chimney Advanta V12 stent grafts were used (one unilateral and three bilateral) from axillary access. In one case aorto-uniliac Nellix was implanted with cross-over by-pass. The decision was made during the procedure when there was no possibility to introduce one of the stent grafts due to tortuous and calcified iliac artery. The mean length of hospital stay was 6 days, four patients were sent to intensive care unit for one day after the procedure. No endoleaks were noticed during the procedure and during follow up. All prostheses remain patent. One patient was readmitted on 17th post-operative day due to secondary aneurysm rupture. Open conversion was performed, the Nellix stent graft was explanted and replaced with a bifurcated graft. Further follow up was uneventful.

Conclusion: EVAS is an innovative concept in the treatment of AAA designed to target the causes of secondary interventions such as endo-leaks and migration. It offers an alternative for patients unsuitable for fenestrated devices or open surgery. Results of the chimney technique, though beyond the instruction for use for the procedure, are very promising and in particular cases it can be an alternative to custom made fenestrated stent grafts reducing costs and shortening the time of waiting for interventions.

Aorto-Enteric Fistula following Endovascular Aortic Repair: Results from the Multicenter study on Aorto-Enteric Fistulization after Stent grafting Of the abdominal aorta (MAEFISTO)
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Introduction: As the number of patients treated with endovascular abdominal aortic repair (EVAR) is considerably growing in recent years, related complications are observed with increasing frequency. Among these, aortoenteric fistula (AEF) is known to be a dramatic and highly lethal event, but evidence in the literature is scant and mainly based on single center case reports. Aim of this study is to investigate the incidence, clinical features, therapeutic options, and outcomes of AEF developing after EVAR.

Methods: A retrospective multicenter study was conducted among eight Italian universities and hospital centers with an abdominal aortic endovascular program, to collect data on AEF developed after EVAR performed for non-infectious disease.

Results: Among 3,932 patients who underwent EVAR between 1997 and 2013, 32 (0.8%; 27 males, mean age 72 ± 8 years) developed an AEF. Median time between EVAR and AEF formation was 18.5 months (inter-quartile range, IQR: 10.5–63.5 months). Both anastomotic pseudoaneurysm as the indication to EVAR, and urgent/emergent EVAR resulted significantly associated with AEF development (34% vs. 5%, P < 0.0001; and 22% vs. 8%, P = 0.01, respectively). Among 5 patients treated conservatively, 2 (40%) died at 7 and 15 months respectively, while the other 3 are alive at a median follow up of 12 months (IQR: 7–15). The remaining 27 patients underwent AEF surgical treatment, with a peri-operative mortality of 37% (n = 10). No additional aortic related death was recorded in operated patients at a median follow up of 28 months (IQR: 14–42).

Conclusion: Late AEF may occur in less than 1% of patients submitted to EVAR, with an increased risk in case of emergent EVAR or performed for pseudoaneurysm following previous aortic surgery. Both conservative and surgical treatment of post-EVAR AEF is associated with high mortality. However, beyond the peri-operative period, surgical correction of AEF appears to be durable at midterm follow up.

Internal iliac Aneurysms have a Low Risk of Rupture under 4 cm: A Multicentre Study
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Introduction: Internal iliac artery aneurysms are rare and their risk of rupture is unknown. The definition of common iliac aneurysm is a maximum diameter of greater than 18–20 mm, but there is no clear diameter definition for internal iliac aneurysms. The threshold for elective repair in iliac aneurysms is commonly 30 mm. However, no strong scientifc data exists on the risk of rupture. The aim of the current study was to evaluate the size of internal iliac aneurysm at the time of rupture.

Methods: This was a retrospective multicentre study including patients with ruptured internal iliac artery aneurysm (RIIAA) from Australia, Finland, Germany, Hungary, New Zealand, Norway and Sweden. The data on aneurysm size at the time of rupture, information on concomitant aneurysms in aorta, ipsilateral common iliac artery as well as contralateral iliac arteries, treatment of the RIIAA as well as outcome were collected from CT-images and patients’ case records.

Results: In total 59 RIIAA patients were treated during 2004–2014. Median diameter at the time of rupture was 67.5 mm (IQR 52–85 mm, range 25–116 mm). In one patient (1.8%) the maximum diameter was less than 3 cm, in 3 patients (5.5%) less than 4 cm. Mean age at the time of rupture was 77 years. 86% of patients were men. 57% had bilateral IAAA, 64% also had an aeurysmal common iliac artery and 44% also had AAA. 38% had involvement of internal and common iliac arteries and the aorta. 29% had an isolated internal iliac aneurysm. Repair by either open procedure (n = 42, 71%), endovascular procedure (n = 12, 20%) or hybrid procedure (n = 5, 8.5%) was performed on all patients. 30 day mortality was 19%; 8.3% after endovascular treatment, 21% after open surgery and 20% after a hybrid procedure.

Conclusion: Internal iliac artery aneurysm ruptures are rare. As with RAAA most of the patients are male. Compared to operative RAAA mortality, RIIAA mortality seems to be somewhat lower with less than 20% mortality at 30 days. The median size of the aneurysm at the time of rupture was 67 mm, compared to 76 mm in abdominal aortic aneurysms. Only one patient had a rupture at a diameter of less than 3 cm, which suggests that the threshold for elective treatment might be quite safely increased to 4 cm.

Comparative Effectiveness of Endovascular versus Open Repair for Juxta- and Suprarenal Abdominal Aortic Aneurysms
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Introduction: With the advancement of endovascular techniques (EVAR) for abdominal aortic aneurysm repair (AAA), the number of patients treated for juxta- and suprarenal aneurysms with EVAR is increasing. During the adoption of new treatment strategies, it is important to track performances and compare results to conventional treatment. The purpose of this study was, therefore, to examine perioperative outcomes in patients undergoing endovascular juxta- and suprarenal AAA repair and compare those results to conventional open repair.

Methods: We identified all patients undergoing non-emergent EVAR or open repair for juxta- and suprarenal AAA between January 2003 and December 2014 in the Targeted Vascular data set from the American College of Surgeons National Surgical Quality Improvement Program. Comparative analyses included patient and intraoperative characteristics, in addition to 30-day postoperative outcomes. Independent risk factors for morbidity and mortality were established using multivariable logistic regression analysis.

Results: A total of 907 patients were included, with 411 (45%) undergoing EVAR, and 496 (55%) undergoing open repair. Perioperative mortality following EVAR was 2.2% vs. 4.6% after open repair (P < 0.047). Postoperative deterioration of renal function was less common among patients undergoing EVAR (2.2% vs. 8.7%, P < 0.001), as well as the need for dialysis (1.2% vs. 5.2%, P = 0.001). Other differences in perioperative morbidity after EVAR and open repair, respectively, included the occurrence of ischemic colitis (1.0% vs. 5.0%, P < 0.001), myocardial infarction (0.7% vs. 3.8%, P = 0.002), wound dehiscence (0.2% vs. 2.6%, P = 0.005), pneumonia (1.2% vs. 7.9%, P < 0.001), prolonged ventilator dependence (1.9% vs. 13.5%, P < 0.001).
and return to the operating room (5.4% vs. 13.3%, P < .001). In addition, EVAR was associated with shorter length of hospital stay (4.1 vs. 11.1 days, P < .001) and ICU stay (1.0 vs. 4.5 days, P < .001). Compared to EVAR, open repair was an independent predictor of 30-day mortality (OR: 2.5, 95% CI: 1.1–5.6), renal function deterioration (4.5, 2.1–9.4), and any complication (3.9, 2.7–5.7).

Conclusions: This multicenter study found that EVAR for juxtaand suprarenal AAA is associated with significant perioperative morbidity and mortality benefits. These findings suggest that endovascular repair for anatomically complex AAA may be preferred over conventional open repair. Further research is warranted to assess whether this favorable outcome is maintained during long-term follow-up.

Impact of Number of Vessels Targeted by Fenestrations or Branches on Outcomes of Patients Undergoing Endovascular Repair of Complex Abdominal Aortic Aneurysms

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Introduction: Fenestrated endovascular repair (FEVAR) with four vessel designs offers the advantages of wider clinical applicability with placement of the stent graft in a more stable aortic segment, but require coverage of the distal thoracic aorta and stenting of additional target vessels, potentially increasing morbidity and mortality. The aim of this study was to investigate the impact of number of vessels targeted by fenestrations or branches on outcomes of FEVAR.

Methods: We reviewed the clinical data and outcomes of 260 patients (209 male, 51 female; mean, 74 ± 7 years) treated by FEVAR using patient specific or off the shelf manufactured stent grafts with one to five fenestrations or branches. All patients were enrolled in prospective investigational device exemption protocols (2009–2014). Patients with type I-III thoraco-abdominal aneurysms were excluded from the study. Data was analyzed in patients treated with ≤2-vessel (n = 124), 3 vessel (n = 80) or ≥4-vessel (n = 56) targeted by fenestrations or branches, not including scallops. Endpoints were technical success, procedural variables, 30 day mortality and major adverse events (MAEs).

Results: Demographics, cardiovascular risk factors, comorbidity scores and aneurysm diameter were similar in all three groups. 830 vessels were placed (4.5, 2.1–9.4), and any complication (3.9, 2.7–5.7). For the four-vessel group, differences were not significant. Increasing number of target vessels was associated with longer operating and fluoroscopy time, more contrast use, and longer hospital stay, but did not affect technical success, morbidity or mortality. Although rates of spinal cord injury were higher in the four-vessel group, differences were not significant.

Conclusion: FEVAR was associated with high technical success (99%), low mortality (1.5%) and morbidity (14%). Increasing number of target vessels was associated with longer operating and fluoroscopy time, more contrast use, and longer hospital stay, but did not affect technical success, morbidity or mortality. Although rates of spinal cord injury were higher in the four-vessel group, differences were not significant.

High Heritability of Abdominal Aortic Aneurysms — A Population-based Twin-study

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Introduction: It is well known that there is an increased risk of developing abdominal aneurysms (AAA) among first-degree relatives of AAA-patients; however, it is still uncertain how great a role genetics generally play in the development of the disease. In twin studies the influence of genetic and environmental factors can be assessed by comparing concordance rates between monozygotic (MZ) and dizygotic (DZ) twins. Higher phenotypic similarity between MZ than DZ twins indicates a genetic attribution to the etiology.

The primary aim of this study was to investigate the heritability of AAA among Danish twins using concordance rates and heritability estimates. Secondary aims were to investigate possible differences between gender regarding age at diagnosis and prevalence.

Methods: We identified all Danish twins with AAA using three different population-based registries: the National Hospital Patient Registry, the Registry of Cause of Death and the Danish Twin Registry, which were linked together using the Danish Civil Registration System. We calculated age at diagnosis and prevalence for both men and women, and proband-wise concordance rates. Heritability was estimated using tetrachoric correlations and structural ADCE-modelling.

Results: We included 65 – 820 twins (32 – 910 pairs). We identified 414 twins with AAA; 69.8 % (283/414) were men and 30.2 % (125/414) women. Mean age at diagnosis was 69.7 years with no significant difference between men and women (69.6 vs. 70.0 years, p = 0.64). The prevalence across all zygosities was 0.87% in men and 0.39% in women. The proband-wise concordance rate in MZ twins was 30.6% (95% CI [confidence interval]:20.3;43.3%) compared with 12.2% (95%CI:7.0;20.1%) in DZ twins. In the analysis of heritability 77% (95%CI:67;85%) of the total variance could be explained by additive genetic components. The rest of the variance could be explained by non-shared environmental factors, whereas genetic dominance and shared environmental factors were not needed to account for the observed variance.

Conclusion: In this study we found more than a two times higher concordance rate in MZ twins compared with DZ twins, which indicates a genetic component in the development of AAA. Furthermore we found an overall heritability of 77 % meaning genetic variance accounts for more than 7/9 of the total phenotypic variance. Prevalences were generally low with women accounting for about a third of the AAA-cases and we found no difference between genders regarding age at diagnosis.