed. 6 patients are actual under clinical and radiological control due to multiple or singular adenoma.

Conclusion:
There is still no guideline for hepatocellular adenoma in Germany. For this purpose, a Germany-wide index of these tumors, containing subtype, therapy and diagnostic pathway, is needed. Herewith, it could be possible to detect patients fraught with risk earlier and faster and to initiate a subtype-based therapy.
Pylorus Resection Does Not Reduce Delayed Gastric Emptying After Partial Pancreato-duodenectomy: a Blinded Randomized Controlled Trial (PROPP study - DRKS00004191) (Abstract ID: 571)

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Background:

Partial pancreato-duodenectomy (PD) is the standard treatment for tumors of the pancreatic head. Preservation of the pylorus has been widely accepted as standard procedure. Delayed gastric emptying (DGE) is a common complication causing impaired oral intake, prolonged hospital stay and postponed further treatment. Recently, pylorus resection with preservation of the stomach has been shown to reduce the incidence of DGE. The aim of this study was to investigate the effect of pylorus resection on postoperative DGE in PD.

Materials and methods:

Patients undergoing PD for any indication at the University of Heidelberg were randomized to either PD with pylorus preservation (PP) or PD with pylorus resection and complete stomach preservation (PR). The primary endpoint was DGE within 30 days according to the International Study Group of Pancreatic Surgery (ISGPS) definition. Secondary endpoints were operative time, blood loss, postoperative complications, mortality, length of hospital stay, and quality of life.

Results:

188 patients were recruited from February 2013 to June 2016. Ninety-five patients were randomized to PP and 93 patients to PR. There were no baseline imbalances between the groups. Overall, 53 of 188 patients (28.2%) developed a DGE (grade: A 15.5%; B 8.8%; C 3.3%). In the PP group 24 of 95 patients (25.3%) and in the PR group 29 of 93 patients (31.2%) developed a DGE (odds ratio 1.534, 95% confidence interval 0.788 to 2.987; p=0.2079). None of the secondary endpoints differed significantly between the groups. However, higher BMI was a significant risk factor for DGE severity.

Conclusion:

In this randomized controlled trial, pylorus resection during PD did not impact the incidence or severity of DGE. The development of DGE seems to be multifactorial and may not be attributable to pyloric dysfunction alone. Pylorus preservation should therefore remain the standard of care in PD.
Evolution of laparoscopic liver resection – from benign liver lesions to surgical oncology
(Abstract ID: 595)

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Background:
Percentage of benign lesions has been disproportionally high in early series reporting of laparoscopic liver surgery. Here, we report on changes in indications for laparoscopic liver surgery over time and associated changes in extent of resection and perioperative outcomes.

Materials and methods:
We retrospectively analyzed all consecutive patients scheduled for laparoscopic liver resection between January 2015 and August 2017 at our Department. Indications for liver resection and perioperative outcomes were analyzed and compared between an early time period (period 1; 2015) the last year (period 2; 2016) and he current year (period 3; 01/2017-8/2017).

Results:
Between January 2015 and August 2017 we performed a total of 189 laparoscopic liver resections for benign (n = 62; 32.8%) and malignant tumors (n=127, 67.2%). Significant differences were noted with regard to the indication between period 1 (benign, n = 24; 46.2%; malign, n =28, 53.8%), period 2 (benign, n =27; 35.5%; malign, n =49, 64.5%) and period 3 (benign, n =11; 18.0%; malign, n =50, 82.0%; p<0.01).

Preoperative health (mean ASA score 3 (1-3) vs. 2 (1-3); p<0.001) was significantly impaired and BMI was significantly increased (25.9 (17.8-43.6)kg/m² vs. 22.5 (16.6-35.9)kg/m²; p<0.01) in patients with malignancies, when compared to patients with benign tumors. In keeping with this, patients with malignancy were significantly older (68 (27-89) years vs. 47 (13-76) years; p<0.0001).

Extent of liver resection tended to be higher in patients with malignancies (malignant - minor, n = 85; 68.0%; major, n = 40, 32.0%/ benign - minor, n =47; 75.8%; major, n =15, 24.2%). Accordingly, postoperative morbidity (Grade III-V; 22 vs. 6; 15.2% vs. 9.7%) and total length of stay was increased in patients with malignancies, when compared to patients with benign tumors (9 (2-59) days vs. 7 (2-27).

Conclusion:
Our data suggest a paradigm shift in laparoscopic liver surgery from minor liver resections for benign tumors to major liver resections primarily for liver malignancies. This evolution is associated with characteristics well know from conventional surgical oncology, such as patients with reduced preoperative health, high BMI and high age.
Elastic Net Risk Prediction Model for Postoperative Pancreatic Fistula using DGAV StuDoQ|Pancreas
(Abstract ID: 651)

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Background:

Postoperative pancreatic fistula (POPF) is a major factor for morbidity and mortality after pancreatic resection. Risk stratification for POPF is important for adjustment of treatment, selection of target groups in trials and quality assessment in pancreatic surgery. In this study we build a risk-prediction model for POPF based on a large number of predictor variables from StuDoQ|Pancreas.

Materials and methods:

StuDoQ|Pancreas was searched for patients, who underwent pancreatectoduodenectomy from 2014-2016. A multivariable logistic regression model with elastic net regularization was built including 52 preoperative and intraoperative parameters. Cross-validation was used to select the optimal model. The model was assessed via area under the ROC curve (AUC) and calibration slope and intercept.

Results:

A total of N=2488 patients were included. In the optimal model the predictors selected by the elastic net were texture of the pancreatic parenchyma (soft versus hard), body mass index, histological diagnosis pancreatic ductal adenocarcinoma and operation time. The AUC was 0.70 (95% CI 0.69-0.70), the calibration slope 1.67 and intercept 1.12. In the validation set the AUC was 0.65 (95% CI 0.64-0.66), calibration slope and intercept were 1.22 and 0.42, respectively.

Conclusion:

StuDoQ|Pancreas was established as a tool for risk adjusted quality assessment in pancreatic surgery. The model we present is a valid measurement instrument for POPF risk and together with StuDoQ|Pancreas can be applied to improve the quality of pancreatic surgery in Germany.
Technical challenges in major liver resection for alveolar echinococcosis (i.e. echinococcosis multilocularis)  
(Abstract ID: 701)

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Background:

Alveolar Echinococcosis (AE) is a potentially fatal, often multifocal infection of the liver with malignancy mimicking growth and potential metastasis. Currently the only curative treatment option is radical resection, which is often complicated by parasitic involvement of adjacent organs or hilar structures of the liver. There are very few reports about the outcome of extended surgery.

Materials and methods:

We retrospectively analyzed the chart of eight patients who underwent major liver resection for EA at our center between 2006 and 2017. We looked at surgical procedures, post-op complications as well as follow-up.

Results:

Eight patients (pts) (4m, 4f, all Caucasian Germans) with a mean age of 46y (Range 19 - 76y) were included. 6 / 8 pts were preoperatively treated with Albendazole for a median of two weeks (Range 1 - 537). 5 / 8 pts underwent trisectionectomy (4 right, 1 left) and three a standard hepatectomy (1 right and 3 left). Five patients had resection of extra hepatic bile ducts with a complex hepaticojejunostomy in two cases. Two had partial resection and reconstruction of the IVC. Two had partial resections and reconstructions of the portal vein. One had reconstruction of the right HA. Two had partial resection and reconstruction of the diaphragm. The median length of hospital stay was 16d (Range 10 - 26 days).

Four patients experienced complications >= Dindo 3a: Three biliary leaks requiring intervention and one pulmonary embolism. To date all pts are alive, with no signs of recurrent disease and no need of liver transplantation with a mean follow-up of 35 months.

Conclusion:

Due to its long incubation period patients with EA are often diagnosed late when biliary symptoms arise and the disease is already advanced locally. Yet we believe that resections with complex reconstructions are a feasible alternative to liver transplantation in tertiary centers for HBP surgery.
Percutaneous biliary drainage is not associated with lower survival rates after major liver resection for perihilar cholangiocarcinoma

(abstract ID: 718)

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Background:

Biliary decompression is routinely performed in patients with perihilar cholangiocarcinoma before resection. We aimed to analyze potential associations of external biliary drainage with perioperative complication rates and survival after major hepatectomy.

Materials and methods:

Data of all consecutive patients undergoing major hepatectomy for perihilar cholangiocarcinoma between 2005 and 2015 at the Department of Surgery, Campus Virchow-Klinikum, Charité - Universitätsmedizin Berlin were retrospectively analyzed. Perioperative outcome as well as 1-year and 3-year survival of patients with external biliary drainage (group 1) were compared to patients with no external biliary drainage (group 2).

Results:

Between 2005 and 2015, 264 patients underwent major hepatectomy for perihilar cholangiocarcinoma, of which 58 (22.0%) received an external biliary drainage (group 1).

Group 1 was characterized by significantly more type IV tumor according to Bismuth-Corlette (group 1, 55.6%; group 2, 39.1%; p = 0.04), more lymph node metastases (group 1, 62.1%; group 2, 46.3%; p = 0.034) and lower rates of microscopically free margins (group 1, 44.8%; group 2, 70%; p < 0.001). Postoperative complications as classified by Dindo-Clavien did not differ between both groups (p = 0.08), resulting a comparable mean ICU stay and hospital stay. Noteworthy was a trend of more peritoneal spread in group 1 (group 1, 25.0%; group 2, 15.4%; p = 0.129) in the follow up. One-year overall survival was significantly reduced in group 1 (group 1, 56%; group 2, 71%; p =0.041); however, this difference was not longer apparent after 3 years (36% vs. 38%; p = 0.410).

Conclusion:

Preoperative external biliary drainage for perihilar cholangiocarcinoma was obviously indicated in patients suffering from more advanced tumors. Nevertheless, no evidence was found supporting negative effects on perioperative outcome or 3-year survival.
Treatment of biliary leakage after liver resection – an 11-year single-centre experience  
(Abstract ID: 740)

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Background:

Bile leaks are still a major cause of postoperative morbidity with the need for additional diagnostic tests, interventions, prolonged hospital stay, mortality and higher costs. Despite surgical progress, bile leak incidence remained stable in the last decades, reported between 5% - 12%. Aim of this study is to assess the therapeutic success of various treatment options.

Materials and methods:

All patients, who received liver resection at the Department of General Surgery at the Medical University of Vienna, from January 2005 to December 2016 were included in this analysis. Treatment options for BL were compared regarding success rate.

Results:

Overall, 1554 patients with liver resections were included in this study. BL occurred in 82 patients (5.28 %). According to the ISGLS classification, biliary complications were classified as grade A in 13 patients, grade B in 37 cases and 32 patients were classified as grade C. The majority of patients with BL received LR due to cholangiocarcinoma (35 patients, 42.7%). 13 patients were successfully treated conservatively (including antibiotic therapy). 27 CT-guided percutaneous drainages were performed, with a success rate of 66.6%. 9 patients received additional therapies after the CT-guided drainage (7 patients ERCP, one patient re-laparotomy and one patient both). ERCP was the initial treatment choice in 18 patients, with a success rate of 61.1%. A total of 27 ERCP were performed (18 times without any prior therapy, 8 times after CT-guided percutaneous drainages and in one case after re-laparotomy). Overall success rate of ERCP was 70.4%. Additional therapies for persisting BL after ERCP were necessary in 8 patients (29.6%), re-laparotomy in 6 cases and CT-guided percutaneous drainages in two cases. Re-laparotomy was inevitable in 32 cases (39%), 25 times as first treatment choice due to severe biliary complications after LR and 7 times after failed previous treatments. Resolving of the BL was achieved in 30 cases (93.5%). Two patients received radiofrequency-ablation due to persisting BL, which was successful in one case.

Conclusion:

The choice of therapy of BL is often based on the experience of the responsible surgeon. Our study provides an overview of the success rates of the current treatment options for BL and can be the basis for further prospective clinical trials.
99mTc-mebrofenin hepatobiliary scintigraphy and LiMAx to evaluate liver function for major liver resections

(Abstract ID: 775)

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Background:

There is still no reliable diagnostic algorithm to assess the future remnant liver function before major liver resections to predict postoperative outcome and to minimize the severe risk of posthepatectomy liver failure (PHLF). This complication is directly associated with higher morbidity and mortality rates. The aim must be to implement a presurgical routine to measure the current liver function and to calculate future remnant liver function for further individual therapeutic decisions. Therefore, we used 99mTc-mebrofenin hepatobiliary scintigraphy and maximum liver function capacity test (LiMAx) for major liver resections.

Materials and methods:

In 12 patients undergoing major liver resection because of hepatobiliary malignancies, a full presurgical liver function evaluation through 99mTc-mebrofenin hepatobiliary scintigraphy and maximum liver function capacity test (LiMAx) (Fig.1) was carried out to determine the estimated future liver remnant (FLR). In a first step the tumorous parts were marked in the mebrofenin scintigraphy image and the remnant functioning liver tissue was measured. In a second step, we mapped the actual resection borders of the performed surgery within the same image to re-evaluate and measure the new representative uptake rate. (Fig.2) We analyzed the impact of liver function on postoperative outcome including PHLF (50-50 criteria, Peak-Bili-7, ISGLS-criteria) and morbidity (Dindo-Clavien Classification).

Results:

In 9 patients preoperative 99mTc-mebrofenin hepatobiliary scintigraphy showed critical levels (< 2.7 \%/min/m²). LiMAx measurement revealed borderline values (< 100 µg/h/kg) in 4 patients. All 12 patients underwent major liver resections. PHLF relating to ISGLS-criteria occurred in 3 patients (1 ISGLS-A, 2 ISGLS-B). These 3 patients also fulfilled the Peak-Bili-7 criteria, which showed liver failure in the whole for 4 patients. Two of these patients (one positive for ISGLS-A and Peak-Bili-7, one only positive for Peak-Bili-7) were not recognized as critical by preoperative liver function assessment, neither by scintigraphy nor by LiMAx. None of the included patients developed PHLF according to 50:50 criteria. Postoperative complications IIIb or higher occurred in 3 patients, 30-day mortality was 0%.

Conclusion:

99mTc-mebrofenin hepatobiliary scintigraphy and LiMAx can be helpful tools to improve the estimation and accuracy of posthepatectomy liver failure prediction, but the impact still remains unclear. Therefore further investigations are necessary.
Maximum Liver Function Capacity Test diagram (LIMax - Test)

healthy patient: 538 μg/h/kg

sick patient: 268 μg/h/kg

Fig. 1

99mTc-macrobeta hepatic scintigraphy

Fig. 2
Impact of enlarged and affected lymph nodes on long-term outcome after surgical therapy of alveolar echinococcosis
(Abstract ID: 777)

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Background:

Alveolar echinococcosis (AE) is a serious helminthic disease. In humans, AE affects mostly the liver, but regional hepatic lymph nodes may be also involved, pointing to dissemination of AE from the liver. For this reason, enlarged hepatic lymph nodes may be resected during surgical treatment. We evaluated the frequency of microscopically and immunohistochemically (monoclonal antibody Em2G11) affected lymph nodes. Further, we analyzed the association of resection of enlarged and affected lymph nodes on long-term outcome after surgical therapy of patients who underwent surgery with curative intent.

Materials and methods:

109 curatively operated patients between 2000 and 2017 were evaluated regarding the lymph node resection/involvement, the duration of medical therapy with benzimidazole derivates, and the further course of AE.

Results:

In 43 out of 109 curatively operated patients, lymph nodes were resected. A systematic lymph node dissection in the hepatoduodenal ligament was performed in 11 patients. Most frequently, lymph nodes were resected due to enlarged in size. Microscopically infested lymph nodes (lamellar bodies were visible) were found in 7 out of these 43 patients (16%). In more than three quarters (25/32) of all specimen investigated, lymph nodes showed small particles of echinococcus multilocularis (SPEM) when stained with antibody against Em2G11, a monoclonal antibody specific for the Em2 antigen of the Echinococcus multilocularis metacestode. Median size of microscopic affected lymph nodes was 2 cm [range: 1.2 to 2.5cm], median size of immunohistochemically and non-affected lymph nodes was 1.3 cm each [range: "small" to 2.3 or 2.5cm, respectively]. Median follow-up was 8 years for all patients, 5 years for patients with lymph node resection, and 4 years for patients with infested lymph nodes. Overall, recurrent disease was seen in 10 patients (10/109; 9%) after a median period of 1.5 year (range 4 month to 4 years). None of the 7 patients with microscopically affected lymph nodes suffered from recurrent disease. One patient with negative resected nodes and one patient with SPEM showed recurrent disease after 4 and 35 months, each.

Conclusion:

Lymph node infestation in AE is frequent, particularly after immunhistochemical examination of lymph nodes with monoclonal antibody Em2G11. Affected lymph nodes were slight, but non-significant larger in size when compared to non-affected lymph nodes. Lymph node affection is not associated with recurrent disease at short term.
Multimodal treatment modalities are associated with improved long-term outcome in patients with recurrent hepatocellular carcinoma.
(Abstract ID: 796)

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Background:
Orthotopic liver transplantation (OLT) is considered as the treatment as it treats both the tumor and the underlying liver disease. Unfortunately, the low availability of liver allografts has been a major problem while waiting list mortality remains high. As such, liver resections also in patients with underlying chronic liver disease are becoming increasingly popular. Tumor recurrence after liver-resection, however, continues to impose a major problem in hepatocellular carcinoma (HCC). Here we aimed to evaluate prognostic markers for recurrence-free (RFS) and overall survival (OS) in HCC-patients who underwent liver-resection in curative intent. In addition, we investigated the effects of multimodal treatment modalities in a subgroup of patients with HCC-recurrence.

Materials and methods:
Between 2009-2016 111 patients (BCLC-0: n=3, BCLC-A: n=67, BCLC-B: n=27, BCLC-C: n=17) underwent surgical resection for HCC at our institution. Surgical complications were assessed using the Clavien-Dindo complication score. Patients with tumor recurrence (n=50) were treated with repeated liver-resection alone (n=5), liver transplantation (n=1), local-ablative procedures (n=5), transarterial chemoembolization (TACE) (n=3), sorafinib therapy (n=10), best supportive care (n=16) or a combination or multiple treatment modalities (n=15). The associations of RFS and OS with histopathologic characteristics were assessed using univariate and multivariable cox regression analyses.

Results:
Median RFS was 31 months and median OS was 27 months. 62 of 111 patients developed surgical complications, whereas only 13.5 % of the patients (15/111) developed Clavien-Dindo > 3b. Macrovascular invasion (p<0.001), number of tumor nodules (p=0.003) and red blood cells transfused (p=0.045) were independently associated with RFS. Tumor recurrence per se did not show an association with OS (p=0.228). However, patients with HCC-recurrence who underwent repeat-surgical or interventional treatment showed significant improved OS compared to patients treated with palliative or sorafinib treatment alone (OS: 18 months vs. 2 months; p<0.001).

Conclusion:
Tumor recurrence alone is not associated with poor oncological outcome and repeat liver resections as well as local-ablative procedures are crucial to improve OS in HCC. Large prospective trials are needed to validate our findings.
Hilar en-bloc resection for perihilar cholangiocarcinoma (PHCC); a single-center experience
(Abstract ID: 799)

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Background:

Cholangiocarcinoma (CCC) is a relatively rare malignancy that is typically diagnosed at an advanced disease stage. Since its introduction by Neuhaus et al., hilar en-bloc resection with portal vein reconstruction has emerged as the mainstay of surgical treatment for patients with perihilar cholangiocarcinoma (PHCC). Despite recent advancements, the overall survival (OS) and recurrence-free survival (RFS) of patients with PHCC remains lower than for most other solid tumors and tumor recurrence after curative resection continues to impose a significant problem in the management of patients with CCC. Here we aimed at identifying prognostic markers of clinical outcome in PHCC patients that underwent hilar en-bloc surgical resection in curative intent.

Materials and methods:

Between 2010-2016 ninety-five (n=95) patients underwent hilar en-bloc surgical resection for PHCC at our institution. Surgical complications were assessed according to the Clavien-Dindo complication score and the comprehensive complication index (CCI). The associations of recurrence free- (RFS) and overall survival (OS) with clinico-pathological characteristics were assessed using univariate and multivariate survival analyses. Intrahepatic- and distal CCCs or PHCC patients who underwent associating liver partitioning with portal vein ligation for staged hepatectomy (ALPPS) were excluded from this study.

Results:

Median RFS was 36 months and median OS was 38 months. Clinico-pathological characteristics including age (p=0.481), ASA-score (p=0.620), gender (p=0.193), Bismuth-classification (p=0.591) and arterial infiltration (p=0.591) were not associated with clinical outcome. In contrast, local lymph node metastases (p=0.044), histological grading (p=0.033) and lymphatic metastases (p=0.033) were predictors of impaired OS and RFS. Even though surgical complications as assessed by CCI were higher in the right (n=46) compared to the left (n=36) hilar en-bloc resection group (CCI: 51±32 vs. 32±29 respectively, p=0.005), we did not observe any differences with regards to clinical outcome comparing extended left versus extended right hilar en-bloc resections (median OS: 41 months vs. 30 months respectively, p=0.875). All risk factors identified demonstrated impaired survival in the overall cohort and were equally distributed between left and right hilar en-bloc resections.

Conclusion:

Hilar en-bloc resection for PHCC is safe and feasible in experienced high-volume liver centers. Meanwhile right hepatectomy is associated with higher morbidity, the oncologic outcome does not differ between left versus right hilar en-bloc resections. Large prospective trials are needed to validate our findings.
Comparative clinical and oncological outcome analysis of conventional two-stage hepatectomy with portal vein embolization (TSH/PVE) versus associating liver partition and portal vein ligation (ALPPS) for patients with colorectal liver metastases (CRLM)

(Abstract ID: 801)

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Background:

Traditionally, surgical resection has offered the best option for prolonged survival in patients with colorectal liver metastases (CRLM). Over the past 20 years significant progress has been made to expand the criteria for defining resectability in patients with primary or metastatic hepatic malignancy. In an attempt to further increase resectability in patients with CRLM, surgical and interventional maneuvers such as portal vein embolization (PVE), portal vein ligation (PVL) and two-staged hepatectomies (TSH) have been implemented. Recently, a novel two-stage surgical procedure with rapid liver-hypertrophy coined associating liver partition and portal vein ligation (ALPPS) has been introduced. Even tough, both surgical procedures (TSH/PVE versus ALPPS) are technical feasible and allow complete resections (R0) in patients that were otherwise considered not resectable, little is known about the comparative oncological outcome of TSH/PVE and ALPPS.

Materials and methods:

Between 2011-2016 52 patients underwent staged hepatectomies for CRLM at our institution. Thirty-five (n=35) patients underwent the conventional TSH/PVE approach whereas 17 patients were treated with the novel ALPPS procedure. Surgical complications were assessed using the Clavien-Dindo complication score and the Comprehensive Complication Index (CCI). Associations between oncological outcome and patients’ characteristics were accessed by univariate and multivariate survival analysis. Differences between the groups were accessed by the log-rank and non-parametric tests.

Results:

In 20% (7/35) of all CRLM patients undergoing the conventional TSH/PVE approach, the second step was not completed due to insufficient hypertrophy of the future liver remnant (FLR) or progressive disease. From these, 5 out 7 (71%) were treated with salvage ALPPS, whereas 2 of these patients were subject to palliative care. All 17 ALPPS patients (100%) completed both steps as planned. No significant differences in mortality were observed between the groups (TSH/PVE vs. ALPPS, 6.7% vs. 5.9%, p=0.999). However, the mean comprehensive complication index (CCI) was higher in ALPPS group (39±21) than in the TSH/PVE group (24±27) indicating more morbidity for patients undergoing the ALPPS procedure (p=0.014). Preoperative risk factors, which included the number of liver metastases (p=0.621), timing of metastases (p=0.082), preoperative cycles of chemotherapy (p=0.103) and the amount of chemotherapy lines (p=0.103) were equally distributed between the groups. CRLM patients who were treated with TSH/PVE versus ALPPS did not show a significant difference in median overall survival (TSH/PVE vs. ALPPS, 29 months vs. 19 months, p=0.819).

Conclusion:

Conventional and novel techniques of two-stage hepatectomies (TSH/PVE versus ALPPS) are feasible and safe in experienced high-volume liver centers. Even though ALPPS was associated with an increased perioperative morbidity, CRLM patients undergoing TSH/PVE versus ALPPS did not show
significant differences in overall survival. As such, patient selection is of upmost clinical importance and salvage ALPPS may be a suitable approach for TSH/PVE patients with insufficient inter-stage hypertrophy of the FLR.
Frontiers in pancreatic surgery: feasibility and benefit of radical resection for locally advanced and metastasized pancreatic adenocarcinoma

(Abstract ID: 813)

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Background:

Pancreatic ductal adenocarcinoma (PDAC) is a highly aggressive malignancy and most patients present with locally advanced disease or distant metastases at the time of diagnosis. It is unclear whether patients with locally advanced PDAC benefit from resection of adjacent involved structures. The role of synchronous hepatic resection for singular hepatic metastases and extended interaortocaval lymphadenectomy as standard care in metastatic disease also remains controversial. However, selected patients may significantly benefit from radical surgery. The aim of this study was to evaluate survival outcome after extended local pancreatic resection, especially arterial resection. Furthermore, survival outcome after resection of synchronous metastases was evaluated.

Materials and methods:

We reviewed the records of patients who underwent oncologic pancreaticoduodenectomy (PD) for PDAC of the pancreas head with artery resection to achieve margin clearance between 2003 and 2017. Patients who received synchronous metastasectomy of the liver (HEPM) or extended interaortocaval lymphadenectomy (IAC-LAD) between 2003 and 2017 were also retrospectively evaluated. Clinico-pathologic data were analysed with focus on morbidity and oncologic outcome. Matched pairs analysis was performed with patients who received arterial resection and a homogeneous patient collective receiving palliative treatment, harbouring no distant metastases at the time of diagnosis. Survival outcome of patients who received liver metastasectomy or IAC-LAD was compared to patients who received standard oncologic PD for PDAC, with a similar pathologic staging result for the primary tumor, but without hepatic metastases or distant lymphogenic metastases.

Results:

Data from 284 patients who received oncologic PD between 2003 and 2017 for PDAC of the pancreas head were analysed. From this cohort, 29 patients (10%) required resection of adherent arterial vessels, including the celiac axis (CA), common hepatic artery (CHA) and superior mesenteric artery (SMA). Adjuvant therapy was administered to more than 90% of these patients. The median survival was 13.9 months (3.7 months-3.8 years), which was significantly better than in patients receiving only palliative treatment (median survival: 3 months; p<0.001). 60 patients (21%) underwent oncologic PD with synchronous metastasectomy (hepatic n=27, IAC-LAD n=33). In the liver resection group, surgical morbidity, mortality and average hospital stay were 5%, 0% and 20 days; in the IAC-LAD group, 11%, 0% and 27 days, respectively. Hospital stay and morbidity showed no significant difference in cases with liver metastasectomy or extended LAD compared to standard oncologic PD. Overall median survival (OS) after M1 resection was 9 months (3-46 months) in the HEPM group, with a significant difference from a homogenous group of patients receiving only chemotherapy (p=0.044). OS in the IAC-LAD group (15 months (2.4-52 months)), was not statistically different to patients who received PD for locally advanced PDAC of the head (pT3N1M0R0) (14 months (2-154 months)) (p=0.899).

Conclusion:

This cohort represents one of the largest series of PDAC patients receiving PD with arterial resection or synchronous metastasectomy, respectively. Arterial resection and synchronous metastasectomy
resulted in significantly prolonged OS. Thus, these treatment options should be considered for a selected group of patients, as it may be superior to palliative treatment. Further randomized prospective studies are warranted.
Treatment of acute necrotising pancreatitis with splenic autolysis - a case report
(Abstract ID: 818)

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Background:
Acute necrotising pancreatitis is the most severe form of pancreatitis, which has high rates of morbidity and mortality. Due to the proximity of the spleen to the pancreatic tail, splenic complications can eventuate and range from moderate infarction to hemorrhagic rupture. A rare complication ist the complete splenic autolysis.

Materials and methods:
We report on a case of necrotising pancreatitis with complete autolysis of the spleen in a 49 year old male patient, which could be treated successfully by both surgical and percutaneous drainage procedures.

Results:
A 49 year old male patient was referred to our institution from another clinic after diagnosing a severe necrotising pancreatitis with mucosal necrosis of the stomach. The patient was primarily managed with percutaneous drainages, bowel resting, parenteral nutrition and broadband antibiotics. The patient remained in a stable state for many weeks. As thrombocytosis developed, a complete dissolution of the splenic parenchyma was seen radiologically. The spleen could not be seen during the subsequently performed laparoscopic necrosectomy with drainage of several infected fluid collections in the upper abdominal regions. Gastric wall necrosis with local perforation and a colonic perforation were found, which were treated by gastric tube and abdominal drainage. The CT examinations showed a resolution of the splenic necrosis. After second laparoscopy and subsequent percutaneous drainages a stable situation with low-output small bowel fistulae was reached. After a four months hospitalisation the patient could be dismissed.

Conclusion:
Splenic autolysis can be the result of necrotising pancreatitis, possibly by thrombosis of the splenic vessels. Successful management ist feasible by consistently draining all infected fluid collections. Surgery is necessary when radiologic percutaneous does not suffice.
Radiological development during treatment
Bile Leakage after Liver Resection: Analysis of 147 Consecutive Cases in a Single Center
(Abstract ID: 826)

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Background:
Bile leakage is a serious complication after liver resection and represents one of the major causes of postoperative morbidity.

Materials and methods:
Perioperative data regarding 147 Patients undergoing elective liver resection without biliary reconstruction performed between April 2016 and September 2017 were analyzed.

Results:
Biliary leakage was observed in 4 patients (2.72%). The extent of parenchymal resection was not associated with the total occurrence of biliary leak (p=n.s.). Higher incidence of biliary leakage from the resection surface was significantly associated with prolonged operation times (p<0.01). All biliary leaks occurred in patients receiving a conventional "open" liver resection. No leak was detected in patients with minimally invasive resections (n=42; 29.25%). T-tube insertion did not significantly prevent from biliary leakage in our cohort (p=n.s). Once biliary leak occurred median hospitalization duration significantly increased (no leak:15 vs leak: 36 days; p<0.05).

Conclusion:
Our data demonstrate a low incidence of bile leak after elective liver surgery with excellent results for minimally invasive procedures.
Endocystectomy for Cystic Echinococcosis: A single center experience
(Abstract ID: 893)


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Background:

Surgery is currently the most effective treatment for active cysts of cystic echinococcosis (CE) not accessible with percutaneous treatment and benzimidazoles. However, there are still controversies about the best technique. The purpose of this study is to report the short-term outcomes of a modified endocystectomy developed in our center.

Materials and methods:

During the last 6 years (between 2011-2017), 21 patients (12 men and 9 women, with a median age of 28 years) suffering from hepatic echinococcosis that underwent endocystectomy were retrospectively evaluated. The total number of the cysts treated by endocystectomy was 47 with a median number of 2 (range: 1-8) cysts in each patient. Nine patients (43%) had single cystic lesion. During follow-up period (median duration of 11 months), patients underwent sonography and/or MRI.

Results:

The median operation time was 165 minutes (range: 120-250) and median intraoperative bleeding volume was 200 mL (range: 50-800). Morbidity (Clavien-Dindo III-IV) occurred in four patients (19%). The median hospital stay of the patients was 9 days (range 6-28). No mortality and no recurrence were reported during the median follow up.

Conclusion:

The established modified Endocystectomy is a safe procedure with acceptable morbidity, no mortality and without relapse in our patient series.
Double ligation of portal veins and hepatic veins leads to the same rapid hypertrophy as in-situ-Split/ALPPS – a study in pigs (Abstract ID: 936)

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Background:
Liver hypertrophy induced by partial portal vein occlusion can be accelerated by adding parenchymal transection as shown in the "in-situ split/ALPPS procedure". There is evidence that the mechanism of acceleration is the prevention of neocollaterals between the occluded and the growing part of the liver. A preclinical experimental study in pigs was performed to test the hypothesis if simultaneous ligation of portal and hepatic veins (PVL HVL) of the liver also prevents the formation of collaterals and thereby accelerates regeneration as well.

Materials and methods:
A pig model of PVL HVL was established and compared to portal vein ligation alone (PVL). The major hepatic veins draining the portal vein deprived lobe were identified with intraoperative ultrasound and ligated using pledgeted trans-parenchymal sutures. Kinetic growth was compared by weighing the lobes after 7 days and the portal vein system was then studied after 7 days using epoxy casts of the portal circulation. Portal vein flow and portal pressure were measured and Ki-67 staining was used to evaluate the proliferative response.

Results:
Pigs were randomized to PVL (n=8) and PVL HVL (n=6). PVL HVL was well tolerated, led to mild cytolyis and no necrosis in the portal vein deprived lobe. The portal vein supplied sector increases by 90±22% after PVL HVL compared to 29±18% after PVL (p<0.001). Collaterals to the deportalized liver developed after 7 days in both procedures, but were markedly reduced in PVL HVL. Ki-67 staining at 7 days was comparable. PVL HVL appeared comparable to a previously established pig model of ALPPS in our lab and found to have comparable volume increase.

Conclusion:
This preclinical large animal study shows that simultaneous PVL HVL leads to accelerated hypertrophy comparable to ALPPS. The findings suggest the use of simultaneous PVL HVL accelerates liver regeneration for extended liver re-sections in humans and should now be tested in controlled clinical studies.
Total laparoscopic pylorus-preserving pancreatoduodenectomy and reconstruction via Roux-en-Y  
(Abstract ID: 938)

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²Kantonsspital Winterthur, Winterthur

Background:

Laparoscopic pancreaticoduodenectomy (Lap PD) has not adopted widely until recently when Lap PD has become the predominant approach in several high volume US centers. A International consensus meeting in 2016 recommended a cautious introduction of the lap PD in centers experienced with laparoscopy. Cantonal Hospital Winterthur is the first group in Switzerland to adopt a totally laparoscopic approach.

Materials and methods:

Video coverage from the first three procedures performed was reviewed. Patients were selected based on BMI and tumor size. Challenges of both resection and reconstruction are reviewed by demonstration of respective sequences.

Results:

The procedure was performed in supine French position with a 3D camera system using three 12 mm working ports and two 5 mm assistance ports. The pancreatic head is mobilized and resected in a standard fashion. Reconstruction is performed using duct-to-mucosa technique with 5-0 PDS and additional pancreaticojenunal sutures using barbed Vicryl sutures. The bile duct is anastomosed to a Roux-limb with a stapled jejuno-jejunostomy. There are no hybrid elements in the procedure. The specimen is extracted through a 6 cm Pfannenstiel incision and blood loss was 10-30cc. In the initial experience of 3 patients there were no conversions, 2 grade A pancreatic fistulas, no major complications and no delayed gastric emptying. Median lymph node yield was 10.

Conclusion:

Lap PD can be introduced safely and oncologically adequately in selected patients. Given the extended laparoscopic portfolio of todays surgeons, the total laparoscopic variant the traditional Kausch-Whipple procedure has the potential to be more widely used in selected patients in the future.
Techniques of laparoscopic liver transection – the many faces of bleeding
(Abstract ID: 939)

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Background:

Ultrasonic dissection and bipolar electrocautery are now well established in laparoscopic surgery and allow minimal blood loss and good visibility. On occasion however, hemostasis remains a challenge and intraoperative situations of hemorrhage require adequate control measures.

Materials and methods:

This video assembles footage from 15 major laparoscopic hepatectomies performed since 2016. All intraoperative bleeding situations were selected and analyzed and are presented to demonstrate a large variety of successful and less successful measures against intraoperative hemorrhage.

Results:

Multiple techniques of laparoscopic liver transection are demonstrated including clamp crush dissection with bipolar sealing, energy device dissection and sealing as well as ultrasonic dissection and bipolar sealing. The superiority of the pre-cauterization technique followed by ultrasonic dissection is demonstrated visually. The management of situations of acute hemorrhage is emphasized. Laparoscopic sponges, stitches, bipolar electrocautery, vascular clamps and increased pneumoperitoneum are used to stop acute bleeding. Only in one situation out of 15, bleeding led to conversion to open procedure.

Conclusion:

The video demonstrates a variety of effective techniques to control intraoperative hemorrhage in laparoscopic liver resections. Conversion due to uncontrollable bleeding remains should nowadays be a rare event.
Intraoperative changes of liver function tests are immediate predictors of posthepatectomy liver failure

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Background:
Posthepatectomy liver failure (PHLF) is the main cause of death after hepatic resection. Several studies explored pre- or postoperative blood parameters as predictors of PHLF. This is the first study to investigate the intraoperative course of biochemical liver function tests and their clinical value as immediate predictors of PHLF.

Materials and methods:
Patients enrolled in a randomized trial on inferior vena cava clamping were eligible for analyses. Biochemical blood tests were performed pre-, intra- (pre- and post-transection) and postoperatively (postoperative day 1, 3, 7). The International Study Group of Liver Surgery definition of PHLF was applied. Predictors of PHLF were analyzed using receiver operating curves (ROC), uni- and multivariate analysis.

Results:
From 128 patients who underwent partial hepatectomy, 77 (60.1%) patients underwent a major resection and 9 (7%) patients developed PHLF. Intraoperative values of AST, ALT, gGT, albumin and AT-3 decreased, whereas INR increased immediately post-transection with more pronounced changes after major resections. On multivariate analyses pre-transectional AT-3 (OR 0.957, 95% CI 0.930 - 0.984; p = 0.002) and post-transectional ALT (0.984, 0.970 - 0.998; p = 0.030) were associated independently with PHLF, as was an intraoperative drop of serum gGT (0.979, 0.962 - 0.997; p = 0.023). ROC analyses revealed intraoperative changes of gGT as strongest predictor of PHLF (Area under the curve 0.813; 95% CI 0.717 - 0.908; p = 0.003).

Conclusion:
Partial hepatectomy is associated with marked intraoperative changes in biochemical liver function tests. An intraoperative gGT decrease is an immediate and strong predictor of PHLF.
Robot-assisted versus laparoscopic Roux-en-Y gastric bypass: early perioperative outcomes
(Abstract ID: 71)

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Background:
The DaVinci Surgical system is successfully used in a wide variety of areas. So far in Germany, there has been little experience with the system in obesity surgery. Since January 2017 we have been performing robot-assisted gastric bypass surgery. In the meantime, the more complex redo operations have also been carried out with the use of the DaVinci Si System.

Materials and methods:
Retrospective analysis of prospectively collected data regarding surgical and stationary course and postoperative morbidity, 30 days and 6 months after robot-assisted versus laparoscopic proximal Roux-en-Y gastric bypass. Statistical Analysis was performed using SPSS Version 24.0 (SPSS, Inc., Chicago, IL, USA). Normally distributed variables were expressed as mean ± standard deviation (SD) and compared using the two independent-samples Student’s t test. Categorical data were expressed as n (%) and compared using the Chi-square test or Fisher’s exact test. A two-sided P value < 0.05 was considered statistically significant.

Results:
In the period from January to August 2017, 53 gastric bypass operations were performed including Omega bypass and ReDo procedures. Of these, 21 interventions were performed with the DaVinci Si system. The comparison included 19 DaVinci versus 26 laparoscopic proximal Roux-en-Y gastric bypass operations. Both cohorts showed no significant difference in preoperative weight, BMI, EOSS and ASA classification. The use of the robot resulted in a non-significantly longer operation time (141±35min versus 131±33min). Postoperative analytical parameters such as Hb, leucocytes and CRP, as well as the length of stay and the excess weight loss after 30 days and 6 months showed no significant difference. There was no revision surgery in either group. After laparoscopic surgery, a re-admission was necessary and finally a late anastomotic leak of the gastrojejunostomy was diagnosed, which could be effectively treated endoscopically by VAC therapy.

Table:

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Robot-assisted versus laparoscopic Roux-en-Y gastric bypass

Conclusion:
The proximal Roux-en-Y gastric bypass can be performed comfortably, safely and efficiently using the DaVinci Surgical system. The operation time seems to be slightly prolonged, whereby the learning curve has to be taken into account. Complications did not occur in the DaVinci group. The more precise suturing technique may help to avoid complications such as anastomotic leakage.
Rating the operation videos with a checklist score improves the effect of E-learning for bariatric surgery training
(Abstract ID: 372)

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Background:

Mental training of laparoscopic procedures with E-learning has been shown to translate to the operating room (OR). The present study aims to explore whether the use of rating checklists during E-learning improves transfer of skills to the simulated OR on a Virtual Reality (VR) trainer for Roux-en-Y gastric bypass (RYGB).

Materials and methods:

Laparoscopy naive medical students (n = 80) were randomized in two groups. After an E-learning introduction to RYGB, group A rated RYGB videos using the validated Bariatric Objective Structured Assessment of Technical Skills (BOSATS) checklist while group B only observed the videos. Participants then performed RYGB on a VR-trainer twice and were evaluated by a blinded expert rater using BOSATS. Suturing on a cadaveric porcine small bowel was evaluated using objective structured assessment of technical skill (OSATS) and a knowledge test was performed.

Results:

Group A was better in the knowledge test (Group A 8.3 ± 1.1 vs. Group B 7.1 ± 1.3; p = <0.001) and there was a trend towards better BOSATS on the first try (Group A 85.9 ± 10.2 vs. Group B 81.1 ± 11.5; p = 0.058). There was, however, no significant difference on the second BOSATS score (Second try; Group A 92.0 ± 9.7 vs. Group B 89.3 ± 10.5; p = 0.251) and OSATS was not different (Group A 29.5 ± 3.0 vs. Group B 29.0 ± 3.5; p = 0.472).

Conclusion:

This study demonstrates that the use of a BOSATS checklist helps trainees to improve both their knowledge acquisition with E-learning and the transfer from mental training to the simulated OR environment is enhanced for training of bariatric surgery. Checklists should thus be incorporated into mental training and E-learning curricula.
Megaobese and High-risk Patients - World's larger clinical experience with Endoscopic Sleeve Gastroplasty with Apollo Overstich

(Abstract ID: 448)

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Background:
Bariatric surgery for morbid obesity can induce important excess weight loss (EWL) during years after surgery, and co-morbidities often improve or resolve. As many patients with surgical contraindications for formal bariatric surgery have no alternative besides conservative management, new endoscopic procedures can be currently applied to these cases. This study describes the preliminary German clinical experience with Endoscopic Sleeve Gastroplasty - Endosleeve in this set of patients.

Materials and methods:
Primary endoscopic sleeve gastroplasty was performed for a series of 18 patients using the full-thickness suturing device Apollo Overstich. All selected patients were ASA III classified, due to cardiopulmonary high-risk, or liver/renal transplant candidates. Technical steps included general anesthesia, insertion of an Overtube, full-thickness suturing of the corpus and fundus with interrupted nonabsorbable sutures, sizing the gastric tube. The patients were followed and documented regarding complications, weight loss and co-morbidities.

Results:
All patients were submitted to the procedure without intraoperative complications. Mean operative time was 87 min. Mean preoperative BMI was 61kg/m², Highest BMI was 100.8, highest body weight was 310kg. Follow-up showed satisfactory weight loss with no weight regain after 6 months. Co-morbidities were ameliorated with reduction of medications in all patients.

Conclusion:
Endoscopic primary sleeve gastroplasty using Apollo Overstich is a new less invasive procedure for morbid obesity, satisfactory early results and no complications for this set of high-risk patients.
Team position for performing Apollo Endosleeve in a high risk patient, ASA III, BMI 72. The patient is under full general anesthesia in supine position, the surgeon and assistant perform the procedure on the left side.
Banded sleeve gastrectomy - short-term results of the MISO (MiniMizer for Sleeve Optimization) Trial
(Abs abstract ID: 555)

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Background:

Laparoscopic sleeve gastrectomy (LSG) is the most frequently performed bariatric operation in Germany. Despite excellent initial weight loss, there is increasing evidence of weight regain in a relevant number of patients. With the objective if added restriction by placing a non-adjustable gastric band around the proximal sleeve could improve weight loss and prevent weight regain after LSG, a single-centre prospective randomized trial was performed.

Materials and methods:

94 patients were randomized to undergo a banded LSG (BLSG) using a MiniMizer® ring, or a conventional LSG. Performing an interim-analysis at a median follow up of 1 year, we examined safety, weight loss, reflux and postoperative regurgitation.

Results:

Mean preoperative BMI was 50.55 ± 6.2 kg/m² for BLSG and 50.69 ± 6.5 kg/m² for LSG (Mann-Whitney P=0.9). Mean operative time was equal in both groups (BLSG 37.26% ± 7.86; n = 27 vs. LSG 35.63 ± 11.21; n = 32; P = 0.246). There was no postoperative complication in either group. 2 patients in the BLSG dropped due to a change of procedure and 1 patient in the LSG group developed rectal cancer shortly after surgery. Excess BMI loss (%BMI loss) was similar in both groups 1 year after surgery (BLSG 73.4 ± 16.74; n = 35 vs. LSG 71.73 ± 16.14; n = 42; P = 0.48). 2 years after surgery, there was gap of 8.5% in %BMI loss, yet it did not become statistically evident to date (BLSG 80.38 ± 20.31; n = 11 vs. LSG 71.85 ± 16.34; n = 14; P = 0.34). Ring placement had no impact on presence of reflux symptoms (Fisher’s exact test P=0.991) 1 year after surgery. As a relevant side-effect, the rate of postoperative regurgitation was increased in BLSG patients (BLSG 17% vs. LSG 3%; Fisher’s exact test P=0.169, Odds ratio 5.4) at this time.

Conclusion:

BLSG is a safe procedure that does not prolong operative time. Ring placement had no impact on reflux or weight loss in short-term follow-up and only mildly promoted regurgitation in this series. Long-term data on prevention of weight regain will be of great interest.
Ulcera of the Gastrojejunal Anastomosis After Y-Roux-Gastric-Bypass - A Retrospective Analysis
(Abstract ID: 820)

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Background:

One of the most common postoperative complications of the Roux en Y gastric Bypass (RYGB) is the development of ulcers on the gastro-jejun-al-anastomosis. They are classified as marginal ulcers (MU) and dominate the postoperative complications. Patients present with symptoms as epigastric pain, nausea or vomiting. Complications of MU are perforation, stenosis of the gastrojejunostomy and hemorrhage. Risk factors for the development of MU are preoperative infection with Helicobacter pylori, nicotine, use of NSAR, foreign body or ischemia.

Materials and methods:

The study population included 229 patients, who underwent RYGB surgery between 2019 and 2016 in our hospital. This retrospective analysis evaluated the incidence of MU and correlation to risk factors such as smoking, alcohol, preoperative infection with Helicobacter pylori and preoperative use of NSAR in a case population. MU were diagnosed by endoscopy.

Results:

During the time the analysis was conducted, 229 Patients received a Roux en Y gastric bypass, 170 female and 59 male. 27 patients of our population were diagnosed with MU, 74.1% of the ulcers were located directly on the anastomosis, 11.1% at the remaining pouch and 14.8 % on the jejunal margin. All patients received PPI as conservative treatment, 85 % were additionally treated with Sucralfat, 1 patient was diagnosed with ulcer perforation, which was treated surgically. 1-3 control gastroscopies were conducted. 114 of the patients of the population were smokers. In the sample of the patients with MU 81.5% were smokers (p=0.001).

Conclusion:

The described incidence of 10.8% of ulcers in our population support the reported figures in the literature. (2,3) We were able to show the significant correlation of smoking with the development of MU after RYGB. Perforation is very rare complication of the MU. Follow up showed, that MU could efficiently be treated with PPI and Sucralfat and prevented with nicotine abstinence. Apart from smoking, no other risk factor showed significant correlation with the development of MU in our population.
Addiction remission and addiction transfer after bariatric surgery - preliminary results
(Abstract ID: 847)

S. Chiappetta, C. Stier, R. Weiner

Sana Klinikum Offenbach

Background:
The gut-brain-axis plays an important role in the development of obesity and food addiction. Addiction remission and addiction transfer is described after bariatric surgery. Different surgeries might provide different outcomes. The aim of this study is to find out, whether changes are different between restrictive and gastric bypass procedures.

Materials and methods:
We performed a prospective analysis of patients undergoing sleeve gastrectomy as a restrictive procedure and Roux-en Y gastric bypass (RYGB) or Mini-/One anastomosis gastric bypass (MGB/OAGB) as a first surgical treatment for severe obesity. All patients filled out a questionnaire evaluating food addiction (Yale Food Scale), alcohol addiction (Audit Scale), nicotine addiction (Fagerström Scale), sport addiction, Internet addiction and drug addiction (drug use questionnaire) prior to surgery and 6 months after surgery (NCT02757716).

Results:
114 patients underwent sleeve gastrectomy (n = 69), RYGB (n = 34) and MGB/OAGB (n = 11). At 6 months food addiction decreased significantly after both procedures. Alcohol and drug addiction increased more in the bypass and nicotine addiction more in the sleeve group. Sport and Internet addiction decreased significantly after gastric bypass surgery.

Conclusion:
Restrictive and gastric bypass procedures cause important differences and changes in addiction remission and addiction transfer.
Putting the hindgut hypothesis to the test in a bariatric Zucker rat model
(Abstract ID: 941)

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Background:
The hindgut theory hypothesizes a key role of differential hindgut stimulation following bariatric procedures in ameliorating diabetes mellitus. We used two strategies to remove the hindgut from intestinal continuity in order to analyze its impact on diabetes mellitus.

Materials and methods:
Loop duodeno-jejunostomy (DJOS) with exclusion of one third of total intestinal length was performed in 3 groups of 9-week-old Zucker diabetic fatty rats. In group 1, no further alteration of the intestinal tract was made. Group 2 received additional ileal exclusion via jujunocoecal bypass anastomosis (DJOS + IE). Group 3 underwent additional resection of 50% of the ileum with end-to-end ileocoecal anastomosis (DJOS + IR). 1, 2, and 4 months after surgery, fasting blood glucose levels, oral glucose tolerance tests (OGTT), glucose-stimulated hormone analyses were conducted, and bile acid blood levels were compared. Body weight was documented weekly.

Results:
There were no significant weight differences between the groups (p>0.05). Confirming effective ileal exclusion, bile acid blood levels were significantly higher in the DJOS group compared to both DJOS + IR and DJOS + IE (p=0.0009 and p=0.0114). Operative interventions had no impact on GLP-1 and GIP levels at any time point (Mann-Whitney p > 0.05 for all). Furthermore, we did not observe a significant impact on fasting glucose levels or fasting and glucose stimulated insulin blood levels (p>0.05).

Conclusion:
We implement the Zucker rat bariatric model to test two strategies of ileal exclusion in order to shed light on the role of the hindgut in remission of diabetes mellitus following bariatric surgery. This data supports the hypothesis that the mechanisms driving amelioration of diabetes mellitus are complex and cannot be reduced to the ileum.
Short term results after laparoscopic repair of giant hiatal hernias with pledgeted sutures
(Abstract ID: 54)

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Background:
This study investigates if pledgeted sutures for hiatal closure could be an alternative to mesh for the surgical treatment of large hiatal hernia.

Materials and methods:
Forty-one patients who underwent laparoscopic 270° Toupet fundoplication with pledgeted sutured crura between September 2014 and December 2016 were evaluated with regard to recurrence of hiatal hernia three months and one year after surgery. Indication for pledgets was a hiatal surface area (HSA) of at least 5,60cm², migration of more than 1/3 of the stomach into the thorax or preoperative hernia size > 5cm. The integrity of repair was assessed using a barium swallow test 3 months and one year after surgery.

Results:
All procedures could be completed laparoscopically with no intraoperative complications. Until study end no complications related to the pledgets have occurred. Thirty-six of 41 patients completed the follow-up radiographic examination (87.8%) three months (mean 12.7 weeks) after surgery. Postoperative recurrence was diagnosed in 3/36 patients (8.3%). One year after surgery so far 24 patients (58.5%) completed follow up (mean 55.1 weeks). One year after surgery 4/24 (16.6%) had a recurrent hernia. Only one of these patients was symptomatic.

Conclusion:
Utilization of pledgets to reinforce hiatal sutures is safe and shows a low early recurrence rate. Long term data will allow firm conclusions as to whether pledgeted sutures are an appropriate solution for the treatment of giant hiatal hernias.
Refluxassociated injury of the remnant esophagus after Ivor Lewis esophagectomy – Gastrointestinal Function Testing Using the Minimally Invasive laryngopharyngeal PH Probe (Restech) in a human reflux model

(Abbreviation ID: 207)

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Background:

Laryngopharyngeal PH monitoring is a relatively new reflux testing device that needs more validation. Previous studies have shown that patients after esophagectomy can ideally serve as a human reflux model. Aim of this study is to further evaluate the acid exposition based on a newly developed minimally invasive laryngopharyngeal PH monitoring device (Restech) and to correlate the results with conventional esophageal pH monitoring.

Materials and methods:

In our esophageal center of excellence, more than 250 esophageal surgeries are performed annually. All patients undergoing minimally invasive hybrid Ivor Lewis esophagectomy are prospectively entered in our IRB approved database and undergo a routine check-up program with yearly surveillance endoscopies and further exams following surgery. Only patients with a complete check-up program and reflux symptoms were offered inclusion into this study and evaluated using 24-h laryngopharyngeal and concomitant esophageal pH-monitoring. Subsequently, the relationship between the two techniques was evaluated. A total of 75 patients with R0 resection and reflux symptoms after esophagectomy are scheduled to be included in this prospective study.

Results:

A total of 35 (7 females) patients with a median age of 62 (range 39-80) were recruited from 05/2016-09/2017 after minimally invasive Ivor Lewis esophagectomy (median follow up 29 months). Adenocarcinoma was present in 23 patients, squamous cell carcinoma in 12 patients. All patients showed mucosal damage of the esophageal remnant upon endoscopic evaluation. GERD related symptoms were found in all patients: heart burn (70%), dysphagia (42%), regurgitation (72%), cough (19%), hoarseness (7%), globus sensation (30%), and retrosternal pain (60%). A total of 30 patients (86%) had a pathological conventional esophageal pH metry. In laryngopharyngeal pH metry, 24 patients (69%) had pathological acid exposure. In these patients, laryngopharyngeal reflux was more present in the upright (100%, mean Ryan Score 109 [range, 10-409]) than in the supine position (23%, mean Ryan Score 15 [range, 2.2-149]).

In this human reflux model, esophageal pH metry correlated well with laryngopharyngeal pH metry (94%).

Conclusion:

Patients following esophagectomy and reconstruction with gastric interposition do ideally serve as a human reflux model. Interestingly, laryngopharyngeal reflux phases occur mainly in the upright position. This study helps to further validate laryngopharyngeal pH-metry.
Picture:

Restech Device, intraoral placement
Robotic Versus Laparoscopic Splenectomy – Experience in a Single Team Series of 359 Cases
(Abstract ID: 228)

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Background:

Over the past decades laparoscopic splenectomy has gained wide acceptance with particular aspects regarding difficult cases such as: massive splenomegaly, portal hypertension, partial/subtotal splenectomy and splenic tumors. To extend the indication of minimally invasive splenectomy robotic equipment is particularly useful, improving outcomes in terms of: intraoperative bleeding, risk of organ injury, conversion rate and postoperative morbidity.

Materials and methods:

A number of 530 elective minimally invasive splenectomies were registered in our department; 359 were performed by a single team, including 262 laparoscopic and 97 robotic splenectomies. Among the indications for total splenectomy (300 cases: 238 laparoscopic and 62 robotic) were: idiopathic thrombocytopenic purpura, liver cirrhosis with hypersplenism, malignant hemopathies with splenic involvement, autoimmune hemolytic anemia. Subtotal/partial splenectomy (59 cases: 24 laparoscopic and 35 robotic) were performed for: hereditary spherocytosis, splenic hydatid cysts, splenic non-parasitic cysts and beta thalassemia. Differences between intra and post-operative parameters of laparoscopic and robotic approaches, were further investigated. The effect of learning curve and the relative complexity for each type of procedure was analyzed using the Minimally Invasive Splenectomy Score, which further allowed dividing the splenectomies performed in simple splenectomies and, respectively difficult splenectomies. Statistical analyze using the CUSUM algorithm of the intra and post-operative parameters between laparoscopic and the robotic approaches, for both simple and difficult splenectomies, were further investigated.

Results:

The robotic approach in difficult splenectomies when compared with laparoscopy has shorter operative time (82.15 min vs. 99.5 min; p<0.05) with a median operative time until full exposure of the splenic vascular anatomy of 15 minutes in the robotic group, compared with 30 minutes in laparoscopic group (p<0.05); decreased blood loss (30.88 ml vs. 156.9 ml; p<0.05), lower conversion rate and lower postoperative morbidity rate. It also allows for a better evaluation of the splenic remnant in subtotal splenectomy as shown by the postoperative imaging control. The statistical results have clearly indicated a learning curve effect in laparoscopic splenectomy, but not for robotic splenectomy.

Conclusion:

Laparoscopy remains the approach of choice in simple splenectomies, in the surgical treatment for common indications, like ITP or hemolytic anemia. However the robotic system is particular beneficial in difficult splenectomies (partial splenectomy, splenectomy in liver cirrhosis, splenic tumors). In these cases it may shorten the operative time, decrease the blood loss and the risk of hemorrhagic complications during surgery. Partial/subtotal splenectomy seems to be a suitable candidate for robotic surgery, requiring a delicate dissection of the splenic vessels. Robotic partial/subtotal splenectomy is comparable to laparoscopy in terms of hospital stay and complication; the main benefits are: lower blood loss rate, vascular dissection time and a better evaluation on the splenic remnant volume.
Less pulmonary complication and opiate-demand after laparoscopic liver resection for lesions in the posterior liver segments compared to the open procedure  
(Abstract ID: 326)

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Background:

Laparoscopic liver resection (LLR) of lesions in the posterior segments is challenging but has become more practical recently due to the progress in surgical techniques. The left decubitus position and the semiprone position makes lesion in liver posterior segments to anterolateral, which facilitate the liver resection in laparoscopic setting. The limitation as well as the advantages of laparoscopic approach is still unclear.

Materials and methods:

Patients undergoing LLR or open liver resection (OLR) for lesions in posterior segments between 06.2014 and 09.2017 in authors institute were compared with respect to demographics, perioperative and short-term oncological outcomes. The procedure ranged from non-anatomic resection to anatomic bisegmentectomy.

Results:

From more than 300 curative liver resections, 33 patients with lesions (< 10 cm) at the posterior segments (segment 6 and 7) were identified. 20 patients underwent OLR while 13 patients underwent pure LLR. Except for a higher BMI in the laparoscopic group (p =0.025), there were no differences in patient demographics. The tumor-size showed to be larger in patients who underwent an open procedure (4.0 cm [1.4-9.2] vs 3.0 cm [0.4-5.8], p =0.049). Though significant differences were observed regarding to operative time, (median operative time for the LLRs 279 minutes [183-610] vs. 212 minutes [148-365] for the OLRs; p = 0.023), the requirement of intraoperative transfusion and the rate of major postoperative complication according to Clavien-Dindo or the rate of liver-surgery specific complication were comparable in both groups. There was no 90-day mortality in both groups. However, more pulmonary complications and more opiate-demand were observed in the OLR group (p<0.05), which possibly led to the tendency of prolonged hospital stay in this group (10 days [7-28] vs 7 days [3-18]; p > 0.05).

Conclusion:

The laparoscopic liver resection is found to be a secure and feasible approach in selected cases. The technical challenge of the laparoscopic liver surgery for lesions at the posterior segments can be highly overcome by positioning the patient in semiprone. Compared to OLR, LLR of posterior Lesions is associated with significantly less postoperative pulmonary complications and opiate-demand.
Does 3D visualization reduce workload and surgery duration in minimal invasive surgery?
Results of a prospective randomized controlled trial
(Abstract ID: 526)

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Background:
Minimally invasive surgery is common standard in many fields of visceral surgery and innovative visualization systems are available. But it remains unclear, if newly developed 3D visualization techniques are really associated with better outcomes (e.g., performance safety and surgery duration), and how workload changes due to this new technology. Since it is known that long 3D movie shows are associated with fatigue, we implemented a prospective-randomized controlled trial to identify advantages and disadvantages of the new technology.

Materials and methods:
From 10/2015 to 05/2017 n = 641 patients operated on with minimal invasive procedures were included in the monocentric trial. Intraoperative procedures were the same for the 2D control group (n = 285) and the randomized 2D and 3D intervention group (n = 163, and n = 188, respectively). Surgeries were performed both by assistant physicians and expert physicians. Biometric information of the surgical team (including refraction analysis to assess stereoscopic vision), biometric information of participating patients, intraoperative performance safety (duration of so called indicator steps during surgical procedures), subjective workload of the surgical team (NASA TLX Score), as well perioperative complications were recorded to assess the learning curve and general surgical skills.

Results:
Regarding overall surgery duration there is no significant difference between the control group as compared to 2D and 3D visualization (Figure 1). Expert surgeons are significantly faster than trainees. Performance safety as measured by the indicator step duration increases as indicated by median duration of mesh placement during TEP, which is 15 % faster for 3D than for 2D visualization (Table 1). Individual surgeons even profit by up to 45 % with 3D. For the indicator step during cholecystectomy, there was no significant difference between 3D and 2D visualization. Theater nursing stuff shows a significantly higher workload in the 3D condition (2D: 29.7; 3D: 35.1). There is no difference in the workload (NASA TLX score) between 2D und 3D visualization for expert surgeons (Median 2D: 20.5; 3D: 23.2), and assistants (2D 46.0; 3D: 47.4).

Conclusion:
Performing surgery under study conditions does not increase operation time. 3D assisted laparoscopic surgery increases individual performance, as measured by the indicator step, without increasing workload for surgeons, regardless of the level of experience (Experts vs. Trainees).
Box plot of surgery duration for cholecystectomies and TEP as a function of expertise and visualization mode. The box depicts the upper and lower quartile, as well as the median. Whiskers depict the 1.5 IQR, and crosses mark maximum and minimum values.
Experience and dissection device are more relevant than patient-related factors for operation time in laparoscopic sigmoid resection. A retrospective 8-year observational study (Abstract ID: 540)

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Background:
Surgical outcome is influenced by multiple patient-specific factors and operative expertise of the surgeon. Clinical relevance of medical technical innovations often remains unclear even though laparoscopic surgical procedures are characterized by continual advancement of various devices. Lately, in dissection and sealing technology fast-cutting ultrasonic scissors are combined with simultaneous bipolar coagulation (Bimodal Dissection Device; BDD). We investigated how this new technology, operative expertise, and patient-specific factors (body mass index, age) influence operation time in laparoscopic-assisted sigmoid resection.

Materials and methods:
Observation period comprised 8 years (2008-2016). All laparoscopic-assisted sigmoid resections carried out in the Department of General and Visceral Surgery, Pius Hospital Oldenburg were evaluated retrospectively and eligible datasets were identified. Between 3/2008 and 2/2012, bipolar clamps in combination with an ultrasonic dissector or bipolar dissection device were used (subsumed as CDD). Instruments were selected by the respective surgeon, while surgical technique had been set out in standard operating procedures (SOPs) as part of the continuing training program. In 3/2015, all surgeons switched to using only bimodal dissection device Thunderbeat (BDD).

Results:
Minor postoperative complications (e.g., impaired wound healing, non-revisional secondary bleeding) occurred in 11 cases (6.8%). Major complications (e.g., bleeding requiring revision, anastomotic leakage) were observed in 3.7%. No heat related coagulation damage was observed. BDD reduced operation time for experienced (CDD: 150min; BDD: 125min; p<.001), and trainee surgeons (CDD: 169min; BDD: 135min; p=.036). In the BDD group 72.2% of all operations take between 60-150 min, whereas only 44.5% of procedures are within that time window for the CDD operations (p<0.05; Figure 1). A multiple linear backward stepwise regression analysis was performed to evaluate the impact of the following variables on the operation time:

- Patient age at time of surgery
- BMI
- Type of surgery (non-oncol. vs. oncol. surgery)
- Experience of the surgeon (less exp. vs. exp.)
- Type of dissection device used (CDD vs. BDD)
A model with an good fit ($R = .347$, standard error of estimate $= 32.8$, $F = 10.717$, $p < .001$), and very good power of the performed test ($1 - \beta = 0.995$, for $\alpha = .05$) was found, containing only experience of the surgeon, and type of dissection device used as predictive variables for operation time (Table 1).

**Table:**

<table>
<thead>
<tr>
<th>Group</th>
<th>Coefficient</th>
<th>Std. error</th>
<th>$F$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>164.622</td>
<td>4.976</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissection device</td>
<td>-19.335</td>
<td>5.192</td>
<td>13.866</td>
<td>$p &lt; .001$</td>
</tr>
<tr>
<td>Surgeons’ experience</td>
<td>-15.107</td>
<td>5.377</td>
<td>7.892</td>
<td>$p = .006$</td>
</tr>
</tbody>
</table>

Results of the backward stepwise linear regression analysis. Only values for the variables predictive of surgery duration are given.

**Conclusion:**

The bimodal dissection device Thunderbeat reduced operation time in laparoscopic sigmoid resection when compared to conventional dissection devices. This was regardless of the expertise of the surgeon. In this study, patient-specific factors do not have a significant effect on operation time.

**References:** This study is published as: Weyhe, D., Uslar, V.N., Tabriz, N. et al. Int J Colorectal Dis (2017). https://doi.org/10.1007/s00384-017-2896-3
Grouped operation times for CDD and BDD
Suprapubic bottom-to-up approach for robotic right colectomy: technical and oncological advances for complete mesocolic excision (CME)
(Abstract ID: 788)

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Background:
Studies have demonstrated a relationship between lymph node (LN) yield and survival after colectomy for cancer. Complete mesocolic excision (CME) with central vessels ligation (CVL) reduces local recurrence, but is technically demanding, particularly with a laparoscopic approach. Here we report our early single center experience with robotic right colectomy utilizing the novel suprapubic access comparing the "classical" medial-to-lateral with the bottom-to-up approach with an improved CME and CVL.

Materials and methods:
Here we present early results of 11 consecutive patients (median age 76y (65-84y)) following robotic right colectomy for cancer at our center from 5/2016 to 8/2017. Surgery was realized with the DaVinci Xi® system in combination with a TruSystem® 7000dV OR-table enabling integrated table motion without necessity of detaching the robotic device. 4 robotic trocars were placed along a horizontal line 3-4 cm above the pubis plus 1 assist trocar in the left lateral abdomen. Patients were divided in group A with medial-to-lateral (n=6) and group B with bottom -to-up approach (n=5). In group A the right colon was initially dissected on the fascia of Gerota after incision of the peritoneum at the origin of the right Mesocolon medial of the ileocolic vessels followed by transection of the latter plus lateral dissection of the peritoneal fixation of the coecum and descending colon. In group B , the caudo-lateral detachment of the right colon was initially performed starting from the coecum, developing the specimen with respect of the Gerota plain independent of the necessity for transecting any vessels during that step. It provided an optimal patient adapted preparation of the subsequent CME. Latter is eased by the orthograde view along the super mesenteric vessels. Ileo-transversostomies were performed in all cases side-to-side extra corporeally via the incision for specimen extraction in the left upper quadrant with a combination of linear stapler and running suture on top. There where no differences among groups concerning age, co-morbidity (ASA), operating time and stage of malignancy respectively.

Results:
We experienced no mortality or unintended conversion in this patient cohort. As complications we observed 1 trocar-incisional hernia in each group, 1 wound dehiscence and 1 transient chylus fistula in group B and 1 post-OP blood-infusion-dependent anemia in group A latter without relevant intra- or post-OP blood loss. Hospital stay in the CME group B was longer with a mean of 16,2d (±2,4d) if contrasted to group A (10,0d ±1,9d; p=0,001). The ICU stay was comparable with a median of zero days in both groups. However the yield in lymph nodes was superior in the CME group with a mean of 29,2 nodes (±8,9) in comparison to group A (16,3 nodes ±8,8; p=0,039).
Conclusion:

In our experience the novel suprapubic access in combination with the bottom-to-up approach facilitates technically improved CME and CVL in robotic right colectomy if compared to the "classical" medial-to-lateral strategy. Although operating on rather elderly patients we demonstrated the procedure in this early experience with both surgical approaches to be safe observing moderate morbidity. These preliminary results need to be proven in larger cohorts with long term observation.

Picture:

4 key steps in robotic right colectomy with suprapubic approach, CME and CVL
Robotic-assisted colo-rectal surgery in young, elderly and very elderly patients – an early single center experience
(Abbrev ID: 793)

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Background:

With demographic change, one recognizes an increasing seniority of patients requiring colo-rectal surgery not least due to a rising incidence of colo-rectal carcinoma with age. Comorbidities and frailty represent well-known problems during and after surgery in elderly patients. Robotic surgery may improve advances of conventional minimally invasive procedures and as such represents an interesting option for the elderly population. In this report we evaluated feasibility and efficacy of the application of robotic surgery in elderly patients affected by colorectal diseases.

Materials and methods:

Here we present the outcome of 37 consecutive patients following robotic colo-rectal surgery at our center from 5/2016 to 8/2017. A DaVinci Xi® system in combination with a TruSystem® 7000dV OR-table was deployed enabling integrated table motion without necessity of detaching the robotic device. The 2 patients with unplanned conversions were in group-A, one each due to obesity and to small bowel infiltration of a left colic cancer. Both, as converted right after initial laparoscopy, were excluded from analyses. Patients were divided in 3 groups of age (group A: <=69y, median 49,5 (range 29-69; n=18) ; group B: 70y-79, 75,5 (70-78; n=12); group C: >=80y, 82 (80-84; n=7). Among indication for surgery were colo-rectal carcinoma or adenoma, ulcerative colitis and diverticulitis. Anastomoses were performed (side to side for colon) or prepared (circular stapler for rectum) extracorporeally via the incision for specimen extraction. Deep rectal anastomoses were secured by a protective stoma.

Results:

Patients in group B and C were pronounced co-morbid (B: mean/median ASA 2,75/3,0 - p<0,001; C: 3,0/3,0 - p<0,001) if compared to group A (ASA 1,72/2,0). There were no significant differences among groups for skin-to-skin operative times (A: mean 334,0min (±72,0min SEM); B: 299,0min (±58,4min); C: 293,1min (±71,8min)); hospital stay (A: mean 14,2d (±6,9d SEM); B: 18,6d (±19,1d); C: 16,4d (±9,0d)), ICU-stay (A: median 0,5d (range 0-25d); B: 1,0d (0-48d); C: 1,0d (0-19d)), and first post-OP bowel movement (A: median 0,0d (range 0-5d); B: 0,5d (0-3d); C: 1,0d (0-2d)). One patient (group A) developed a minimal anastomotic leak with pre-sacral abscess treated by drainage. There were 2 trocar-incisional hernias (group C) that were one each treated by re-operation and conservatively. One mortality had to be recorded in an 82y old lady following anterior rectum resection due to pneumonic sepsis with locally uneventful course suffering from moderate myelo-dysplastic syndrome. Overall there were no significant differences in the rate of complications among groups.

Conclusion:

Robotic colo-rectal surgery is a safe and effective technique in the aging patient population too. There was no increased risk of death, morbidity or conversion rate compared to younger patients in the three groups examined. There may be a trend for trocar-incisional herniation in patients beyond age of 80y. The option of flexible changes in table positioning during the surgical procedure provided by the
utilized system may have aided to reduce the physical stress of steep table orientation with subsequent morbidity especially in elderly. Further long time studies in larger number of patients are required to further evaluate the clinical and oncological outcome of robotic colo-rectal surgery.
Treatment of gastric cancer - An ongoing and multifactorial challenge  
(Abstract ID: 56)

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Background:
Gastric adenocarcinoma (GA) and signet-ring cell carcinoma (SR-Ca) being the fifth most common malignancy and the second leading cause of death within the malignant diseases, still remains a considerable cause of morbidity and mortality even though numerous advances in treatment-strategies have been established within the past years. Surgery can be considered as pillar of a curative approach despite high recurrence rates and a merely poor 5-year survival rate including all stages between 25 and 30%. Approaches to the different types and localizations of GC have evolved permanently over the past 20 years, attempting an improvement of long-term survival and outcome with multimodal concepts following surgery such as neo-adjuvant and adjuvant chemotherapy, postoperative chemotherapy with radiation or perioperative chemotherapy. Worldwide there is no applicably accepted standard of care concerning patients with advanced GC (AGC) so multimodal strategy needs to be evaluated.

Materials and methods:
Retrospectively, we evaluated several data of patients treated for GC at fourteen hospitals in the vicinity of Bonn in an almost 20-year range (1992 to 2011). Data including first clinical presentation up to the certain treatment-modality were reviewed and outcomes including morbidity rate and other clinical features within the different treatment- and entity-groups were compared and later discussed among the current literature.

Results:
A total of 384 patients (116 female and 268 male, mean age 65,8 years) were included, 244 of them presenting with GA and 125 with signet-ring cell carcinoma (SR-Ca). Averagely patients with GA showed longer survival rates with 23 months compared to patients suffering from SR-Ca with 15 months. Furthermore, the data clearly underlined a significant benefit for an R0-resection revealing a median survival of 37 months in contrast to an R1-resection showing a median survival of 8 months and an R2-resection with only 1 month. The addition of adjuvant chemotherapy improved outcomes in patients with GA significantly, not with SR-Ca. Within our data, a neo-adjuvant regime showed no significant improvement in survival, loco-regional recurrence rate or metastatic disease.

Conclusion:
GC is still associated with a bad outcome. The histological subtype as well as the clinical stage at first presentation is crucial for further outcome. Surgery remains pivotal to the curative approach of resectable GC, but overtime the importance of a multimodal management has become lucid. In higher clinical stages for example, Chemo-radiotherapy may modify the outcome in a positive way as a
combined therapy approach in some individual cases as a clinical option with favorable, individual results. However, larger and also more clinical trials are needed to establish the value of a certain therapy regime. Cancer immunotherapy may also be an option in the future since it has gained importance in advanced melanoma, renal cell carcinoma, and non-small cell lung cancers.
Low hiatal hernia recurrence after concomitant magnetic sphincter augmentation and posterior cruroplasty

(Abstract ID: 108)

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Background:

We recently demonstrated excellent short-term outcomes following concomitant magnetic sphincter augmentation (MSA) and hiatal hernia repair (HHR) in patients with gastroesophageal reflux disease (GERD) and large hiatal hernias. In this follow-up study we report the durability and efficacy of this approach.

Materials and methods:

A review of patients was performed who underwent MSA and large HHR at our institution between May 2009 and December 2015. Large hiatal hernias were defined as those measuring >=3 cm intraoperatively. All patients underwent formal hiatal dissection with posterior cruroplasty. The primary endpoint was hiatal hernia recurrence (identified on radiography and/or endoscopy). Secondary endpoints included proton-pump inhibitor (PPI) use, dysphagia requiring dilation, change in symptoms, and GERD Health-Related Quality-of-Life (HRQL) scores.

Results:

There were 46 patients included in the study. Mean preoperative GERD-HRQL score was 20.3 and the DeMeester score was 52.4. Median hiatal hernia size was 4cm (range 3-7cm). Postoperatively at follow-up GERD-HRQL score decreased from 20.3 to 3.1 (p<.001), 89.1% of patients were off PPIs and 17.4% of patients required dilation for persistent dysphagia. 97.8% of patients reported an improvement or resolution of GERD symptoms. Hiatal hernia recurrence was identified in 1 patient at 11 months for an overall recurrence rate of 2.2% over a mean 16.1 months (6-38 months).

Conclusion:

Magnetic sphincter augmentation with concomitant posterior cruroplasty in patients with gastroesophageal reflux disease and large hiatal hernias demonstrates durable reflux control and a low hiatal hernia recurrence rate.
Improvement of surgical aspects and patients prognosis due to perioperative chemotherapy with FLOT vs. ECF/ECX for resectable gastric or gastroesophageal junction (GEJ) adenocarcinoma (FLOT4-AIO): A randomized phase 3 trial

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Background:

The MAGIC trial established perioperative (periop) epirubicin, cisplatin, and 5-FU (ECF) as a standard treatment for patients (pts) with operable esophagogastric cancer, but survival continues to remain poor. FLOT4 (NCT01216644) is a multicenter, randomized, investigator-initiated, phase 3 trial. It compares the docetaxel-based triplet FLOT with the anthracycline-based triplet ECF/ECX as a periop treatment for pts with resectable gastric or GEJ adenocarcinoma.

Materials and methods:

Eligible pts of stage >=cT2 and/or cN were randomized to either 3 preoperative and 3 post-operative 3-week cycles of ECF/ECX (epirubicin 50 mg/m², cisplatin 60 mg/m², both d1, and 5-FU 200 mg/m² as continuous infusion or capecitabine 1250 mg/m² orally d1-21) or 4 pre-operative and 4 post-operative 2-week cycles of FLOT (docetaxel 50 mg/m², oxaliplatin 85 mg/m², leucovorin 200 mg/m², and 5-FU 2600 mg/m² as 24-hour infusion, all d1). The primary endpoint was overall survival (OS; 80% power; HR of 0.76; 2-sided log-rank test at 5% type I error). Funded by Deutsche Krebshilfe.

Results:

Between Aug 2010 and Feb 2015, 716 pts (360 ECF/ECX; 356 FLOT) were randomly allocated. Baseline characteristics were similar between arms (overall, male 74%; median age 62; cT3/T4 81%; cN 80%; GEJ 56%). 91% and 37% of pts with ECF/ECX and 90% and 50% with FLOT completed planned pre-operative and post-operative cycles, respectively. Median follow-up was 43 mon. 369 pts died (203 ECF/ECX; 166 FLOT). FLOT improved OS (mOS, 35 mon with ECX/ECF vs. 50 mon with FLOT; HR 0.77 [0.63 - 0.94]; p=0.012). 3y OS rate was 48% with ECF/ECX and 57% with FLOT, Projected 5y OS rate was 36% with ECF/ECX like in the Magic trial and 45% with FLOT. FLOT also improved PFS (mPFS, 18 mon with ECX/ECF vs. 30 mon with FLOT; HR 0.75 [0.62 - 0.91]; p=0.004). FLOT especially improved survival in subgroups like patients older than 70 years, AEG I tumors, diffuse type gastric cancer and T2- tumors. Periop complications were 50% with ECF/ECX and 51% with FLOT. 30- and 90-day mortality was 3% and 8% with ECF/ECX and 2% and 5% with FLOT. The rate of curative surgeries and R0- resections was significantly improved with FLOT- regimen.

Conclusion:

FLOT increased rates of curative surgeries and prolonged progression-free and overall survival compared to ECF/ECX. Compared to 23% 5y OS in the MAGIC trial with surgery alone, 5 Y OS was nearly doubled due to FLOT compared to surgery alone. Relative effect from FLOT was consistent across subgroups and sensitivity analyses. There was no increase in surgical morbidity and mortality,
re-surgeries, or hospitalization times. FLOT is new standard of care in perioperative treatment of patients with resectable adenocarcinoma of the stomach or gastroesophageal junction.
Recovered Acidity of Gastric conduit after Minimally Invasive Ivor Lewis Esophagectomy may quickly contribute to occurrence of Neo-Barrett’s Esophagus
(Abstract ID: 206)

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Background:
As shown in literature, up to 50% of patients develop Neo-Barrett’s Esophagus above the anastomosis after Ivor-Lewis esophagectomy. Due to bilateral vagotomy during this operation, gastric acidity was thought to be reduced permanently. Aim of this study is to answer the question how and when acidity of the gastric conduit recovers over time and to analyze how this phenomenon contributes to the significant mucosal damage of the esophageal remnant.

Materials and methods:
Prospective study to evaluate the gastrointestinal functional outcome in patients after Ivor Lewis esophagectomy. In our esophageal center of Excellence, more than 250 esophageal surgeries are performed annually and a large proportion of tumor patients are seen during follow up on a regular scheduled base. IRB approval and a local grant have been received to support this project. A total of 75 patients with R0 resection and reflux symptoms after esophagectomy are scheduled to undergo endoscopy and functional tests in our laboratory. Functional tests include 24 h impedance pH metry and oropharyngeal (Restech) pH metry. Group comparisons are performed in accordance to length of follow-up to analyze the acidity of the gastric conduit during long term follow up.

Results:
A total of 35 (7 females) patients with a median age of 62 (range 39-80) were recruited so far and followed up after minimally invasive Ivor Lewis esophagectomy (median follow up 29 months). Adenocarcinoma was present in 23 patients, squamous cell carcinoma in 12. In routine surveillance endoscopy, all patients showed mucosal damage of the esophageal remnant. Symptoms reported were reflux (65%), regurgitation (71%) and bloating (85%). Already shortly after surgery (group 1, follow up 6-24 months) acidity of the gastric conduit is nearly normalized (mean pH 3,1; range 1,7-6,7). Mean pH in group 2 (Follow Up 24-48) and group 3 (Follow Up >48 months) is 3,3 (range 1,2-6,7), and 2,2 (range 1,6-2,9), respectively.

Conclusion:
Acidity of the gastric conduit in patients after Minimally Invasive Esophagectomy quickly recovers even though bilateral vagotomy is performed. This phenomenon seems to heavily contribute to the occurrence of mucosal damage in the esophageal remnant and has important implications on the pathogenesis of Barrett’s esophagus and esophageal cancer.
Figure: Hyperplasia of squamous epithelium and "vascular lake" as signs of early inflammation in the esophageal remnant after Ivor Lewis Esophagectomy
Results of different treatment options for patients with gastric cancer with peritoneal metastases
(Abstract ID: 226)

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Background:

Patients with peritoneal metastases of gastric cancer have a poor prognosis. The reported median survival is approximately 7 months. Cytoreductive surgery (CRS) in combination with hyperthermic intraperitoneal chemotherapy (HIPEC) showed major improvement in survival in selected patients. The aim of this study was to demonstrate several treatment options and their outcome during the past 10 years in a single center.

Materials and methods:

This retrospective analysis included all patients with gastric cancer and peritoneal metastases only diagnosed by laparoscopy and treated at our cancer center between 01/2008 and 12/2016. We divided all patients in three different treatment groups: 1) complete CRS & HIPEC in combination with systemic chemotherapy, 2) tumor debulking & HIPEC in combination with systemic chemotherapy and systemic chemotherapy only. Patients who were treated with CRS or tumor debulking received HIPEC (Cisplatin, Mitomycin, 60min, mean temperature 41°C) using a closed circulatory technique. The median survival was calculated from time of operation (CRS & HIPEC or diagnostic laparoscopy) until patient’s death.

Results:

A total of 100 patients with a mean age of 53.19 (SD 11.2) years, a mean BMI of 24.6 (SD 4.9) and a mean Peritoneal Cancer Index (PCI) of 15.3 (SD 11.8) were included. The main factor differing between groups were PCI 9.2 (SD 7.2) Group 1 vs. 27.1 (SD 9.8) group 2 vs. 24.8 (SD 11.3 group 3; p<0.001). All other demographic factors including preoperative chemotherapy were similar. In total, 91 patients received preoperative systemic chemotherapy. Patient’s median overall survival was 10.4 (SD 0.82) group 1, 6.3 (SD 0.58) group 2 and 5.9 months group 3 (SD 1.4; p<0.001), respectively. Predictors for survival were L- and V-Status, PCI and completeness of cytoreduction in patients treated with CRS & HIPEC. The multimodal approach including perioperative systemic chemotherapy in combination with CRS & HIPEC showed 5-year survival of 10.2% in selected patients.

Conclusion:

CRS and HIPEC showed positive results in selected patients with peritoneal metastases of gastric cancer. In contrast tumor debulking (non-complete cytoreduction) in combination with HIPEC showed no improvement of median survival compared to systemic chemotherapy only. The impact of HIPEC in addition to cytoreductive surgery will be evaluated by the ongoing GASTRIPEC study.
Oesophageal diverticulum formation after conservative treatment of a cervical oesophageal perforation.
(Assert ID: 274)

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Background:

There are many cases of perforated diverticula of the oesophagus. Developing an oesophageal diverticulum at the site of a former perforation on the other hand is not that common. The following case shows not only a complicated course of an oesophageal perforation, but also the unique case of a pseudodiverticulum formation within six months after the perforation of the cervical oesophagus.

Materials and methods:

A 76-year-old multimorbid patient was referred to our hospital for treatment of a perforation of the high cervical oesophagus following a TEE. The patient received antibiotic and antifungal therapy, as well as multiple thoracic drainages. Following the perforation, the patient developed a large via falsa that reached from the perforation site deep down into the mediastinum, which resulted in a paraoesophageal empyema. The empyema was treated by CT-guided and Endosonographic-guided drainages and the patient had to undergo several hospital stays with intravenous antibiotic therapy.

Three months later, the patient returned again to our hospital complaining of dysphagia for solid foods and regurgitation. Multiple EGD were performed, but could not identify the cause of her symptoms. Eventually, a barium swallow showed a newly developed oesophageal diverticulum located at the former perforation site. The patient was admitted to hospital, where a diverticulopexy and myotomy was performed. Following surgery, the patient suffered from a left vocal cord paresis. Logopaedic therapy was initiated and the patient could be released from hospital eight days after surgery.

Results:

There are few reports of a pseudodiverticulum formation after oesophageal perforation. In this case, the diagnosis might have been missed, if the barium swallow had not been performed, as it is particularly difficult to identify pathologies of the very high cervical oesophagus during an EGD. The diagnosis was also delayed due to the patient’s history. The symptoms were at first thought to be caused by her former disease, since they evolved only within six months after the perforation and the EGD findings did not indicate a further pathology.

Conclusion:

Oesophageal pathologies in patients following an oesophageal perforation might be missed, because their symptoms can be associated with the former perforation. Diverticulum formation should be considered in patients with dysphagia and regurgitation after oesophageal perforation. The barium swallow is a key instrument to diagnose pseudodiverticula of the oesophagus.
Does The Margin Matter in Esophageal Cancer?
(Abstract ID: 283)

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\textbf{Background:}

The prognostic impact of circumferential resection margin (CRM) involvement in resected esophageal cancer is controversial discussed in the literature. The College of American Pathologists (CAP) and the Royal College of Pathologists (RCP) provide two different definitions of CRM involvement. The aim of this systematic review was to evaluate the clinical significance of CRM involvement on patients’ survival following esophagectomy due to esophageal cancer.

\textbf{Materials and methods:}

Pubmed, Science Direct and Google scholar (January 1990 to March 2017) were searched for studies analyzing the clinical impact of CRM in esophageal cancer.

\textbf{Results:}

Twenty-eight studies over the last 24 years analyzed the prognostic effect of a positive circumferential resection margin in esophageal cancer. A wide range of CRM involvement (8.6\% - 83.1\%) was reported. Both available meta-analyses found a significant association between a positive CRM and patients’ survival irrespective of RCP (OR 2.52 (95% CI 1.96 - 3.25; p<0.001)) or CAP (OR 4.02 (95% CI 2.25 - 7.20; p<0.001)) criteria. The influence of neoadjuvant therapy on the circumferential resection margins remains unclear. Studies found an increased rate of positive CRM involvement in patients treated with a transhiatal approach as compared to a transthoracic approach.

\textbf{Conclusion:}

CRM involvement is a useful parameter for EC patients’ prognosis. The application of CAP criteria should be preferred since patients with a poor prognosis can be identified more sufficiently. Neoadjuvant therapy and en bloc transthoracic esophagectomy show favorable results for achievement of negative CRM.
Tissue characterization using hyperspectral imaging
(Abstract ID: 389)

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Background:
Nowadays abdominal and thoracic surgical procedures tend to be progressively performed in a minimally invasive manner using laparoscope systems. Despite the use of magnifying glasses, the operating field of view is reduced and it is sometimes difficult to identify anatomical structures especially the recurrent laryngeal nerve or the parathyroid glands during surgery. Therefore, new imaging technologies capable of providing additional information for the surgeon, beyond the abilities of the human eye, are being developed. Hyperspectral imaging (HSI) is a relatively new modality, which combines spectroscopy with camera imaging. It enables a non-invasive tissue differentiation through a contact free chemical analysis. Moreover it provides additional information about the superficial and deep (up to 1 cm) tissue perfusion. The goal of this work was to evaluate HSI for the identification of organs and structures in thyroid surgery.

Materials and methods:
The HSI system developed by the company Diaspective Vision GmbH (Pepelow, Germany) was used to acquire data of 12 patients during open thyroidectomies and parathyroidectomies. Using the software Analyse Panel of Diaspective Vision anatomical structures, i.e. thyroid and parathyroid in vivo, nerve, muscle and fat were manually annotated as region of interest (ROI). The averaged absorbance spectra of all annotated structures were computed and plotted (Figure 1).

Results:
The observation of the absorbance spectra showed that: (1) The known spectroscopic peaks (deoxygenated hemoglobin at 760 nm, fat at 930 nm, water at 960 nm) were clearly detected in the absorbance spectra; (2) The nerve and muscle curves presented small peaks corresponding to the water (960 nm) and hemoglobin (760 nm) bands. These peaks were not represented in the fats’ spectrum, which showed however larger absorbance in the fat bands (930 nm). Moreover, the absorbance spectra of the nerve presented a lower absorbance in the range 600 to 700 nm and a larger absorbance in the range 800 to 1000 nm than the spectra of muscle and fats, indicating a larger oxygenation of nerves; (3) The absorbance spectra of the in vivo thyroids and parathyroids showed different oxygenation states, allowing a clear differentiation between those two structures.

Conclusion:
Our observations match the results published in the literature (especially from Schols et al. 2014 and 2016). The observed features in the absorbance spectra of the different structures and organs will allow spectrally characterizing them. Moreover, the development of computer assisted algorithms (for example machine learning classification algorithms) should perform the in vivo automatic identification of these structures during operations.
Fig. 1. Averaged absorbance spectra of in vivo structures acquired during thyroidectomy and parathyroidectomy operations of 12 patients. Left: original spectra. Right: normalized spectra (using the standard normal variate SNV normalization method).
Laparoscopic resection for adenocarcinoma of the stomach or gastroesophageal junction improves postoperative outcomes: a propensity score matching analysis
(Abstract ID: 396)

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Background:

Minimal-invasive resection for upper gastrointestinal tumors has been associated with favorable results. However, the role of laparoscopic surgery (LS) in the multimodal treatment of patients with advanced adenocarcinoma of the stomach or gastroesophageal junction needs further investigation.

Materials and methods:

Clinicopathological data of patients who underwent gastrectomy between 2005 and 2017 were assessed. Outcomes of patients undergoing LS were compared with those treated with a conventional open resection (OR) using a 1:1 propensity score matching analysis.

Results:

Curative resection for adenocarcinoma of the stomach or gastroesophageal junction was performed in 417 patients during the study period. Beginning in June 2014, the majority of patients underwent LS (n=72) and were matched with 72 patients treated with an OR. 89% of patients treated with LS had advanced cancer (UICC Stage II and III) and 82% of them received neoadjuvant chemotherapy. LS was associated with a significantly lower 90-day major complication rate (13 % vs. 26%, p = 0.035) and a lower length of hospital stay (14 vs. 16 days, p = 0.001). After a median follow-up time of 32 months, 1-year overall survival rate was higher after LS than after OR (93% vs. 74%, P = 0.126), however results did not reach statistical significance.

Conclusion:

LS for adenocarcinoma of the stomach or gastroesophageal junction is feasible and significantly reduces major postoperative morbidity resulting in a reduced length of hospital stay. Therefore, LS may be considered as the preferred option for the surgical treatment of patients with these malignancies.
Robotic-assisted esophagectomy for esophageal cancer
(Abstract ID: 432)

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Background:
Robotic surgery seems to be useful for complex surgical procedures with need of extensive nodal dissection and a reconstructive part.

Materials and methods:
The video shows a two-field robotic assisted esophagectomy with lymphadenectomy and reconstruction by intrathoracic hand-sewn robotic assisted anastomosis without stapler.

Results:
There were no intraoperative complications. The operative time was 320 minutes. The postoperative course was uneventful.

Conclusion:
Robotic esophagectomy is feasible. Nevertheless, large series are required prior to consider it as a standard of care.
Prognostic Value of Chest-Tube Amylase in Detecting Early Anastomotic Leakage After Ivor-Lewis Esophagectomy

(Abstract ID: 458)

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Background:

Intrathoracic anastomotic leaks after esophagectomy are a significant cause of postoperative morbidity and death. Early detection and timely management is crucial but existing diagnostic methods are either invasive or have a low sensitivity. The aim of this study was to evaluate the effectiveness of daily drain amylase levels in detecting early anastomotic leaks after Ivor-Lewis esophagectomy compared with C-Reactive Protein (CRP) Levels.

Materials and methods:

Between June 2015 and September 2017, 117 Ivor-Lewis esophagectomies for cancer were performed in our surgical department. In 80 of these patients, drain amylase levels were collected, CRP levels are measured routinely. Early anastomotic leaks were defined as occurring within the 3rd postoperative day (POD). Drain Amylase levels > 350 U/l, and CRP > 30 mg/dl were considered positive. Sensitivity and specificity in detecting anastomotic insufficiency for both drain amylase and CRP were calculated.

Results:

A clinically significant anastomotic leak occurred in 5% (4/80) of all esophagectomy patients with 1.2% (1/80) postoperative mortality. Three of these four patients had a positive chest-drain amylase level and none a positive CRP level on POD1. Three of the four patients with anastomotic disruption had a positive CRP level on POD 2. The sensitivity and specificity for drain amylase and CRP at day 1 was 75% and 100% vs 0% and 100%, respectively.

Conclusion:

Chest-tube amylase levels recorded on POD 1 after Ivor-Lewis esophagectomy are more accurate for the detection of early esophageal anastomotic leaks than CRP. This facilitates an early detection of anastomotic leaks up to 24 hours earlier than elevated blood CRP levels.
Magnetic sphincter augmentation as treatment modality for gastroesophageal reflux disease
(Abstract ID: 477)

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Background:
Magnetic sphincter augmentation is a novel minimal-invasive anti-reflux procedure that was recently introduced as an alternative to fundoplication. The aims of this study were to evaluate the long-term outcomes of patients following magnetic sphincter augmentation (MSA) at a specialized reflux centre.

Materials and methods:
Consecutive patients between 03/2012 and 10 were included into this study. A standardized interview was performed by the same physician assessing postoperative gastrointestinal symptoms, proton pump inhibitor intake (PPI), GERD-Health-related-Quality-of-Life (GERD-HRQL) and Alimentary Satisfaction (AS). Postoperative esophageal functioning testing was performed in the majority of patients.

Results:
At a median age of 45 (IQR, 38-58) years a total of 115 GERD patients (46 males, 22 females) underwent magnetic sphincter augmentation (MSA). There were no intraoperative complications and the median OR time was 27 min (IQR, 21-34). The postoperative GERD-HRQL total score was significantly reduced (0.5 (IQR, 0-4.3) vs. 26 (IQR, 17-32); p< 0.001). Median follow up time was 13 months (IQR, 4.2-45). Endoscopic dilatation was successfully performed in 2 patients (3.6%) with permanent dysphagia. In another 2 cases (3.6%) the device was explanted.

Conclusion:
Magnetic LES augmentation is safe and efficient in the treatment of selected GERD patients and associated with improved symptoms and quality of life.
Impact of the interval between neoadjuvant CROSS regime and esophagectomy on postoperative mortality and oncological outcome – a systematic literature review  
(Submitted ID: 523)

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Background:

In patients with locally advanced esophageal carcinoma the combined neoadjuvant radiochemotherapy according to the CROSS protocol is considered as state of the art (S3-guidelines). The time interval between the neoadjuvant treatment and the transthoracic esophagectomy is currently under discussion is analysed in a prospective randomized multicentre study with the participation of the University Hospital of Cologne (NeoRES II: 4-6 weeks vs. 10-12 weeks). The review presents the current evidence and literature.

Materials and methods:

We systematically reviewed the literature indexed at Medline (PubMed) from January 2000 to August 2017. We included all studies investigating the time interval between the end of neoadjuvant radiochemotherapy (RCTx) and the esophagectomy in patients with esophageal carcinomas. Special focus was set on postoperative mortality, pathologic complete response (pCR) as well as 3-year and 5-year survival.

Results:

16 retrospective studies with a total of 9,087 patients fulfilled the inclusion criteria. In four studies, no significant differences could be shown regarding to different time intervals (median 6.6-7.1 weeks vs. 10.0-12.4 weeks) and their effect on the outcome. Five studies favoured a short time interval with significantly reduced postoperative mortality rates and longer survival times. Two of these studies showed a significant positive correlation between length of time interval and pCR. Four other studies could demonstrate a significantly higher pCR rate in favour of a late time interval, but without any effect on the survival rates. Three studies had a significantly lower rate of recurrences in later-operated patients.

Conclusion:

The literature review of the exclusively retrospective studies shows that the current results regarding oncological outcome and postoperative mortality do not allow definite therapy recommendation on this relevant question. The data emphasizes the need for a prospectively randomized study.
Management of a high esophago-tracheal fistula caused by esophageal stent due to anastomotic leakage after ivor-lewis esophagectomy - a case report.

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Background:

Esophagotracheal perforation is a very severe complication. However, an esophagotracheal perforation caused due to an esophageal stent after anastomotic leakage after ivor-lewis resection, is even more complex and associated with high mortality. Therefore we present a case how we managed a high esophagotracheal perforation and anastomotic leakage after ivor-lewis resection of esophageal cancer, prior treated with neoadjuvant radiochemotherapy.

Results:

A 71-year old patient was transferred to our center due to an esophagotracheal perforation at the proximal stent - and at 18-20 cm from the front teeth row. The stent had been placed due to anastomotic leakage after ivor-lewis resection. The patient’s history began with a squamous cell carcinoma of the esophagus, treated with neoadjuvant radiochemotherapy and followed by ivor-lewis esophagectomy. She developed an anastomotic leakage, which was treated with an esophageal stent. This stent perforated and caused a fistula between the esophagus and the trachea. After transfer to our center, we performed a tracheotomia with a tubus blocked, distal of the esophagotracheal fistula, to prevent respiratory insufficiency. We removed the dislocated stent and induced an endosponge therapy. A prolonged healing process lead to a step-by-step decrease of the anastomotic leakage. Finally, the semicircular hole could be supplied by a fibrin sealant. We resected the fistula via cervical surgery and placed a pectoralis muscle flap between trachea and esophagus. The surgery was performed under steady neuromonitoring control. The postoperative course was uncomplicated. The patient could be extubated with spontaneous breathing. Eleven days after surgery, the patient could be discharged fully enteralised. The stomach interponate could be kept. Half a year later, our patient shows up in our regular consultation, reporting no dysphagia.

Conclusion:

Our experience with endosponge treatment suggests that this is the first choice for successful healing of anastomotic leakage after ivor-lewis resection. A stenting of the esophagus after finding an anastomotic leakage can be considered, but is associated with a risk of further complication.
Non-epithelial malignant tumors of the esophagus – register analysis in a high volume center
(Abstract ID: 561)

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Background:

While adeno- and squamous cell carcinoma of the esophagus are associated with an incidence of 5/100,000 cases per year, non-epithelial malignancies of the esophagus remain very rare diseases. This register - analysis presents the so far largest retrospective analysis of patients with non-epithelial cancers of the esophagus.

Materials and methods:

Medical records of patients diagnosed and treated at our institution with non-epithelial malignancies (2000-2016) were reviewed retrospectively. A clinico-pathological database was designed to evaluate clinical and pathological characteristics of this extremely rare patient cohort.

Results:

19 patients with non-epithelial malignancies of the esophagus (neuroendocrine carcinomas (n=6), melanomas (n=4), small-cell neuroendocrine carcinomas (n=3), gastrointestinal stroma tumors (n=3), large-cell neuroendocrine carcinoma (n=1), NOS-sarcoma (n=1) and 1 intramural metastasis (urothelial carcinoma) of the esophagus were analysed for clinical and pathological variables. Patients were aged 36 to 81 years (mean age 66y) at time of diagnosis with male predominance (3:1). While 13 patients underwent surgery only, 6 patients received neoadjuvant chemotherapy or radiation therapy (6 of 10 patients (60%) with neuroendocrine carcinomas). 18 patients underwent an Ivor-Lewis esophagectomy with intrathoracic stapled esophago-gastric-anatomosis. One patient with a small low-risk GIST received a thoracoscopic enucleation. Histopathologic examination of the surgical specimen revealed in-sano resection (R0) in 16 (84%) and R1-status in 2 cases (11%). 1 case was not available for evaluation

Mean length of hospital stay was 25 days (range 10-55 days). Assessment of perioperative complications according to the Clavien-Dindo score revealed 6 patients (31%) with no unusual perioperative events. 4 patients (21%) were subject to minor events requiring non-invasive interventions (Grade II). 6 (31%) and 3 (16%) patients required invasive treatment for postoperative complications (Grade IIIa and IIIb).

Mean follow-up (FU) time was 15 months (range 1 to 81 mo) with 9 patients alive (47%) and 10 deceased (53%) at last FU.

Throughout FU 9 patients suffered recurrent disease (7/10 neuroendocrine carcinoma) while 4 patients were free of tumor.

Conclusion:

Non-epithelial malignant tumors of the esophagus are extremely rare (<1% of all esophageal malignancies). In our study the most frequent entities were neuroendocrine carcinomas [NEC’s] (53%), melanomas (21%) and gastrointestinal stromal tumors [GIST’s] (16%). Whereas GIST’s are generally associated with a favourable prognosis, NEC’s display a dismal outcome (6 of 10 deceased of tumor recurrence) which is consistent with data from NEC’s in other locations.
Meta-analysis of minimal-invasive esophagectomy compared to open esophagectomy in esophageal cancer
(Abstract ID: 574)

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Background:
A cornerstone of treatment of esophageal cancer is esophagectomy. Major surgery is performed more and more minimal invasive. The aim of this systematic review and meta-analysis was to summarize evidence for the potential risks and benefits of complete endoscopic (thoracic and abdominal) esophagectomy compared to the open procedure.

Materials and methods:
A systematic literature search from was performed in MEDLINE, Web of Science and CENTRAL without language restrictions. Prospective controlled trials (randomized and non-randomized) comparing minimal invasive esophagectomy with the open procedure were included. Two reviewers independently identified the relevant trials and extracted data on perioperative safety and effectiveness outcomes. Pooled results were displayed as odds ratio (OR) or mean difference (MD) with respective 95% confidence interval (95%-CI).

Results:
A total of 19 prospective comparative trials were included investigating 2397 esophageal cancer patients. Overall morbidity did not differ between the open and the minimal invasive group (OR 0.81, 95%-CI 0.56 to 1.18). Three outcomes were in favour of the minimal invasive esophagectomy: pneumonia (OR 0.54, 95%-CI 0.34 to 0.84), blood loss (MD -361ml, 95%-CI -514ml to -209ml) and 1 year survival rate (OR 1.54, 95%-CI 1.05 to 2.26). The only endpoint in favour of open surgery was operative time (MD 35min, 95%-CI 18min to 52min). Further, short-term and long-term mortality, major complications, reoperations, anastomotic leakages, overall pulmonary complications, length of hospital stay, length of intensive care unit stay, positive resection margin, and number of harvested lymph nodes did not differ between the groups.

Conclusion:
In this set of prospective comparative trials minimal invasive esophagectomy was performed minimally invasive safely and effective compared to the open procedure. The minimal invasive approach was able to avoid pneumonia and had a better 1 year survival rate compared to the open procedure. More randomized trials are needed to increase the quality of the existing evidence.
Hypertensive Poorly Relaxing Lower Esophageal Sphincter in High Resolution Manometry – A Study of Prevalence and Clinical Features
(Abstract ID: 688)

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Background:

The clinical significance, natural history and treatment of hypertensive lower esophageal sphincter (HTLES) remains uncertain. With the introduction of high-resolution manometry (HRM), cases of HTLES have been increasingly recognized. Our aim was to assess clinical features, prevalence and HRM characteristics of patients with HTLES.

Materials and methods:

From a cohort of 1,686 consecutive patients who underwent HRM, forty patients (2.4%) were identified with HTLES characterized by a resting pressure >49.8 mmHg. Patients with achalasia, hiatal hernia and previous foregut surgery were excluded. Twenty-six patients with both, HTLES and an associated elevated residual pressure (4s-IRP >14.7 mmHg) formed the study population (52.6±14.2 years; BMI 24.6±4.6; F:M 22:4).

Results:

Dysphagia was present in 46%, heartburn in 42%, regurgitation and atypical GERD symptoms in 35%. Mean LES resting pressure was 60.1±8.6 mmHg and 4s-IRP 19.7±4.7 mmHg. The majority had normal esophageal motility (58%); hypertensive contraction pattern was present in 39%, and 1 case met HRM criteria for diffuse esophageal spasm. Treatment included Botox injection in five, dilation in two and myotomy in one patient. Patients with dilation and myotomy had near complete resolution of dysphagia. Response rate after Botox ranged from no symptom improvement to good short-term response. One patient treated with fundoplication had complete GERD-symptom resolution.

Conclusion:

HTLES is an uncommon, but not rare manometric finding present in 1.5% of unselected manometric procedures. The clinical presentation and associated studies reveal varied underlying physiology including both predominant GERD and motility disorders. Further clinical trials and follow up are necessary to determine treatment options with best possible response.
Changes in functional phenotype of achalasia following laparoscopic myotomy – a study using high-resolution manometry
(Abstract ID: 693)

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Background:
Achalasia is a rare motility disorder which is characterized through a non-relaxing lower esophageal sphincter and disturbed motility of the esophageal body. The current Chicago Classification distinguishes 3 phenotypes (type I - aperistaltic, type II - panesophageal compression, type III - spastic). Nevertheless, this classification is applicable for patients without previous treatment, only. However, few data suggest that structural integrity returns following therapy in quite a few cases.

Materials and methods:
We aim to assess i) the prevalence of changes in phenotypic characteristics of achalasia following laparoscopic Heller myotomy (LHM) and ii) the frequency of recovered peristalsis of the esophageal body.

Overall, we analyzed 500 liquid swallows of 25 patients with achalasia (9 male, 16 female, mean age 49 ±14.5 years). All underwent high-resolution manometry pre- and postoperatively and were distinguished according to the current Chicago-Classification version 3.

Results:
Preoperatively, 5 (20%) patients fit type I, 17 (68%) type II, and 3 (12%) type III. Overall, 30% (N=75) of swallows were aperistaltic, 60% (N=151) showed panesophageal pressurizations and 10% (N=24) presented a spastic pattern. The manometric pattern changed in 60% of patients following LHM (36% type I, 8% type II, 44% type III). Interestingly, 3 patients did not fit the achalasia Chicago-Classification (non-described, type ND) postoperatively. Type I and type III achalasia did not change. However, type II achalasia changed in almost all cases (N=4 type I, N=2 type II, N= 8 type III, N=3 type ND). Also the overall number of peristaltic, failed, simultaneous and spastic swallows changed significantly (0 vs. 35, 75 vs. 118, 151 vs. 17 and 24 vs. 80 respectively; p<0.0001).

Conclusion:
The postoperative classification of achalasia through HRM is obsolete as the manometric phenotype changes in 60% of cases. Subtype II showed the a tremendous heterogeneity in its postoperative pattern. We observed a recovery of peristalsis in 14% of swallows following LHM. This phenomenon might be multifactorial and is part of our ongoing research.
Post-therapeutic manometry following achalasia treatment does not predict symptomatic outcome
(Abstract ID: 694)

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Background:
Esophageal motility disorders are categorized through the current Chicago-Classification in its 3rd version. Achalasia as a rare motility disorder is discriminated by its contractile pattern (type I - aperistaltic, type II - panesophageal compression, type III - spastic). The literature focuses on relieve of the esophagogastric junction (EGJ) after either endoscopic dilatation (ED) or laparoscopic Heller myotomy (LHM). Changes in motility pattern of the esophageal body and their correlation to posttherapeutic symptoms have not been studied so far.

Materials and methods:
We investigated the manometric phenotype of patients with achalasia following ED and LHM and its symptomatic outcome.

We included patients with verified achalasia who underwent either ED or LHM. Pre- and post therapeutic symptom assessment was acquired through a standardized questionnaire including the Eckardt-Score (ES). All patients underwent high-resolution manometry (HRM) 6 months following therapy and were assigned into their distinct phenotype according to the Chicago-Classification version 3.

Results:
Thirty patients were available for analysis (male 11, female 19, mean age 51 ±15 years). Five (17%) underwent ED and 25 (83%) LHM. Following ED and LHM ,12 patients fit type I, 2 type II and 12 type III. Surprisingly, 4 patients did not fit into the Chicago-Classification afterwards. The ES following LHM was significantly decreased compared to ED (1 IQR 0-3 vs. 4 IQR 2-7, p=0,021). There was no significant difference between posttherapeutic subtype and ES (0 1,5 IQR 0-7,5; I 2,5 IQR 1,25-3,75; II 0,5 IQR 0-0,5; III 1 IQR 0-3; p=0,42).

Conclusion:
Following endoscopic dilatation and laparoscopic Heller myotomy, subtypes I and III are more dominant than described in the literature. The short term symptomatic and manometric course was not significantly different with regard to achalasia subtype and ES.
Further differentiation of pN3-category in esophageal adenocarcinoma  
(Abstract ID: 706)

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Background:

While in esophageal cancer lymph node involvement is only differentiated between pN1-, pN2-, and pN3-category, in gastric cancer pN3-category is further divided into pN3a (7-15 metastatic lymph nodes) and pN3b (>=16 metastatic lymph nodes). Aim of this study was to evaluate, whether further differentiation of pN3-category into pN3a and pN3b analogous to gastric cancer provides better prognostication of patients with esophageal adenocarcinoma.

Materials and methods:

We analyzed data of 444 consecutive esophageal adenocarcinoma (AEGI+II) patients, who underwent surgery in curative intent (neoadjuvant treatment: 233, R0-resection: 367) at our institution 2001-2015 from a prospective database. Tumors were staged according to UICC-TNM-classification 8th edition of 2017. pN-category was additionally staged analogous to the gastric cancer. Survival was estimated according to Kaplan-Meier (log rank).

Results:

42 patients had M1 metastatic disease. Distribution of pN-category in patients without metastasis (M0, n=402) was pN0 42.5% (n=171), pN1 19.2% (n=77), pN2 15.7% (n=63), pN3 22.6% (n=91), pN3a 18.2% (n=73), pN3b and 4.5% (n=18). The median number of lymph nodes removed was 22 (0-62).

Median overall survival (mOS) was 120.1 months for pN0, 38.5 months for pN1, 26.0 months for pN2, and 21.1 months for pN3. Survival of pN3b was worse than that of pN3a (mOS 22.9 vs. 12.0 months, p=0.027) and even slightly - but non-significantly - worse than survival of M1 (mOS 18.8 vs. 12.0 months, p=0.230).

In patients with a minimum of 16 lymph nodes removed (n=313) mOS was 12.0 months for pN3b (n=18) compared to 23.1 months for pN3a (n=66, p=0.025), and compared to 18.4 months for M1 (n=37, p=0.278).

In R0-resected patients (n=347) mOS was 12.0 months for pN3b (n=15) compared to 24.4 months for pN3a (n=55, p=0.066), and compared to 18.4 months for M1 (n=20, p=0.199).

In R0-resected patients with a minimum of 16 lymph nodes removed (n=268) mOS was 12.0 months for pN3b (n=15) compared to 24.4 months for pN3a (n=50, p=0.073), and compared to 18.4 months for M1 (n=18, p=0.224).

Conclusion:

Further distinction between pN3a and pN3b analogous to gastric cancer improves prognostication in esophageal adenocarcinoma patients. pN3b-category is associated with dismal prognosis comparable to metastatic disease. It should be evaluated in a large cohort of patients and considered for the next edition of the TNM-staging-system for esophageal adenocarcinoma.
Epiphrenic diverticulum on the basis of achalasia: demonstration of an operation video of laparoscopic diverticulectomy, Heller myotomy and anterior fundoplication

(Abstract ID: 717)

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Background:

Epiphrenic diverticulum is a rare pathology of the foregut. The adapted surgical approach is challenging, as diverticulectomy needs to be combined with elimination of the underlying cause, dysmotility of the esophagus and lower sphincter hypermotility and postinterventional reflux control. Also, the height of the diverticular neck must be taken into account selecting between a thoracic or laparoscopic procedure.

Materials and methods:

We here present an operation video from a laparoscopic diverticulectomy, Heller myotomy and anterior fundoplication in a patient with achalasia and symptomatic epiphrenic diverticulum.

Results:

The operation was performed without any complications. There were no postoperative symptoms of dysphagia, regurgitation or reflux. The patient was discharged from hospital at day seven with mashed food diet.

Conclusion:

Surgical treatment of epiphrenic diverticula linked to dysmotility of the esophagus need a tailored approach combining diverticulectomy, myotomy and an antireflux procedure.
Laparoscopic explantation of an Endostim™ system
(Abstract ID: 742)

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Background:

The laparoscopic implantation of Endostim™, an electronic stimulation system that is supposed to build up the muscular gastroesophageal antireflux barrier, is a new strategy in gastroesophageal reflux disease (GERD) therapy. Although it is established in Germany since 2014 and the first long-term results after 4 years are available, there has been no publication about the explantation of an Endostim™ system.

Materials and methods:

Within 2 years of experience with the Endostim system (n=12) our department saw two patients with a total loss of Endostim function. Patients were referred to us with an increase of GERD symptoms after they had experienced an initial therapeutic benefit under Endostim™ therapy.

Results:

A video of the implantation and the explantation of an Endostim™ system is demonstrated. An 18 year old patient with a long term GERD history, a small hiatal hernia and a DeMeester score of 110 in 24 hour pH-testing was referred to us for anti-reflux surgery. Because of the young age and the small hernia we decided to implant an Endostim™ system. The patient was satisfied with the procedure for 7 months and then he complained about new GERD symptoms and decreased quality of life. 24 hour pH-monitoring revealed a DeMeester Score of 51,8. The external programmer showed an extreme increase of impedance so that the implantable impulse generator (IPG) was out of range for re-programming. In an x-ray a broken lead at the entrance to the IPG was suspected. The patient underwent re-laparoscopy. The lead was broken close to the IPG. Intraoperatively there were adhesions between the lead and Colon tranversum and sever adhesions at the esophageal gastric junction. Endostim was explanted and a Nissen fundoplication was performed. 6 months later the patient is well. He is off PPI therapy and only rare GERD symptoms.

Conclusion:

This is the first time the explantation of Endostim™ is demonstrated in a video due to a broken lead. Surprisingly there were more peritoneal adhesions in the post-Endostim™ site than expected. Experiences with Endostim™ failure and re-do procedures should be documented and published to gain information for a better patient treatment.
Laparoscopic implantation of a temporary gastric stimulation system - a new strategy to predict the outcome of permanent electronic stimulation in gastroparesis

(Abstract ID: 747)

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Background:
Gastroparesis (GP) is a chronic disease with a delayed gastric emptying (GE) and without an obstruction of the pylorus. It can be divided into idiopathic (IGP), diabetic (DGP), post surgical (PGP) and rare causes. Main symptoms are nausea, vomiting and early satiety. The electronic gastric stimulation (EGS) - Enterra Medtronic™ - is an established part of GP therapy. Its impact has been reported in open label trials, but not in randomized controlled trials (RCT). The response to EGS is hard to predict preoperatively. It depends on GP type (DGP >PGP>IGP) and on the patient’s symptoms. The aim of this study was to establish an authentic and reliable simulation of permanent GES.

Materials and methods:
6 female GP patients refractory to medical treatment with different GP etiologies (IGP=1, DGP=1, PGP=3, Scleroderma=1) underwent laparoscopy. 2 temporary cardiac electrodes (Medtronic Streamline 6492™) were placed 10 cm from the pylorus at the greater curvature. Standardized parameters were programmed (frequency 14Hz, pulse width 330 µs, ON 1 second, OFF 4 seconds, current 5 mA). Voltage was adapted according to the impedance. Baseline and postoperative gastroparesis cardinal symptom index (GCSI), a validated index for GP therapy, was assessed. A response to GES was defined as a decrease of GCSI 50% under the baseline measurement.

Results:
The average procedure time was 99 (54-141) minutes and median stimulation time was 77 (28-104) days. 4 of 6 patients responded to temporary EGS. 1 PGP and 1 IGP patient showed no response. 3 of 4 responders underwent re-laparoscopy for permanent implantation. 1 non-responder (IPG) received a permanent Enterra in a different hospital. Within the responder group GCSI remained below 50% of baseline. The non-responder’s had increased from 2,67 to 4.

Conclusion:
Laparoscopic implantation of a temporary EGS system was able to predict the outcome of a permanent gastric stimulation in a small series.
Early surgical outcome and survival in patients with gastric cancer and carcinoma of the esophagogastric junction.

(Abstract ID: 752)

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**Background:**

We retrospectively analyzed all patients with gastric cancer including Siewert type II/III carcinomas of the esophagogastric junction that underwent surgery in our institution from 2001 to 2014.

**Materials and methods:**

Neoadjuvant therapy - either as radio-chemotherapy or as chemotherapy - was administered to 153 patients. We comparatively evaluated safety margins, number of examined lymph-nodes, perioperative mortality and morbidity, as well as survival in patients that either received surgery alone or surgery after neoadjuvant therapy.

**Results:**

In total 590 patients, 241 distal resections, 16 proximal resections with distal esophageal resection, 196 total gastrectomies and 131 total gastrectomies with distal esophageal resection were identified.

R0 resection was achieved in 87.9% of patients who underwent primary surgery and in 81.7% of those after neoadjuvant therapy.

Median number of harvested lymph nodes was 33 for patients diagnosed with gastric cancer and 29 for those with adenocarcinomas of the esophagogastric junction.

Anastomotic leak rate was 3.6%. Early postoperative morbidity was increased in patients treated neoadjuvantly, but comparison with those receiving primary surgery did not reveal any significance.

Overall in-hospital mortality was 5.4%; in 3.2% of the cases mortality was due to surgical complications.

5-year overall survival rate was 51.5 % for gastric carcinoma, 44.1% for Siewert type II and 47.1% for Siewert III cancers of the esophagogastric junction.

**Conclusion:**

Individualization of treatment dependent on the tumor staging results in good long-term outcomes. In a high-volume setting neoadjuvant therapy does not negatively affect perioperative morbidity and mortality.
When Endostim™ fails: An evaluation
(Abstract ID: 784)

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Background:
Electronic stimulation of the lower esophageal sphincter (LES) is a new promising anti-reflux procedure that is established in Germany since 2014. Basically two leads are placed laparoscopically into the LES and connected to an implantable pulse generator (IPG) that is implanted in a subcutaneous pocket. This stimulation is supposed to build up the muscular anti-reflux barrier. It is limited to patients with a small hiatal hernia < 3 cm and reflux esophagitis LA Classification Type A-C. Although long-term results up to 4 years with a good postoperative reflux control and an increased quality of life have been published, no data about Endostim™ non-responders, difficult postoperative situations and procedure failure has been reported yet.

Materials and methods:
Between 12/2015 and 11/2017 12 patients underwent laparoscopy for an Endostim™ implantation. All patients had an upper endoscopy, a barium swallow, high-resolution esophageal impedance manometry (HRIM), 24-hour multi-channel impedance and pH monitoring (MII-pH) prior to the procedure and after 6 months. The quality of life was assessed with the GERD health related quality of life (GERD-HRQL) questionnaire preoperatively and during further follow-up.

Results:
6 of 12 patients (50%), 2 female 4 male, reported new GERD symptoms after an initial postoperative symptom relief. 1 patient had a prolonged period (15 months) of reprogramming until complete symptom control was achieved. 1 patient had a recurrent 3 cm hiatal hernia after 3 months, so that only a partial responds was reported. In 2 patients reprogramming could not reach a proper responds. Two patients showed a complete technical failure due to a broken lead close to the IPG.

Conclusion:
Reasons for Endostim™ failure can be heterogeneous. Because it is a young and new procedure non-responders should be investigated closely so that there can be a critical discussion about indications, contraindications and negative predictive factors.
Influence of an intensified neoadjuvant Chemotherapy for Gastric Cancer on perioperative Results – a Propensity Score based analysis
(Abstract ID: 843)

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Background:
Nowadays, a multidisciplinary treatment approach is the standard for locally advanced gastric cancer and cancer of the esophagealgastric junction. Neoadjuvant therapy led to increase in survival and to an improvement of surgical results.

However, adjuvant chemotherapy as part of the whole treatment concept is often not completed due to different reasons. The NeoFLOT-trial therefore aimed at establishing an intensified neoadjuvant treatment regime with 6 cycles of preoperative FLOT (5-FU, leucovorine, oxaliplatin, docetaxel) for gastric cancer and proved it to be a safe option (Schulz et al. 2015). Yet, the influence of such an intensification has not been analysed regarding its possible impact on perioperative results.

Therefore, aim of the present was to compare perioperative results of patients who had received intensified chemotherapy according to the NeoFLOT-trial to those after a standard neoadjuvant therapy and to those without any neoadjuvant therapy.

Materials and methods:
540 patients were enrolled in this study, 135 of whom followed a standard neoadjuvant protocol, 356 had not received any neoadjuvant treatment and 47 patients had undergone chemotherapy according to the NeoFLOT protocol. Statistical analysis were made using a propensity score based model.

Results:
Preliminary results reveal that there is no significant difference in perioperative morbidity and mortality with regard to the neoadjuvant treatment protocol.

Anastomotic leakage occurred in 7% (n=38) in the whole study population, in 7,1% in the group without neoadjuvant therapy, in 6,7% among patients with a standard therapy and in 8,2% in the NeoFLOT group. Abscesses were diagnosed in 3,7%, 3,6% among patients without treatment and in 3,2% after a standard therapy. There was a tendency towards a higher rate of abscesses in the NeoFLOT group with 6,1%, yet the difference not statistically significant. Postoperative lymph-fistulas showed the same tendency with a higher rate in the NeoFLOT group (4,1% vs. 0,3% vs. 1,6%), the difference though not significant. Postoperative bleeding and hematoma occurred less frequently in the NeoFLOT group (2,1% vs. 5,33% vs. 5,1%). But patients in this group had a higher risk for blood transfusions (OR 5,5; 95%-KI; 2,49-12,19) whereas patients without neoadjuvant treatment had the longest ICU-stay (mean 8,3 vs. 4,5 vs. 6,7 days).

Conclusion:
Preliminary results of the current study indicate that an intensified neoadjuvant chemotherapy does not increase perioperative complications significantly. There is a tendency though towards higher rates for lymph-fistulas and abscesses in the NeoFLOT group.
Subgroup analysis, regarding age, comorbidities, tumor-stage, etc., need to be made to further elucidate on possible factors influencing perioperative results and to further personalize treatment strategies according to an individual risk stratification in gastric cancer.
Interims analysis: Effect of demographics and postoperative complications on economic outcome after surgery for upper GI cancers  
(Abstract ID: 920)

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Background:

Surgical treatment of upper GI cancers is associated with considerable morbidity and mortality, and management of these patients can be very cost-intensive. We are currently conducting a retrospective study to thoroughly assess the effect of demographics, patients’ general condition and perioperative course amongst other factors on economic outcome after surgery. In this context, we now present a first interims analysis on limited demographic data and complications and their impact on economic outcome.

Materials and methods:

Between 2011 and 2016, 180 consecutive patients underwent either esophagectomy or gastrectomy for cancers of the upper GI tract. Limited demographic data and complications were selected, and their impact on economic outcome (as determined via net profit/loss based on actual costs and revenues from the German diagnosis related groups (DRG)-system) was analyzed retrospectively. Analysis was performed separately for esophagectomy and gastrectomy.

Results:

Age of patients, sex, BMI, preoperative condition as estimated via the Karnofsky-index and final tumor stage (pT-stage, pN-stage, lymph node ratio) did not affect net profit/loss. However, occurrence of postoperative complications in general led to a progressive net loss after esophagectomy respectively gastrectomy (p=0.02 / p=0.002). Regarding specific complications after upper GI cancer surgery, pneumonia affected as well economic outcome negatively after esophagectomy and gastrectomy (p=0.036 / p=0.008), whereas anastomotic leakage did not significantly affect net profit/loss.

Conclusion:

This first interims analysis on limited data showed that postoperative complications negatively affect economic outcome after upper GI cancer surgery, while demographics seem not to correlate with net profit/loss after surgery. The finalization of the current study will provide a more detailed and exact picture on the economic aspects of upper GI cancer surgery.
How to classify Adenocarcinoma of the esophagogastric junction?
(Abstract ID: 925)

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Background:

With the recent release of the 8th edition of the UICC-TNM-classification the classification of adenocarcinoma of the esophagogastric junction (AEG) Siewert type I-III as esophageal or gastric cancer has been modified once again making for the third alteration within less than 15 years. Aim of this study was to evaluate which classification system provides better stratification of AEG I-III tumors.

Materials and methods:

We analyzed data of 409 consecutive patients with AEG (167 AEG I, 196 AEG II, 46 AEG III) without distant metastases (M0), who underwent surgery in curative intent (neoadjuvant: 223; R0-resection: 356) at our institution 01/2001-12/2015 from a prospective database. Tumors were staged according to UICC-TNM-classification 8th edition (2017) for esophageal and gastric adenocarcinoma. Survival was estimated according to Kaplan-Meier (log rank).

Results:

28 patients were complete histopathologic responders (ypT0). Tumor stage according to the esophageal staging system was: 11.0% stage I (n=45), 10.0% stage II (n=41), 46.5% stage III (n=190), and 25.7% stage IVA (n=105). Tumor stage according to the gastric staging system was: 21.0% stage I (n=86), 33.5% stage II (n=137), and 38.6% stage III (n=158).

In AEG I+II+III median overall survival (mOS) according to esophageal staging was not reached for stage I, 149.6 months for stage II, 49.2 months for stage III, and 21.3 months for stage IVA (p<0,001), mOS according to gastric staging was 149.6 months for stage I, 68.1 months for stage II, and 23.1 months for stage III (p<0,001).

In AEG I mOS according to esophageal staging was not reached for stage I (n=22), 149.6 months for stage II (n=27), 28.6 months for stage III (n=66), and 21.5 months for stage IVA (n=32, p<0,001), mOS according to gastric staging was 149.6 months for stage I (n=49), 28.6 months for stage II (n=52), and 23.1 months for stage III (n=46, p<0,001).

In AEG II mOS according to esophageal staging was 120.1 months for stage I (n=18), not reached for stage II (n=11), 78.2 months for stage III (n=103), and 20.4 months for stage IVA (n=58, p<0,001), mOS according to gastric staging was 120.1 months for stage I (n=29), 85.6 months for stage II (n=68), and 22.9 months for stage III (n=93, p<0,001).

Separate survival analysis of AEG III was not performed since sample size was too small.

Conclusion:

In AEG I+II+III both staging systems provide acceptable prognostic information. In AEG I neither staging system provides optimum stratification. In AEG II gastric staging stratifies patients by prognosis slightly better than esophageal staging.
Neither the esophageal nor the gastric staging system can be identified as superior in predicting overall survival in AEG. Either further harmonization of esophageal and gastric adenocarcinoma staging or a separate staging system for AEG would be desirable and would facilitate comparison of data.
Transposition of a pancreas transplant from the bladder to the terminal ileum twenty years after combined allogenic kidney-pancreas-transplantation

(Abstact ID: 198)

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Background:
During the first years of combined allogenic kidney-pancreas-transplantation bladder diversion of the exocrine pancreas secretion was used. After reporting urological and systemic complications it was switched to an enteric diversion with excellent results of pancreas function. Today enteric diversion of the pancreatic ductal secretion is the standard procedure. Nevertheless there are still patients alive with the bladder diversion from the early years of transplantation with a good pancreatic function but loss of kidney function. This case describes such a patient and how we dealt with the problem.

Materials and methods:
A 53-year old male patient presented with a progressive renal failure twenty years after combined allogenic kidney-pancreas-transplantation with bladder diversion of the exocrine pancreas secretions. Urine excretion was declining with a pre-dialysis renal failure. Still the pancreas transplant was working properly without the need of insulin therapy. We therefore carried out a separation of the graft duodeno-cystostomy and re-established diversion by a side-by-side graft duodenal-recipient ileal anastomosis. This was done by a 2-layer hand sewn technique. Bladder catheter, drainage near the bladder and drainage near the anastomosis were removed after 5, 8 and 10 days respectively. The pancreas showed proper function without the need of insulin therapy. The patient was released from hospital 14 days after operation.

Results:
Transposition of a pancreas transplant from the bladder to the terminal ileum twenty years after primary transplantation is technically possible. In this case it was also reasonable in order to protect the bladder from the aggressive pancreatic ductal secretion. Because of the declining urine excretion due to progressive failure of the kidney transplant the exocrine secretion was not properly diluted anymore with the risk of hematuria, lower urinary tract infections, reflux-associated pancreatitis and transitional cell dysplasia. These conditions could limit the opportunity for the patient for a second kidney donation.

Conclusion:
Transposition of a pancreas transplant from the bladder to the terminal ileum twenty years after primary transplantation is technically possible and reasonable to offer the patient a chance for a second kidney donation.
Transposition finished
Impact of bridging therapy on the survival and recurrence rate after liver transplantation for HCC
(Abstract ID: 291)
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Background:
Tumor recurrence is a frequent cause of death after liver transplantation (LTX) for HCC. We investigated the impact of the bridging therapy (BT) on the long-term survival and the recurrence rate.

Materials and methods:
We analyzed 147 consecutive adult patients who underwent transplantation between 1996 and 2014. Bridging therapies were TACE, RFA and RE. The cumulative survival rate (CSR) and recurrence rate (CRR) were calculated according to Kaplan-Meier. The median follow-up period is 48 months.

Results:
70 patients (48%) received a bridging therapy. 48 (33%) developed a recurrence. The median survival of all patients was 106 months. The observed 5 and 10 years cumulative survival rate after LTX was 61% and 43%, respectively (p=0.016). None of the 18 patients without evidence of a tumor in the explant specimen developed a recurrence. Significant impact on the cumulative recurrence rate had among others bridging therapy (p=0.005), Milan (p=0.008) and Duvoux score (p<0.001). With stratification according to Milan the impact of the bridging therapy on the cumulative recurrence rate was maintained: (inside Milan 11% vs 32%, P=0.058; outside Milan 31% vs 57%, p=0.025). The bridging therapy influenced the location of the tumor recurrence: following bridging therapy intrahepatic recurrences were less frequently observed (1% vs 22%, p<0.001), extrahepatic recurrences approximately equal in frequency (23% vs 32%, p=0.407). The cumulative survival rate after extrahepatic recurrence was better than after intrahepatic recurrence (p=0.001).

Conclusion:
With bridging therapy in HCC, long-term survival, CRR and location of the tumor recurrence after LTX are positively influenced.
MELD based allocation deteriorates patient survival without improving waiting list mortality in Germany
(Abstract ID: 302)

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Background:
The MELD-based allocation system was implemented in Germany in 2006 to improve fairness and simultaneously decrease waiting list mortality in patients with end stage liver disease. However, the preoperative MELD score not only reflects the probability to die within 3 months, but at the same time represents a major risk factor for post transplantation patient survival. Aim of this study is to evaluate post transplant results and waiting list mortality since the introduction of MELD-based allocation.

Materials and methods:
Liver transplant patients were assessed retrospectively from 2005 -2015 using our own center as well as open access Eurotransplant data. Statistical analysis was carried out using SPSS (IBM V22.0) and Graphpad Prism 5.01.

Results:
In our department 1172 liver transplantations were performed from 2005 to 2015. The median Match-MELD at time of transplantation increased significantly from 16 to 26 (Pearson r=0.69, p= 0.019). Concomitantly, 3-year patient survival decreased from 85% in 2005 to 70% in 2012 (Pearson r=-0.78, p= 0.022). Similarly, in the Eurotransplant area the average 3-year patient survival decreased from 78% to 70%. In these years on average 57 percent of all liver transplantations in the Eurotransplant region were performed by German transplantation centers. To overcome organ shortage donor age increased from 48 to 54 during this time period. Nevertheless the number of transplantations per year dramatically decreased from 158 in 2005 to 79 in 2015 at our center. At the same time the ratio of waiting list mortality/active-listed patients increased significantly from 2007 to 2016 (Pearson r=0.69, p= 0.019), indicating an increased waiting list mortality.

Conclusion:
The combination of increasing organ scarcity and MELD based allocation may require reconsideration of the current allocation policy and the inclusion of prognostic outcome factors should be discussed.
Prophylaxis of lymphocele formation after kidney transplantation via peritoneal fenestration: a systematic review
(Abstract ID: 508)

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Background:
Lymphocele formation after kidney transplantation is a frequent complication which causes pain, secondary graft loss, re-hospitalizations and reoperations. Therefore, prophylaxis of lymphocele formation is of utmost importance. The aim of this study was to assess the effectiveness of peritoneal fenestration in renal transplantation to prevent lymphocele development.

Materials and methods:
A systematic literature search was conducted combined with hand-searches on lymphocele prevention following renal transplantation using peritoneal fenestration. A qualitative and quantitative analysis of included trials was conducted.

Results:
We identified three trials including 414 patients and 437 transplantations which studied peritoneal fenestration. Only one randomized controlled trial was identified. Critical appraisal uncovered a number of methodological flaws, predominantly in the nonrandomized studies. Most importantly endpoint definitions varied among trials, selection bias was high and interventions and follow-up were not standardized. Meta-analysis of the included trials showed a significant reduction of clinically symptomatic lymphoceles (OR: 0.23, 95% CI: 0.09-0.64, P = 0.005) and overall postoperative fluid collections (OR: 0.49, 95% CI: 0.28-0.88, P = 0.02) without a significant increase in other surgical complications.

Conclusion:
Although peritoneal fenestration is a promising technique to reduce lymphocele formation, only few studies have investigated this technique so far. Given the low methodological quality of included trials, more studies are necessary to evaluate the effectiveness and the risks and benefits of this technique.
Impact of Surgeon’s Experience on Vascular Complications after Kidney Transplantation  
(Abstract ID: 515)

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Background:
Vascular complications are of the most challenging causes of graft loss after kidney transplantation (KTx). Our objectives were to investigate the independent risk factors of vascular complications after renal transplantation and to evaluate how the surgeon’s experience affects the rate of vascular complications.

Materials and methods:
We retrospectively analyzed all KTx performed between 2000 and 2016. 1462 consecutive KTx out of 1813, operated by 42 attending general/visceral surgeons. Pediatric and multi-organ transplantations were excluded. Independent risk factors were evaluated by multivariate logistic regression analysis. The effect of the surgeon’s experience (number of KTx already performed) on reducing vascular complications was determined by receiver operating characteristic (ROC) curve analysis.

Results:
Vascular complications occurred in 38 KTx (2.6%). Renal vein thrombosis was the most common type of complication (0.6%). Graft loss occurred in 11 out of 38 (28.9%) cases. Donor age of >60 years [odds ratio (OR) 3.124, 95% confidence interval (CI) 1.422-6.868, p=0.005], recipient cardiovascular disease (CVD) [OR 2.157, 95% CI 1.025-4.541, p=0.043] and surgeon’s previous KTx experience [OR 0.835, 95% CI 0.736-0.949, p=0.006] were independent predictors of vascular complications. Vascular complications rate decreased significantly (p<0.001) from 5.3% to 1.1% after 25 transplantations (area under the curve: 0.726, sensitivity: 78.9%, specificity: 62.3%). The mean operation time correlated inversely with the number of KTx previously performed by the surgeon.

Conclusion:
The surgeon’s experience is an independent risk factor for vascular complications after KTx. Acceptable postoperative vascular complications are achieved without supervision after a minimum of 25 KTx. Since a donor age of >60 years and recipient CVD are also independent risk factors for vascular complication after KTx, we suggest that these patients should preferably be operated by surgeons who have performed more than 25 KTx.
Definition and Severity Grading of Post-Kidney Transplantation Lymphatic Complications: An International Consensus

(Abstract ID: 534)

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Background:

Post-kidney transplantation lymphatic complications (PKTLs) are one of the most common types of surgical complications after kidney transplantation (KTx). The reported incidence and associated morbidity vary considerably in the literature. This is at least in part because a universally accepted definition of PKTLs has not been established. Our aim was to propose a standardized definition of and severity grading system for PKTLs (lymphorrhea/lymphocele).

Materials and methods:

After a comprehensive literature review, a generally agreed and easy to apply definition and grading of PKTL severity was decided upon. This was provided to all members of an international consensus team from high-volume and well-known transplantation centers. The definition and grading system were discussed, revised, and the final versions were drafted.

Results:

A post-KTx lymphorrhea was defined as the outflow of more than 50 ml/day fluid after the 7th post-KTx day. Fluid should flow from the drain, the site of the removed drain, or the surgical wound and not include blood, pus, or urine. Post-KTx lymphocele was defined as fluid accumulation near to the transplanted kidney in a non-epithelialized cavity of variable size after hematoma, abscess, and urinoma have been ruled out. Three different PKTL grades (grade A, B, and C) were defined according to the management approach. Grade A PKTLs need non-invasive treatments and have minor effects on patient management. Grade B PKTLs require non-surgical interventions. For example, grade B lymphoceles can be treated with external drainage and sclerotherapy and grade B lymphorrhea can be treated with medical therapy, sclerotherapy, radiotherapy, or replacement of the drain. In the case of grade C PKTLs, surgery is inevitable and patient management is significantly affected.

Conclusion:

We propose a standardized definition and severity grading of PKTLs (lymphorrhea/lymphocele) that are easily applicable and will allow results from different clinical PKTL studies to be compared.
Technical challenges in living donor kidney transplantation - diagnosis and solutions
(Abstract ID: 547)

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Background:
Due to organ scarcity living donation is becoming a major source of kidneys for transplantation. Besides medical contraindications, anatomy of the kidneys may be a challenge for the surgeon. Multiple arteries, multiple veins, short right renal vein and ureter duplex may be considered as a contraindication for living donation. We herein describe all consecutive cases of living donor kidney transplantations carried out at our institution since October 2014 with a focus on technical challenges and the algorithm of acceptance and side preference.

Materials and methods:
Retrospective analysis of all living donor kidney transplantations from October 2014 - October 2017. Donor imaging has been carried out by multislice computed tomography with 3D reconstruction. Side selection has been based on an algorithm including 3MAG scintigraphy and anatomy. Endpoints were donor exclusion for anatomical reasons and vascular complications in the recipients.

Results:
100 living donor kidney transplants have been carried out during the time period. No single donor (0%) has been excluded for anatomical reasons. Side preference was mainly based on lower 3MAG creatinine clearance (86%) while in 14% the slightly better kidney was chosen due to anatomical reasons (multiple arteries n=10, short renal vein n=2, multiple renal veins n=2). 23 vessels had to be reconstructed backtable (multiple arteries n=15, early branching n=7, multiple veins n=1) and in 2 cases a pole artery was anastomosed to the epigastric inferior artery. Ureter duplex was found unexpectedly in one case intraoperatively. One recipient (1%) underwent surgical revision due to kinking of the renal artery with favorable outcome. No kidney was lost due to surgical reasons.

Conclusion:
Anatomical variations should not be a contraindication for living donor kidney transplantation. Microsurgical reconstruction and optimal choice of the side are crucial for favorable outcomes.
Technical aspects of liver transplantation - a survey-based study within the Eurotransplant, Swisstransplant, Scandiatransplant and British Transplantation Society networks
(Abstract ID: 610)

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Background:
Orthotopic liver transplantation (OLT) has emerged as the mainstay of treatment for end-stage liver disease. However, technical aspects of OLT are still subject of ongoing debate and are widely based on personal experience and local institutional protocols. Aim of the present study was to obtain an overview of technical aspects of OLT within the European transplant community.

Materials and methods:
In February 2017, an online-survey with 22 open-ended multiple-choice questions was sent to all centers of the Eurotransplant (ET; n=37), Swisstransplant (ST; n=3), Scandiatransplant (SCT; n=5) and British Transplantation Society (BTS; n=7) networks. The survey sought information on center-specific OLT case-load, techniques used for vascular- and biliary-reconstruction, modes of vascular reperfusion, intraoperative control of hemodynamics and usage of intra-abdominal drains. Both qualitative and quantitative methods were used for data-analysis.

Results:
After 2-months follow-up, 42/52 (81%) centers responded. Response was received within a mean of 11 days (mean 11±12 days; median 9, range 1-64 days). 67% of the responding transplant units were reporting between 25-100 OLT cases/year, meanwhile 9.5% of were high-volume centers with over 100 cases/year. 50% percent of the centers reported piggyback (PB) and 40.5% total cava-replacement (TCR) as their standard technique, respectively. No differences were found between the centers case-load and OLT-technique implemented (p = 0.19). In 48% of all centers veno-venous bypass (VVB) or temporary portacaval shunt (PCS) is not applied during OLT. VVB for TCR and PCS for PB is routinely implemented in 7%-7%, respectively. There was a significant association of center case-load and the routine or occasional use of VVB or PCS (vs. no shunt p = 0.04). Portal vein first reperfusion is used in 64.3%, followed by simultaneous portal vein and artery (16.7%), and retrograde reperfusion (11.9%). There was a homogenous distribution concerning the use of intraabdominal drains. 45%-45% of the respondents reported they preference for open-circuit and close-circuit abdominal drains, respectively, however, 10% of the centers are using a rather strict drain policy and using intra-abdominal drains only in selected cases. End-to-end choledocho-choledochostomy without biliary drain (86%) was the most common performed method of biliary reconstruction. 88% percent of the respondents believe that the above-detailed technical issues of OLT are not evidence-based and 98% would participate in randomized controlled trials (RCT).

Conclusion:
On behalf of the whole study group (42 European transplantation centers) we can conclude that techniques of OLT vary widely among European centers. Well-designed multicenter RCTs are needed.
Liver transplantation allocation algorithm based on major Extended Donor Criteria
(Abstract ID: 655)

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Background:

Donor age >65 years, biopsy proven macrovesicular steatosis (BPS) >40%, and cold ischemia time (CIT) >14 hours are major EDC (maEDC) that decrease short- and long-term graft survival, and long-term patient survival after liver transplantation (LT). We aimed to analyze the impact of maEDC in combination with different labMELD-scores on post-LT outcome and examine the plausibility of a maEDC-based allocation algorithm.

Materials and methods:

All consecutive LTs (n=465) since December 2006 were included in the study. We considered the graft to be good if none of the maEDC (donor age >65y, BPS >40%, CIT >14h) were present, whereas grafts with >=1 maEDC were considered to be marginal. Patients with labMELD score >=20 were considered to be recipients at high risk, and those with labMELD score <20 were considered as recipients at low risk. We compared the groups as follows: group A (good graft-to-low risk recipient; n=122); group B (good graft-to-high risk recipient; n=89); group C (marginal graft-to-low risk recipient; n=156); group D (marginal graft-to-high risk recipient; n=85). Graft failure and mortality rates were analyzed and differences between the groups were compared.

Results:

We observed lowest graft failure rates at 90 days, 1 year, and 5 years post-LT in group A, and highest in group D (p=0.009, 0.040, and 0.010 adequately). Similarly, the highest 5-year patient mortality rate was that of group D (16.5%), and the lowest was that of group A (4.9%) (p=0.042). Overall 5-year graft survival was significantly higher in recipients at risk (labMELD >=20) who were transplanted with grafts with one maEDC compared to recipients at risk who received organs with two maEDC (p=0.034), whereas no significant difference was observed in low risk patients (labMELD <20) who received grafts with one or two maEDC (p=0.140). Overall 5-year patient survival didn’t differ between high risk recipients (labMELD >=20) transplanted with grafts with one and two maEDC (p=0.464). Similarly, no survival difference was observed in low risk recipients (labMELD <20) who received grafts with one or two maEDC (p=0.165).

Conclusion:

Allocation algorithm based on maEDC is plausible and necessary as it may improve post-LT outcome. We suggest that donor organs with one maEDC could be allocated to recipients with labMELD >=20, whereas grafts with two maEDC should be preferably allocated to recipients with labMELD <20 or to oncologic patients. Grafts with three maEDC might be preferred for carefully selected oncologic patients with hepatocellular cancer, cholangiocellular cancer, colorectal liver metastases or neuroendocrine tumors in rigorously controlled clinical trials.
Influence of complications on the outcome after pancreas transplantation
(Abstract ID: 680)

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Background:
Pancreas transplantation (PT) shows a higher rate of complications compared with other organ transplantations. Graft thrombosis and intraabdominal infections are the most common causes for relaparatomy. We analyzed the influence of complications on the organ function after PT.

Materials and methods:
145 pancreas grafts were transplanted between 01/2010 and 12/2015 at the Knappschaftskrankenhaus Bochum with 132 simultaneous pancreas-kidney transplantations, 5 isolated pancreas transplantations and 8 pancreas after kidney transplantation. Out of this, 16 were retransplantations. A further analysis was done for 132 cases.

Results:
Complications occurred in 72 of 132 patients (54,55%). Pancreatitis (n=53), pancreatic fistulas (n=33) and postoperative bleeding (n=24) were most commonly observed. A relaparatomy was required for every third patient, mainly because of infectious reasons as abscess and pancreatitis. 22 pancreas transplants and 14 kidney transplants lost their function shortly after transplant. Until 05/2017 68,18 % of the pancreas and 78,03 % of the kidney transplants were full functional. Complications had a significant influence on the organ function after PT (p=7.046e-05). Operative revision (p=0,0009), pancreatitis (p=0,0114), bleeding (p=0,0045) and graft thrombosis (p=0,0054) showed statistical significant influence on the pancreas graft function after transplantation. Rejection (p=0,1778) , pancreatic fistulas (p = 0,0843) and CT-drainage (p=0,8088) demonstrated no further influence. Our data showed no correlation between the occurrence of complications and donor or recipient variables (e.g. BMI, age). Neither had the ischemia time nor the operation duration or the presence of positive germ wraps any significant influence.

Conclusion:
Complication rates are still high in PT and affect the function of the pancreas graft significant. Strategies to reduce postoperative pancreatitis and infections need to be further investigated.

(Abstract ID: 691)

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Background:

Liver transplantation causes inevitably hepatic ischemia/reperfusion (IR) leading to hepatocellular injury and compromised liver function. Key pathways in ischemia/reperfusion injury (IRI) are initiated by oxidative stress, anaerobic metabolism and acidosis inducing apoptosis, immune responses and cytokine regulations, all resulting in cellular damage. None of the previously explored strategies to prevent or reduce IRI was implemented widely into clinical routine. Therefore, a novel method for controlling IRI is needed to improve postoperative outcome. Nigella sativa (Family Ranunculaceae) has a long tradition as a natural remedy. In the essential oil, Thymoquinone (TQ) was defined as the main component and responsible for most of the therapeutic properties. Current studies reveal its broad array of potential therapeutic effects with hepatoprotective properties. Toxicity studies have confirmed the safety of TQ, especially in oral administration. Therefore, this systematic review aimed to explore the mechanisms of N. sativa and its potential suitability for reduction of IRI.

Materials and methods:

The keywords "liver" and "TQ" were used to select the in-vivo studies analyzing the effect of TQ in hepatic diseases. The main properties of TQ - each forming one group - were defined and the described mechanisms were sorted into the according group.

Results:

The search disclosed a total of 92 articles containing the keywords liver and TQ with 36 of them meeting our selection criteria. Most studies were conducted on liver toxicity models. Experiments were performed in rats, mice and rabbits using a wide range of doses (0.5 mg/kg/day to 100 mg/kg/day). The key findings can be summarized as TQ having a strong antioxidant, anti-inflammatory, anti- and pro-apoptotic, anti-fibrotic and anti-carcinogenic effect. Only in one study side effects were reported irrespectively of the large dose range, suggesting a wide therapeutic window.

Conclusion:

The described strong anti-inflammatory and anti-oxidative effect together with very low side effects give rise to the expectation that TQ could evolve to a novel powerful drug to prevent/reduce IRI. Therefore, a clinical trial analyzing the outcome of TQ treated patients after/before IRI is necessary.
The combined liver and kidney transplantation in case of polycystic liver and kidney disease - First clinical results of a modified operation technique in comparison to the standard technique (Abstract ID: 735)

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Background:

The indication for combined liver and kidney transplantation (cLKTx) is based on non-reversible chronic liver and kidney dysfunction. The common reason for combined liver and kidney failure is the polycystic liver and kidney disease (PCKLD), mostly due to the dysregulation of PDK-1 gene. Another indication for cLKTx is the end-stage kidney dysfunction in combination with an end-stage liver failure, based on nutritive toxic or viral aetiology. The cLKTx in patients with PCKLD is always a major challenge due to the huge volume of sick liver and kidney organs. Here we introduce a new modified operation technique for orthotopic liver and kidney transplantation (mLKTx) for patients with PCKLD.

Materials and methods:

The retrospective data analysis includes 13 patients with liver and kidney dysfunction who received a cLKTx at the Jena University Hospital in the period between 2004 and 2017. Nine patients underwent a cLKTx through standard operation technique (Group A) using two separate surgical incisions. The orthotopic liver transplantation with cava-interposition was done first followed by the heterotopic kidney transplantation (hLKTx) in the iliac fossa. In this technique, the vascular anastomoses of the kidney graft were created on the iliaca vessels. Another four patients with PCKLD (Group B) presenting large liver and kidney volumes underwent a mLKTx. During preparation, a right nephrectomy was performed followed by orthotopic liver transplantation with cava-interposition. After liver reperfusion, the right-sided kidney transplantation was performed. The venous anastomoses are established between the inferior caval vein and the renal vein of the donor. The arterial blood flow originates from the common iliac artery. The reconstruction of the ureter an end-end uretero-ureterostomy.

Results:

The mean age of patients in Group A is 53.78 (± 7.74) years at the time of transplantation. In comparison patients from Group B are 53.25 (± 2.99) years old at time point of mLKTx. The aetiology of terminal liver disease in Group A is traced back to virus infection (3 patients), nutritive toxic genesis (2 patients), gene mutation (3 patients) and autoimmune disease (1 patient). The Standard-Exceptional-MELD average (Budd-Chiari-like-syndrome) is 30 points for Group B. The mean lab-MELD score of patients in Group A is 24 points. The operation time for hLKTx and mLKTx is comparable (Group A: 350 (±107.44) minutes, Group B: 315 (±74.59) minutes). Both Groups stay approximately 30 days in hospital after cLKTx. In histopathological examination, the explanted liver weight of patients in Group B (4320.00 g ± 568.74) is significantly higher (p<0.05) compared to Group A (2201.44 g ± 1660.26). Six months after cLKTx, the long-term organ function is similar in both groups.

Conclusion:

We present a new mLKTx technique for patients suffer from PKLKD with huge liver and kidney volumes. This technique allows a combined transplantation by a single incision resulting in less surgical trauma. The organ function in long time follow-up is comparable with the standard operation technique. To sum up, this technique could be an alternative transplantation method for patients with the need for a combined liver and kidney transplantation.
Understaffed and Overworked? - Possible Effects of Weekend and Night-time Work on Outcomes in Liver Transplantation -
(Abstract ID: 744)

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Background:
One of the undisputed dogmas of transplant medicine is the reduction of cold ischemia time by any means. Therefore, procedures such as orthotopic liver transplantation (oLT) are often performed during off-hours, such as on weekends or late at night. It is now recognized that the outcome for various time-sensitive or emergency conditions (e.g. stroke) show an association between weekend hospital admissions (“weekend effect”) or night-time procedures (“midnight effect”) and increased rates of morbidity and mortality. However, it remains unclear if a weekend effect or midnight effect might affect outcomes after oLT.

Materials and methods:
We retrospectively analyzed all oLTs at our center between January 2006 and June 2016 and divided the patients into the following groups: a) weekend (WE: Saturday+Sunday) and weekday (WD: Monday-Friday) as well as b) midnight (MN: 6pm-6am) and midday (MD: 6am-6pm). The follow up time was 12-months and we assessed one-year patient and graft survival, biopsy proven acute rejections (AR), primary non-function (PNF), surgical complications requiring re-operation, length of stay and number as well as length of re-admissions.

Results:
We identified 306 oLT patients, of which 76 (24.8%) patients received a liver graft on a weekend and 230 (75.2%) during the week. Of all oLTs, 130 (42.5%) were conducted at MN and 176 (57.5%) on MD. Co-founders such as age, gender, indication for oLT, cold and warm ischaemia time, MELD score, high-urgency allocation or time on waiting list were all similar between WE and WD as well as between MN and MD. One-year patient (WE: 72.4% vs. WD: 75.7%, p=0.481; MN: 71.5% vs. MD: 77.3%, p=0.282) and graft survival (WE: 65.8% vs. WD: 73.0%, p=0.183; MN: 70.0% vs. MD: 72.2%, p=0.779) were also similar between the groups. Frequencies of PNF (WE: 11.8% vs. WD: 7.0%, p=0.225; MN: 6.2% vs. MD: 9.7%, p=0.298) and AR (WE: 21.1% vs. WD: 14.3%, p=0.206; MN: 16.9% vs. MD: 15.3%, p=0.754) were comparable between the groups. Complications requiring re-operations as well as re-transplantations within the first-year after oLT (WE: 11.8% vs. WD: 8.7%, p=0.497; MN: 7.7% vs. MD: 10.8%, p=0.432) were also similar.

Conclusion:
In conclusion, we did not observe a weekend or midnight effect on neither short-term outcomes nor surgical complications nor on one-year allograft and patient survival after oLT in our center. This could be due to standardized transplant procedures, qualified nursing staff and specialized transplant teams available locally 24/7.
Intraoperative arterial flow rate after reperfusion is a predictive parameter for primary function in kidney transplantation

(Abstract ID: 749)

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Background:

Primary graft function after kidney transplantation is influenced by multiple parameters like graft age and quality, ischemia time, morbidity of the recipient, surgical problems etc.. Up to date, there is no quantitative parameter to be prognostic for primary graft function. Aim of study was to investigate the role of intraoperative arterial blood flow measurement after reperfusion to predict primary graft function.

Materials and methods:

Intraoperative arterial blood flow (IABF) measurement was performed by a standardized method with a Medistim device. Primary graft function was evaluated by creatinine measurement and calculation of the glomerular flow rate (GFR) at discharge. Further parameters to be assessed included ischemia time, vascular resistance, age, graft quality and age. Correlation analysis, student’s t-test and multivariate analysis were used for statistical calculation.

Results:

IABF was measured in 221 patients. Mean IABF was 236,9 ml/min (SD 146). Mean GFR was 43,5 ml/min/1,73m2 (SD 15). 163 / 221 patients showed primary urine production (73,8%). IABF correlated with GFR (p<0.006) and creatinine (p=0.034) at discharge. Further significant correlations were found for ischemia time and recipient age. Interestingly, there was no correlation between IABF and primary urine production.

Conclusion:

IABF was found to be a prognostic parameter for primary graft function in kidney transplantation. Therefore, IABF measurement could be of great value for interpretation of the postoperative course of patients with kidney transplantation.
Hospitalization and life support before liver transplantation – easily available predictors for post-transplant patient survival
(Abbreviation: Abstract ID: 761)
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Background:
According to the German law of transplantation (Tx) organ allocation should be based on urgency and prospect of success. Unfortunately no outcome predictors have been implemented for liver allocation to date. Aim of this study was to analyze the prognostic value of hospitalization prior Tx, pre-operative life support and the duration thereof for transplant outcome.

Materials and methods:
The electronic record system of the Charité - Berlin was analyzed for all patients who underwent liver transplantation from 2005 to 2016 for hospitalization and life support before Tx. Life support was defined as dialysis accordingly to ET Liver Allocation system, mechanical ventilation and need of catecholamines.

Results:
From 1244 liver transplant recipients in this era, 264 underwent transplantation coming from an intensive care unit (ICU) (group 1), 178 patients from a regular ward (group 2) and 802 from home (group 3). Of all recipients 187 required dialysis, 123 ventilation and 101 were under catecholamine therapy. A group of 57 patients was treated with all three mentioned.

Patients coming from the ICU were significantly younger but sicker according to their higher labMELD at day of transplantation. Not surprisingly these patients had a significant lower 3 months, 1 year and 3 year survival compared to patients coming from home (ICU vs. home: 76,9% vs. 94,4% and 65,9% vs. 87,5% and 64,4% vs. 82,4%, all p=0,000).

Differences between patients from group 1 and 2 showed no significance, not even for short term survival (3 month: 76,9% vs. 84,3%, p=0,057), decreased over time and did not have an influence on 1- and 3 year survival (1 year: 65,9% vs. 71,9%, p=0,132; 3 year: 64,4% vs. 65,2%, p=0,556).

Subgroup analysis revealed that the length of ICU stay prior to Tx had a significant impact on patient survival if longer than 6 days (1-6 days vs. 7-14 days: 1 year p=0,036). Remarkably no changes between 7-14 days or >14 days could be noticed.

Interestingly survival of patients with six or fewer days spent on ICU before Tx was comparable to patients transplanted from a regular ward (ICU 1-6 days vs. regular ward; 3 months: 83,6% vs. 84,3%, p=0,814; 1 year: 74,2% vs. 71,9%, p=0,809; 3 year: 71,9% vs. 65,2%, p=0,359).

The median post-transplant ICU stay of patients transplanted from the ICU was three times higher than of patients transplanted from home and also the total median length of stay was significantly longer.

Dialysis prior to Tx was associated with an inferior outcome compared to patients without renal placement (3 year: 56,1% vs. 79,7%, p=0,000). These results remained significant even for patients receiving only dialysis and no other life support therapy whereas ventilation or catecholamines alone did not influence survival. There were no significant differences between the pre-operative labMELD of
these three groups. However, recipients with ventilation and catecholamines showed similar results as patient with dialysis only (3 year: 61.3% vs. 60.6%, p=0.890). Patients with the triad of dialysis,

ventilation and vasopressor therapy had the worst outcome with a 3 year patient survival of only 47.4% compared to 80% of patients without life support (p=0.000). This subgroup also had the highest pre-operative labMELD and the longest postoperative stay both on ICU and total in-hospital.

**Conclusion:**

Hospitalization status as well as life support before transplantation are valuable predictors for patient survival following liver transplantation and should be considered for the allocation process.
Liver Transplantation for Alcoholic Hepatitis: Systematic Review and Meta-analysis

(Abstract ID: 898)

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Background:

Early liver transplantation (LT) to rescue patients with severe alcoholic hepatitis unresponsive to medical therapy remains controversial. Furthermore, recent studies questioned the role of the required six-month alcohol abstinence prior to transplantation. The aim of this review is to gain evidence on liver transplantation (LT) in patients with acute alcoholic hepatitis regarding overall survival and alcoholic relapse compared to control.

Materials and methods:

Any study type comparing patients with alcoholic hepatitis undergoing LT with a control group was included. CENTRAL, MEDLINE and Web of science were searched. Meta-analyses were performed with a random-effects model calculating odds ratio (OR) with 95% confidence intervals at a level of significance of 5%.

Results:

We identified nine studies. For them two different meta-analyses were performed. In two studies early LT for patients with severe alcoholic hepatitis not responding to medical therapy were compared to medical therapy, the six-month patient survival (OR 15; P<0.00001) and one-year patient survival (OR 5.9; P=0.001) were significantly higher in the transplantation group. Seven studies compared LT for patients with alcoholic hepatitis failing the 6-month abstinence with LT for alcoholic liver disease without acute hepatitis. One-year survival (OR 1.4; P=0.15), three-year survival (OR 1.5; P=0.08) and five-year survival (OR 1.4; P=0.15) was not different between the groups. Alcohol relapse was also not significantly different in groups (OR 1.9; P=0.08).

Conclusion:

Early LT should be considered as a life-saving treatment for selective patients with alcoholic hepatitis not responding to medical therapy. The quality of evidence is moderate and based on the results of two prospective case-control studies. Future randomized controlled trials taking into consideration long time survival and alcohol relapse are needed to ensure comparability and effectivity of results.
Retrospective analysis of microbiologically verified severe course of Clostridium difficile infections over 16 years
(Abstract ID: 33)

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Background:
Adverse events resulting from a C.difficile infection are rare, but their consequences are often disastrous. The aim of the study was to evaluate the outcome over 16 years for this patient population.

Materials and methods:
Patients suffering from pancolitis, pseudomembranous colitis or toxic megacolon with a microbiologically verified C.difficile infection at the University Clinic of Surgery in Vienna between 2001 and 2017 were included in the retrospective analysis.

Results:
A total of 35 patients were identified. fifty-four percent were female; mean age was 69.7 years (range: 24.6-89.2). Twenty-five patients (71.43%) died because of a complication directly associated to the C.difficile infection. The median survival time after diagnosis of C.difficile was 11.5 days (range: 0-84).

Within the non-survivors (25/35), the median time between diagnosis of C.difficile and appearance of a complication was 3 days (range: -2-32). In 16.0% (4/25) the complication occurred prior to the diagnosis. Acute surgery was performed in 48.0% (12/25); the median time between complication and surgical intervention was 2 days (range: 0-15).

Within the survivors (10/35), the median time between diagnosis of C.difficile and appearance of a complication was 0 days (range: -4-27). In 33.3% (3/10) the complication occurred prior to the diagnosis of C.difficile. Acute surgery was performed in all (10/10) patients that survived. The median time between complication and surgical intervention was 0 days (range: 0-3).

Conclusion:
This retrospective evaluation illustrates that patients suffering from complications of C.difficile infections have a greater chance of survival if aggressive surgery is done at onset of complications.
Right- vs. left-sided metastatic colorectal carcinoma: Differences in prognosis after primary tumor resection
(Abstract ID: 61)

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Background:
The differences in prognosis between right- and left-sided colorectal carcinomas are currently an important topic in the treatment of metastatic colorectal carcinoma.

Materials and methods:
We analyzed the data of 937 patients with stage IV colorectal carcinoma who had primary tumor resection (CME or TME/PME) between 1985 and 2014. Carcinomas in the cecum to transverse colon were defined as right-sided (n=249; 26.6%) and carcinomas in the splenic flexure to rectum were categorized as left-sided (n=688; 73.4%). A curative resection (n=304; 32.4%) was defined macroscopically and included R0 and R1 resections as well as patients with radio frequency ablation or cytoreductive surgery in curative intent (RX). We compared three ten-year periods: 1985-1994, 1995-2004, and 2005-2014.

Results:
From 1985-1994 to 2005-2014, the number of patients with M1c (metastases to the peritoneum +/- others, UICC 2017) increased (12.7% vs 24.2%; p=0.006), more patients received multimodal treatment (17.2% vs 86.7%; p<0.001) and/or interventional procedures. Also the number of curative resections increased (30.9% vs 40.3%; p<0.001).

In right-sided carcinomas we observed more female patients (51.0% vs 36.2%; p<0.001), more M1c carcinomas (32.1% vs 14.4%; p<0.001) and more emergencies (11.6% vs 7.1%; p=0.027) while multimodal treatment was given in fewer patients (51.4% vs 63.8%; p=0.001) and curative resections were less frequently (18.5% vs 30.8%; p=0.001).

Prognosis was significantly worse in patients with right-sided carcinomas (2-year survival 26.9% vs 44.7%, p<0.01). This difference was more pronounced after R2 resection (15.3% vs 29.6%; p<0.001), than after macroscopic curative resection (2-year survival 63.3% vs 72.0%; p=0.062). In multivariate Cox regression analysis, the localization of the primary tumor was found to be an independent prognostic factor for overall survival in metastatic colorectal carcinoma.

Table:

<table>
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<th>n</th>
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<th>(95% CI)</th>
<th>5-year survival</th>
<th>(95% CI)</th>
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<tr>
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<td>249</td>
<td>26.9</td>
<td>(21.4-32.4)</td>
<td>9.4</td>
<td>(5.7-13.1)</td>
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<tr>
<td>Left colon</td>
<td>688</td>
<td>44.7</td>
<td>(41.0-48.4)</td>
<td>17.8</td>
<td>(14.9-20.7)</td>
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<tr>
<td>Right colon R0,1,X</td>
<td>60</td>
<td>63.3</td>
<td>(51.1-75.5)</td>
<td>37.9</td>
<td>(25.2-50.6)</td>
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<tr>
<td>Left colon R0,1,X</td>
<td>244</td>
<td>72.0</td>
<td>(66.3-77.7)</td>
<td>44.9</td>
<td>(38.4-51.4)</td>
<td>0.062</td>
</tr>
</tbody>
</table>
Overall survival in right- and left-sided metastatic colorectal carcinoma

Conclusion:

In a surgical patient cohort with primary tumor resection, significant differences in prognosis between patients with metastatic right- and left-sided colorectal carcinomas were observed in univariate and multivariate analysis. This is important for multimodal treatment planning.

Picture:

![Graphs showing overall survival in right- and left-sided metastatic colorectal carcinoma](image-url)
How does tumor site affect oncological outcomes? - A high-quality population-based analysis comparing laparoscopic vs. open colon cancer surgery from Germany. (Abstract ID: 171)

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Background:
Over 20 years after the introduction of laparoscopic surgery for colon cancer many surgeons still prefer the open approach. In the past decades several high-quality RCTs mostly conducted in specialized hospitals proofed the oncological safety of laparoscopy. Observational studies are the only way to examine the validity of these findings in daily clinical practice. Unfortunately most retrospective surveys suffer from poor data quality and inadequate handling of missing data.

Materials and methods:
Data was retrieved from an official German district cancer-registry (Tumorzentrum Regensburg, member of ADT), which collects medical records of all malignant tumors diagnosed within a political district of 1.1 million inhabitants. Details on each patient include demographics, tumor-characteristics, surgical procedure, adjuvant treatment, oncological comorbidities, complications and long-term outcomes. Information on every single item is nearly complete with e.g. only 6% missing data on surgical approach. Included were all patients with major elective resection of non-metastatic colorectal adenocarcinomas between 01.01.2004 and 31.12.2013. In order to compare survival rates in patients with laparoscopic vs. open resection Kaplan-Meier and Cox-regression analysis were used. A 90 days cut-off time to eliminate the effect of perioperative mortality was applied, since focus of this study is on long-term oncological outcome. Sensitivity analysis was performed to quantify potential selection bias.

Results:
Among 2518 included patients, 14.9% received laparoscopic procedures. The highest share of laparoscopic resections was seen among tumors located in the Sigma (36.8%). After 5 years 82.8% of laparoscopic Colon patients compared to 75.3% in the open group (p = 0.047) were still alive. Examining the different types of resections separately, one can observe significant survival benefits after laparoscopic right hemicolecotomies (5-year overall survival rate, open vs. laparoscopic: 74.0% vs. 86.5%, p = 0.044) and Sigma-resections (5-year overall survival rate, open vs. laparoscopic: 70.4% vs. 80.9%, p = 0.006). Having adjusted for potential confounders, laparoscopy still is associated with superior or at least equivalent overall survival, although significance level is not reached anymore.

Conclusion:
As one of few high-quality observational studies on the topic we can confirm the oncological safety of laparoscopic colorectal cancer surgery in daily clinical practice. Overall survival rates in both approaches are at least comparable, regardless in which part of the colon a resection is performed.
How does tumor site affect oncological outcomes? - A high-quality population-based analysis from Germany comparing laparoscopic vs. open rectum cancer surgery.

(Abstract ID: 172)

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Background:

An increasing number of rectum carcinoma resections are performed laparoscopically. Many surgeons still prefer the conventional approach, although prospective studies proofed the oncological safety of laparoscopy. It is yet unclear if these findings can be transferred to daily clinical practice.

Materials and methods:

The aim of this population-based retrospective cohort study is to evaluate 5-year local recurrence free survival after open and laparoscopic resections of rectal cancer. It was conducted in a southern German region of 1.1 million inhabitants. Data was collected by an official clinical cancer registry (Tumorzentrum Regensburg) and includes information on demographics, tumor-characteristics, surgical procedure, perioperative therapy and oncological comorbidities. All primary non-metastatic rectum adenocarcinoma cases with major surgery between January 1st, 2004 and December 31st, 2013 were included. Information on every single item is nearly complete with e.g. only 5.5% missing data on surgical approach. To compare survival rates, Kaplan-Meier analysis and multivariate Cox-regression were used. A 90 days cut-off time to eliminate the effect of perioperative mortality was applied in all multivariate models. Selection bias is quantified by a sensitivity analysis.

Results:

1507 patients with a median follow-up time of 7.1 years were included. Among all patients 28.4% received laparoscopic procedures, with an increasing rate over time. Patients with tumors of the upper or middle rectum, younger patients and patients of specialized hospitals had a higher chance of laparoscopy. Laparoscopy was followed by superior local recurrence-free survival rates. This advantage was also significant in multivariate analysis (HR = 0.70, CI: 0.52 - 0.92). Stratifying for localization, significant survival benefits after laparoscopic resections in the upper rectum (5-year local recurrence-free survival rate, open vs. laparoscopic: 70.6% vs. 84.3%, p = 0.001) and the lower rectum (5-year local recurrence-free survival rate, open vs. laparoscopic: 71.6% vs. 85.0%, p = 0.015) were observed. This advantage remained stable after adjustment for potential confounders, and reached significance level for tumors in the upper rectum (HR: 0.580; CI: 0.359 - 0.935).

Conclusion:

Presenting one of the first high-quality observational studies on the topic the oncological safety of laparoscopic colorectal cancer surgery in daily clinical practice can be confirmed. More studies outside the setting of a randomized trial have to be conducted in future to confirm this insight.
Laparoscopic resection rectopexy - a standard procedure in patients with rectal prolapse or pelvic floor syndromes  
(Abstract ID: 188)

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Background:

In the operative treatment of rectal prolapse and pelvic floor syndromes, laparoscopic approach has become a standard procedure in most centres. Laparoscopy offers not least advantages in terms of cosmetic results, which is particularly appreciated by the patients. The results of the minimally invasive procedure are comparable with the open procedures. The technique of resection rectopexy performed standardized in our clinic is presented in the video.

Materials and methods:

The laparoscopic operation is performed in a lithotomy position and in a general anesthesia, a 4-trocar laparoscopy with a camera approach is performed above the navel. The left hemicolon and sigma are mobilized to the left flexure on the gerontafasia, the flexure is retained as a suspension. The rectum is mobilized dorsally and ventrally of the mesorectum completely down to the muscular pelvic floor, the laterally irradiating nerve fibers and vessels are preserved. Finally the sigma is dissected next to the intestinal wall with maintenance of the superior rectal artery, and the rectum is interrupted in the upper third. The length of resection is chosen so that, after the anastomosis, the colon runs straight from the flexure into the small pelvis, without any relevant tension. After the anastomosis, the mobilized and elevated rectum is pexed by a modified rectopexy after Sudeck with continuous suture to the lateral peritoneum in the small pelvis.

Results:

In our patients laparoscopic resection rectopexy has become a standard procedure with good mid-term and long-term results. Patients benefit from this procedure and show improvement of their quality of life.

Conclusion:

Laparoscopic resection rectopexy should be a gold standard in patients with rectal prolapse and pelvic floor syndromes.
Successful reduction of local recurrence rates in low rectal cancer by MRI Staging system: long term results of the prospective multicenter MERCURY II Study

(Abstract ID: 202)

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Background:

Low rectal cancer (LRC) is technically and oncologically challenging with higher risks of local recurrence and even in the TME era sometimes reported to be between 10 - 20 %. The key factor in reducing local recurrence is a negative pathologic circumferential resection margin (pCRM). The LRC MRI staging system has been developed and prospectively validated to predict a clear pCRM and select the appropriate multidisciplinary and surgical approach. Herein we report the long term outcomes of the MERCURY II study.

Materials and methods:

Between 2008 and 2012, consecutive patients with adenocarcinoma <= 6 cm from the anal verge were approached and recruited after informed consent from 14 European Centers. Tumors were assessed clinically, by rigid rectoscopy and by high resolution MR imaging using a predefined protocol. Further management was tailored according to the MRI low rectal plane (mrLRP) which combines the relationship of the tumor to the mesorectal fascia (above the puborectalis sling) and the intersphincteric plane. If the mrLRP was infiltrated by the tumor, management was tailored accordingly, including preoperative (neoadjuvant) radio(chemo)therapy, extralevator abdominoperineal resection or multivisceral resection when indicated. All data was collected prospectively and follow-up included regular clinical investigations, CEA level measurements and imaging. Cumulative local recurrence rates were calculated with the Kaplan-Meier product limit method as were disease free (DFS) and overall (OS) survival.

Results:

After exclusion of patients with tumors > 6 cm and patients who did not undergo surgery for the primary tumor there remained 294 patients (65 % males, median age 64 (56 - 72) years) for further evaluation. Mean distance from the anal verge was 3.7 (+/- 1.6) cm. Neoadjuvant Radio(chemo)therapy was administered in 62 %. Type of surgery was abdominoperineal excision (APE) in 51 % and low anterior resection (LAR) in 45 %. Median follow-up was 5.7 (IQR 5.0 - 6.6) years. Local recurrence occurred in 6 % at 5 years and was not different between patients who underwent a LAR (6%) or APE (6%). DSF and OS amounted to 63 % and 70 % at 5 years.
Conclusion:

This study reports a marked improvement of local recurrence rates for LRC. MRI based management with a dedicated protocol assessing the mrLRP results in local recurrence rates that are comparable to those of mid rectal cancers. Of note, LR rates for APE were not inferior to LAR which suggests that modern APE techniques improve outcome of advanced LRC.
Safety of extraperitoneal rectal resection and ileo- or colorectal anastomosis without loop ileostomy in patients with peritoneal metastases treated with CRS and HIPEC
(Abstract ID: 225)

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²AKH Celle, Celle

Background:
Extraperitoneal rectal resection combined with complete peritonectomy of the pelvis in patients with peritoneal metastases is associated with a high rate of morbidity and mortality due to anastomotic leakage. Therefore, many centers tend to perform loop ileostomy to reduce the clinical impact of anastomotic leakage.

Materials and methods:
We analyzed 53 patients who underwent extraperitoneal rectal resection from 409 consecutive patients treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) at our department between January 1997 and December 2016. Clinical parameters and morbidity and mortality rates were evaluated.

Results:
Mean age of the patients was 56.7 (SD 12.2) years and the median Peritoneal Cancer Index was 24.6 (SD 12.0). Complete cytoreduction was achieved in 33 patients (62.3%). HIPEC was mainly performed using the closed technique (48/53) for 60 min and 42°C. Six patients received an ileo- or colostomy, 5 of 6 with permanent intention. No patient developed anastomotic leakage postoperatively. Overall, 21 patients (39.6%) developed surgical complications, while 41 (77.3%) developed medical complications. The mortality rate was 7.5% (n = 4). In total, 26 patients (49.1%) developed Clavien-Dindo class-III/IV complications.

Conclusion:
These results demonstrate the safety of colorectal anastomosis in combination with HIPEC in the absence of loop ileostomy. The complications of stoma and its reversal can be avoided using a safe anastomotic technique, thereby increasing the quality of life in patients with peritoneal metastases. We recommend stoma creation for patients at a high risk for anastomotic leakage or in whom a second suture line is not feasible.
Transabdominal pouch pexy techniques for pouch prolapse after restorative proctocolectomy and j-pouch – review of the current evidence and first report of a laparoscopic ventral pouch pexy with acellular dermal matrix (ADM)

(Abstract ID: 305)

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Background:

Ileal pouch prolapse is a rare complication after restorative proctocolectomy and j-pouch formation with an incidence of about 0.3%. However, if a pouch prolapse occurs, it can be a debilitating complication for the patient causing severe physical and psychological strain. Whereas mucosal prolapse often responds to conservative treatment, full-thickness pouch prolapse usually warrants surgical repair.

Materials and methods:

1. Systematic review of the current evidence from the literature on transabdominal pouch pexy techniques for full-thickness pouch prolapse. 2. First description of a laparoscopic ventral pouch pexy with acellular dermal matrix (ADM) in a 30 year old female patient who had undergone restorative proctocolectomy and j-pouch for familial adenomatous polyposis (FAP).

Results:

There is a paucity of evidence on surgical repair techniques for full-thickness pouch prolapse. The available literature consists exclusively of small retrospective case series (number of patients operated for pouch prolapse <10 per series), a comprehensive survey among members of the American Society of Colon and Rectal Surgeons (which revealed 52 patients with full-thickness pouch prolapse who underwent surgical repair), and a few case reports. At our institution, we performed one case of laparoscopic ventral pouch pexy with acellular dermal matrix (ADM) without any intraoperative complications via only 4 trocar incisions (1x 10mm, 1x 12.5mm, 2x 5mm). Operation duration was 249 minutes. A 4x16 cm acellular dermal matrix (ADM) was sutured to both levators, to the pouch (ventrally and dorsally), to the promontory, and to the cranial vaginal pole. The postoperative course was uneventful except for a higher stool frequency which could be managed conservatively. The patient was discharged on POD 9. Since then the patient has been symptom free without any sign of recurrence.

Conclusion:

Since pouch prolapse is an uncommon complication after j-pouch formation, the available evidence is scarce and of limited quality. Laparoscopic ventral pouch pexy with acellular dermal matrix (ADM) performed by a surgeon experienced in laparoscopic pouch surgery is an innovative and promising treatment option in patients with pouch prolapse.
Improved quality of colon cancer surveillance after implementation of a personalized surveillance schedule
(Abstract ID: 374)


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2Kantonsspital Olten
3Spitalzentrum Biel/Bienne
4Kantonsspital St. Gallen

Background:

Patients operated for colon cancer are at risk for disease recurrence. Consistent surveillance is highly recommended as early detected disease recurrence might be curable. We previously reported inadequate quality of surveillance among a Swiss cohort of patients with colon cancer (Ann Surg Oncol. 2010 Oct;17[10]:2663-9). The poor results lead to the introduction of a personalized surveillance schedule. The present study reassesses the quality of surveillance nine years after implementation of a personalized surveillance schedule and quantifies its efficacy.

Materials and methods:

Patients undergoing curative surgery for colon cancer between January 2009 and December 2014 were included in this prospective single center cohort study. All patients and involved doctors received a surveillance schedule individualized according to the national surveillance guidelines, recommending periodic measurement of carcinoembryonic antigen (CEA) levels, computed tomography (CT) and colonoscopy. All patients included gave written informed consent. Compliance to surveillance was compared with the national guidelines.

Results:

A total of 93 patients were included in this study. Median follow-up was 46.9 months (inter quartile range [IQR] 25.3-59.7 months). Twenty patients (21.5%) had disease recurrence. Three-year overall and disease-free survival were 89.0% and 79.5%, respectively. Compliance to periodic measurements as recommended by national guidelines was for CEA measurements 76.1%, for CT-scan 74.2% and for colonoscopy 71.8%. Forty patients (43%) received adjuvant chemotherapy. No difference in compliance was detected between patients with and without adjuvant chemotherapy (p=0.185). Before implementation of the personalized surveillance schedule compliance with CEA measurements, CT-scan and colonoscopy was 32.8%, 31.7%, and 23.8%, respectively.

Conclusion:

The quality of surveillance after curative colon cancer resection increased considerably with the implementation of a personalized surveillance schedule. This study shows that awareness of patients and health care professionals regarding the effect of potential life-saving benefits from surveillance increases with a simple measure.
Acute intestinal ischemia: successful early stoma take down is a good prognostic indicator for long-term survival  
(Abstract ID: 376)  

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Background:  
Acute intestinal ischemia (AMI) is a life threatening disease that requires early surgical intervention but still has a poor prognosis. Early diagnosis and intervention including resection of infarcted bowel and revascularization improves outcome and survival. This study aimed at investigating long-term outcome after AMI with focus on bowel continuity.  

Materials and methods:  
Data from patients with acute AMI (arterial and venous) who were admitted to the department of surgery between 1 January 2008 and 31 December 2016 were retrospectively included in the analysis. The clinical record was reviewed and the clinical outcome was recorded with focus on long-term survival and presence of stoma.  

Results:  
A total of 63 patients (32 women, 31 men) with a mean age of 68.8 years (42-91 years) were included. Arterial occlusion was found in 55 patients and splanchnic vein thrombosis in 8 patients. Bowel resection alone was performed in 17 patients (27%). A vascular reconstructive procedure alone was undertaken in 11 patients (17%). In 16 cases (25%) a combination of bowel resection with vascular reconstruction was performed. In 19 patients (30%) exploratory laparotomy alone was done because of extensive gangrene.  

Stoma formation was necessary in 16 (36.3%) patients. The rate of stoma formation was higher in the group with vascular reconstruction + bowel resection compared to bowel resection alone. However, stoma take down rate was also higher in this group. From 44 patients who were treated with curative intent, 2 patients showed prolonged survival with stoma (4.5%) but died during follow-up. 13 out of 18 patients (72.2%) are still alive without stoma, 3 patients in this group died during follow-up (see table 1). Median resected bowel length was 110 cm (range 20 - 290 cm) and had no influence on long-time survival and indication for stoma formation.  

The overall cumulative survival rates at 30 days, at 1 year and at 5 years were 28.1%, 25% and 20.3%.  

Table:  

<table>
<thead>
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<th>Bowel resection</th>
<th>Vascular reconstruction</th>
<th>Vascular recon. + bowel resect.</th>
<th>Exploratory laparotomy</th>
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<td>6</td>
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<td>6</td>
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<tr>
<td>-alive without stoma</td>
<td>0</td>
<td>4</td>
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</table>
Overview on surgical interventions, stoma take down and long-term outcome after AMI

**Conclusion:**

AMI still has a very poor prognosis on short and long-time survival. Initial stoma formation is required in one fourth of patients. Only 1 patient (2%) showed long-time survival with stoma (3 years total) compared to 21% without ostomy. The possibility of early stoma take down indicates a good overall prognosis.
Deloyers Procedure Postoperative Complications and Functional Results  
(Abstract ID: 384)

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Background:
Colorectal anastomosis after extended left hemicolectomy might be challenging, due to the short mesentery and the long distance between the two bowel ends.

Deloyers procedure (anastomosis of rotated right colon and rectum or anus) may be used as a possible salvage procedure. The aim of our study is to report the postoperative complications and functional results after this operation.

Materials and methods:
After a query of the institutional electronic patient database, we identified 19 patients who underwent a Deloyers procedure between October 2008 and August 2016. We investigated the short and long term outcome and the functional results by using the Bristol Stool form scale and the Wexner score.

Results:
There were 10 men and 9 women with a median age of 57 (range 23 to 90) years in our cohort. The postoperative complications according Clavien-Dindo I-IIIa occurred in 6 patients (32%). In one patient a laparotomy was needed because of abdominal wound dehiscence. The median hospital stay was 16 (range 7 to 41) days. After a median follow-up of 39 (range 5 to 99) months two patients developed an anastomotic stenosis and one patient an incisional hernia. The median number of bowel movements per day was 4 (range 1 to 6). Beside three patients with a Bristol stool scale of 6, all others had normal stool. Eleven patients had a good functional result (Wexner Score <= 4).

Conclusion:
Deloyers procedure is a save technique to maintain bowel continuity with an acceptable perioperative morbidity and good functional results.
Association between postdiagnostic physical activity, sedentary time and all-cause mortality among long-term colorectal cancer survivors
(Abstract ID: 392)

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3Rheinische Friedrich-Wilhelms Universitätsklinikum Bonn
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5Leibniz-Zentrum für Diabetes-Forschung, Düsseldorf
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Background:
Increasing numbers of newly diagnosed cases and rising survival rates lead to a growing group of CRC survivors. While regular physical activity has a broad range of beneficial health effects there is rising interest to what extent behavioral factors affect the course of the disease and survival of patients with CRC.

Materials and methods:
We assessed physical activity in 1385 CRC survivors (44% women; median age, 69 years) at median 6 years after CRC diagnosis. A validated questionnaire was used to collect self-reported data of physical activity. Multivariable-adjusted Cox regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for all-cause mortality according to categories of physical activities and sedentary behavior.

Results:
During the median follow up time period of 7 years 200 of the 1385 study participants had died. We observed evidence for a statistically significant nonlinear association between total physical activity and all-cause mortality (p nonlinear=0.02, Wald chi-square test). Considering individual types of physical activity, sports showed the strongest inverse association with all-cause mortality (HR: 0.39; 95% CI: 0.23-0.65 comparing >20 with 0 MET-hours/week, ptrend=0.0001). The individuals who slept >=2 hours during the day had more than twice the risk of dying (HR: 2.29; 95% CI: 1.47-3.55, ptrend=0.0003) compared to individuals who did not sleep at day. Furthermore, >=4 hours/day spent watching TV was significantly associated with a 53% higher all-cause mortality compared with <=2 hours/day of TV viewing (HR: 1.53; 95% CI: 1.07-2.18, ptrend=0.02). We identified significant effect modification by sex, BMI, and tumor location in the sense that the observed association between total physical activity and all-cause mortality was stronger in women, in individuals with a lower BMI, and in individuals with a colon tumor (as compared to individuals with a rectum tumor).

Conclusion:
In this cohort of 1385 long-term CRC survivors, higher post-diagnostic total physical activity was associated with lower all-cause mortality.
Rare Causes of Anemia and Perianal Bleeding – Keep It in Mind
(Abstract ID: 438)

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Background:
Perianal bleedings have an incidence of 20-30 /100,000 men and women per year and occur at an average age between 63 and 77 years. It represents one of the most frequent symptoms of daily surgical routine. The majority of perianal bleedings are caused by hemorrhoids and anal fissures, which are easy to treat and have an excellent prognosis. Nevertheless more severe pathologies like polyps, diverticular disease or cancer may hide behind a perianal bleeding. We present a case where the origin of a perianal bleeding was a not gastrointestinal correlated pathology.

Results:
A 57 year old healthy male Patient with a history of partial lung resection and adjuvant chemotherapy for a non small cell lung cancer presented with a relevant drop of hemoglobin and perianal bleeding. Endoscopic workup (gastroscopy and colonoscopy) showed no pathology. The capsule endoscopy, successively performed, revealed a tumorous conglomerate in the ileum. The imaging exams performed for the staging of the lung cancer (Abdomen CT; Thorax CT and MRI) did not show any metastasis. A conglomerate tumor in the ileum was identified - GIST was suspected. Laparoscopic resection was performed and found a tumor with a diameter of 7 cm at 40 cm proximal to the ileocecal valve. Histology revealed a distant metastases of the lung cancer.

Conclusion:
Although perianal bleeding is common with anal pathologies as hemorrhoids or fissure further endoscopy should be performed to rule out other origins of the bleeding. Our case is an example for perianal gastrointestinal bleeding related to a rather rare pathology like the unusual metastasis in our case. We conclude that in any case of perianal bleeding a cause above the anal verge should be ruled out by further examination.
Massive Lower GI Tract Bleeding
The role of surgery and Imiquimod therapy in the initial treatment of HPV-associated anal lesions in HIV-positive patients  
(Abstract ID: 460)

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Background:

Human Papilloma Virus (HPV) infection in HIV-positive patients can cause anogenital condylomata accuminata (C. acc.), anal intraepithelial dysplasia (AIN) and anal cancer. For condylomata and low grade dysplasia, Imiquimod has been discussed as first line treatment. In this study, we contrast the use of Imiquimod in HIV-coinfected patients with ablative surgical treatment.

Materials and methods:

We retrospectively analysed 97 HIV-positive patients from the HIV outpatient clinic of the University Hospital Bonn who consulted our proctological outpatient clinic over an 11 year period (11/2004-11/2015), comparing the success of surgical ablative treatment, local pharmacological therapy with Imiquimod and a combination of both. Histologic results of tissue biopsies and immunological data were available for further analysis.

Results:

Of a total of 97 patients, only 53 had a HPV-associated anal disease upon first visit. The mean patient age was 41.0 ±11.6 years, most patients were under cART (74.2%) and the median CD4+ cell count was 470.0 ±289.8 cells/µL. All of these 53 patients had macroscopic C. acc. and several patients were additionally diagnosed with either a low grade (7 patients) or high grade anal intraepithelial dysplasia (18 patients) upon first visit, respectively. We then compared the success rates regarding all treatments (Imiquimod only, surgery only, Imiquimod+surgery) of AIN and C. acc. A four week treatment course with Imiquimod alone showed no satisfactory remission of AIN or C.acc., whereas surgical treatment resulted in immediate short term cure in most cases and no benefit for additional treatment with Imiquimod after surgery was found. Complete remission of C. acc. and AIN four weeks after treatment was achieved as follows: For C. acc., success rates of Imiquimod only were 5/25 treatments (20.0%) vs. surgery only 30/57 treatments (52.6%) vs. surgery+Imiquimod 7/15 treatments (46.7%), respectively. Likewise, for AIN, success rates of Imiquimod only were 4/24 treatments (20.0%) vs. surgery only 30/57 treatments (52.6%) vs. surgery+Imiquimod 7/15 treatments (46.7%), respectively. Several patients had to be treated multiple times over time for recurrence.

Surgical complication rates were moderate: Of 92 surgical treatments, only seven complications were reported: Four minor and two significant bleeding episodes which required surgical hemostasis and one perianalvenous thrombosis which was treated conservatively. No severe side effects of Imiquimod therapy other than skin irritation were documented.

Conclusion:

Surgery as initial therapy of HPV-related anogenital disease in HIV-positive patients is more effective than Imiquimod. Imiquimod might be an additional option in the treatment of recurrent dysplasia and C.acc. However, long term recurrence rates need to be further evaluated.
Belong carcinomas of the Rectosigmoid Junction to the Upper Rectum or Sigmoid Colon?
(Abstract ID: 539)

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Background:
Carcinomas of the rectosigmoid junction represent up to ten percent of colorectal carcinomas. The objective of this study is to determine whether carcinomas of the rectosigmoid junction can be assigned to the upper third of the rectum or to the sigmoid colon according to tumor characteristics and oncological outcome.

Materials and methods:
A retrospective analysis of all patients who underwent resection of a primary colorectal carcinoma between 2004 and 2014 was performed. Oncological outcome was evaluated by a standardized survey.

Results:
Of 350 patients, 196 showed a primary carcinoma of the sigmoid colon (56%), 42 patients of the rectosigmoid junction (12%) and 112 of the upper third of the rectum (32%). The median follow-up period was 44 (0-136) months in the entire study population and 50 (0-136) months in all living patients. While most histopathological features did not differ between the three localizations, tumor ulceration and polypoid growth in tumors of the rectosigmoid junction were more similar to tumors in the upper rectum. Synchronous as well as metachronous liver metastasis were more frequent in tumors of the rectosigmoid junction (31% / 20%) than in tumors of the sigmoid colon (16.3% / 6.6%) and the upper rectum (12.5% / 8.7%). In patients with stage I-III tumors three- and five-year recurrence-free survival were as follows: sigmoid colon: 83.6% and 76.7%, rectosigmoid junction: 64.3% and 64.3%, upper rectum without neoadjuvant therapy: 75.4% and 69.2%, upper rectum receiving neoadjuvant therapy: 94.7% and 87.4%.

Conclusion:
The rectosigmoid junction resembled the upper rectum in the few histopathological features which differed between the three localizations. Synchronous and metachronous liver metastasis were more frequent in the rectosigmoid junction, than in the sigmoid colon and the upper rectum.
Extra nodular metastasis is a poor prognostic factor for overall survival in node-positive patients with colorectal cancer.

(Abstract ID: 564)

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Background:

Colorectal cancer (CRC) is the second leading cause for cancer-related death in industrialized nations. Nodal involvement has been identified as a relevant prognostic feature in CRC. Extra nodal metastasis (ENM) describes the spread of malignant cells beyond the nodal capsule. ENM is thought to be independent risk factor for poor survival. This study examined ENM as an independent risk factor for poor overall survival in patients with nodal positive CRC.

Materials and methods:

Data from a prospectively maintained CRC database was retrospectively analyzed. Blinded slides of patients with stage III and IV CRC following radical surgical resection were re-examined for the presence of ENM. The effect of ENM on overall survival was examined using Kaplan-Meier Curves.

Results:

One hundred and forty-seven cases with nodal positive CRC (UICC stages III and IV) including 78 cases with ENM were included for analysis. ENM was seen in 60 patients with colon cancer (58.8%) and in 18 patients with rectal cancer (40%), p = 0.033. ENM-positive patients had a significantly higher odd for cancer-related death compared to ENM-negative patients ratio of [OR 0.44: 0.22 - 0.88, CI 95%, p = 0.021], p = 0.02. The median an overall survival was significantly longer in patients without ENM, 51.0 ± 33 vs. 30.5 ± 42 months, p =0.02.

Conclusion:

Extra nodal metastasis is an independent prognostic factor in patients with nodal positive colorectal cancer. Extra nodal metastasis is associated with high odds of tumor-related mortality and poor overall survival.
Initial experience with taTME in patients undergoing laparoscopic restorative proctocolectomy for familial adenomatous polyposis.
(Abstract ID: 569)

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Background:

Trans anal total mesorectal excision (taTME) is a minimally invasive technique which was developed to overcome the difficulties associated with the "top-down" pelvic dissection by enabling a "bottom-up" dissection in patients with mid and low rectal cancer. While this technique was primarily designed to manage tumors in the mid and lower rectum, its spectrum of indications has been broadened to include benign colorectal pathologies. Herein, we report our initial experience with taTME in patients undergoing restorative proctocolectomy for familial adenomatous polyposis (FAP).

Materials and methods:

The results of eight consecutive patients (six females and two males) undergoing prophylactic restorative proctocolectomy with IPAA for FAP using taTME are presented.

Results:

The median age in this series was 19.5 yrs (range: 16 - 31 yrs). Surgery was successfully completed using the taTME in all cases. No perioperative complications were recorded. A median of five bowel movements with intermittent anti-diarrheal medication was recorded in all case.

Conclusion:

Our initial experience on eight consecutive cases suggests taTME to be safe and effective in patients undergoing prophylactic restorative proctocolectomy with IPAA for FAP.
Colorectal cancer in young average risked individuals. It is time to rethink the age for recommending screening colonoscopy?
(Abstract ID: 570)

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Background:

The role of colonoscopy in the screening of colorectal cancer (CRC) has been unequivocally established. In Germany screening colonoscopy with full insurance reimbursement is available for individuals aged 55 and for persons with well-known risk factors for CRC. However, advanced CRC is not uncommon in individuals below 55 years. This study was designed to investigate the incidence of advanced CRC in patients < 55 years.

Materials and methods:

A retrospective analysis of data from a prospectively maintained CRC database of a university hospital in Germany was performed. Using the recommended age for screening colonoscopy as cut-off, the study population was divided into two groups: < 55 yrs (study group) and >= 55 yrs (control group). Both groups were compared with regard to the extent of CRC using the UICC stages. Only surgically managed patients were included for analysis. Advanced CRC was defined as UICC stage III or IV.

Results:

Complete follow-up data was available for 609 patients treated between 2009 and 2014. The study group included 83 patients, 42 females and 41 males with a median age of 48.0 ± 10 yrs, while the control group was made up of 526 patients, 230 females and 296 males with a median age of 75.5 ± 8.3 yrs. Both groups were comparable with regard to gender distribution, p = 0.24. Significantly more patients from the study group were diagnosed with advanced CRC in comparison to the control group, 56.6% vs. 43.9%, p = 0.03. There was no statistically significant difference amongst both groups with respect to cancer related mortality, 10.8% vs. 12.5%, p = 0.66.

Conclusion:

Patients below the recommended age for screening colonoscopy might be at increased risk for advanced CRC. There is need to decrease the recommended age for screening colonoscopy to prevent CRC or enable an early diagnosis in patients below 55 yrs.
Initial experience with virtual ileostomy following restorative proctocolectomy for familial adenomatous polyposis.
(Abstract ID: 575)

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Background:
Anastomotic leakage (AL) is the most feared complication in colorectal surgery. A diverting ileostomy is routinely used to prevent or reduce morbidity and mortality following AL. However, a diverting ileostomy cannot prevent anastomotic. Besides, diverting ileostomy might be associated with relevant complications. Herein, we introduce the virtual ileostomy as an alternative to diverting ileostomy in patients undergoing restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) for familial adenomatous polyposis (FAP).

Materials and methods:
The virtual ileostomy was created using the last ileal segment about 20 - 30 cm from the ileocaecal valve. The mobility of the chosen ileal segment was tested by displacing the segment up against the abdominal wall. A narrow window was created at the mesentery side of chosen ileal segment to permit the passage of a vascular vessel loop. The vascular vessel loop was then exteriorized at the usual ileostomy site located midway between the iliac spine and the umbilicus. For laparoscopic procedures the vascular loop was exteriorized via a 5 mm port, which was purposely placed at the position. The vascular vessel loop is then secured on the skin so that the looped ileal segment freely hangs in the abdomen.

Results:
The results of nine patients, four females and five males with a median age of 21.0 ± 10.0 yrs undergoing restorative proctocolectomy with IPAA and virtual ileostomy for intestinal polypsis syndromes, eight cases with FAP and one case with Lynch syndrome are presented. All cases were laparoscopically managed. The virtual ileostomy was released between postoperative day 7 and 9. No AL was registered. Postoperative recovery was uneventful and pouch functionality was excellent in all cases.

Conclusion:
A diverting ileostomy was prevented via the use of virtual ileostomy in all cases. Thus virtual ileostomy is a serious alternative to diverting ileostomy in patients undergoing restorative proctocolectomy with IPAA for intestinal polypsis syndromes.
Total minimal invasive esophagectomy with a modified intrathoracic linear stapler side-to-side esophageal gastric anastomosis
(Abstract ID: 590)

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Background:
Minimally invasive esophagectomy is associated with better perioperative outcome than open esophagectomy. However, it is demanding and, particularly, the minimally invasive intrathoracic anastomosis is technically challenging. The aim of this presentation was to demonstrate the crucial steps of a total minimally invasive esophagectomy with special focus on a simplified method to perform the esophagogastrostomy.

Materials and methods:
Video presentation of a total minimally invasive esophagectomy with linear stapler esophagogastrostomy, which is performed through two small incisions, one in the staple line of the esophageal stump and one in the anterior wall of the stomach 3cm from the margin. The closure of the remaining esophagogastric hole after stapling is done by a transversal running suture.

Results:
22 unselected patients with esophageal cancer have undergone the presented method at our institution compared to 46 open esophagectomies during the same period. The mean operating time was with 448 minutes longer than open esophagectomy (p<0.001). All tumors were resected completely (R0). The mean number of harvested lymph nodes was with 25 the same as in open esophagectomy (p=0.47). Complication rate was reduced (p=0.056), with equal anastomotic leakage rate (p=0.76) and reduced pulmonary complications (p=0.069) and no 90 day mortality. Mean postoperative stay was 14 days.

Conclusion:
Total minimally invasive esophagectomy with linear stapler esophagogastrostomy can be done in a simplified manner and with good perioperative outcome.
Surgical therapy of rectal cancer recurrence – review of single center results
(Abstract ID: 602)

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Background:
Surgical therapy of rectal cancer recurrence is complex and needs an interdisciplinary concept for success. The best long-term survival can be achieved by surgical R0-resection of the cancer recurrence.

Materials and methods:
We performed a retrospective data analysis of the related multivisceral operations for rectal cancer recurrence between January 2015 and August 2017 by recording techniques of resection, procedures, of perineal reconstruction, histology, morbidity/mortality, and duration of hospital stay and overall survival.

Results:

13 patients were surgically treated due to rectal cancer recurrence between 1/2015 and 8/2017. During primary therapy, patients were aged 73.4 years in median (range between 52-89 yrs). 7 out of 13 patients had been treated with neoadjuvant radiochemotherapy before the first resection. All primary resections had been R0; all were adenocarcinomas and 6 out of 13 displayed lymph node metastases. The time between primary surgery and recurrence was 34.6 months (range between 9 and 66 months).

In 5 cases, we performed a local resection of the cancer recurrence (e.g. transanal endoscopic microsurgery/TEM because due to of anastomotic recurrence, excision of an iliac lymph node metastasis or particular resection of the abdominal wall because of a local metastasis). In 8 cases, we made a multivisceral resection with ventral, dorsal or total evisceration of the pelvis. To reconstruct the pelvic floor, we used a synthetic BIO-A-Mesh (Gore®) in 2 patients and a omentum plasty reconstruction in 6 cases.

Eight out of 13 cases were resected R0. In one case, we treated a local R1-situation with implantation of afterloading-sheets. In 2 patients, we came out of the recurrence surgery with a local R2-situation. Here, we had started the operation in curative intention, but curative resectability was not possible at exploration. 2 other patients had a systemic R2-situation, due to pulmonal metastases.

Duration of hospital stay was 23,9 days (range between 6 and 89 days). We recognized 5 patients without any complications, n=4 with grade 3, n=2 with grade 4 and n=2 with grade 5 (bowel ischemia after cardiopulmonal resuscitation due to a cardiac infarction, multi organ failure) Clavien-Dindo-Classification. Adjuvant chemotheraphy was advised and applied in 3 cases. One patient was treated with local brachytherapy. 2 cases were sent to thoracic surgery because of synchronic pulmonal metastases. The median overall survival is 69,2 % currently (4 of 13 patients died). 2 patients died because of postoperative complications and 2 died because of the cancer disease progress.
Conclusion:

Surgical therapy of rectal cancer recurrence is complex, highly specific and related to potentially severe complications. Surgical treatment is indicated in a specific multimodal setting and perioperative management has to be planned meticulously.
The tailgut cyst – a rare entity in rare locations. A report of a precoccygeal and a presacral tailgut cyst
(Abstract ID: 646)

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Background:
Tailgut cysts are rare cystoids lesions, which usually occur in the presacral space. It is assumed, that they develop from a remnant of the tailgut. We discuss different locations and the therapeutic management of tailgut cysts.

Materials and methods:
We present the case of a 38 year old woman with a recurrent presacral tailgut cyst, and the case of a 35 years old woman with a rare precoccygeal tailgut cyst.

Results:
A 35 year old woman presented with an increasing, nonpainful, palpable formation in the precoccygeal area. An MRI showed a cystic formation with a size of 2 cm next to the coccyx. It had no connection to the rectum. Total excision was performed under digital rectal control. Histological analysis revealed a cystic formation predominantly lined with non-keratinizing squamous epithelium, without indication of malignancy, consistent with a tailgut cyst.

A 38 year woman presented to our emergency unit with two weeks of fever and four weeks of pain in the left gluteal area. An MRI revealed a presacral cystoids lesion with a size of 8,5 cm. Blood cultures were positive for streptococcus sanguinis. Antibiotic treatment was started and a laparoscopic excision performed.

We present the perioperative course of both cases including MRI, macroscopic and histopathological views.

Conclusion:
These two cases outline the importance of tailgut cysts as differential diagnosis for cystic lesions in the precoccygeal and presacral space. Tailgut cysts typically present in middle aged women and are frequently asymptomatic. They regularly occur in the presacral space. Few cases have been reported with tailgut cysts in the perirenal, perianalae and precoccygeal space. The therapeutic management of the tailgut cysts depends on the location. We got good results with local excision in precoccygeal tailgut cyst. Laparoscopic total excision of deep presacral and retrorectal localized tailgut cysts showed itself to be complex. They can show malignant transformation, though this is rare.
MRI image of a preoccocygeal tailgut cyst
The 4-point method to improve autonomic nerve preservation during lower anterior resection of the rectum
(Abstract ID: 930)

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Background:
Recurrence rates and urogenital dysfunction following anterior resection of the rectum were significantly decreased with the introduction of total mesorectal excision and nerve-preserving dissection. However, whereas the quality of TME has improved in most centers, huge differences remain in regard to post-operative sexual and urinary dysfunction. A step-by-step method, focusing on the topography of four crucial points of the autonomous plexus may help to improve functional results.

Materials and methods:
Video clips of laparoscopic (lower) anterior rectal resection, performed between 2014 and 2017, were analyzed in regard to potential damage of the mesenteric and hypogastric plexus.

Results:
"Critical incidents" of potential nerve injury due to surgical technique or use of diathermy predominantly occurred at four points: 1) the pre-aortic plexus with multiple anatomical variations at the trunk of the inferior mesenteric artery, 2) the entry into the "holy plane" at the transition of the mesosigmoid to the mesorectum, 3) the crosspoint between the endopelvic fascia and the neurovascular bundle with close relation to the inferior hypogastric plexus (lateral mesorectal excision), and 4) the lateral border of Denonvilliers’ fascia anteriorly of the neurovascular bundle (anterior mesorectal excision).

Conclusion:
Focusing on the four crucial cross-points of the resection line between mesocolon/mesorectum and the autonomous nerve bundles helps to avoid nerve damage during anterior resection of the rectum.
Case Report: Abdominal and Retroperitoneal Schwannoma – a Rare Finding
(Abstract ID: 29)

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Background:
Schwannomas of gastrointestinal tract are very rare mesenchymal tumors. They constitute about 0.2%
 of abdominal tumors and are originating from Schwann cells. These types of tumors present
generally very slow growing mass, which is mostly benign. The treatment of choice is surgical
resection with wide resection margins. In our case report an MRI was done by a 60-year-old female
patient by non-specific back pain. To the other findings belong also an abdominal tumor of gaster
and a mass in retroperitoneum at the side of the right iliac vein. A surgical intervention was
recommended. The patient underwent a Wedge-resection of the gaster tumor and excision of the
mass in retroperitoneum through a middline lower abdominal laparotomy. The histopathologically and
immunohistochemically corresponded both tumors to a schwannoma. There is no recurrence with
follow up of 2 year.

Results:
A 60 year-old female patient was sent by her family physician for a neurological examination due to
non-specific back pain. Upon the recommendation of the neurologist, an MRI scan of the spine was
performed, which amongst other findings revealed an abdominal tumor of gaster measuring 2.8 x 3.5 x
2.6 cm. Up to that time, neither the patient nor her family had suffered from any gastroenterological
diseases or symptoms. A CT scan of the abdomen was performed for further diagnostics. After
consultation with radiology, the suspicion of a gastrointestinal stromal tumor [GIST] or another
mesenchymal abdominal tumor was expressed due to the extraluminal growth tendency and the sharp
demarcation from the surrounding tissue. The results of gynecological as well as colonoscopic
examinations were normal. The gastroscopy detected a 2.5-3 cm long protrusion of the stomach wall
into the lumen, located on the greater curvature 5 cm under the cardia, the overlying gastric mucosa
was normal. Histopathological examination of the samples taken during the gastroscopic examination
was inconspicuous. The original MRI scan, detected in addition to the abdominal tumor, a space-
occupying lesion of the retroperitoneum in the area of the right common iliac vein. The etiology of the
retroperitoneal tumor measuring 3.7 x 2.7 cm remained unclear. In the differential diagnosis either a
primary tumor of the retroperitoneum or a metastasis were considered. The locoregional lymph
nodes were unremarkable. To rule out possible malignancy, additional examinations were initiated. With
these results the patient was presented in our Multidisciplinary tumor board and a surgical resection of
both tumors was decided to take place. Following appropriate diagnostics and preparation, a
laparoscopic Wedge-resection of the stomach tumor was performed. In the same session, the
retroperitoneum was explored through a midline lower abdominal laparotomy.

Conclusion:
This case has shown how important is it to include gastric schwannomas in the differential diagnosis,
when preoperative imaging studies reveal a submucosal mass. These types of tumors are mostly
benign and slow growing. The curative treatment of choice is the surgical resection with an complete
negative margin. Recurrence of the disease is caused only after incomplete resection. For a definitive diagnosis of schwannomas is immunohistochemical examination very important.
Management and treatment of retroperitoneal liposarcoma: a single-center experience
(Abstract ID: 370)

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Background:

Approximately 30-40% of all retroperitoneal diagnosed soft tissue tumors are sarcomas with liposarcoma prevailing with about 50%. Liposarcoma shows typically a high rate of local recurrence and very late distant metastases. The aim of our retrospective analysis was to investigate the efficacy of treatment in our own patients with primary or local recurrent liposarcoma.

Materials and methods:

27 consecutive patients underwent surgery for a retroperitoneal liposarcoma between October 2004 and May 2014 in our institution. Liposarcomas arising from the mesenteric or abdominal adipose tissue, the pelvic or both were excluded. Since 2011 we introduced neo-adjuvant therapy in patients without severe comorbidity and/or older than seventy years.

Results:

Out of 27 patients 15 (56%) presented with primary and 12 (44%) with locally recurrent disease. In 8 of the 27 patients (30%) a radical resection (R0) could be achieved, in 17 (63%) resection was marginal (R1). Tumor-free survival in neo-adjuvant treated was with 33.3 months clearly longer than after surgery alone- (17.8 months) and adjuvant-treatment (22 months) and tumor-related death rarely.

Conclusion:

In patients with neo-adjuvant treatment of retroperitoneal liposarcoma we confirm an improved outcome with less and later recurrence than compared to patients with surgery alone or adjuvant therapy.
Metastatic aggresive primary pulmonary leiomyosarcoma – description of a rare case
(Abstract ID: 387)

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Background:

Primary leiomyosarcoma of lungs is an extremely rare entity, which comprises less than 0.5% of all primary lung tumors. It arises either from smooth muscles of bronchial wall, vessel wall or pulmonary interstitium. For its highly aggressive behavior, it is important to distinguish it from other pulmonary neoplasms.

Materials and methods:

We present a case of noncompliant 78 year old woman, admitted for respiratory insufficiency due to tumorous process in the right lung diagnosed 1.5 months prior to current hospitalization. At the time of diagnosis the tumorous mass measured according to the CT 90 x 95 x 140 mm, with metastasis in right lower lobe and multiple metastases in right pleura and mediastinum.

The autopsy revealed extensive homogenous, grey white mass (22 x 15 x 11 cm) infiltrating the whole middle and lower part of the upper lobe, reaching on lateral side all the way to the parietal pleura and growing medially through hilum to mediastinum. Nodules of the same macroscopic characteristic were found in the right lower and upper pulmonary lobes as well as in mediastinum (diameter 0.5 cm - 9 cm). No other tumorous processes were found anywhere in the body, the uterus was thoroughly examined and without any lesions.

Results:

Histologically the tumor consisted of highly polymorphous spindle cells with eosinophilic cytoplasm and large elongated hyperchromatic nuclei, growing in interweaving fascicles. The mitotic rate was high, 21 mitoses / 10 HPF, also with atypical mitotic figures.

Immunohistochemical staining demonstrated strong cytoplasmic positivity to vimentin, SMA and focally to desmin; negativity to pancytokeratin coctail, myosin, caldesmon, calponin, S100, CD117, CD34, ALK, and HMB45. Proliferation rate (Ki67) reached 50% in high proliferative areas. The diagnostic conclusion was primary pulmonary high grade leiomyosarcoma according to Federation Nationals des centres de Lutte le Cancer grading system.

Conclusion:

Primary leiomyosarcoma of the lungs is an unusual finding, with uncommon metastases, usually encountered in advanced stages of the disease. Generally, metastatic origin of lung sarcomas is far more common, thus careful investigation an elimination of primary mass in other organs must be made with emphasis on uterus in females, since metastases of leiomyosarcoma have been described several years following the hysterectomy.

Histologically, the tumor consists of spindle cells with various degree of polymorphism, thus in differential diagnosis it is important to distinguish these tumors from sarcomatoid carcinoma (vimentin negative), malignant peripheral nerve sheath tumor (S-100 positive), metastases of GIST (CD117 positive), myofibroblastic inflammatory tumor (ALK positive), myofibroblastic sarcoma (CD34 positive) and perivascular epitheloid cell tumor (HMB45 positive).
Secondary wound closure in abdominal wounds following treatment with negative pressure therapy (V.A.C.®)

(Abstract ID: 405)

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Background:

The application of negative pressure therapy to infected wounds has shown to promote and accelerate wound healing. Secondary wound healing with filling of the defect by granulation tissue is a lengthy process with a significant reduction in quality of life and increase in health care costs. Secondary closure of wounds managed with open wound treatment is not the standard of care because of bacterial contamination of the subcutaneous tissue. Aim of this retrospective study was to evaluate the effectiveness of secondary wound closure in abdominal wounds following treatment with negative pressure therapy (V.A.C.®) and to compare it to patients treated without secondary wound closure.

Materials and methods:

Patients, hospitalized between January 2013 and March 2016 at the University of Würzburg Medical Center, with abdominal wounds treated with negative pressure therapy were analyzed retrospectively. Preoperative patient characteristics were analyzed and risk factors indentified. Patients with secondary wound closure were compared to those with secondary wound healing regarding sex, weight, co-morbidities and ASA score, length of ICU and hospital stay and wound condition after discharge.

Results:

265 patients were included in this study, of which 67 were treated with secondary wound healing and 198 with secondary wound closure. The mean duration of hospital stay was 30.09 days with a shorter stay for patients with secondary wound closure (29.43 days versus 32.90 days in patients with secondary wound healing). Wounds after secondary wound closure healed nicely and patients could be discharged without the need for outpatient wound treatment. The rate for hernias seemed to be identical in both groups. Negative pressure therapy (V.A.C.®) lasted in average 10.51 days and on average 2.09 dressing changes were performed. 59 % of the patients were male and 41 % female. The most common secondary diagnosis were hypertension (50.94 %), diabetes mellitus (20.00 %), diverticulitis (10.94 %), atrial fibrillation (10.57 %) and renal insufficiency (9.81 %). 19 % of patients were smokers and 8 % had just recently stopped smoking.

Conclusion:

Secondary wound closure after negative pressure therapy (V.A.C.®) seems to be a valid alternative to standard secondary wound healing. On discharge, patients leave with a closed abdominal wound, with no need for repeated outpatient wound treatment and with a higher level of quality of life and patient comfort.
Long term survival and predictive factors in patients with diffuse malignant peritoneal mesothelioma treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (Abstract ID: 541)

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Background:
Diffuse Malignant Peritoneal Mesothelioma (DMPM) is an aggressive and rare neoplasm that arises from the mesothelial cells of the serosal layer of the peritoneum. Due to the minimal benefit of systemic therapy, during the last 30 years, highly specialized centers have developed cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) as the preferred therapy in selected patients with DMPM. This combined approach has changed the natural history of DMPM, dramatically improving survival and quality of life outcomes.

Materials and methods:
This retrospective analysis included all patients with diffuse malignant peritoneal mesothelioma treated at our cancer center between 01/2008 and 12/2016. All patients received CRS and HIPEC (Cisplatin, Mitomycin or Doxorubicin, 60min, mean temperature 41°C) using a closed circulatory technique. The median survival was calculated from time of operation until patient’s death.

Results:
A total of 37 patients with a mean age of 56.3 (SD 13.7) years, a mean BMI of 25.3 (SD 2.8) and a mean Peritoneal Cancer Index (PCI) of 23.6 (SD 12.5) were included. Five patients were treated with a repeated CRS and HIPEC procedure 16.9 (SD 8.2) months after the first CRS and HIPEC was performed. Preoperative chemotherapy was applied to 27.7% of all patients, complete cytoreduction (CC0+1) was reached in 60.6% of all patients.

Patient’s overall 5-year-survival was 72.4%. Patients with ki-67 <=5 or positive PD-L1 status showed improved 5-year survival (83.3% and 80.0%) compared to patients with ki-67 >5 (39.7%) or negative PD-L1 status (59.3%). In our study, none of the potential predictive factors reached level of significance (p=0.119 and p=0.190). Perioperative morbidity 21.1% and mortality 3.3% was acceptable in our cohort.

Conclusion:
Patient’s overall 5-year-survival was 72.4% with an acceptable perioperative morbidity and mortality in selected patients. Ki-67 <=5 and positive PD-L1 status seemed to be positive predictors for patient survival, but did not reach level of significance in our study.
Trans*nt mesenteric ischemia in children with congenital heart disease: tackling enteric hypoperfusion surgically
(Abstract ID: 664)

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Background:
Pre- and post-operative transient mesenteric ischemia events in children with congenital heart disease are not infrequent, but rarely need surgical therapy. We report of our experience in a series of 7 cases. 2 Patients needed abdominal surgery (segmental bowel excision). This single center experience is in accordance with recent reports from literature.

Materials and methods:
Retrospective study of 7 subsequent patients with congenital heart disease from 2015 to 2017 in our pediatric heart unit which developed clinical signs of necrotic enterocolitis (NEC) before and after heart surgery.

Results:
7 children (3 male, 4 female) with congenital heart disease are presented, 6 showed an acute abdomen resembling classical NEC after heart surgery (day 1 to day 3), only one newborn preoperatively (day 4 of life). Two patients (both female) needed abdominal surgery (segmental bowel resection with temporary ostomy). All children survived their bowel disease, there were no persistent enteric impairment till now. Cases were followed-up from 6 months to 1 year.

Conclusion:
The visceral surgeon integrated in a pediatric heart unit setting should be aware of this special form of bowel disease (transient mesenteric ischemia) simulating classical NEC.
Hyperspectral imaging of gastrointestinal anastomoses
(Abstract ID: 687)

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Background:
Anastomosis insufficiency (AI) remains a most feared surgical complication in gastrointestinal surgery, closely associated with a prolonged inpatient hospital stay and specific postoperative mortality. Hyperspectral imaging (HSI) is a relatively new medical imaging procedure that has proven itself promising in tissue identification, as well as in the analysis of tissue oxygenation and water content. Until now, no data exists on the in vivo hyperspectral analysis of gastrointestinal Anastomosis.

Materials and methods:
Intraoperative images were obtained using the TIVITA™ Tissue System hyperspectral imaging camera of Diaspective Vision GmbH (Pepelow, Germany). In 17 Patients who underwent gastrointestinal surgery with esophageal, gastric, or intestinal anastomosis, 92 Images were generated. The parameters obtained at the site of anastomosis included tissue-oxygenation (StO2), tissue hemoglobin index (THI), Near-infrared (NIR) perfusion, and Tissue-Water-Index (TWI).

Results:
Obtaining and analyzing intraoperative images with this Non-Invasive Imaging system, proved practicable and delivered good results on a consistent basis. An NIR-gradient along and across the anastomosis was observed and furthermore analysis of the tissue-water and oxygenation content showed specific changes at the site of anastomosis. (Figure 1)

Conclusion:
HSI provides, without the use of a contrast medium, a non-contact, non-invasive, intraoperative imaging procedure, which allows a real-time analysis of physiological anastomosis parameters that may contribute to determining the "ideal" Anastomosis region. In light of this, the establishment of this methodology in the field of Visceral Surgery, enabling the generation of Norms or "Cut off" values for different gastrointestinal anastomosis types, is an obvious necessity.
Figure 1: Ileostomy Reversal with handsewn end-to-end anastomosis
Case report: Intraabdominal Fat Necrosis  
(Abstract ID: 737)

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Background:
An unusual cause of abdominal pain which can mimic an acute abdomen is the intraabdominal fat necrosis, related in other studies as a common finding at abdominal cross-sectional imaging. Other case reports showed that these findings can also remain asymptomatic or be treated with oral pain medication. In these cases there was no acute indication of an operative removal of the fat necrosis. The most common fat necrosis causes are the torsion of an epiploic appendage, infarction of the greater omentum, trauma and pancreatitis.

Materials and methods:
45 yo female patient with progredient to acute abdominal pain since 3 days without nausea, diarrhoea or vomiting. CT scan releve the torsion of the greater omentum with reactive lymphadenopaty.

Results:
The patient was emergency laparoscopic operated. Intraoperative immages confirm the radiologically diagnosis as infarction of the omentum majus as result of omental torsion. The partial necrosis was surgically removed. The patient was discharged 5 days later in very good health condition.

Conclusion:
In the literature the most cases of intraabdominal fat necrosis were treated conservative. In our cases we put the indication of explorative laparoscopy due to the clinical presence of an acute abdomen.
Treatment of arrosion hemorrhage following extended pancreatic surgery
(Abstract ID: 874)
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Background:
Arrosion bleedings of the hepatical arterial system are a feared complication after pancreatic surgery. They occur between the 7th and 80th day after surgery. Such a massive acute bleeding event shows a mortality rate over 60 percent. Because of the sudden incident diagnostic parameters are rare, so that the diagnosis can only be based on the Hgb. level and clinical shock signs. Very often the first sign is the gastrointestinal sentinel bleeding.

Materials and methods:
We did a retrospective data analysis out of a prospectively created data base. Within a group of 323 patients who underwent extended pancreatic surgery, 19 patients where treated with an interventional stent placement in the hepatical arterial system after a massive arrosion bleeding.

Results:
Following this interventional emergency procedure we could decrease the mortality rate in our patient group to 32%, which is much lower than the rates shown in the literature for pure surgical treatment.

Conclusion:
The time - delayed arrosion haemorrhage of viszeral vessels after pancreatic surgery is a life threatening event. The angiographic - stent placement is the quickest, safest and most successful treatment option.
Intrathoracic VAC – Instill application. Is it a revolutionary therapy-option in the field of septical thoracic surgery

(Abstract ID: 917)

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Background:

The surgical treatment of septical intrathoracic pathologies is a major challenge. This includes the treatment of intrathoracic empyema, intrathoracic complications following surgery and septical complications of the chestwall.

Those situations have often led to the need of a temporary or sometimes even a permanent thoracostoma. This kind of surgical treatment has always been a physically and physiological harm to the patient.

Nowadays the VAC Instill therapy is initialising new capabilities and treatment options for those patients.

Materials and methods:

We collected three interesting cases in which the VAC Instill therapy played the decisive role.

The first case report shows a patient within a critical septical condition with a metapneumonial empyema. Because of his co-morbidities such as COPD IV and cardiac insufficiency NYHA Class 3 a standard decortication procedure had not been possible. With the VAC-Instill system we could create a therapy regime in which we performed a thoracocentesis and the VAC application in local anaesthesia. After two further changings of the VAC system the patient had been released from hospital.

The second case shows a patient with an empyema necessitatis after previous surgery with a mini-thorakotomia because of a pleural carcinosis. Even in this case we could initiate the healing by placing a VAC Instill and could even reach a definitive closure of the chest wall.

The third case is about an overwhelming infection after thoracic wall resection with osteosynthetic reconstruction and plastical-surgical closure. Also in this case the chest wall reconstruction as well as the lobe of the lung could have been preserved.

Conclusion:

The VAC Instill system played the decisive role in all those cases. Which led us to the opinion that the intrathoracical VAC Instill application is not only a new treatment device but a revolutionary technique within the field of septical thoracical surgery.
Acute Colon Volvulus in an 18-Year-Old Patient with Cornelia-de-Lange-Syndrome
(Abstract ID: 929)

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Background:
Cornelia-de-Lange-Syndrome is a rare genetic disorder with multiple characteristic features including synophrys, dwarfism and heart defects. Patients are mentally retarded to varying extent. Active communication is usually limited to simple sounds and gesticulation. Hyperactivity is common.

Materials and methods:
An 18-year-old patient with Cornelia-de-Lange-Syndrome and known chronic constipation was seen in our pediatric emergency department presenting with loss of appetite, malaise and abdominal distension. Due to his mental retardation the patient was not able to address his troubles. On examination the patient appeared to be in significant discomfort. Temperature and blood pressure were normal. There was rebound tenderness in all quadrants and diminished but still audible bowel sounds. No other focus was present.

Results:
Because of the abdominal distension and the rebound tenderness a surgical consult was called. Abdominal radiography was obtained and revealed a massive dilatation of the colon. On suspicion of an acute bowel obstruction emergency surgery was performed.

The abdominal cavity was accessed via midline laparotomy. Torsion of the ascending colon was identified as cause of the massive colon dilatation. After untwisting of the torsion the bowel was inspected. Owing to significant infarction of ascending colon and cecum without tendency towards recovery we decided to remove these parts of the bowel. Transverse colon and ileum were rejoined by end-to-side anastomosis.

The patient recovered well after surgery, except for an event of aspiration pneumonia. Transition to normal diet was not delayed.

Conclusion:
There is a known increased risk of bowel obstruction to patients with Cornelia-de-Lange-Syndrome, presumably due to congenital nonfixation of the colon. As this contributes to the mortality in these patients caregivers and pediatricians should be aware of symptoms related to impending bowel obstruction as abdominal distension, constipation, vomiting and lack of bowel movement. Radiographic imaging and surgical referral should not be delayed on suspicion.
Abdomenübersicht