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Keynote: Systematic prospective database of complications as a basis for performance of certification for surgical centers of excellence

(Abstract ID: 493)

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Background:

Quality control is gaining importance in daily routine. Surgical outcome is measured by structured prospective documentation of postoperative complications. These are recorded by the well known Clavien-Dindo-classification and graduated into minor and major complications.

Materials and methods:

There are different systems for quality control and recording that are available nationally as well internationally. We evaluate our experience with our own and international registries for quality control.

Results:

We present an overview over the actual international registries of the upper GI tract. The two most important systems are for example the system of the FREGATT group (France) and the system of the ECCG- Esophagectomy Complication Consensus Group (International). These redistries do not only serve for documentation of complications but also include preoperative risk adjustment and evaluation of pre- and postoperative morbidity and mortality.

Conclusion:

There are well established registries nationally as well as internationally. To compare quality and outcome in the process of establishment of centers of excellence, these intruments are indispensable.

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The role of enteric glia cells in intestinal regeneration after mesenteric ischemia and reperfusion

(Abstract ID: 944)

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Background:

Acute occlusive mesenteric ischemia is a life-threatening disease and the underlying molecular mechanisms remain to be incompletely understood in modern gastrointestinal surgery. Enteric glia cells (EGC) are known to regulate epithelial integrity and homeostasis, potentially protect enteric neurons from injury and are crucial players in enteric neuro-immune interactions. We investigated the role of EGC after limited ischemia and reperfusion (I/R) of the small bowel in an animal and in vitro-model.

Materials and methods:

Limited superior mesenteric artery (SMA)-occlusion was performed in C57Bl/6 mice as well as in GFAP-GFP reporter-mice. After SMA occlusion for 45 minutes and subsequent reperfusion, morphologic and cellular changes were assessed in the affected small intestine at 3 and 24 hours. Immunofluorescence staining for GFAP, Sox-10 was perfomed in whole-mount preparations. EGC gene-expression of known inflammatory and ischemia related cyto- and chemokines was performed via RT-PCR and proliferation and apoptosis of EGC was assessed. Furthermore, primary cultures of EGC were analysed under hypoxic and normoxic conditions.

Results:

Immunofluorescence staining of the EGC marker GFAP in intestinal whole mounts showed a primary disaggregation of GFAP filaments after 3 hours (decreased mean GFAP fluorescence intensity in 5 randomly chosen EGC ganglia per HPF 200x) and a distinct morphologic upregulation after 24 hours of reperfusion. However, gene expression analysis revealed an induction and early significant upregulation of GFAP mRNA expression in the tunica muscularis at 3 hours of reperfusion, potentially representing EGC activation. Furthermore, a significant upregulation of proinflammatory cytokines (IL-6, Il-1ß) and chemokines (MCP-1) and several hypoxia induced factors was observed concomitant to a distinct change in posthypoxic EGC phenotype.

Conclusion:

Limited mesenteric ischemia and reperfusion leads to an early morphologic damage of GFAP+ EGC. A subsequent activation of GFAP+ EGC concurs with an inflammatory micro-environment and may trigger repair mechanisms essential to the restoration of normal intestinal function.

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Laser-Speckle-Contrast Analysis Perfusion Imaging of Surgical Tissues

(Abstract ID: 404)

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Background:

Survival of compromised tissues depends on sufficient perfusion and is paramount to longterm tissue stability. Laser-Doppler supported procedures allow an objective measure of relative tissue perfusion. The development of Speckle based Laser-Doppler-Imaging now permits a real time representation of tissue perfusion. The perfusion of tissues relevant in plastic surgery such as scars, phalangeal replantations and burn wounds were systematically examined by Laser Speckle Contrast Analysis (LASCA) imaging.

Materials and methods:

Perfusion of baseline skin, atrophic and hypertrophic scars, keloids and replanted fingers and different burn wound degrees (IIa, IIb and III) were examined by LASCA-imaging. Baseline perfusion and perfusion values of compromised tissues were quantified and compared. Defined ROI (regions of interest) where analysed as arbitrary perfusion units and statistically compared by one-way Anova und Tukey´s Test for multiple comparisms.

Results:

LASCA-imaging showes significant differences in baseline perfusion of skin compared to atrophic scars, hypertrophic scars and keloids. Finger replantationen with subsequent replantation failure showes a characteristic and significant hypoperfusion in line with the expected clinical feature. A significant difference of tissue perfusion marks clinically not unambiguously distinguishable superficial (IIa) and superficial deep (IIb) burns. In deep burns a typical hypoperfusion exists, which mimics the low perfusion values of normal skin and thereby differs significantly from IIa°- and IIb° burn wound perfusion. Furthermore, the characteristic perfusion values of different burn degrees corresponds to the varying treatment strategies.

Table:

	Basal	Atrophic	Hypertrophic	Keloid
Number (Pt.)	11	11	11	7
Mean	46.04	27.10	71.67	97.76
SEM	2.039	1.154	7.404	5.932
95% CI	41.49 - 50.58	24.53 - 29.67	55.17 - 88.17	83.25 - 112.3

	Basal	Vital replantation	Avital replantation
Number (Pt.)	11	11	12
MEAN	44.54	64.00	14.28
SEM	1.857	18.69	3.268
95% CI	40.41 - 48.68	51.44 - 76.55	12.20 - 16.36

	Basal	Grad IIa	Grad IIb	Grad III
Number (Pt.)	30	30	27	24
Mean	50.25	264.9	89.16	49.29
SEM	1.097	10.29	2.466	1.636
95% CI	48.01 - 52.50	243.8 - 285.9	84.09 - 94.22	45.91 - 52.68

burn degree	IIa (n)	IIa (Fraktion%)	IIb (n)	IIb (Fraktion%)	III (n)	III (Fraktion%)
E	27	90	3	11.1	0	0
TD-SHTX	3	10	21	77.8	3	11.1
ED-SHTX	0	0	3	11.1	24	88.9

Conclusion:

LASCA-Imaging represents a robust method of perfusion imaging, which combines high resolution and speed. The evaluation of scar qualitiy, phalangeal replantation and burn wound depth by LASCA-imaging provides a reliable evaluation tool to support clinical decision making and timely therapy.

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Isolated limb perfusion beyond 12h – a potential avenue for global organ sharing, limb resuscitation and optimization

(Abstract ID: 984)

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Background:

The maximum allowable ischemia time of 4-6h for amputated limbs is currently the biggest hurdle for broader application of limb allotransplantation and optimized donor-recipient matching. The safe extension of the allowable ischemia time for transport and or restoration and optimization of tissues prior to replantation may be achieved through extracorporeal isolated limb perfusion.

Materials and methods:

Based on the results of our experimental studies of ex-vivo perfusion of porcine forelimbs for up to 12h and beyond, and when compared with conventional cold storage on 4°C ice, extracorporeal perfusion with acellular solution at 10°C is a safe means to preserve amputated limbs.

Results:

The implications of this progress are many-fold as its success would potentially allow for global organ sharing as well as treatment of injured limbs with compounds unavailable for systemic therapy prior to replantation.

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Higher anti-cardiolipin antibodies levels and pathologic activated protein C resistance (APCR) reduce significantly the primary patency (PP) of polytetrafluoroethylene (PTFE) shunt prostheses

(Abstract ID: 101)

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Background:

In end-stage renal disease, autologous arteriovenous fistulas should be preferred over arteriovenous (AV) grafts as access for hemodialysis. Shunt thrombosis represents a frequent and therefore important complication of these hemodialysis access sites. It is unknown, which thrombophilic factors have an influence on the PP of PTFE grafts, which is defined as time between implantation and first thrombosis.

Materials and methods:

From 2009 to 2014 135 PTFE grafts were implanted at the Medical University of Graz. In this study 43 patients with 59 shunts could be included. Blood was taken for determination of various thrombophilic factors, clinical data were drawn retrospectively. Thrombophilia screening included genetic tests for MTHFR mutation, Factor V "Leiden"- and Prothrombin G20210A mutation. Additionally, serum levels of homocysteine, lipoprotein a, APCR, protein C activity, fractionated protein S antigen, Lupus sensitive activated partial thromboplastin time (aPTT), Lupus anticoagulant, anti-cardiolipin antibody and ß2-glycoprotein antibody levels were evaluated.

Results:

Two of the investigated factors revealed significant differences (table):

11.9 % of the patients had a factor V Leiden thrombophilia (heterozygous + homozygous). All patients with a factor V Leiden mutation had pathologic activated protein C resistance (APCR) values and a significantly lower PP.

Table:

	Value	PP (months)	P
APCR	< 2.9	6.4	0.001
	>= 2.9	17.6	
Cardiolipin Antibodies		24.5	0.05
	> 2.5	9.1	

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Conclusion:

Patients with factor V Leiden mutations in general only need protection against thromboembolic events in high risk situations (pregnancy, immobilization). Our data reveal that the use of PTFE shunt grafts puts the patients at risk for thromboembolic events so these particular individuals should be put on oral anticoagulation. To reduce the frequency of thrombectomies, patients should undergo thrombophilia screening before a PTFE shunt graft is implanted.

The anti-cardiolipin antibodies were significantly associated with a low PP, which is surprising because the anti-cardiolipin antibody levels of all patients were within the "normal" range according to the Sydney criteria from 2008 thus we are not able to draw conclusions with sufficient power, further studies are needed for that particular issues.

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The value of ABCD2 Score extensions for surgical decision making

(Abstract ID: 120)

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Background:

The ABCD2 Score was derived to identify patients with TIA (transitoric ischaemic attack), who need urgent neurological diagnosis and treatment to prevent stroke for which patients with a risk score of 6 or 7 are considered to be at high risk.

In case of symptomatic internal carotid artery stenosis surgeons need to know, if such a patient should be in theatre within 24 hours or if a waiting time of one week is acceptable.

Materials and methods:

A systemic literature review was performed using the items "ABCD" and "Score". 159 matches were found. After abstract reading 99 papers were identified dealing with ABCD2 and stroke. All papers were read, 12 papers finally displayed 7-day-stroke risk with detailed stratification to distinct ABCD2 levels. Six of the papers showed pure 7-day-stroke risk, the other ones investigated additional factors in order to improve the value of the ABCD2 score. To determine the impact of these additional informations c-statistic was calculated (area under the ROC-curve) for pure and extended ABCD2 score.

Results:

Cumulative data of all published 7-day-risk data for pure ABCD2 score revealed an area of 0.59 (CI 0.564; 0.616).

Adding different items best results were seen in combination with MRI and the proof of positive areas in diffusion weighted imaging (DWI).

Calvet 2009: 0.86 (0.782; 0.937)

Ay 2009: 0.763 (0.657; 0.869)

Internal carotid artery stenosis as well improved the area under the ROC-curve:

Koton 2007: 0.852 (0.685; 1). But this study lacked statistical power for a low number of participants (n = 29).

Other factors did not improve the value of the ABCD2-Score significantly:

Koton 2007, ABCD2 and atrial fibrillation: 0.659 (0.368;0.951)

Fothergrill 2009, ABCD2 and history of hypertension: 0.622 (0.527; 0.717)

Fothergrill 2009, ABCD2, history of hypertension and high glucosis on admission: 0.583 (0.476;0.69)

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Conclusion:

There is sufficient evidence that the inclusion of MRI and the presence or absence of positive areas in DWI has a major impact on the 7-day-stroke-risk after TIA. So patients with a ABCD2 score of 6 or 7 and DWI positive areas should undergo surgery as soon as possible.

So far we do not have sufficient information about the subgroup of patients with a high ABCD2 score and internal carotid artery stenosis. We conclude our workflow from the whole dataset but we are in need of a prospective trial focusing on this subgroup.

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Mesenteric ischemia following branched EVAR for thoracoabdominal aortic aneurysms

(Abstract ID: 221)

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Background:

Branched endovascular aortic repair (BEVAR) has become an accepted option for treatment of thoracoabdominal aortic aneurysms (TAAA). Staged procedures with temporary aneurysm sac perfusion (TASP) was shown to reduce the risk of spinal cord ischemia in patients with extended aortic aneurysmal disease. However, other major complications like mesenteric ischemia still remain.

Materials and methods:

Patients with TAAA were treated with branched EVAR between 09/2007 and 12/2015 using a single step or open branch staged procedure with temporary aneurysm sac perfusion. TASP side branches were completed after 1-12 months. Postoperative mesenteric ischemia was defined as laparotomy for suspected or proven intestinal malperfusion. Mesenteric ischema with intestinal resection, patency of visceral branches to the celiac trunk (CeTr), the superior (SMA) and inferior mesenteric artery (MA), the rate of reinterventions and perioperative mortality was analyzed.

Results:

118 patients were treated with BEVAR, 46 without an aneurysm sac perfusion (single-step) and 72 with open branch and TASP. In 7 Patients the TASP side branch was not completed for various reasons. Technical success, duration of intervention, contrast volume and the rate of early reinterventions were similar in both groups. The combined number of days on the intensive care unit and the hospital stay was longer in the open branch TASP group. Laparotomy for suspected mesenteric ischemia was observed in 9 patients and 8 (6.7 %) patients had small bowel or colon resections 1-7 (mean: 3.1) days after the endovascular intervention. Cause of acute mesenteric ischemia was multiple embolic disease (n=2), SMA malperfusion (n=3) and left colonic ischemia related to non-compensated IMA occlusion. The risk of mesenteric ischemia with intestinal resection was more frequently observed in the single step group (15.2 % vs 1.4 %, p=0.005) although perioperative mortality was similar in both groups (8.7 % vs 6.9 %).

Conclusion:

Staged procedures using the open branch concept with temporary aneurysm sac perfusion seem to improve outcome after branched EVAR for TAAA with reduced risk for mesenteric ischemia.

Indications and results of planned second-look operations in acute mesenteric ischemia

(Abstract ID: 726)

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Background:

During laparotomy for acute mesenteric ischemia, besides revascularisation bowel resection is often necessary. Given the risk of progressing ischemia of initially uninvolved or critically perfused bowel segments, the strategy of planned second look operations after 24 - 48 hours has gained widespread acceptance. In this study indications and results of these second look operations are assessed to clarify if second look operations might be safely omitted in selected cases.

Materials and methods:

All patients being treated for acute mesenteric ischemia at the University Hospital Muenster between 01/2010 and 03/2015 were identified by searching the ICD codes. Charts were reviewed retrospectively extracting the following parameters: etiology of ischemia, surgical therapy, indication for second look operation, result of second look operation, and letality. Chi Square tests were used for statistical analysis.

Results:

126 patients with acute mesenteric ischemia were included in the study. Patient age was in median 67 (20-89) years, with 53 females and 73 males. Etiologies of ischemia were non-occlusive mesenteric ischemia (NOMI) in 31.7%, ischemia due to mechanical strangulation (hernia, adhesions) in 16.7%, arterial thrombosis in 15.9%, arterial embolus in 8.7%,venous thrombosis in 5.6%, other causes in 7.9%; in 13.5% the etiology remained unclear. Overall letality of mesenteric ischemia was 52.4%. During the initial operation, 68/121 (56.2%) patients had clearly restricted ischemic areas with adjacent vital bowel segments, 22/121 (18.2%) had diffuse ischemic alterations without clear borders, 23/121 (10.7%) had no irreversible ischemia and needed no resection, and 8/121 (6.6%) had a complete necrosis of the intestine. After resection, critically perfused, but not necrotic segments were left in situ in 38/121 (31.4%). A second look operation was planned in 65/113 (57.5%), with 12/65 (18.5%) deceasing before the planned second look operation. During the second look operation, new ischemic bowel segments were identified in 32/53 (60.4%). Letality in all patients being planned for a second look operation was 38/65 (58.5%). Among 48 patients without planned second look operation, 14/48 (29.2%) needed unplanned emergency redo laparotomies because of bowel ischemia or other intraabdominal complications, and overall mortality in this group was 16/48 (33.3%; p=0.008 versus patients with planned second look operation). In the group without planned second look operation, sharply circumscribed bowel ischemia due to mechanical strangulation (hernia, adhesions) was the only etiology without letality or unplanned redo operation for progressive ischemia (n=12 patients).

Conclusion:

After surgical management of acute mesenteric ischemia, a scheduled second look operation is strongly recommended. It reveals further ischemic bowel segments in 60.4%, while omission of a second look operation leads to emergency redo operations in 29.2%. In this retrospective study, the survival benefit of patients not being scheduled for a second look operation is clearly due to a selection bias, as the most critical patients were always scheduled for second look operations. Sharply bordered bowel ischemia due to mechanical strangulation is the only indication which seems to allow the omission of a planned second look operation.

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Local vascular complications after cardiac catheterization and angiography

(Abstract ID: 558)

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Background:

Local vascular complications (pseudoaneurysm / local vascular occlusion) after cardiac catheterization and interventional angiography still play a major role despite known risk factors and new vascular closure devices. A risk reduction is indispensable with increasing patient age and multi-morbidity and increasing number of interventions.

Materials and methods:

This retrospective study was performed to analyze risk factors, and to provide an impression of advantages and disadvantages of new vascular closure devices. For this purpose, we analyzed the data from approximately 22000 conducted cardiac catheterizations, angiographies and electrophysiological studies during the last 5 years in our hospital. Special focus was set on pseudoaneurysm wich had surgery, and critical limb ischemia after using closure devices.

Results:

In the period between 2011-2016, we conducted a total of 12,917 left heart catheterizations; 11,205 were performed via radial access, 33 observed pseudoaneurysms underwent surgical treatment (0.3%). Via a brachial access we performed 36 left heart catheterizations and 654 angiographies. In this group 16 pseudoaneurysms needed surgical treatment (2.3%). 1,676 left heart catheterizations, 8,152 angiographies and 225 electrophysiological studies were carried out over a femoral approach, 263 of them had pseudoaneurysms with surgery (2.6%).

Table:

Punktion	femoral	brachial	radial	total
Left heart catheterization 2011-2016	1676	36	11205	12917
angiography 2011-2016	8152	654	0	8806
electrophysiological examination of the heart 2015-2016	225	0	0	225
had surgery 2011-2016 results	263	16	33	312

Conclusion:

In the studied cohort of 21,948 angiographies / cardiac catheterizations of radial access over the femoral approach is considered to be safe first (rate of vascular surgery at radial access 0.3%). What influence indroducer set size and their length of stay, the individual risk factors of the patient and how large the number of conservative supplied pseudoaneurysm, will become clear in the final analysis.

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Influence of disease status, location of lesion and profession on radiation dosage of percutaneous treatment for PAD – Results from a 11-year population based registry in the metropolitan area of Hamburg

(Abstract ID: 50)

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Background:

Worldwide prevalence of peripheral artery disease (PAD) has evolved to a primary treatment option and therefore used with escalating incidence. Dose-area product (DAP) serves to estimate the total amount of radiation energy deposited in the patient during ER. This study aims to determine whether there is any association between stage of disease, localization of target lesion and surgical expertise on the radiation dose in endovascular treatment of PAD.

Materials and methods:

Prospective, mandatory population based registry study. 24,000 invasive percutaneous endovascular treatments of PAD conducted in the metropolitan area of Hamburg (Germany) were consecutively collected between January 2004 and December 2015. DAP was analyzed by special discipline conducting the procedure, Fontaine classification, patient gender and age.

Results:

While the total number of procedures increased, DAP remained stable during the study period with a median DAP for all conducted procedures of 1,250 cGy*cm² (IQR = 400 to 3,515). DAP was significantly lower for treatment of CLI in radiology and internal medicine including cardiology. No significant differences were detected in vascular surgery or in angiology. Considering all procedures, the lowest DAP values were observed in patients treated by vascular surgeons (711 vs. 1,801 cGy*cm², $p < .001$). Lowest DAP values were reached following multidisciplinary consultation (1,156 vs. 2,336 cGy*cm², $p < .001$). Lowest DAP values have been demonstrated in treatment of ulcers or gangrene. Considering the treatment of intermittent claudication, men had statistically significantly higher DAP values compared to women. Men also had higher DAP values at the age of 70 to 79 years. Although DAP decreased significantly in higher age groups, no substantial linear statistical correlation between age and DAP could be found.

Table:

	Vascular Surgery	Radiology	Angiology	Internal and Cardiology
No. of procedures	7,705	7,823	1,134	3,668
Proportion of CLI, % (CI)	41.4 (40.3 - 42.5)	34.8 (33.7 - 35.9)	34.6 (31.8 - 37.4)	41.5 (39.9 - 43.1)

Conclusion:

This is the first population based study on DAP during ER of PAD. Higher age and female gender was associated with lower radiation dosage. Procedures conducted by vascular surgeons revealed lowest DAP values. Furthermore, multidisciplinary decision making was statistically significantly associated with lower radiation dose. Since ER is developing to the primary treatment in PAD, additional studies might be useful to diminish radiation exposure for patients as well as for healthcare professionals.

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Treatment of blunt thoracic aortic injury in Germany — should the superiority of the endovascular treatment be reflected more critically? – assessment of the TraumaRegister DGU® (2002-2013)

(Abstract ID: 74)

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Background:

Although new endovascular therapies offer fast and minimal invasive treatment, traumatic rupture of the thoracic aorta is still afflicted with high morbidity and mortality rates. Using the data delivered by the German Trauma Register DGU® from 2002 till 2013, the value of different therapy modalities in case of blunt thoracic aortic injury (BTAI) in Germany were analyzed.

Materials and methods:

Prospectively collected data of patients suffering from BTAI were retrospectively analyzed. Differences between grade I-IV injuries, classified following the recommendation of the Society of Vascular Surgery, have been assessed. Patients who underwent medical treatment, endovascular or open surgical repair, had been compared regarding morbidity and mortality rates.

Results:

821 patients suffering from BTAI were identified. Of these, 51.6 % (424) cases were classified as grade I injury, 35.4% (291) as grade II or III injury and 12.9% (106) as grade IV injury, 77.5 % (n = 635) of these patients were men (44.94 ± 20.6 years). The main patterns of injury were high- speed accidents and falls (78.0% [n = 640], 21.8%[n = 171] respectively). Significant differences between grade I and grade II/III as well as IV injuries could be assessed for the incidence of cardiopulmonary resuscitation, a Glasgow Coma Scale score below 8 and a systolic blood pressure below 90 mmHg (two-sided p-value: <0.001). In the primary admission subgroup, 44.1% (197/447) of the patients received best medical treatment, 55.9% received surgical intervention (250/447). In the surgical subgroup, 37.2% (93/250) received open surgery and 62.8% (147/250) had been treated by endovascular means. Significantly lower 24-h- and in-hospital-mortality rates were encountered after endovascular treatment for all gradings of BTAI (two- sided p-value: <0.001). Yet this subgroup of patients showed the lowest incidence of further severe injuries and cardiac arrest, according to a compulsory preselection.

Conclusion:

Within the last decade, endovascular therapy became the treatment of choice for BTAI in Germany. Patients who have been treated by surgical means showed the highest survival rate, independent from the existing grading. Especially endovascular therapy showed a favorable low mortality rate. In the present cohort of patients certain limitations regarding the estimated superiority of the endovascular approach has to be taken into account.

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Clinical implications of fracture-associated vascular damage in extremity and pelvic trauma

(Abstract ID: 690)

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Background:

Introduction: The establishment of surgical trauma units comprising a specialized, multidisciplinary team of medical professionals has increased the survival rates and injury-specific outcome of multi-injured patients. Yet, increased mortality and morbidity is observed, when additional vascular damage aggravates the pattern of injuries. Therefore, specific clinical implications of vascular damage associated with osseous destruction should be reassessed.

Materials and methods:

Material and Methods: This comprehensive nine-year retrospective single center cohort study analyzed epidemiological, laboratory, treatment and outcome data from a total of 3689 patients, thereof 64 fracture-associated vascular injuries versus a respective control group.

Results:

Results: 1 ouf 14 trauma room cases (6.5%) in a level I trauma center requires a vascular surgeon. Additional vascular damage is a rare complication with a tremendous clinical impact, yet comparable overall survival, that accompanies osseous fracture in 4-6% of all trauma cases. Most seriously, in pelvic fractures it is associated with an increased immediate and overall mortality rate. Substantial fluid administration during stabilization to secure patient transport, easily estimated by hemoglobin count and alterations of plasmatic coagulation at the time of admission, is indicative of associated vascular issues. Open and endovascular procedures for arterial and venous repair depend on the site of injury, yet both techniques are mandatory to be hold available .

Conclusion:

Conclusion: Vascular damage in combination with osseous fracture severely deteriorates the course of disease in trauma patients. Immediate diagnosis and early goal-directed supportive, interventional and surgical means are necessary to optimize patient-specific outcome.

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Clinical and molecular effects of EPO and cEPO-Fc on murine spinal cord ischemia/reperfusion injury after aortic clamping

(Abstract ID: 384)

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Background:

Almost 30 % of all patients, undergoing clamping procedure for thoracoabdominal aortic repair, suffer postoperatively from the consequences of ischemia/reperfusion (I/R) injury of the lower body half, which can cause paraplegia. Studies show a central role of the endoplasmic reticulum (ER) stress as a result from the I/R and the resulting free radicals.

In this study, we examine the effects of pre-operative use of native erythropoietin (EPO) and its derivative cEPO - Fc on paraplegia and ER stress in vivo.

Materials and methods:

By clamping the thoracic aorta of male mice (C57BL) ischemia of the distal parts of the body and the associated spinal cord sections was induced. After testing the best clamping time, 3 groups (EPO, cEPO-Fc and control) were observed for 4 days. Twice a day mice were examined neurologically using Basso mouse scale. At the end animals were sacrificed and spinal cord harvested. Tissue were stained using hematoxylin-eosin stain and luxol fast blue stain. Furthermore immunohistochemistry of relevant ER stress proteins were performed. Pictures were taken and analysed using ImageJ.

Results:

Basso mouse scale showed an ideal clamping time of 7min. EPO and cEPO-Fc showed clear neurological effects. Damage to the spinal cord was evaluated by a histological score and showed significant differences in the experimental groups. Regulation in ER stress-related proteins like CASP12 and ATF6 were detected.

Conclusion:

EPO and cEPO-Fc showed significant effects in attenuating spinal cord ischemia and reperfusion injury and improved neurological outcome after aortic clamping procedure on clinical as well on molecular level.

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Population-based Screening for Abdominal Aortic Aneurysms in the Metropolitan Area of Hamburg – First Results of the Hamburg City Health Study

(Abstract ID: 51)

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Background:

Invasive treatment of intact (iAAA) and ruptured (rAAA) abdominal aortic aneurysms has remarkably changed over the last decade. Utilization of endovascular approach (EVAR) is ever-increasing and the short-term mortality after EVAR decreases continuously. Although the increased rate of EVAR can be found worldwide, there are remarkable differences across countries for EVAR utilization, the management of the elderly and screening for AAA. While most screening programs in Europe are build up on the results from four randomized trials (RCT) of the nineties, recent studies report significantly lower prevalences and increasing number-needed-to-screen (NNS) for today. This might implicate that important assumptions of former RCT are outdated. Up to the present day, little is known about the prevalence of AAA in Germany. This study aims to determine the population based prevalence of abdominal aortic aneurysms, gender differences and risk factors in the metropolitan area of Hamburg to support the process of planning an ultrasound screening program in Germany.

Materials and methods:

The Hamburg City Health Study (HCHS) is a joint interdisciplinary endeavour of physicians and scientists from the University Medical Center Hamburg-Eppendorf. It is an epidemiological, prospective, cohort study of 45.000 citizen of the city of Hamburg, carried out for the improvement of individual risk stratification for the major chronic diseases. More than 6,000 items are collected during an examination duration of 6 hours. An ultrasound of the abdominal aorta is conducted for each participant. Statistical association is analyzed for largest infrarenal aortic diameter by several predictors, like gender, age or cardiovascular risk factors.

Results:

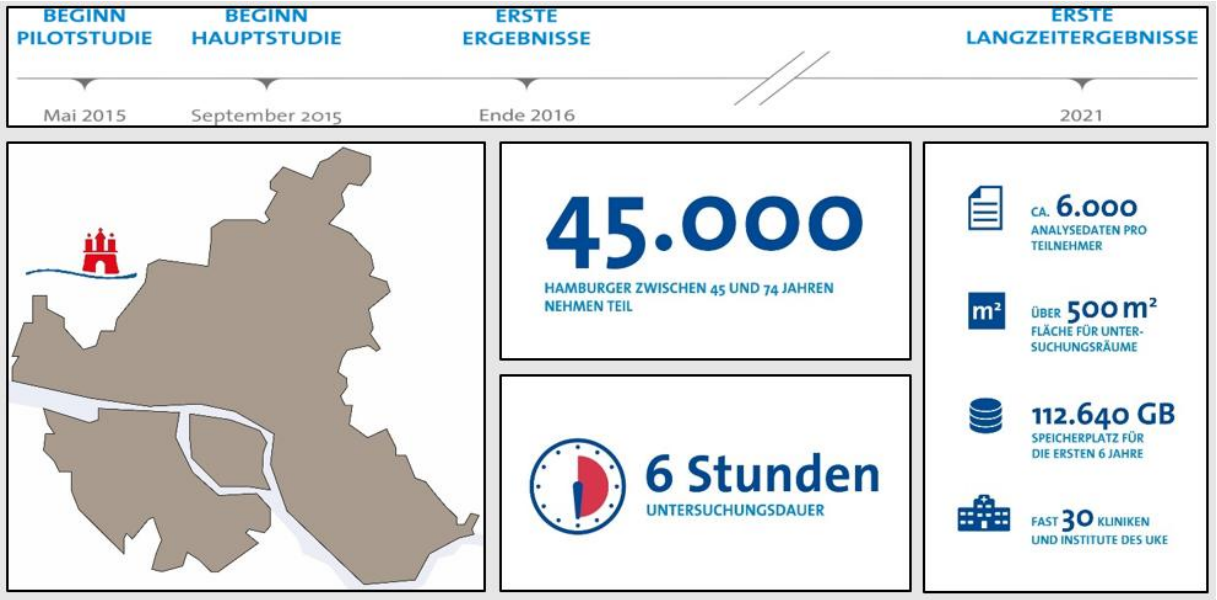
The first population-based results will be available at the end of 2016 (first 5,000 participants). Preliminary analyze shows a prevalence of 1 - 2 %.

Conclusion:

Newer population-based data is needed to estimate the benefit and harms of ultrasound screening programs on abdominal aortic aneurysm. Less is known about female gender and other specific cohorts under risk.

The first population-based results will be available at the end of 2016 (first 5,000 participants). Preliminary analyze shows a prevalence of 1 - 2 %.

Picture:



HCHS Overview

Innov Surg Sci 2017; 2, (Suppl 1): s217–s237

Survival of endovascular stentgraft infection with clostridium perfringens (gas gangrene)

(Abstract ID: 86)

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Background:

Prosthetic graft infections are rare but devastating complications and occur after open as well as endovascular procedures. With respect to the bacteria, gram-positive bacteria are the microorganisms identified in far the most cases. However, also gram-negative bacteria as well as fungi have reported. To our knowledge, an endovascular stentgraft infection by clostridium perfringens (gas gangrene) with subsequent survival of the patient has not been reported so far.

Materials and methods:

The patient presented to our department with diffuse abdominal pain, general malaise and subfebrile temperature. He was treated for AAA by endovascular aneurysm sealing (EVAS) with Nellix® grafts 15 months before with regular follow-up CT-scans at 6 and 12 months. However, CT-Scan on admission now showed infective changes of the retroperitoneum around the aneurysm as well as air bubbles in the aneurysm sac and the surrounding tissue. Therefore, diagnosis of prosthetic graft infection was made and the patient prepared for graft removal.

Results:

Complete removal of the Nellix® stentgrafts was performed via median laparotomy and suprarenal aortic crossclamping. Autologous femoral vein was harvested from both limbs and used for reconstruction of the aortoiliac axis (aortobiiliac neo-bifurcation). Additionally, the aneurysm wall was resected and omentoplasty was performed to cover the reconstruction. The operative time was 420 min and the patient was transferred in stable condition to ICU postoperatively. On the second postoperative day, microbiology culture of the removed endografts/aneurysm wall confirmed presence of clostridium perfringens (gas gangrene). Therefore, the patient was immediately transferred to a pressure chamber and 5 cycles of hyperbaric oxygenation were performed. Additionally, the patient received targeted antibiotic therapy. After a prolonged hospital stay (59 days), the patient was discharged home without signs of infection. After a follow-up of 12 months, the patient is doing well and MR-/CT-angiograms at 0 and 12 months were regular.

Conclusion:

To our knowledge this is the first case of survival of endovascular stentgraft infection with clostridium perfringens/gas gangrene achieved by a combination of complete graft removal, autologous reconstruction, hyperbaric oxygenation and targeted antibiotic therapy.

Innov Surg Sci 2017; 2, (Suppl 1): s217–s237

3D-Analysis of component stability of the Nellix® endovascular aneurysm sealing (EVAS) technology after treatment of infrarenal abdominal aortic aneurysms

(Abstract ID: 87)

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Background:

To assess short-term stability and conformational changes of the nellix endografts after treatment of AAA by 3D-analysis.

Materials and methods:

Postoperative CT-Scans obtained at 0, 3 and 12 months of 24 patients treated between december 2013 and december 2014 by EVAS for intact AAA (within IFU) with EVAS were evaluated for stentgraft deviation (of proximal, middle and distal segments) in multiple planes using a dedicated 3D-analysis software. In addition, 2D analysis using an anatomically fixed reference landmark was performed to assess craniocaudal migration. Clinical and follow-up data of the patients were recorded and matched with results of the imaging analysis.

Results:

We found a promising overall stability of the non-connected Nellix endografts with a mean deviation of 2mm for proximal and 3 mm for middle segments at 12 months when compared to baseline (0 months). Relevant (>mean+1SD) conformational changes were noted in 9 patients and are in the majority of cases (n=6) limited to the iliac graft segment. Distal deviation was clinically benign in all cases, conversely, stentgraft deviation of the proximal segment in one patient of our series correlated with Type IA endoleak. By additional 2D-analysis, relevant (>=5mm) caudal migration of the Nellix graft was noted in 6 patients (25%) including the one patient with EL IA. In 4 patients, 3D-analysis demonstrated the absence of conformational changes of the endografts despite caudal migration.

Conclusion:

This is the first study performing postoperative 3D-analysis on Nellix endografts and we found a promising overall stability of the non-connected stentgrafts in the short-term. Relevant conformational changes (stentgraft deviation) are in the majority of cases limited to the iliac graft segment and were clinically benign in all instances.

Innov Surg Sci 2017; 2, (Suppl 1): s217–s237

Use of the Omniflow II-Biograft for aortoiliac reconstruction in contaminated operative fields

(Abstract ID: 85)

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Background:

Contamination of the operative field can be caused by bacteria either derived from prosthetic graft infection or other infective foci like toe gangrene or urosepsis. We report our experience with use of the Omniflow II-Biograft for aortoiliac reconstruction in contaminated operative field.

Materials and methods:

Between november 2015 and july 2016 we used the Omniflow II-Biograft for aortoiliac reconstruction in contaminated operative field in 5 patients (4 men). Bacterial contamination resulted from prosthetic graft infection in 2 cases (tube graft, EVAS) and in 3 cases of infective foci (toe gangrene, urosepsis, simultaneous hysterectomy/bladder resection).

Results:

Operative approach was via median laparotomy in all cases. The Omniflow-Bifurcation was intraoperatively created from a 8mm Omniflow II-Biograft and placed as an aortobiiliac graft in 3 cases and aortobifemoral graft in 3 cases. In the 2 cases of prosthetic graft infection, an additional omentoplasty was performed. The mean operative time was 275 min. Postoperatively, all patients were monitored for one night at the ICU and the mean length of hospital stay was 11 days. Postoperative imaging revealed one anastomotic stenosis of the Omniflow-Bifurcation that was corrected subsequently by patch plasty. After a mean follow-up of 6 months, all patients are alive with normal perfusion of lower limbs.

Conclusion:

Due to its increased resistance to infection, the Omniflow II-Bifurcation represents a viable option for aortoiliac reconstruction in contaminated operative fields.