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 innovate concept in the treatment of AAA designed to target the causes of secondary interventions such as endoleaks 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)


**Vascular Surgery, Vita-Salute University School of Medicine, San Raffaele Scientific Institute, Milano, Italy**

**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 complication. This was, therefore, to examine perioperative outcomes in patients undergoing endovascular aortic repair and compare results to conventional treatment. The purpose 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 15.8 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 mid-term follow up.

### Internal Iliac Aneurysms have a Low Risk of Rupture under 4 cm: A Multicentre Study

**M.T. Laine, M. Björck, B. Beiles, M. Altreuter, Z. Szeberin, I. Thompson, S. Debus, K. Mani, G. Menyhei, M. Venermo**

**Helsinki University Hospital, Helsinki, Finland**

**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 scientific 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 IIAA, 64% also had an aneurysmal 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

**K.H.J. Ultee, BSc, S.L. Zettervall, MD, P.A. Soden, MD, J. Darling, BA, H.J.M. Verhagen, MD, PhD, M.L. Schermerhorn, MD**

**Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA**

**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 = .047). Postoperative deterioration of renal function was less common among patients undergoing EVAR (2.2% vs. 8.7%, P < .001), as well as the need for dialysis (1.2% vs. 5.2%, P = .001). Other differences in perioperative morbidity after EVAR and open repair, respectively, included the occurrence of ischemic colitis (1.0% vs. 5.0%, P < .001), myocardial infarction (0.7% vs. 3.8%, P = .002), wound dehiscence (0.2% vs. 2.6%, P = .005), pneumonia (1.2% vs. 7.9%, P < .001), prolonged ventilator dependence (1.9% vs. 13.5%, P < .001).