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Program at-a-glance

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Monday June 11

08.00 ABDOMINAL AORTA – PART I
Chairmen: G. Bracale, N. Cheshire, L. Inglese
08.00 How to do it:
- Iliac bifurcated stent, J. Busquet
- Chimney grafts, M. Lachat

08.30 Recorded live cases:
- New devices: first and (until today) unique Italian experience with FORTEVO stent-graft for treatment of AAA, C. Setacci
- AFx: the opportunity of anatomical fixation, J-P. de Vries
- Virtual reality simulation for endovascular treatment of ruptured AAA, N. Rudarakanchana

Interactive voting
09.30 Oral presentations:
- EVAR follow up, C. Setacci
- Robotic manipulation for TEVAR, N. Cheshire
- Discussion

10.00 Coffee break on the exhibition hall

10.30 ABDOMINAL AORTA – PART II
Chairmen: P. Cao, J. Busquet, J-P. de Vries
10.30 Didactic case reports:
- Endovascular treatment of an early EVAR complication: the role of the images, C. Setacci
- EVAR in a patient with challenging infrarenal neck and iliac anatomy, Z. Krajcer
- Nellix: the future of EVAR is EVAS, D. Krievins

11.00 Live case: Para-renal aneurysm (chimney technique), N. Mangialardi, M. Lachat

12.00 Oral presentations:
- Use of endostaples in EVAR to improve proximal fixation and its use in EVAR revision surgery, J-P. de Vries
- Chimneys, sandwich, branches for tAA; is there an agreement?, E. Ducasse
- Discussion

12.30 Lunch break on the exhibition hall

14.00 THORACIC AORTA – PART I
Chairmen: P. Bergeron, E. Diethrich, G. Melissano
14.00 Didactic case reports:
- Controlled deployment of a Captiva stent graft in the thoracic aorta, P. Bergeron
- Bridging EVAR and TEVAR with multilayer stent, L. Inglese

Interactive voting
14.30 Oral presentations:
- Hybrid surgery for TAA is the answer, R. Chiesa
- Multilayer flow modulator concept – Is it the answer?, E. Diethrich
- Discussion

15.30 Coffee break on the exhibition hall

16.00 ABDOMINAL AORTA – PART II
Chairmen: C. Buckley, R. Chiesa, M. Lachat
16.30 How to do it:
- Sutureless anastomosis, M. Lachat
- Branched stentgrafts, P. Cao

17.00 Recorded live cases:
- Scalloped endografts for aneurysms of the aortic arch, C. Riga
- A new device for treatment of juxta and pararenal aneurysms, E. Diethrich
- A very complex case of thoraco-abdominal aortic aneurysm, G. Melissano
- Post dissection aortic arch aneurysm treated with a branched endograft (Bolton custom-made), P. Cao
- The Nellix sac anchored endoprosthesis for treating AAA, C. Buckley

Interactive voting
18.00 Oral presentations:
- Long term outcome of TEVAR, L. Inglese
- Chimney & snorkel grafts: are they durable?, M. Lachat
- Discussion

18.30 HONORARY GUEST LECTURES:
- The future of endovascular therapy in an era of bioconvergence, E. Diethrich
- Presentation of the world experience with the Nellix device for treatment of AAA on behalf of the international investigators, C. Buckley

19.00 End of the sessions
Tuesday June 12

08.00 CAROTID ANGIOPLASTY AND STENT
Chairmen: M. Amor, C. Setacci, H. Sievert

08.00 Didactic case reports
- Benefits of proximal neuroprotection device for carotid artery stenting, Z. Krajcer
- A didactic case report on CAS based on the CAS-MEET Score, P. Bergeron

CAS-MEET Score - Interactive voting

08.30 Recorded live cases
- Introduction: complication case, K. Mathias
- CAS mEEt Score - Interactive voting

09.00 Oral presentations:
- Optimal brain protection during CAS, H. Sievert
- CREST conclusions are correct and will lead to a larger role for CAS, P. Schneider
- Discussion

10.00 Coffee break on the exhibition hall

10.30 CAS
Chairmen: Z. Krajcer, K. Mathias, D. Raithel

10.30 How to do it:
- Carotid artery aneurysms, H. Sievert
- Making CAS safer, P. Schneider

11.00 Live cases: CAS, N. Mangialardi, S. Ronchey, M. Amor

12.00 Oral presentations:
- Endovascular treatment of acute carotid occlusion, K. Mathias
- My analysis of the CREST results, E. Houdart
- Discussion

12.30 Lunch break on the exhibition hall

14.00 BELOW THE KNEE ANGIOPLASTY AND STENT – PART I
Chairmen: V. Alexandrescu, C. Rabbia, P. Schneider

14.00 Didactic case reports, C. Rabbia

14.30 Live cases: BTK, N. Mangialardi, F. Ducasse, K. Urasawa

15.30 Oral presentations:
- Future role of drug coated balloons, P. Schneider
- Recanalization of tibial CTO, M. Amor
- Discussion

16.00 Coffee break on the exhibition hall

16.30 BTK – PART II
Chairmen: C. Cernetti, E. Ducasse, K. Urasawa

16.30 How to do it:
- Crossing of SFA CTO, K. Urasawa
- Strategy for BTK interventions in managing critical limb ischemia, P. Schneider

17.00 Recorded live cases, E. Ducasse, M. Amor, P. Schneider

PARALLEL SESSIONS

08.00 FREE PAPERS COMPETITION in stent room
Jury: N. Cheshire, T. Ischinger, D. Raithel

11.00 End of the parallel session

08.30 E-POSTERS SESSION on the exhibition hall
Jury: J. Busquet, L. Castellani, L. Inglese

10.00 End of the parallel session
FREER PAPERS & VIDEO SESSION

Tuesday June 12  
08.00 - 11.00  
STENT ROOM

Jury:  N. Cheshire, T. Ichinger, D. Raithe

FREE PAPERS PERIPHERAL

08:00  Peri-procedural anticoagulation during arterial interventions: current practice, A. Wiersema
08:06  Endovascular treatment of tasc C and D aortoiliac lesions: a single center experience, V. Brizzi
08:12  Exclusion of splenic artery aneurysm with endoprosthesis, C. Moncalvo
08:18  PTA and stenting of the celiac artery due to in-stent restenosis, C. Moncalvo
08:24  Acute ischemia of the upper right limb due to occlusion of right iliac artery during coronary artery bypass treated with PTA and stenting, C. Moncalvo
08:30  European experience with a novel transcervical access neuroprotection system for carotid revascularization, I. Van Herzele
08:36  A novel case report, trans-collateral angioplasty for below the ankle lesion, T. Nakama

FREE PAPERS AORTA

08:46  2-D guide-wire tip path-length: a novel endovascular skill metric, A. Rolls
08:52  Successful emergency endovascular repair of a mycotic thoracic aortic pseudoaneurysm using a coeliac-scalloped device, M. Jenkins
08:58  Case-specific rehearsal prior to EVAR, L. Desender
09:04  Do anatomical and clinical features affect EVAR results?, G. La Barbera
09:10  Fenestrated Anaconda stent graft – An ideal innovation?, F. Abid
09:16  Successful endovascular treatment of an aortic mycotic pseudoaneurysm, I. Bouckenooge
09:22  Hybrid repair of thoracoabdominal aortic aneurysms and chronic aortic dissections, A. Garcia Familar
09:28  Standard aortic endograft and renal tricks for juxtarenal landing zone. Are we bungling? Personal experience, G. Boselli

FREE PAPERS VENOUS

09:38  Orientated Foam Sclerotherapy (OFS), a new safe and effective method treating GSV varicose veins, L. Altarazi
09:44  Endovenous Laser Treatment (ELT) of lesser saphenous vein: our experience, C. Baraldi
09:50  Hybrid techniques for treatment of varicose veins: combined new and conventional technologies, C. Baraldi
09:56  Right subclavian vein thrombosis after first rib resection: residual thrombosis or late onset complication? Diagnosis and endovascular treatment, T. Martens

FREE PAPERS MISCELLANEOUS

10:36  Revascularization for the occlusion of two major coronary arteries by percutaneous coronary intervention in ACS, J-F. Jiang
10:42  Local vascular and systemic inflammation of acute myocardial infarction, K. Sungeun
10:48  Periodontitis is closely associated with carotid arterial inflammation, K. Sungeun
10:54  Computational mechanics of stent grafts: can we predict deployed configurations?, S. De Bock
11:00  To open or not to open: that is the question, N. Randhawa

VIDEO SESSION

11:06  Robot-assisted fenestrated aneurysm repair, Alex Rolls

Tuesday June 12  
08.30 - 10.00  
EXHIBITION HALL

Jury:  J. Busquet, L. Inglese

E-POSTERS PERIPHERAL

08:30  Mechanics of carotid stenting: a novel predictive tool of the operative outcome, F. Iannaccone
08:36  Hybrid endovascular treatment of kommerell diverticulum. A case report and outcome, G. Boselli
08:42  Aortic arch pseudoaneurysm on penetrating ulcer: delayed closure after endovascular treatment, C. Baraldi

E-POSTERS AORTA

08:36  Hybrid endovascular treatment of kommerell diverticulum. A case report and outcome, G. Boselli
08:42  Aortic arch pseudoaneurysm on penetrating ulcer: delayed closure after endovascular treatment, C. Baraldi

E-POSTERS VENOUS

08:48  Are there opportunities in daycase surgery to improve training in radiofrequency ablation?, B. Grewal

E-POSTERS MISCELLANEOUS

08:54  Major pelvic trauma. The role of vascular - endovascular surgeon at our hospital, G. Boselli
09:00  Omega-3 fatty acid decreases both systemic inflammation of reticulo-endothelial system and inflammation at vascular plaque, K. Sungeun
09:06  Evidence based management in the endovascular era, V. Pegna
Abstracts
Endovascular treatment of an early EVAR complication: the role of the images

C. Setacci
Siena, Italy

Currently, the methods of follow-up are a source of intense debate. The fixed plan is to find the optimal method to identify and characterize complications. Endoleak is the most frequent and potentially catastrophic complication after endovascular aneurysm repair (EVAR). The vascular surgeon must identify the endoleak and understand its nature to schedule possible surgical or endovascular repair. Unfortunately, in most cases there are no dedicated workstations or vascular radiology services available 24 h a day.

The goal of this article was to seek a simple but equally reliable means of image analysis.

CASE REPORT
An 83-year-old woman was admitted to our institution for volumetric expansion of the aneurysm sac due to a suspected type II endoleak detected during regular computed tomography (CT)-angiography follow-up of 16 months follow-up. The patient underwent endovascular aneurysm repair (EVAR) for 5.4 cm AAA using the E-Vita stent graft from Jotec Inc., Hechingen, Germany. 30 x 180 mm x 16 x 18 x 70 mm), a nitinol stent graft, with suprarenal fixation. During follow-up the patient remained asymptomatic and the CT-angiography at 6 months from the index procedure showed complete exclusion of AAA associated with a diameter decrease of 1.1 cm. The last CT-angiography revealed a 2-cm sac enlargement (maximum diameter 6.4 cm) due to a suspected type II endoleak.

CT-angiography was performed using a 64 slices LightSpeed VCT (GE Medical Systems, Salt Lake City, UT, USA) with and without contrast medium during arterial and venous phases; the thickness was 2.5 mm. At 2D view the endoleak was clearly evident in the arterial phase, and persisted in the venous phase. A preoperative angiogram confirmed the diagnosis. Endurant stent graft limbs (20 x 20 x 80 mm, Medtronic-Cardiovascular, Santa Rosa, CA, USA) were placed to cover the graft’s hole with satisfactory angiographic and clinical results.

DISCUSSION
The rapid evolution of digital imaging techniques and the increasing number of multidimensional and multimodality studies constitute a challenge for Picture Archiving and Communication Systems (PACS) workstations and image display programs. Traditional 2D image viewers and image display programs are becoming inadequate for interpretation of large sets of images.

Today, many attractive alternatives to dedicated workstations are available. The most popular and easy to use is the software OsiriX, developed 8 years ago by Ratib and Rosset at the Department of Medical Imaging and Information Science at the University Hospital of Geneva, Switzerland. This software is distributed free of charge and the source code is available under the GNU General Public License open-source licensing agreement allowing other institutions to enhance and improve the existing version. It runs on a regular laptop or desktop Mac OS X computer and allows accurate rendering and measuring of the aorta and its branches. This software allows vascular surgeons to achieve accurate analysis of the CT images and organise eventual surgical or endovascular adjunctive procedures.

The purpose of this report is that a simple analysis of axial images can lead to misinterpretation, also very important. A more detailed analysis (with 3D reconstructions) is essential for an accurate diagnosis. However, we should not forget that software such as OsiriX cannot simply replace dedicated workstations or the experience of radiologists.

Challenging case presentation: EVAR in a patient with challenging infrarenal neck and iliac anatomy

Z. Krajcerc
MD, Texas Heart Institute at St. Luke’s Episcopal Hospital, Houston, TX, USA

INTRODUCTION
Short, angulated and irregular infrarenal neck in patients undergoing endovascular abdominal aneurysm repair (EVAR) has been associated with less than optimal procedural and long-term results due to the risk of endograft migration and endoleak.

CASE PRESENTATION
The patient was a 63 year old male with 5.5 cm abdominal aortic aneurysm (AAA). His AAA enlarged for 1 cm in the last six months. His CT revealed a short (12 mm) irregular infrarenal neck with 70 degree angulation. He also had bilateral, 4 cm in diameter common iliac artery aneurysms that extended to the origin of the left and right Internal iliac arteries.

PROCEDURE
The patient underwent percutaneous EVAR via right and left Femoral artery percutaneous approach with the use of Gore Excluder with C3 Delivery System. To achieve the adequate seal in this short and angulated infrarenal neck an Excluder aortic extension cuff was first deployed 3 mm below the origin of the left renal artery (Kilt technique). This was done to prevent distal movement of the stent graft during and after the deployment and also to achieve a secondary seal. The right Internal iliac was then occluded with a 14 mm Amplatzer Plug II (St. Jude, Inc.). The C3 device was then advanced and partially deployed, but because of the suboptimal placement it was repositioned, repositioned and deployed in the more satisfactory location. The left Internal iliac artery was then cannulated via the left brachial cut-down approach with a 5 Fr Multipurpose catheter (Cordis Inc. Miami Lakes, FL, USA) over an 0.035 super stiff hydrophilic guide wire. A 7 Fr 100 cm long sheath was then advanced into the left Internal Iliac Artery. The 0.035 super stiff guide wire was then removed and an 0.018 guide wire was introduced in the left Internal iliac artery. The Viabahn (Gore, Flagstaff, AZ) stent graft that measured 6 in diameter and 100 mm in length was then advanced and deployed in the left Internal and Common iliac arteries in the previously deployed Excluder Iliac Limb. This was followed by placement of a 12mm in diameter and 100 mm in length Excluder Iliac Limb in a parallel fashion to the deployed Viabahn stent graft. Balloon angioplasty was then performed of the infrarenal neck, the left iliac excisor limb and the Viabahn. The aortic angiogram revealed no evidence of endoleak with good flow through the Viabahn and the left and right Iliac limbs.

CONCLUSIONS
Proximal NPd might be a preferable approach during CAS for symptomatic patients with vulnerable plaque lesions. Until better stent designs are available, catheter thrombectomy might be of benefit to remove the atheromatous material that frequently protrudes through the stent struts after stent deployment and balloon angioplasty.
EVAR follow-up

C. Setacci
Siena, Italy

INTRODUCTION
Lifelong follow-up is recommended for all patients following endovascular aortic aneurysm repair (EVAR), the primary goal being prevention of aneurysmal sac rupture. Various follow-up modalities are employed including plain abdominal radiography (XR), colour duplex ultrasonography (CDU), computed tomography angiography (CTA), magnetic resonance imaging (MRI), contrast-enhanced CDU and sac pressure measurement. The optimal protocol for imaging and timing EVAR follow-up is debatable as well as the balance of advantages and disadvantages for each modality. Follow-up includes measurement of aortic aneurysm diameter, detection and classification of endoleaks, detection of morphologic details of the stent graft, graft occlusion, graft infection and other minor details. A recent systematic review reported that >90% of EVAR patients under follow-up do not benefit from surveillance since imaging alone initiates asymptomatic secondary interventions (SI) ranging from 1.4% to 9%. Furthermore, conventional techniques of surveillance imaging could influence the detection rate of asymptomatic SI following EVAR. In particular, an EVAR follow-up protocol based on CDU + XR and CTA on demand versus a CTA-based protocol, might consider the gold-standard technique of surveillance imaging, were compared. Other aims were to evaluate the freedom from aneurysm rupture and SI, patients' compliance to protocol, cost, radiation exposure and contrast savings at 3 years. Three-year follow-up has been reported as a good indicator for the efficiency of a surveillance regimen.

MATERIALS AND METHODS
Two EVAR surveillance protocols were compared at the same vascular centre. Protocol I, performed from January 2003 to December 2006, consisted of colour duplex ultrasound scan (CDU) plus CT angiography (CTA) 1 month after procedure and every 6 months thereafter. Protocol II, performed from January 2007 to June 2010, consisted of CDU plus CTA 1 month after operation and CDU plus plain abdominal films (XR) every 6 months thereafter. In the second protocol, CTA was carried out only during follow-up in specific conditions. The term 'asymptomatic SI' was used when the necessity for SI was detected by imaging alone on an elective basis, prior to development of any symptoms.

RESULTS
Enrolment included 376 and 341 consecutive patients with a mean follow-up of 1148 days (range 1–3204 days) and 942 days (range 1-1512 days) in Protocols I and II, respectively (p < 0.001). Freedom rates from aneurysmal rupture, freedom from SI and detection rate for asymptomatic SI at 3 years were 98.3% and 98.7% (p = 0.456), 82% and 83.5%(p = 0.876) and 8.8% (n = 33/376) and 8.5%(n = 25/341) (p = 0.49) in Protocols I and II, respectively. Estimated comparison of the costs, radiation exposure and contrast used at 3 years in Protocol I versus Protocol II showed that Protocol II allowed for a three-, four- and six fold reduction in overall costs, radiation exposure and contrast used, respectively (p < 0.0001).

CONCLUSIONS
Our study shows that detection rate of asymptomatic SI following EVAR is not affected by the type of surveillance imaging. The percentage of patients benefiting from surveillance was 8.1%, while 9.2% were treated because of symptoms. The reduced invasiveness, cost, radiation exposure and contrast used of the surveillance protocol based on CDU and XR appears to justify its use in long-term EVAR follow-up, as also patients' better compliance. CTA is necessary in planning SI or in solving diagnostic problems arising from a dubious CDU scan or XR.

Robotic manipulation for aortic disease

N. Cheshire
St Marys Hospital, London, United Kingdom

BACKGROUND
As endovascular therapy is becoming more complex, more advanced and versatile catheter designs utilizing robotic technology may have a role in aortic and peripheral arterial interventions. The Hansen robotic system controls a steerable endovascular catheter from a remote workstation, in a master-slave electromechanical fashion. Clinical use of this technology is mostly limited to transvenous cardiac mapping and ablation procedures.

RESULTS
A comprehensive comparison, review and analysis of robotic versus manual techniques in the aorta and its branches are presented to reveal both their advantages and limitations. Preclinical studies and early clinical experience suggest that robotically steerable endovascular catheters offer improved manoeuvrability at the catheter tip, enhance positional control resulting in «off-the-walls» centralise navigation in a remote-control fashion. This advanced technology has the potential to overcome some of the technical difficulties with manual catheter control, improve stability at key target areas, and reduce the risk of vessel trauma, distal embolization and radiation exposure. Furthermore, conventional guidewire-catheter skills are not necessarily intuitive but must be developed and are highly dependent on operator skill with long training pathways as a result. Robotic technology is shown to enhance overall operator performance with short learning curves; it may allow therefore less experienced operators to attempt complex tasks sooner but with a higher degree of safety.

CONCLUSIONS
Robotic catheter technology may be more suitable to complex and often unpredictable anatomy in the aorta and may offer a reliable platform for future applications involving 3D localization techniques, device delivery or target intervention. This intuitive technology is rapidly evolving and still requires technological refinements to extend current capabilities. Clinical studies involving head-to-head comparisons with conventional techniques are essential for evaluating its long-term safety and efficacy.
Use of endostaples in EVAR to improve proximal fixation and its use in EVAR revision surgery

J-P.P. M. de Vries
Head Dept Vasc. Surgery, St. Antonius Hospital, Nieuwegein, The Netherlands

OBJECTIVE
One of the major limitations of endovascular aneurysm repair (EVAR) is the occurrence of distal migration, especially in angulated and/or short proximal landing zones, which might lead to proximal type I endoleaks. The use of endostaples might:
1. prevent endograft migration and the occurrence of proximal type I endoleaks after initial graft implantation
2. address proximal type I endoleaks in EVAR revision surgery

METHODS
In a 1-year period the following patients were eligible for inclusion in this feasibility study:
1. “de-novo-group”: patients undergoing primary EVAR with short (<8 mm) and large (31-32 mm) infrarenal necks,
2. “repair-group”: patients with proximal migrated endografts and/or proximal type I endoleaks post-EVAR, due to distal migration. All patients were treated with endostaples (HeliFix Securement System, Aptus Endosystems, Inc, Sunnyvale, CA, USA) to fixate the primary endograft to the aortic wall, with or without the use of additional proximal extender cuffs. In case of the use of extender cuffs or bridging grafts these were also fixated with 4 endostaples to the primary endograft and/or aortic wall.

RESULTS
A total of 20 patients (18 men, age 74 ± 8 years) were included in this feasibility study, of which 8 underwent de-novo endostapling of the primary endograft, and 12 underwent secondary fixation of a migrated endograft because of distal migration and/or proximal type I endoleaks post-EVAR. The primary endografts (AneuRx n=3, Zenith n=2, Endurant n=8, Talent n=7) were secured to the aortic wall with a minimum of 4 endostaples. In case of the use of extender cuffs or bridging grafts these were also fixated with 4 endostaples to the primary endograft and/or aortic wall.

One endostaple migrated during implantation but could be successfully snared and taken out.

At completion angiography 1 patient with a primary huge proximal type I endoleak still suffered from this leak and an additional juxtarenal self expandable Jotec E-XL bare stent had to be implanted.

At 6 (17/20) and 12 (8/20)-months Ct-scans no proximal type I or type III endoleaks were seen, nor (further) migration of the endografts or cuffs. No endostapling related complications occurred.

CONCLUSIONS
The use of the HeliFix Securement System with Endoanchors to prevent migration and to treat proximal type I endoleaks due to migration of endografts could be safely performed in this series. During short-term follow-up, (persistent) migration was prevented and proximal type I endoleaks could be treated successfully. Use of this technique may obviate the need for more complex endovascular or open revision surgery after failed EVAR.

Controlled deployment of a captiva stent graft in the thoracic Aorta

P Bergeron
Cardiovascular Surgeon, Private Hospital Résidence du Parc, Marseille, France

Precise deployments of stent grafts are of paramount importance particularly to occlude aortic reentry in chronic thoracic aortic dissections (TAD).

We report the case of a 45 years old patient presenting in 2009 an acute type B TAD which was treated by an arch stent graft with total debranching. The post-operative course was uneventful with complete thrombosis of the thoracic false channel (FC).

At 4 Years follow up, he developed a chronic thoraco abdominal aneurysm, 73 mm diameter due to a massive reentry tear.

This reentry was precisely covered thanks to a captive stent graft.

A remaining abdominal FC is under surveillance for potential therapeutic options to be discussed.
Didactic case report: Bridging EVAR and TEVAR with multilayer stent

L. Inglese
Radiologist Centro E. Melan, San Donato Milanese, Italy

We present a case of a 63 yrs old caucasian male who was operated for AAA 8 yrs before and presented 6 yrs after with a thoracic arch aneurysms ∅ 5.5 close to L-carotid a.; comorbidities where severe COBP and mild St. Total supraotic vessels debranching with aortic wrapping was attempted in a first step followed 1 mo later by implantation of EVG. In developed in the F-u a 6.5 cm, aneurysm of the aorta between the two grafts; visceral vessels were all involved into aneurysm. A new intervention was performed with a multilayer stent deployed bridging previous grafts. Angio tAC control 2 mo after procedure confirmed an incomplete but significant thrombosis of the aneurysm sac, initial reduction of sac aneurysm diameter, good perfusion of visceral vessels. No spinal ischemia was recorded.

Hybrid surgery for TAA is the answer

R. Chiesa
Milan, Italy

OBJECTIVE
Hybrid thoracoabdominal aortic aneurysm (TAAA) repair consists of aortic visceral branches rerouting followed by TAAA endograft exclusion. This technique has been shown to represent a feasible strategy in high-risk surgical patients with unfit anatomy for endovascular repair.

PATIENTS AND METHODS
We analyzed 49 high-risk patients who underwent hybrid TAAA repair between 2001 and 2012 in our Center with a variety of visceral rerouting configuration and of commercially available thoracic endografts. Thirty-nine atherosclerotic and 10 dissecting TAAAs were treated. Thirty-six simultaneous (73%) and 13 staged procedures (27%) were performed with a four-vessel revascularization in 14 cases (28.6%), a three-vessel in 11 (22.4%) and a two-vessel in 24 (49.0%).

RESULTS
No intraoperative deaths were observed, and the technical success rate was 97.9%. Two patients died in the interprocedural period. We recorded a perioperative mortality rate of 14.3% (n = 7), including deaths from multiorgan failure/respiratory failure (n = 3), myocardial infarction (n = 2), coagulopathy (n = 1) and visceral graft occlusion (n = 1). Perioperative morbidity rate was 30.6% (n = 15), including 2 cases of transient paraparesis and 1 case of permanent paraplegia. Renal failure (n = 5), pancreatitis (n = 3), respiratory failure (n = 3) and dysphagia (n = 1) were observed. At median follow-up of 21.3 months related mortality rate was 8.1%; one patient died from visceral graft occlusion and 3 from aortic rupture. There were 3 endoleaks and 1 endograft migration, none of which resulted in death. Five patients died as a consequence of unrelated events.

CONCLUSION
Typical complications of conventional TAAA open surgery have not been eliminated by hybrid repair and significant mortality and morbidity rates have been reported. Fate of visceral bypasses and incidence of endoleak and other endograft-related complications need to be carefully assessed. Hybrid TAAA repair should nowadays be limited as alternative to simple observation in high-risk surgical patients with unfit anatomy for endovascular repair.
Multilayer flow modulator concept – Is it the answer?

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Over the past several years a new concept to exclude aneurysmal disease has been investigated. The basic principles of the device are based upon physics and flow modulation. The multilayer stent upon deployment within the lumen of the artery produces laminar flow. The branches leading from the aneurysm such as renales, celiac and super mesenteric remain patent even though the aneurysm progressively thromboses. While the concept on the surface seems improbable, the extensive preclinical and clinical studies have proven it worthwhile. In the presentation, the basic principles will be explained and the data from the preclinical laboratory work-detailed. Additionally, the world-wide clinical data which is available and able to be released from trial restriction will be discussed. Both the limitations and the attributes for the MFM will be presented. Challenges to the concept will be welcomed in the post-presentation discussion.

How to do it: branched stentgrafts

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Fenestrated and branched aortic endografts represent a valid option for the treatment of para-renal and thoraco-abdominal aortic aneurysms (tAAA) in high risk patients unfit for open surgery. Currently mortality and morbidity rates after open surgery are relatively high. Cowan et al reported, in 2003, the results from a nationwide database representing 20% of US hospitals and including 1542 patients with tAAA.1 The in-hospital mortality rate was 22.3%, with higher rates for low-volume hospitals. Post-operative complications include myocardial infarction, respiratory insufficiency, acute renal failure and neurological deficits. These factors have been identified as predictors for mortality. Even if some excellence centers have achieved operative mortality rates for tAAA open repair ranging from 5% to 12%,2,3 mortality and morbidity rates remain significant.

In 20 years, endovascular treatment for abdominal aortic aneurysm has made several advances, extending the indications and breaking down morphological and anatomical limits. This improvement was also facilitated by new technologies and development of materials. The first exclusion criteria for endovascular aneurysm repair (EVAR) is the absence of suitable proximal landing zone, as the intentional coverage of visceral or renal arteries would not remain unpunished. The solution to this problem was found with custom-made endografts which allows to treat more extensive disease.

Fenestrated and branched endografts can be considered a valid alternative for patients with tAAA, who are usually turned down for open repair because of their comorbidities. Another indication is represented by patients who need aortic reinterventions or who have difficult access to visceral aorta. However, there are some contraindications also for the endovascular approach, such as stenosis, tortuosity and calcifications of the iliac arteries or the aortic arch, presence of thrombus in thoraco-abdominal aorta that may reduce the internal lumen diameter and makes difficult the correct deployment of the endograft or its rotation/adjustment. Other contraindications are represented by stenosis and/or early bifurcation of target vessels that may render the distal sealing of covered stentgraft inadequate. Moreover previous aortic surgical intervention, that has compromised the spinal cord perfusion, would mean an increased risk of paraplegia.

The importance of planning for a total endovascular treatment of a tAAA is crucial and engineering of the prosthesis, based on detailed preoperative imaging, is the key of technical success. Software provided with algorithms for volume rendering, maximum-intensity projection and center-line measurements, are essential to evaluate the diameter and lengths of aorta and target revascularization vessels, the distance between each vessel and their orientation according to the so called clock view. The first step of the preoperative analysis is to identify proximal and distal landing zones and to evaluate the patency of access vessels necessary to the feasibility of the procedure. The second step is to determine the need of fenestrations and/or side-branches. In this choice, size and quality of aorta at the level of visceral and renal arteries is crucial. A small internal lumen diameter and/or the presence of thrombus in thoraco-abdominal aorta may represent a contraindication for a branched endograft and require the need of a fenestrated endograft. An endograft for a complex thoraco-abdominal aneurysm may have only branches or only fenestrations, or both. The possibility of tapering the custom-made endograft at the level of para-renal visceral is an important aspect in graft planning because a tapered endograft may create the space for the branches to open fully within the lumen of the aneurysm. Instead, a very narrow aortic lumen may require the use of fenestrations associated with balloon-expandable stentgraft.

Open tAAA repair has significantly evolved over the past decades. The main improvement was reached in order to reduce risks and complications associated with this kind of procedures. In literature, patients undergone elective open repair for tAAA have shown a perioperative mortality risk ranging from 3% to 17%,4,5 and a risk of spinal cord ischemia and renal failure ranging from 4% to 11%,7-8 and 17% to 25%.6,8,9, respectively. In 2008, Greenberg et al published a comparative analysis between open and endovascular repair for thoraco-abdominal aortic aneurysms including a total of 724 patients. The 30-day mortality rate was 8.3% in surgical group and 5.7% in endovascular group (P=0.2). One-year mortality rate were 15.9% and 15.6%, respectively. Spinal cord injury was detected in 4.3% of endovascular group and 7.5% of surgical group (P=0.08). The development of spinal cord injury was strongly associated to the extent of aneurysm sac. Fenestrated and branched endografts represent a valid option for the treatment of para-renal and thoraco-abdominal aortic aneurysms in patient unfit for open surgery. During the last years there has been a progressive improvement of materials and techniques, rendering these procedures more effective and safer. Careful patient selection with accurate preoperative imaging aimed to precise graft design are crucial points to success. A close follow-up is able to prevent failures. An accurate postoperative imaging is useful to show the integrity of the graft components, their correct overlapping and any rerupture of aneurysm sac. Major complications are relatively rare. Minor complications may be often treated with endovascular reinterventions. Peri-procedural, short and mid-term results are encouraging, especially considering high-risk comorbidities of patients included to this treatment.
ABSTRACTS

Long term outcome of TEVAR

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Thoracic aorta endograft has been adopted in our Lab since 1996. After 16 yrs it is very difficult to present reliable data on the long term follow-up because hospital mortality of TEVAR is easy to define (2%), while long term is biased by the non-thoracic EVG related mortality due to CAD + CVd (30%), K at different organs (22%), and other non vascular pathology (13%). So 15 yrs follow-up shows an overall mortality of 72% where only 7% is due to the EVG itself. Most important is the overall rate of re-intervention needed in the follow-up that was 52%. Most common causes for reinterventions were: Ao expansion distal to graft, disconnection of sequential grafts, retrograde dissections, new endoleaks, aorto-bronchial & aorto esophageal fistulae, endoskeleton fractures.

Best results were recorded in post traumatic pseudo-aneurysms of the arch and isolate, discrete aneurysms of descending aorta distal to L-subclavian (92% at 10 ± 5yrs).

REFERENCES

The future of endovascular therapy in an era of bioconvergence

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Phoenix, USA

There can be no argument that the past two decades have been phenomenal in the progress of endovascular technology and less invasive methods of caring for cardiovascular disease. From stents to endoluminal grafts and beyond, vascular treatment has been changed forever.

Unfortunately, the atmosphere that our predecessors witnessed as new and exciting devices and technology were being created is much different than our present environment. We are living in an era of “bioconvergence”, a term yet to be defined yet clearly visible in our daily lives. Our practices, whatever they may be, are no longer isolated but rather interfaced with all of the governmental, industrial, academic, health care agencies and beyond.

This presentation will identify both the positive and the negative of our bioconvergent society. Furthermore, it will suggest there may be a biounconvergence looming which will affect the clinical practice, our research and future educational programs.

World experience with the nellix device for EVAR:
a new concept with polymer filled bags obliterating the AAA sac and maintaining flow with stents: advantages, limitations and midterm results

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INTRODUCTION
All current FDA approved endografts depend on proximal and distal fixation to prevent migration and maintain endograft integrity. Current endovascular aneurysm repair limitations are: unsuitable arterial anatomy (short angulated infrarenal neck; tortuous or aneurismatic iliacs); endoleaks; endograft migration; endograft kinking/graft occlusion and fracture of the support skeleton.

PURPOSE
To describe a novel “outside the box” solution for most endograft limitations using a new device (Nellix). This endograft consists of dual balloon-expandable endoframes surrounded by endobags filled with quick-setting polymer.

METHODS
We reviewed the worldwide experience on 46 patients from four sites outside the United States whose abdominal aortic aneurysms were excluded using the new device. Follow-up CT scans were obtained at 30 days, 6 months, 1, 2 and 3 years post implant.

RESULTS
Forty-six patients, age 54 – 83, with abdominal aortic aneurysms (diam 5.8cm [range 4.3 – 7.2cm]) were successfully treated with the new device. Aneurysm neck length ranged from 5 – 50mm in length and 18-31mm in diameter. 35% of the patients had large common iliac artery aneurysms, 23-34mm, extending to the hypogastric. Complete AAA exclusion was achieved by filling the endobags with polymer. These filled endobags seal the anatomy from the renals to the hypogastric arteries, which provides support and stability to the endoframe flow lumen and obliterates the potential for endoleaks. Patients with common iliac artery aneurysms were treated with sac anchoring extenders. Hypogastric artery patency was observed in all patients. No significant Type I endoleaks were observed post implant. One Type II endoleak was noted at 30 days with complete sealing at 60 days. Two patients expired; one from a myocardial infarction and one from multi-system organ failure. There were no device-related adverse events and one secondary interventions was required. Follow-up CT scans showed no Type I endoleaks, no additional Type II endoleaks, no device migration and stable aneurysm volume.

Conclusions Experience using sac-anchoring prostheses to treat AAA patients with standard anatomy as well as adverse neck and iliac anatomy is promising. This new device has the potential to address the anatomic limitations of current FDA approved endografts, eliminate endoleaks and reduce the risk of graft migration.
Challenging case presentation: benefits of proximal neuroprotection device for carotid artery stenting

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INTRODUCTION
The use of Proximal Protection Devices was shown to be of a significant benefit during Carotid artery stenting (CAS) in patients with complex anatomy and octogenarians. This recorded live case describes the technique and the benefit of the proximal protection device in a patient who was considered to have a prohibitive risk for Carotid Endarterectomy (CEA).

CASE PRESENTATION
The patient was a 67 year old male with recent TIA’s. His carotid duplex revealed the presence of a 90% soft left Internal Carotid artery stenosis. Due to his co-morbid conditions (congestive heart failure, coronary artery disease, s/p recent cardiac arrest, tracheostomy and recent septicemia) he was considered by a surgeon to be at too high risk for CEA. His past medical history included recurrent ventricular tachycardia, implantable defibrillator, explantation of defibrillator due to septicemia, tracheostomy for tracheomalacia and previous coronary artery bypass surgery and mitral annulo-plasty for severe mitral insufficiency.

PROCEDURE
The patient underwent CAS via right Femoral artery percutaneous approach with 9Fr sheath and the Neuroprotection Device with flow reversal (NPd) (Gore Inc., Flagstaff, AZ). The aortic arch angiogram revealed Type B arch. A 5F Vitek catheter (Cook, Inc. Bloomington, IN) was advanced over a super stiff .035 hydrophilic guide wire to the left Common carotid artery. The angiogram revealed an 80% stenosis of the left External Carotid and a 90% stenosis of the Internal carotid, with a 90% eccentric and radiolucent plaque. The Vitek catheter was then advanced over a .035 super stiff hydrophilic wire to the external carotid artery and the (NPd) was then advanced to the common carotid artery. The left femoral vein was then accessed with a 6F sheath and the flow reversal was initiated after inflating the left External and Common Carotid artery balloons. The patient underwent a successful angioplasty and stenting of the Left carotid with the use of NPd. The thrombectomy catheter was then used to aspirate material that was protruding through the stent struts. There were no neurologic complications during or after the procedure and the patient remained clinically stable on medical therapy for his multiple comorbid conditions.

CONCLUSIONS
Proximal NPd might be a preferable approach during CAS for symptomatic patients with vulnerable lesions. Until better stent designs are available, catheter thrombectomy might be of benefit to remove the atheromatous material that frequently protrudes through the stent struts after balloon angioplasty.

Determining a reliable score to evaluate the risk of Carotid angioplasty appears of prime importance in order to avoid hazardous procedures that might affect patient safety. In that sense, a MEET score has been proposed, based on 12 risk factors related either to the patient, the lesion, the navigation or the operator experience. According to the total score, the CAS procedure is considered at high risk for a total from 7 to 12. This case report highlights this issue.

A didactic case report on CAS based on the CAS MEET Score

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A previous stent had been placed in the innominate artery for a radiation stenosis 5 years ago and based on Duplex and CT angio an instant restenosis combined to a right ICA stenosis was suspected. A preoperative angiogram eliminated a significant ICA stenosis and based on the CAS MEET score the patient was submitted to carotid angiography at low risk. The detailed procedure and CAS MEET score is described.
CREST conclusions are correct and will lead to larger role for CAS

P. A. Schneider
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Both CAS and CEA were performed with excellent results in the CREST Trial. The conclusions of the CREST Trial reflect the steady improvement of CAS over a ten-year period. The results of CREST show that CAS and CEA have different complications but that the two procedures yield similar overall results when including stroke, death, and myocardial infarction. The CREST Trial will likely lead to a larger role for CAS, especially since both treatments achieved the threshold for safe treatment of carotid lesions (3% perioperative risk of stroke and death for asymptomatic and 6% perioperative risk of stroke and death for symptomatic patients).

The CREST Trial compared CAS and CEA in both symptomatic and asymptomatic patients. Both treatments were well trained and roll in patients were treated with CAS patients. MI in the perioperative period was included as a part of the primary endpoint and this has lead to quite a bit of controversy. However, the long-term survival of those who have experienced a perioperative MI was reduced in comparison to those who did not have an MI.

Cranial nerve injury was tabulated but was not considered as an end point, even though about 2% of patients still had a cranial nerve deficit after 6 months. There were two major disadvantages of CREST that biased the results against CAS. The first is that, at the time the study was designed, there was no understanding of which patients were at high risk for CAS or were bad candidates for CAS. There were many exclusions for CEA since the “high-risk” for CEA group was better understood. The second is that, despite many advances in technology over the course of the study, the study device was frozen with the accunet and acculink, even when other stents or protection devices may have been better choices.

In summary, both CAS and CEA are acceptable treatments. Better overall results will likely be achieved if the operator is permitted to customize the treatment to the specific patient and the presentation. CREST conclusions are correct and will lead to larger role for CAS.

Making CAS Safer

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In summary, both CAS and CEA are acceptable treatments. Better overall results will likely be achieved if the operator is permitted to customize the treatment to the specific patient and the presentation. CREST conclusions are correct and will lead to larger role for CAS.
Drug coated balloons will likely play a major role in lower extremity revascularization. The goal of endovascular therapy of the lower extremity is the re-establishment of straight-line flow with adequate perfusion of tissue. PTA continues to be the cornerstone of therapy, with stents reserved for suboptimal PTA. Despite advances in angioplasty balloons and a focus on angioplasty technique, current PTA results demonstrate significant restenosis rates depending on lesion complexity. Drug coated balloons have demonstrated superior patency results in several studies of the superficial femoral artery and evidence is accumulating of better patency for tibial arteries as well. Endovascular techniques must not only be successful in restoring adequate perfusion levels but must be able to do this in a sustained fashion to achieve limb salvage and be economically viable.

**TECHNOLOGY REVIEW**

Currently, standard balloon catheters are covered with the drug-eluting combination. The main theoretic goal would be to fully maintain an antiproliferative agent on a balloon until it is positioned at the lesion and then have all of the intended dose leave the balloon and reside completely within the targeted tissue with little if any systemic loss. Current technology has fallen short on many of these goals. The current approach utilizes a combination of an antiproliferative agent and an excipient in a crystalline form that once in the intima maintains a “micro depot” for the antiproliferative to diffuse into the tissue for a prolonged period of time. 1 The currently utilized proliferative is paclitaxel in a dose ranging from 2 – 3 μg/mm. The challenge will be to apply the drug mixture to the balloon surface and obtain uniform distribution with minimal loss during packing, sterilization, shipping, and handling. While most of the data for drug coated balloons currently exists with paclitaxel, the ‘limus family of agents may also be suitable, however, this family of drugs may not diffuse into media and adventitia or maintain tissue concentrations as long as necessary to treat this disease process.

A number of excipients have been used such as iopromide, urea, polymers and nanoparticles. Typical balloon inflations are 30-60 seconds. The majority of the drug is released down stream with 10-15% of the total drug located in the wall 40-60 minutes later. Approximately 10% (1/100th of initial balloon dose) will still be present at the treatment site 24 hours later. 2 Restenosis after balloon angioplasty occurs secondary to multiple physiologic reactions including elastic recoil, negative remodeling and intimal hyperplasia and drug coated balloons appear to diminish all three reactions. To date most clinical drug coated balloon experience has occurred with paclitaxel. Paclitaxel appears to be optimal due to its lipophilic properties, short absorption, and prolonged duration of antiproliferative effects. In animal models, paclitaxel coated balloon dilatation of 60 seconds released approximately 90% of the drug from the balloon within the arterial wall. Using an animal model, when compared to plain balloon, paclitaxel has demonstrated a 54% decrease in late lumen loss. Contrasted to paclitaxel coated stents, paclitaxel coated balloons proved superior at inhibiting intimal hyperplasia.

**DRUG COATED BALLOON CLINICAL USE**

There is a recent increasing enthusiasm for the use of percutaneous transluminal angioplasty with balloons coated with anti-restenosis agents. This enthusiasm stems from the results of two randomized SFA trial publications using balloon catheters coated with paclitaxel demonstrating encouraging results when compared to uncoated balloons. In the THUNDER trial, 154 patients were randomly assigned to 1 of 3 strategies: bare balloon, bare balloon with paclitaxel diffusion solved in contrast media, and a paclitaxel-coated balloon. The late lumen loss was significantly lower in the segments treated with the coated balloon for mean lesion lengths of 7.5 cm. 3 In a second study, 87 patients were randomized to bare balloon versus paclitaxel-coated balloon, and in mean lesion lengths ranging from 5.7 to 6.1 cm, late lumen loss and target lesion recanalization were significantly lower in the coated balloon-treated segments. 4 Whether this type of sustained restenosis reduction will be seen in the infrapopliteal vascular bed has yet to be determined. Infrapopliteal use of drug coated balloons is an exciting proposition. However, there are some nuances to drug coated balloons that makes evaluation important. As noted previously, the current drug coated balloons are associated with a significant amount of down stream drug delivery. Any possible effect of this down stream cytotoxic agent dosing on ulcers or infection will require evaluation. Schmidt and colleagues treated 104 patients, 109 limbs for critical limb ischemia (82.6%) or severe claudication (17.4%). Tibial disease was complex with a mean lesion length of 176 ± 86 mm. Angiography performed in 84 treated arteries at 3 months showed a restenosis rate of 27.4% (19.1% had restenosis of more than 50%, and 8.3% were occluded). When restenosis was identified, it was usually focal and did not typically affect the entire treated segment. Only in 9.5% of all angiographically evaluated arteries was the entire treated segment restenosed or recalcified. During a follow-up period of 378 ± 65 days, 1 patient was lost and 17 died. Of the 91 limbs remaining in the analysis, clinical improvement was present in 83 (91.2%). Complete wound healing occurred in 74.2%, whereas major amputation occurred in 4 patients, resulting in limb salvage of 95.6% for patients with critical limb ischemia.

**SUMMARY**

Drug coated balloon technology offers the potential for providing an efficacious, cost effective treatment platform for the infrapopliteal vasculature. Even if the longer-term patency does not match data from superficial femoral artery, perfusion optimized for a longer period of time may allow critical limb ischemia to be treated with fewer repeat procedures. Sophisticated trial designs may allow for less burdensome enrollment so that this technology which is available around the world may also be offered to our patients in the United States.

**REFERENCES**

How to do it: crossing of SFA CTO

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Chronic total occlusion (CTO) is one of the most difficult lesions within the endovascular therapy for peripheral arterial diseases (PAD). Standard approach for CTO lesions is antegrade wiring, in which a guidewire is advanced through the occluded arterial segment antegrade, and penetrated into the distal true lumen. However, in some cases, it is difficult to obtain successful result by means of standard antegrade wiring only. In those cases, bi-directional wiring methods could be a great help to improve the initial success rate of endovascular procedure for the CTO lesions. To date, various methods have been reported to establish the bi-directional wiring setting in such situation.

Five years ago, we introduced the trans-collateral angioplasty (TCA) as a method of bi-directional wiring, and have applied for the treatment of femoral CTO lesions with tremendous success. Three years ago, we started the front side puncture of distal SFA in order to introduce a retrograde guidewire into the distal true lumen. However, in some cases, it is difficult to do it in a patient who is rather tall in height, and the success rate has been low. Recently, we added some modification to this omote-pun, and greatly expand its application. Now, we can puncture P1 segment of popliteal artery in order to introduce a retrograde guidewire into the distal true lumen of SFA while patients stay in supine position.

In this paper, I would like to introduce some representative cases of SFA-CTO, and to summarize the clinical usefulness, tips and device selection for TCA and Omote-pun.

Strategy for BTK interventions in managing critical limb ischemia

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Endovascular intervention can be used to heal critical limb ischemia in some patients and the adaptation of endovascular techniques to the infrapopliteal vascular bed has provided an alternative to bypass that is being incorporated into our treatment algorithms. However, the strategy used for bypass and that for endovascular treatment are different. Bypass for revascularization of critical limb ischemia (CLI) depends upon the presence of inflow, an adequate target vessel, and the availability of conduit. Endovascular treatment of CLI depends upon the anatomy of occlusive disease, the degree of foot damage, whether the correct angiosome can be reperfused, and several other factors.

A different strategy may be considered depending upon whether the patient has Rutherford 4, 5, or 6 disease. Sometimes a simple and straight-forward intervention can be enough to reverse a limb-threatening situation caused by rest pain, which is often a result of multilevel disease. One of the strategies in patients with rest pain is not to intervene below the knee if there is an above knee lesion to treat first. Small changes in pressure often solve the problem of rest pain. Because the metabolic requirements of healing exceed those of maintenance, the threshold pressure for healing gangrene (Rutherford 5 and 6) is higher than that for rest pain and revascularization should be as aggressive as possible. Technical success rates for endovascular interventions in the management of severe tissue loss are quite good, but clinical success rates are lower at approximately 70%. Exposure of vital foot or ankle structures or a heel gangrene and poor pedal runoff are the most challenging factors. Often in diabetics and renal failure patients, the pedal blood supply is compartmentalized as the various angiosomes do not collateralize each other well. In this situation, in-line flow to the foot may not directly perfuse the area correct angiosome where the foot lesion is located.

Occluded tibial segments can usually be recanalized as long as there is ample patent outflow. Re-entry from the subintimal plane is easier in the tibial arteries than in the popliteal or tibioperoneal trunk (which is often heavily calcified). The arteries are smaller and straighter and with fewer branches and the intima in the patient segments tends to be thinner. Re-entry can be performed with a variety of methods, our current favorite is to just push through directly with a 0.014” or 0.018” CTO catheter and wire.

BTK lesions causing CLI can be treated with PTA, especially if the correct angiosome can be revascularized and there is no renal failure. Differences between angioplasty and bypass have never been adequately compared. Patients with significant tissue loss in whom you can’t open a direct line to the correct pedal angiosome should be operated upon unless there are confounding surgical risks.
How the angiosome concept may change our approach

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The angiosome theory was first pioneered by Jan Taylor in 1987 by his leading anatomical studies, initially focusing on clinical applications in plastic reconstructive surgery. The concept delineates the human body into three-dimensional blocks of tissue, fed by specific arteries and veins named “angiosomes”. This theory may provide useful topographical information on the human vascular anatomy and related pathology, allowing in the recent years specific applications in CLI treatment. The angiosome model may enable the vascular interventionist to deliberately reinstaure arterial flow in specific CLI wound territories, using precise topographical approaches. By implementing this concept in the “daily” BTK practice, contemporary literature anticipates a possible shift in common strategies for revascularization (endovascular or bypass) that may gather:

d) Modern technologies and correspondent devices as to enable more challenging infragenercic revascularization to be handled, should be also expected: for long and calcified TCO arterial segments (dominant TASC-“D” lesions) in angiosome-guided approaches. It seems realistic to claim specific reconization tools and skills, deployed in complementary techniques and accesses (ante- or retrograde approaches, hybrid surgical and endovascular procedures, etc.).
e) Characteristic postoperative flow assessment as to attest accurate revascularization in each targeted angiosome may be equally forecasted. Detailed per-operative angiographic foot arches and toes arteries appraisal should match focused regional per- and postoperative collateral Doppler evaluation. New methods alike the intra-operative “Indocyanine green Angiography”, or the “Transcutaneous Sensi-laser system (SPP)”, may represent useful tools in precise assessment of the restored “regional flow”. Other methods allowing sector-based foot reperfusion analysis were evoked, such as the thermographic or scintigraphic targeted wound imaging, together with newly described PET or SPECT-scan evaluations in foot reperfusion and may offer potential applications to this concept in the future.
f) A matched postoperative wound follow-up assembling tissue regeneration practice to regional foot flow estimation should be also conceived on multidisciplinary bases and acknowledging dedicated team approaches. The eventual assimilation of angiosome strategy in infragenicular arterial reconstruction seems to afford encouraing wound healing and limb preservation rates for both, bypass and endovascular techniques. These latest may add the avail for simultaneously treating one or multiple fibial or foot arterial trunk in specific “wound-guided” approaches.

The development of the angiosome theory in contemporary BTK revascularization might be useful, although comparative and prospective data are further mandatory to cast any pertinent assertion pro- or against this concept.
Peri-procedural anticoagulation during arterial interventions: current practice

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AIM
The use of anticoagulation during percutaneous arterial interventions (PAI) is subject to a wide variety over the past 25 years. As a first step to create an evidence-based guideline in the Netherlands, an extensive survey was performed on the current practice by interventional radiologists (IR) in the Netherlands. Results were analysed and compared to current literature and existing (inter) national guidelines.

METHODS
In close cooperation with Dutch Societies of IR (NGIR) and Vascular Surgery a study group was formed. A survey was conducted with focus on peri-procedural anticoagulation. It was sent to all active members of NGIR.

RESULTS
Response rate was 70%. CAS was performed by 51 of IR (36%), EVAR by 94% and by 84% of respondents together with vascular surgeon. ASA was continued by almost all (97%), but wide variety existed in the continuation pre-procedural of clopidogrel. Heparin was used by most (95%) but other aspects of use showed a wide variety (dosage, way of administration, measurement of effect). Existing guidelines, including CIrSE SOP, were only partially met.

CONCLUSION
This survey provides an extensive knowledge of current practice of IR and PAI in the Netherlands. The apparent wide variety is consistent with literature over the past 25 years. Existing guidelines are only partially met, but these are also based on a low level of evidence. The need for more uniformity in all aspects of peri-procedural anticoagulation during PAI is clear. This should be based on new RCT’s, resulting in evidence based guidelines.

Endovascular treatment of tASC C and D aortoiliac lesions: a single center experience

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OBJECTIVE
According to internationals guidelines, surgery should be the treatment of choice for extensive aortoiliac chronic occlusive disease. However more and more centers report satisfactory results with endovascular approach. The aim of this study was to evaluate the feasibility and the early outcome of a systematic endovascular treatment of TASC C and D aortoiliac lesions.

MATERIAL AND METHODS
Between September 2009 and December 2011, 61 patients (54 males, average age = 62 years old) underwent endovascular procedure to treat a complex occlusive aortoiliac lesion.

Critical limb ischemia was present in 26% of patients. A TASC D lesion was present in 62% of cases and it was extensive to aorta or to the common femoral artery in 4 and 23 cases respectively. Occlusions were 46.

Technical success was defined as the absence of a residual stenosis >30%.

Follow up consisted of clinical examination and duplex scanning with ABI measurement at discharge, 1, 6, 12 months and yearly thereafter.

Follow up results were analyzed in terms of survival, primary and secondary patencies.

RESULTS
Technical success rate was 93% (four recanalization failed) and mean duration of procedures was 139 minutes (min 52 - max 300).

Local anesthesia was employed in 87% of cases and a brachial approach was necessary in 25% of procedures. Subintimal recanalisation was realised in 62% of occlusions and stenting was systematically after recanalisation. Mortality rate was 1.6% (1 arterial rupture). Early surgical reintervention was necessary in 10% of cases (3 distal embolisations, 1 humeral thrombois, 1 common femoral thrombosis and 1 residual stenosis).

Mean hospital stay was 3 days (min 2 – max 11). Mean follow up was 13 months. Primary and secondary patency rates at 1 year were 83% and 95% respectively.

CONCLUSIONS
Endovascular treatment of extensive aortoiliac chronic occlusive disease is a safe option followed by acceptable early clinical outcomes. Anyway long term follow up is needed in order to make it a first-line option of treatment.
Exclusion of splenic artery aneurysm with endoprosthesis

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**BACKGROUND**
A 72 years old woman was referred to our institution for abdominal pains. Comorbidities included: hypertension, dyslipidemia. The computed tomography showed a splenic artery aneurysm 30 mm in diameter.

**INVESTIGATION AND DIAGNOSIS**
Angiography confirmed the presence of splenic artery aneurysm 30 mm in diameter.

**MANAGEMENT**
Right humeral artery approach with a 6 F – 90 cm sheath positioned selectively in the splenic artery. The aneurysm was crossed with two 0.014” hydrophilic guidewires 260 cm in length. After having changed guidewire with a 0.018”, 300 cm in length the endoprosthesis (6 mm, 10 cm in length) was released.

**RESULT**
Final result was good, showing the complete exclusion of the aneurysm.  
Post procedure: the patient was hospitalized for five days, she remained symptoms free and the computed tomography control confirmed the good result of the procedure.  
One months follow-up: the computed tomography control showed the patency of the endoprosthesis and no endoleaks was detected.

PTA and stenting of the celiac artery due to in-stent restenosis

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**BACKGROUND**
A 72 years old woman was referred to our institution for important loss of weight and restart of “abdominis angina”. Comorbidities included: hypertension, dyslipidemia, previous ilerectomy, previous surgical intervention for lung cancer, previous femoro-popliteal by-pass on right inferior limb. Previous PTA and stenting of celiac artery, superior mesenteric artery and left common iliac artery. The ecodoppler showed the occlusion of the superior mesenteric artery and a critical in-stent restenosis of the celiac artery.

**INVESTIGATION AND DIAGNOSIS**
Angiography confirmed the occlusion of the superior mesenteric artery and the in-stent restenosis (90%) of the celiac artery and showed an aneurismatic dilatation of the abdominal aorta.

**MANAGEMENT**: right humeral artery approach with a 6 F – 90 cm sheath. The stenosis was crossed with a 0.035” guidewire and PTA was performed (balloon 5 mm x 40 mm at 12 atm). A self-expandable stents was released into the previous stent (10 mm in diameter, 4 cm in length). The stent was post-dilated with a 8 mm x 2 cm balloon at 14 atm.

**RESULT**
Final result was good, showing patency of the stent, even if we preferred to leave a suboptimal expansion of the stent at the ostium of the artery because of the presence of large calcifications to avoid a dissection of the aortic wall.  
Post procedure: the patient was hospitalized for five days, she remained symptoms free and the ecoDoppler control confirmed the good result of the procedure.

Four months follow-up: the patient is still symptoms free, she increased in weight and no restenosis was detected at the ecoDoppler control.
Acute ischemia of the upper right limb due to occlusion of right axillary artery during coronary artery bypass treated with PTA and stenting

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**BACKGROUND**

A 76 years old woman was referred to our institution with the diagnosis of angina at rest. Comorbidities included obesity, hypertension, previous right mastectomy and chemotherapy for breast cancer. The coronarography showed a three vessels’ disease so the patient underwent coronary artery bypass (CABG). The intervention was complicated by retrograde dissection of the right axillary artery which was sutured. The patient experienced acute ischemia of the upper right limb.

**INVESTIGATION AND DIAGNOSIS**

Angiography, performed with femoral artery approach, showed right axillary artery’s occlusion. 

**Management:** right radial artery approach with a 6 F – 90 cm sheath. The occlusion was crossed with an hydrophilic 0.035" guidewire and PTA was performed (balloon 4 mm x 40 mm). After having changed guidewire two self-expandable stents were released (10 mm in diameter, 10 + 4 cm in length). The stents were post-dilated with a 6 mm x 4 cm balloon at 10 atm.

**RESULT**

Final result was good, showing a wide patency of the stents, the flux in the right arm was restored and the patient was symptoms-free.

**Post procedure:** the patient was hospitalized for five days, she remained symptoms free and the ecoDoppler control confirmed the good result of the procedure.

**Six months follow-up:** the patient was still symptoms free and no restenosis was detected at the ecoDoppler control.

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**European experience with a novel transcervical access neuroprotection system for carotid revascularization**

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University Hospital of Gent, Belgium

The CREST trial assessed the relative efficacy of CAS versus CEA and found no difference in the primary composite endpoint but important differences in individual components. In the periprocedural period, the CAS arm had an excess of stroke (4.1% vs 2.3%, p=0.01), and the CEA arm had an excess of MI (1.1% vs. 2.3%, p=0.03). A substudy of the ICSS trial looking at new ischemic brain lesions detectable on DWI found 50% in the CAS arm and 17% in the CEA arm.

Flow Altered Short Transcervical Carotid Artery Stenting (FAST-CAS) with the MICHN Neuroprotection System (NPS) is a new hybrid procedure intended to reduce the respective complications of CEA and transfemoral CAS. Embolic risk is reduced by a) direct carotid access to avoid catheter manipulation in the arch and supra-aortic trunk, and b) stenting and angioplasty under high rate blood flow reversal to shunt debris of all sizes away from the brain. The use of local anesthesia and a supraclavicular mini-incision are intended to reduce the risk of MI, cranial nerve injury, and bleeding complications.

The PROOF first in man trial studied the MICHN NPS in 65 patients between March 2009 and September 2011. The primary endpoints were major stroke, myocardial infarction, or death from the index procedure through 30 days. No primary endpoint events were reported. In a subgroup (n=48), microembolization was studied by performing DW-MRI exams both pre-procedure and within 48 hours after the stent implantation. Eight subjects (16.6%) had evidence of new ischemic brain lesions, without sequelae.

CE Mark has been received and initial experience from new centers will be presented.
A novel case report, trans-collateral angioplasty for below the ankle lesion

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According to the angiosome concept, in endovascular therapy, it is the best way to get the direct flow to the wounds for critical limb ischemia patient. We always tried to get the one straight “direct” line to the wound. But it is sometimes difficult to get the “direct” flow for wounds because of existence of the occlusive lesion in below the ankle level.

In our hospital, we tried to perform the endovascular therapy for not only below the knee lesion, but also below the ankle lesion.

In below the ankle lesion, the vessel has complex three-dimensional conformation. Therefore it is difficult to understand the positional awareness for proximal and distal stump for occlusive lumen. It cause the technical difficulty for endovascular therapy for below the ankle lesion.

We have a case who were performed the endovascular therapy for below the ankle lesion with novel interventional technique, trans-collateral approach. The patient was 70s man who had unhealed ulcer in his left 4th toe. In leg angiography, his anterior tibial artery, tibioperoneal trunk and lateral plantar were occluded. In 1st endovascular therapy, we performed the revascularization for tibioperoneal trunk (dilatation with 3.0mm balloon catheter). After the 1st therapy, the ulcer was not cured. Therefore, we performed to 2nd intervention. Target for 2nd intervention was occlusive lesion in lateral plantar. We advanced the guidewire into occlusive lateral plantar. But it went to the subintimal space. It was difficult to cross the guidewire to distal true lumen only antegrade approach. We carefully advanced the guidewire and micro-catheter into the collateral vessel from medial plantar to lateral plantar. Finally, the guidewire get the distal portion of the lateral plantar and penetrate the occlusive lesion for lateral plantar. We dilated the lesion with 2.0mm balloon catheter. We get sufficient “direct” flow fro this ulcer.

2-D guide-wire tip path-length; a novel endovascular skill metric

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INTRODUCTION
Objective motion analysis of guide-wire/catheter manipulation to assess proficiency during endovascular interventions remains unexplored. This study assesses its feasibility and its role in evaluation of technical ability.

MATERIALS AND METHODS
Semi-automated motion tracking software was developed, using CT-calibrated and noise-corrected accumulative translational motion between frame-by-frame fluoroscopic video coordinates to calculate the 2D catheter-tip path-length (PL) with visual representation in an AP projection. 18 experienced interventionalists (at least 100 endovascular cases) each performed a single carotid artery stenting procedure (CAS) on a VISt simulator (Mentice, Gothenburg, Sweden), for a standardised internal carotid artery lesion. Groups were divided into 0 CAS cases performed previously (n=6, group A), 21-50 (n=5, group B) and >50 (n=7, group C). Total PL was calculated for each case and comparisons made between groups. Correlations were made with conventional simulator metrics as well as with a CAS-specific procedure score and generic rating scale (derived from OSATS), from post-hoc video analysis and assessment by three blinded observers.

RESULTS
Median PL was significantly reduced in group C: 5160.289 pixels of movement IQr (3040.646-7612.896) versus 6856.704 (5378.013-8541.437) for group A (p=0.04), and 9482.567 (8384.075-16620.21) (p=0.003) for group B. Combining groups A and B – median 6384.075 pixels (5378.013-16620.01) and with CAS-specific procedure score (rho=−0.542, p=0.02) and with CAS-specific procedure score (rho=−0.516, p=0.028). No significant correlations were identified when comparing PL to metrics derived from the simulator (procedure time, fluoroscopy time, contrast volume, number of cine-loops, and number of simulator recorded errors).

CONCLUSIONS
Endovascular instrument video motion analysis is feasible and may represent a potential tool for the objective assessment of endovascular skills. Further work is required to validate path-length as a robust method of assessment.
Successful emergency endovascular repair of a mycotic thoracic aortic pseudoaneurysm using a coeliac-scalloped device

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Endovascular repair of mycotic aortic aneurysms encroaching upon the visceral segment is complicated by the need to obtain an adequate distal landing zone whilst maintaining visceral perfusion and avoiding paraplegia. Open repair of mycotic aneurysms in this segment has a high mortality; endovascular techniques are an emerging alternative but typically require branched or fenestrated devices which are often not available in the emergency setting due to manufacturing delays.

We report a case of a 66 year-old male who presented to a peripheral hospital with left flank pain and a known 43mm infra-renal AAA under surveillance. Initially an US abdomen revealed no leak from the known AAA and the patient was discharged. He then re-presented with worsening pain and raised inflammatory markers. A non-contrast Ct was performed and compared to a surveillance Ct three weeks prior, revealing a 57x47mm aortic retro-crusal lesion. Ct angiography demonstrated a rapidly expanding mycotic pseudoaneurysm at the level of the coeliac artery. He was unfit for open repair (LVEF 15-20%, CKd stage 4) but a custom-made thoracic stent-graft with a distal scallop was available. This was deployed via a femoral approach under local anaesthesia to cover the coeliac artery whilst maintaining superior mesenteric artery patency, as there was no adequate distal landing zone proximal to the coeliac artery. Recovery was uncomplicated and the patient remains well at home of 4 months follow up. Considering the source, blood cultures grew staph. aureus, thought to derive from an infected pacing wire.

With many recently emerging options (including chimneys, scallops, fenestrations and branches) for endovascular repair of acute aortic syndrome affecting the visceral branches in the emergency setting, we believe it is time to consider the practicalities of maintaining a stock of ‘custom-made’ devices. Yet this will depend on establishing acceptable strategies in maintaining visceral perfusion.

Case-specific rehearsal prior to EVAR

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INTRODUCTION

Recent advancements in simulation permit patient-specific rehearsal (Psr) prior to endovascular repair of aortic aneurysms (EVAR), enabling the interventionalist with or without his team to practice the case prior to treat the real patient. Previous research has demonstrated that Psr of a carotid artery stenting procedure is feasible, and may enhance technical and human factors skills of the entire team. This pilot study has evaluated the feasibility and possible applications of Psr for EVAR.

METHODS

Five patients with an infra-renal aortic aneurysm were selected for endovascular exclusion with the Gore Excluder using the C3 Delivery System (W.L. Gore & Assoc, Inc, Sunnyvale, California, USA). Patient-specific DICOM data were uploaded and the PROCEDURE rehearsal software within the Angiomenter (Simbionix, Ohio, Cleveland) generates a digital 3D model of the anatomy. Subsequently a simulated interventional environment is created. Less than 24 hours before the real case, rehearsals with the endovascular team were conducted in the Laboratory or Angiosuite. Technical performances and human factors skills were assessed in the simulated and real case, and compared. Feasibility, face validity and initial experiences of experienced endovascular teams will be presented.

CONCLUSIONS

Setting up procedure rehearsal for EVAR is feasible for several patients in different hospital settings. However, a randomized controlled trial is required to evaluate how this technology may influence device selection, technical performance and human factors within the team and have an impact on patient outcomes.
INTRODUCTION

EVAR allows low postoperative morbidity and mortality but liberalization may result in bad outcome. Authors report their EVAR experience in Complex AAA (Cpx AAA).

MATERIALS AND METHODS

From January 2004 to December 2011, we treated 111 pts (101 men and 10 women), mean age 72.3 yrs (DS ±7.3). We compared Group 1 (Cpx AAA, 47 pts), including Aortic Anastomotic Pseudoaneurysm (AAP), 4 pts (8.5%) ; AAA diameter > 7 cm, 16 pts (38%); EuroSTAR type C, D, E AAA, 20 pts (42.3%); aortic neck and/or iliac angle > 60°, 23 pts (50%); associated iliac aneurysm, 16 pts (34%); to Group 2 (Reg AAA, 64 pts), according to the following anatomical and clinical variables: EF > 40%, gender, age => 75 yrs, comorbidities, leaks, aorto-uniliac stent-graft, groin infection, hybrid procedures, quartile evaluation (2000-2002; 2003-2005; 2006-2008; 2009-2011). Leaks were defined as any collection of fluid at the anastomosis or iliac access site that was not limited to the access site and/or could not be controlled with additional systemic antibiotics.

RESULTS

Postoperative mortality and morbidity rate, in Cpx AAA vs Reg AAA were respectively 4% vs 11% (p=ns), and 8% vs 11% (p=ns).

Table 2 shows the results according to clinical and anatomical features:

<table>
<thead>
<tr>
<th>Clinical/Anatomical Features</th>
<th>Group 1 Cpx AAA</th>
<th>Group 2 Reg AAA</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF &gt; 40%</td>
<td>41 (88%)</td>
<td>52 (81%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Men</td>
<td>40 (80%)</td>
<td>61 (82%)</td>
<td>.05</td>
</tr>
<tr>
<td>Women</td>
<td>7 (70%)</td>
<td>3 (80%)</td>
<td>.05</td>
</tr>
<tr>
<td>Age &gt; 74 yrs</td>
<td>27 (57%)</td>
<td>19 (30%)</td>
<td>.003</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>27 (57.3%)</td>
<td>46 (71%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Leak</td>
<td>6 (13%)</td>
<td>4 (6.5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Aorto-Uniliaco stent-graft</td>
<td>5 (10.5%)</td>
<td>3 (5.5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Groin infections</td>
<td>3 (6.5%)</td>
<td>8 (12.5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Hybrid procedures</td>
<td>6 (13%)</td>
<td>2 (3%)</td>
<td>.05</td>
</tr>
<tr>
<td>2000 - 2002</td>
<td>0 (0%)</td>
<td>4 (100%)</td>
<td>.002</td>
</tr>
<tr>
<td>2003 - 2005</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
<td></td>
</tr>
<tr>
<td>2006 - 2008</td>
<td>0 (0%)</td>
<td>25 (45.5%)</td>
<td></td>
</tr>
<tr>
<td>2009 - 2011</td>
<td>27 (55%)</td>
<td>22 (44.5%)</td>
<td></td>
</tr>
<tr>
<td>Limb occlusion</td>
<td>3 (6.5%)</td>
<td>3 (5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Patent IMA</td>
<td>7 (15%)</td>
<td>17 (26.5%)</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

One pt was converted because of the endograft dislocation. We had 6/47 (13%) vs 4/64 (6%) leaks respectively in Group 1 and 2. Eight of them resolved spontaneously in 2 months. One patient was unsuccessfully embolised and 1 was successfully treated by external iliac limb extension. In the 5 yrs FU we had an actuarial survival rate of 95% and 85% respectively in Group 1 vs Group 2.

CONCLUSIONS

Cpx AAA are significantly more present in women and elderly pts. There is a progressive increase of EVAR treatment in Cpx AAA, although with an higher rate of postoperative mortality and morbidity rate.

High risk nature of open repair in patients with complex neck infra-renal and juxtarenal abdominal aortic aneurysm (AAA), has forced the evolution in stent graft technology to produce fenestrated stent graft, utilizing the visceral aortic segment for proximal sealing zone and extending the anatomical suitability and advantages of endovascular repair. Fenestrated endovascular repair (FEVAR) in comparison to conventional endovascular repair (EVAR) is technically challenging and the success is highly dependant on precise placement, alignment and cannulation of target vessel fenestrations.

Our experience of 140 conventional EVAR using Anaconda Stent Graft lead us to the development of first fenestrated Anaconda stent graft, as we believed that this stent graft has certain characteristics which are ideal for a fenestrated stent graft. The Anaconda stent graft has no stents in the part of the body where there are potential fenestrations and has a repositionable main body which allows precise placement of fenestrations and alignment with target vessels. The absence of top cap allows brachial access and improves target vessel cannulation rate. The lack of columnar strength prevents deformation of fenestration and the multiple independent ring design allows greater flexibility through tortuous anatomy.

12 patients, mean age 74.6 yrs (range 59-83), mean aneurysm diameter 71.1 mm (range 56-94) with juxtarenal or complex neck infrarenal AAA have so far been treated, with a 100% technical success, 97% target vessel patency rate and no in-hospital mortality. We believe that this new innovative stent graft has the potential to increase the overall proportion of suitability for endovascular repair, with high success and target vessel patency rate, hence reducing the aneurysm related morbidity and mortality.
Successful endovascular treatment of an aortic mycotic pseudoaneurysm: two cases with two year follow up

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An aortic mycotic pseudoaneurysm is a rare but fulminant infectious disease that causes sudden death by aortic rupture unless early diagnosis is made and urgent aortic repair is performed. Two patients with a mycotic pseudoaneurysm underwent successful endovascular treatment at our centre with more than two years follow up.

A 58 year old lady presented with acute back pain. CT-scan showed a contained rupture of the thoracic aorta. Emergent exclusion was performed by EVAR. One month follow up CT and MRI scans revealed a massive vertebral destruction due to a progressive spondylodiscitis of T8-T9 with a prevertebral abscess. The patient underwent a stabilisation with osteosynthesis from vertebræ T6 to T11. Peroperative cultures grew Campylobacter species, clindamycin sensitive. Antibiotics were continued for 6 months and were stopped after normalisation of infectious parameters and stable follow-up CT scans.

The second patient is a 75 year old man, treated curatively with BCG instillations for a bladder carcinoma 2 years earlier. He presented with chronic lower back pain due to an mycotic pseudoaneurysm of the abdominal aorta with prevertebral abscessation. Because of his general condition endovascular treatment was preferred. Despite empiric therapy with clindamycin and ciproxine, inflammatory lab results remained high for more than 18 months and the prevertebral collection was drained. Cultures grew Mycobacterium tuberculosis. His antibiotic regimen was switched to triple tuberculostatic therapy, and stopped after 18 months of good clinical and biochemical evolution.

Both patients have now more than 2 years follow-up with no signs of recurrent infection, endoleak or aortic dilatation at the site of the previous infection. The treatment of a mycotic pseudoaneurysms remains very challenging. An endovascular exclusion of a mycotic aortic segment with an endoprosthesis is a minimal invasive procedure that can be a valid alternative for a difficult open aortic repair in selected cases with good mid-term results.

Hybrid repair of thoracoabdominal aortic aneurysms and chronic aortic dissections

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OBJECTIVE
Hybrid repair consists in debranching of the visceral and renal arteries followed by endovascular exclusion of the aorta. We report our ongoing 4-year experience of hybrid open and endovascular treatment of thoracoabdominal aortic aneurysms (TAA) and chronic aortic dissections (CAD).

METHODS
A series of 10 patients (all male, mean age 63 years) were treated between October 2007 and July 2011. Two patients had TAA type III, one type II, one type IV, five CAD and one mycotic pseudoaneurysm. Two were symptomatic. One had Marfan’s syndrome. Four had received previous aortic surgery. Simultaneous approach was performed in three and staged approach in five. Mean follow-up is 26 months.

RESULTS
Eight patients had a completed procedure. Extensive calcification of the iliac systems in one case and poor flow in the true lumen of a CAD in the other prevented completion of the procedure. There was no thirty-day mortality. There were two deaths in the follow-up, one of which occurred after an abandoned surgery. One patient suffered permanent paraplegia. Two patients lost patency of a peripheral graft (right renal artery in both cases). One of them was successfully treated with a stent and the other one couldn’t be resolved with endovascular treatment. Four patients required temporary hemofilter with subsequent recovery of renal function. None of them required long term dialysis.

CONCLUSIONS
Hybrid repair seems to be an appropriate strategy with encouraging results for selected cases of TAA and CAD.
Orientated Foam Sclerotherapy (OFS), a new safe and effective method treating GSV varicose veins

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2Health ministry/Vascular surgery, Damascus, Syria

PURPOSE
Looking for a safe, durable and highly cost effective method treating GSV incontinence, OFS is: as effective as surgery and thermablation, probably more.
Can do reflux cartography and treat eventual PCS, Varicocele, perforators or LSV at the same scene.
Can treat tortuous, doubled or huge (more than 10 mm) GSVs.
Can treat collaterals and occlude the hole junction far less expensive.
No tumescent anesthesia, outpatient procedure.
Excellent patients comfort and satisfaction.
Few mild complications and contraindications.

METHOD
standard aortic endograft and renal tricks for juxtarenal landing zone. Are we bungling? Personal experience

1ESVS member, ISVS member - Vascular surgery unit, IRCCS ASMN Reggio Emilia public hospital, Reggio Emilia, Italy

BACKGROUND
Endovascular aneurysm repair (EVAR) is the most significant last two decades vascular surgery innovation. Vascular communities are now going beyond orthodox, recommended indications treating juxtarenal landing zone (ILZ).

METHOD
Among more than 750 EVAR we have performed 29 (26 planned, 3 emergency) ILZ procedures from January 2008 to December 2011. Twenty-six male and three females. Four patients with type 1A endoleak. Mean age 78 years. Aneurysms diameter 45 to 90 mm. All patients judged very poor fit for surgery because cardiac set up, chronic obstructive pulmonary disease, hostile abdomen, obesity. Anesthesiology score was III in 16 patient, II in 7 and IV in 6. ChimneyGraft (C.G.) and EndoWedge (E.W.) are common definitions for this strategy. Covered and bare stents, balloon-expandable or self-expandable can be used. Intuitively, it would seem that a covered self-expanding stentgraft, like Viabhan, would provide the best seal and conform better to the angulated take-off particularly for the renal arteries that can form a 90° angle with the aortic lumen. About aortic endograft and renal tools: 15 Excluder, 9 C3Excluder and 5 Endurant, 14 Herculink, 1 Advanta, 2 Radix, 19 Viabhan.

RESULTS
technical success 100%. Hospital mortality 6.9%, overall 25%. Major complications: 1 MI, 1 external iliac rupture, 1 kidney infarction, 1 groin infection, 1 femoral pseudoaneurysm. Follow-up: 4 patients lost, 1 type 1B endoleak, 4 type1A, 1 type 2 endoleak and 1 patient has severe chronic renal insufficiency.

CONCLUSIONS
Safe technique, effective too? Really customizable. Common devices readily available or stocked up, technically affordable even during selected emergency circumstances. A lot of open questions on the carpet. Do should we consider short-term results quite encouraging? Further development has expected in the future.

Test contrast injection controlling perfect occlusion and total incontinent collaterals filling.
Foam injection (1.5 ml 3% sclerosing agent + 0.5 ml contrast agent + 8 ml air, all Tsari method shacked).
Manipulating sheath and balloon to orientate foam to all thigh incontinent tributaries and finally to the trunk, controlling and stopping all foam passage to deep veins under fluoroscopy guidance.
Average procedure time 21 minutes, average sclerosing agent dose 2.7 ml.

RESULTS
Out of 36 duplex controlled cases for more than one year, 34 complete occlusion of GSV, Tributaries and Junction till CFV , this vein keeps a normal aspect with no deformity or bulging thrombus.

CONCLUSION
OFS is associated with an excellent medium term results and extremely few complications and recurrences, it must be encouraged and deserves further trails and evaluation.
Hybrid techniques for treatment of varicose veins: combined new and conventional technologies

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2Department of Cardiovascular Medicine, Mormanno, Italy

We assessed the safety and efficacy of combined endovenous laser treatment (ELT) and traditional techniques for treatment of the saphenous veins insufficiency, based on experience, increasing endolaser procedure in patient often treated with stripping.

Since September 2007 to December 2011, 1182 ELT procedures have been performed (great and small Saphenous vein) using a diode laser 980 nm wavelength (LASEmar1000- Eufoton, Italy) by a kit that includes optical fibers of 600 micron (KIT INVE, Eufoton, Italy). Local Echo-guided anesthesia have performed in all cases. Laser power is variable regarding veins diameter from 6 to 12 watts settled in semi-continuous mode and the energy supplied is personalized to morphologic vein characteristics. Power is always personalized to echographic vein patterns (diameter, wall thickness, anatomic deep). In the 94% of all patients other techniques have been associated: microflebectomy (86%), varicectomy (12%), perforator vein closure (4%), stripping of lower extremity of great saphenous vein (GSV) (7%). This last procedure performed by a day-Surgery ever under ultra-sound guide and by a topical anesthesia. It can ensure good clinical and aesthetic results avoiding invasive procedures like stripping. Combined techniques personalized to the patient’s vein situation permit to obtain the best results and the best satisfaction of patients.

OBJECTIVE
In recent years, endovenous laser treatment (ELT) has been proposed to treat incompetent great saphenous veins (GSV). This study reports the safety and clinical and anatomic historic effectiveness of ELT for treating lesser saphenous veins (LSV).

METHODS
Since September 2007 to December 2011, ELT procedures have been performed for incompetent LSV segments in 412 patients (208 women, 114 men) with a mean age of 57 years (range, 19 to 81 years) were treated with intraluminal ELT using a 980-nm diode laser LASEmar1000 (Eufoton, Italy) by a kit that includes optical fibers of 600 micron (KIT INVE, Eufoton, Italy). The LSV diameter was measured by Duplex examination in an upright position in two LSV segments (1.5 cm below the saphenopopliteal junction and sural segment). These measurements were used to determine the optimal linear endovenous energy density (LEED) for treatment. Patients were evaluated clinically and by duplex scanning at 1 and 8 days, 1-3 and 8 months, and at 1 year to assess treatment efficacy and adverse reactions.

RESULTS
A total of 412 LSVs were treated. The mean diameter was 6.5 mm (range, 4.0 to 10.0). The LEED was tuned as a function of the initial LSV diameter measured in the orthostatic position, from 80 J/cm (4.0 mm) up to 140 J/cm (10 mm). At the 1-week follow-up, 11.4% of the patients reported moderate pain. In the immediate postoperative period, the closure rate was 99.9% and remained constant during the 1-year follow-up (86% of all patients) to reach 99.0%. After 1 year, a complete disappearance of the LSV or minimal residual fibrous cord was noted. Major complications have not been detected; in particular, no deep venous thrombosis. Ecchymoses were seen in 26%, transient paraesthesia was observed in 2%. No nerve injury have not been occurred. There was no dyschromia, superficial burns, hrombophlebitis, or palpable indurations. Complementary phlebectomy was done in 89% of patients. No failures occurred.

CONCLUSIONS
ELT of the incompetent LSV with a 980-nm diode laser appears to be an extremely safe technique, particularly when the energy applied is calculated as a function of the LSV diameter. It is associated with only minor effects. Currently, ELT has become the method of choice for treating superficial veins and has almost replaced the treatment of traditional ligation and stripping.
Right subclavian vein thrombosis after first rib resection: residual thrombosis or late onset complication? Diagnosis and endovascular treatment

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INTRODUCTION
Currently three types of thoracic outlet syndrome (TOS) have to be recognised and treated according to their specific pathophysiological mechanism. In neurogenic TOS (95% of all TOS cases) emphasis lies on conservative therapy, where venous (5%) and arterial (<1%) TOS should immediately be treated surgically. In 11% of all cases of venous thrombosis the affected site is the upper extremity. Of those patients almost half is not CVC (Central Venous Catheter) associated. We present a case of subclavian deep venous thrombosis associated with first rib resection. An endovascular therapy was initiated.

CASE PRESENTATION
A 57-year old male patient was seen because of recently developed varicosis of the right upper arm and shoulder (Figure 1: Extreme varicosities of the right arm). A few years before he underwent first rib resection because of non-specified TOS. Otherwise he was healthy and took no medication. A contrast enhanced computed tomography (CT) showed an occlusion of the right axillary and subclavian vein (Figure 2: CT showing occlusion of right subclavian vein). The external jugular vein and superior vena cava were normal. There was a large network of collaterals. Furthermore the anterior part of the first rib overlying the subclavian artery and vein still was visible (Figure 3: Transversal CT image showing residual first rib anteriorly).

A ultrasound guided venous access was obtained in the right brachial vein and fibrography with thrombolysis was performed (Figure 4: Angiography shows complete subclavian vein stenosis). A 4F introducer was placed. After 24 hours thrombolytic therapy there was no resolvement (Figure 5: Angiography after 24 hours thrombolysis: No resolution of thrombus) of the thrombus thus lysis was continued for another 24 hours. No lysis was obtained. Endovascular therapy was continued by placing an additional 7F introducer through the right common femoral vein. The thrombus was passed with the guidewire and via this “floss-wire technique” 2 self-expandable stents (Wallstent 16x6cm and 14x4cm, Boston Scientific, USA) (Figures 6: Angiography after placement of the first stent, and 7: Angiography after placement of a second more distal stent) were deployed with a nice angiographic result.

Patient recovered well and the varicosis disappeared. He was placed on a therapeutic dose of low molecular weight heparines while starting coumarine therapy.

DISCUSSION
We found no reports of new onset venous thrombosis after first rib resection using an extensive search on Web of Science. Description of residual subclavian vein thrombosis after thrombolytic and surgical therapy has already been described. In this case stenting has given complete sonographic, angiographic and symptomatic relief, as in our case. However reports are scarce, an immediate stenting of these venous lesions seems beneficial.

References


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AIM
To develop a new self-expandable aortic valved stent following the shape of the sinus of valsalva, which can be deployed above native leaflets for aortic regurgitation, and study its effect on coronary artery flow when orthotopic implantation in and above native leaflets.

METHODS
New self-expandable aortic valved stent consist of nitinol stent and bovine pericardium, and was designed following the shape of the sinus of valsalva, the bovine pericardium was tailed as native leaflet. Thirty-six swine hearts were divided into three equal groups of twelve. In Group A (n = 12), the new self-expandable aortic valved stents deployed above native leaflets. In Group B (n = 12), the new self-expandable aortic valved stents deployed above native leaflets. In Group C (n = 12), the cylinder-like valved stents deployed only in native leaflets. The measurements of each coronary flow rate and endoscopic inspections were repeated post-implantation.

RESULTS
In Group A and C, valve implantation in native leaflets resulted in a significant decrease in both left and right coronary flows. In Group B, no significant change in either right or left coronary flow was found after new self-expandable aortic valved stent placement. Endoscopic inspections showed that in group A and C the native leaflets sandwiched between valved stent and aortic wall, whereas, in group B the native leaflets were under the artificial leaflets.

CONCLUSIONS
Two kinds of stents deployed in native leaflets affect left and right coronary flows significantly. No significant effect was found when the new self-expandable aortic valved stent deployed above native leaflets. This new self-expandable aortic valved stent can be deployed above the native leaflets, which avoids the obstruction of native leaflets on coronary flow.
Revascularization for the occlusion of two major coronary arteries by percutaneous coronary intervention in ACS

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OBJECTIVE
To evaluate the feasibility and efficiency of complete revascularization for the occlusion of two major coronary arteries by percutaneous coronary intervention (PCI) in ACS.

METHODS
The direct once PCI for acute occlusion of two major coronary arteries was performed at one time in 10 patients with acute myocardial infarction (AMI) and left anterior descending artery (LAD) was reperfused firstly. Two steps PCIs (1-2 weeks interval) were made for chronic occlusion of two major coronary arteries in 24 patients with unstable angina pectoris (uAP) and the artery of culprit lesion responsible for recent onset was first choice. XB and/or EBu guiding catheter. Crossit 100-200 and Pilot 150 guiding wire, and Maverick balloon were used in all patients. So, complete revascularization (TIMI-III grade of blood flow) was achieved for all 24 patients. After average 18 months follow-up, chest pain was disappeared, myocardial ischemia decreased, cardiac function improved and no major cardiovascular events were found for all patients.

CONCLUSION
Complete revascularization for the occlusion of two major coronary arteries in uAP were essential and practical. Two occluded major coronary arteries were reopened and stented in 10 patients with AMI. Twice PCIs were successful in 23 of 24 patients with uAP. Another one’s right coronary artery was stented successful and distal LAD was well perfused by collateral circulation. XB and/or EBu guiding catheter. Crossit 100-200 and Pilot 150 guiding wire, and Maverick balloon were used to enable PCI success.

Local vascular and systemic inflammation of Acute Myocardial Infarction

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OBJECTIVES
Liver, spleen and bone marrow represent the organs with high reticuloendothelial system (RES) activity. This system is composed of cells which play an active role in the defense mechanism. We hypothesized that in patients with AMI, metabolic activity of organs containing RES will be higher than control subjects.

METHODS
We total 48 subjects consisted of acute myocardial infarction (AMI) patients (n=32, 57±12 years) within one week and control subjects (n=16, 54.4±7.2 years). Patients had fasted 6 h before PET acquisitions and blood glucose had to be less than 7 mmol/l before injection of 310–450 MBq (5–7 MBq/kg) of 18F-FDG. The maximum SUV for right carotid artery, ascending and descending aorta, RES system such as liver, spleen, bone marrow, and lung, visceral fat and subcutaneous fat. Bone marrow and spleen uptake analysis on 18F-FDG PET/CT imaging. BMU level was visually evaluated in homogeneous bone areas outside of possible focal uptakes and graded according to liver uptake (1=below liver uptake, 2=corresponding to liver uptake, 3=above liver uptake). Associated focal BMUs were also reported. As semi-quantitative reference, maximum standardized uptake values (SUV) were generated using a region of interest (ROI). The ROI was drawn manually inside the bone area of the sacral promontory using CT data for anatomical location. Performance of 18F-FDG PET diffuse BMU and SUV to detect bone/bone marrow involvement was also assessed.

RESULTS
In that case BMU grade 3 and SUV > 2.7 were used as positive scan criteria; SUV was visually graded according to liver uptake (1=below liver uptake, 2=corresponding to liver uptake, 3=above liver uptake).

CONCLUSIONS
The maximum SUVs for the liver, bone marrow spleen and lung were higher in patients with AMI than in control subjects (p<0.05). We compared the SUVs for each organ noted.

The maximum SUV for the organs with RES activity were higher in patients with AMI than in control subjects. This could imply that organs with RES cells play an important role in the inflammatory response which can be detected and quantified by the FDG-PET imaging technique. The degree of this response may have a prognostic role in such patients and should be explored further in the future.
Periodontitis is closely associated with carotid arterial inflammation

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**BACKGROUND**

Periodontitis is one of the candidates associated with elevated levels of C-reactive protein (CRP) and other inflammatory biomarkers. Epidemiologic studies have shown that periodontitis is associated with endothelial dysfunction, atherosclerosis, and an increased risk of coronary heart disease and stroke. We aimed to investigate the relation between periodontitis and the inflammation of the carotid artery.

**METHODS**

We observed 86 patients with clinical diagnosis of periodontitis and 42 subjects without it. All subjects underwent F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography and were evaluated for the level of inflammation using the maximum standardized uptake value (max SUV) of FDG in the right carotid artery and the dental region. Results: The patients with periodontitis showed significantly higher SUV of dental region (2.8±0.4 vs. 1.2±0.7, p<0.001) and right carotid artery (2.5±0.4 vs. 0.8±0.7, p=0.001) and high-sensitivity CRP (hsCRP) (2.18±3.10 mg/l vs. 1.20±1.12 mg/l, p=0.014) than control. The correlation of dental SUV was very high with carotid artery SUV (r=0.851, p<0.001) but modest with hsCRP (r=0.179, p=0.51). The hsCRP showed no correlation with carotid artery SUV (r=0.096, p=0.301). In multiple linear regression analysis, carotid SUV was significantly associated with periodontitis (r²=0.730, p<0.001) or dental SUV (r²=0.763, p<0.001) independent of age, sex, hsCRP or other covariates.

**CONCLUSION**

In conclusion, systemic inflammation, these data suggest that periodontitis per se and its degree of inflammation appear to be closely associated with vascular inflammation, a crucial mechanism of the development, progression and vulnerability of atherosclerotic plaque.

Computational mechanics of stent grafts: can we predict deployed configurations? An in vitro and patient-specific case study

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**ENDOVASCULAR REPAIR BY STENT GRAFT DEPLOYMENT**

Endovascular repair by stent graft deployment is an alternative to the traditional surgical repair for abdominal aneurysms, and although the technique has advanced greatly in the last decade, it is still associated with long-term problems such as migration and endoleakage. This study presents a novel tool to study fast and in detail these problems by using a virtual procedure to investigate stent graft mechanics during and after deployment in a patient-specific AAA. Three commercially available SG devices (Medtronic Talent, Gore Excluder and Cook Zenith) were reverse engineered from high-resolution μCT scanning. A computer method is developed in which after crimping and stent positioning, the devices are deployed by the virtue of the nitinol stent’s self-expanding behavior. External and internal forces for each component, and the interactions between them can be quantified and investigated. The presented method is validated in vitro using a silicone mock aneurysm and the Medtronic Talent, with predicted stent and vessel deformations in good agreement with measured values (see figure: Comparison between the experimental deployment and the virtually deployed Medtronic Talent stent graft, on a CT background of the silicone vessel).

The in vitro procedure was adjusted for use with medical human data. Geometrical models were extracted from CT images, including aneurysm, thrombus and calcifications. We retrospectively investigated pre- and post-operative data for a patient presenting with AAA, who was treated with a Gore Excluder. Preliminary results for the patient-specific case study suggest close-matching results with post-operative CT data.

Upcoming work will focus on investigating the deployment result of other stent designs and sizes on the endovascular procedure results (vessel straightening, neck expansion, radial forces...).
To open or not to open: that is the question

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INTRODUCTION
This is an interesting case of a rapidly expanding mycotic aneurysm in a young patient where open repair was favoured over an endovascular repair.

BACKGROUND
A 64 years old previously fit and well gentleman was under investigation for back pain with an incidental findings of a rapidly enlarging juxta-renal mycotic aneurysm with a short neck. The anatomy of the sac excluded the option of conventional endovascular repair. Two options were either using fenestrated graft or open repair with no proven benefit of one over the other. He underwent open repair using silver-impregnated Dacron graft. Post-operatively, he developed an intrasac collection adjacent to the graft. He underwent radiological drainage of over 2 liters of pus, which after analysis grew a rare strain of Klebsiella oxytoca. This is the first case of mycotic aneurysm associated with this bacterium. He required 3-months course of intravenous antibiotics and has made a good recovery.

CONCLUSION
EVAR is well established as an alternative to open repair in conventional infrarenal AAA. However, 25-75% of all AAA are still unsuitable for conventional EVAR. The morbidity and mortality of open repair is significantly higher for juxta-renal AAA (11%). The largest systematic review published in 2009 favours fenestrated EVAR as it reports a low 30-day mortality. A recent systematic review of 11 studies showed no level 1 evidence for using fenestrated grafts in cases with moderate risks. However, this case clearly demonstrates why future vascular trainees still need to be competent with performing open repairs. This highlights a learning opportunity for those practicing endovascular repairs to build confidence in performing endovascular repairs in difficult case and an opportunity for defining morphological classifications.

Robot-assisted fenestrated aneurysm repair

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PURPOSE
To report the initial clinical use of the Magellan robotic catheter system during fenestrated endovascular aneurysm repair (FEVAR).

TECHNIQUE
Following procedure rehearsal using an anatomical plexus phantom, a 67-year-old man underwent robot-assisted FEVAR for a 7.3-cm juxta-renal abdominal aortic aneurysm, using a custom-made 3-vessel Anaconda device (2 right(r) renals, single left(l) renal) was used. The superior mesenteric artery(SMA) was also successfully stented. The procedure was performed under general anaesthesia following bilateral femoral cutdowns in the hybrid endovascular suite. The robotic Northstar catheter (9Fr outer sheath, 6Fr inner guide) was introduced via the left common femoral artery, and was driven from a remote workstation, away from the x-ray source. The catheter was advanced into the main body of the aortic stent graft, and was used to successfully cannulate the L renal artery using fine and controlled movements and act as a stable platform for stiff guidewire exchange (cannulation time 3min). The R renal arteries and SMA were cannulated using the manual approach. Robotic system set-up time was 5 min. Good angiographic results were obtained on completion imaging. There were no postoperative complications, and computed tomographic angiography prior to discharge confirmed that the stent-graft remained in good position, with no evidence of an endoleak.

CONCLUSION
FEVAR using the novel Magellan robotic catheter system is feasible and can potentially be advantageous during complex endovascular tasks. This technology may simplify more complex procedures by increasing the navigational accuracy and perhaps reduce procedure times and radiation exposure to the patient and operator.
E-posters
Mechanics of carotid stenting: a novel predictive tool of the operative outcome

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Carotid artery stenting (CAS) is becoming common clinical practice for treatment of atherosclerotic disease, due to its minimally invasive nature, ease of use and the short hospitalization time. Nonetheless there are unfavorable effects both in the short and long term which can affect the success of the procedure. Incomplete apposition to the vessel wall, changes in the blood flow pattern induced from the struts protruding into the vessel lumen and/or regions of stress concentration in the artery wall seem to be related to failure of CAS causing for example in stent restenosis. Virtual tools able to predict stent positioning and its mechanical behavior in the treated vessel are consequently an appealing technology that in the long term could help surgeons in the stent design choice and the location of delivery for elected patients. The present study introduces a novel virtual patient specific operative environment to emulate the clinical outcome of the CAS procedure. As proof of concept three actual cases treated with different sizes of the Acculink stent (Abbott Vascular) were considered. Routinely acquired pre- and post-tenting imaging data were compared with the computer simulations to validate the virtual operative procedure. Pre-operative 3D CTA scans are used to build a realistic computer model of the diseased vessel. The models include the plaque geometry and information of the wall vessel thickness and compliance retrieved from literature. High resolution CT scans of the deployed stent were used to reconstruct the device geometries. Main steps of the mechanical simulation describe stent crimping, bending along the centerline of the vessel and delivering into the arterial stenotic location by means of the catheter. Comparison of post-operative angiography images and the simulation results show good agreement of the deployed stent geometry, both for artery diameter and deformed struts shape. The developed virtual bench test has the advantage of performing additional analysis hardly possible in vivo. Quantitative measurements of the struts distance to the vessel wall, local radius of the lumen from the centerline of the vessel, stent cells area and mechanical analysis such as wall stresses and critical stresses in the stent are also performed. The developed framework can become a useful tool to aid the physician to understand pre-operatively the interaction of the stent with a patient specific artery and could after further thorough in-vivo validation become part of the clinical decision making process and medical training.

Hybrid endovascular treatment of kommerell diverticulum. A case report and outcome

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INTRODUCTION
Left Aortic Arch with an Aberrant Right Subclavian Artery (ARSA) originating from normal left sided aortic arch is the most common aortic arch anomaly, with an incidence of 0.5-2%. This anomaly results from interruption of the dorsal segment of the right arch between the right carotid artery and right subclavian artery with regression of the right ductus arteriosus in the developing double aortic arch.

CASE REPORT
Male, 70 years old, smoker with severe c.o.p.d. Big aneurysm of aberrant right subclavian artery (ARSA), symptomatic for severe dysphagia, cough and recurrent nerve palsy. Anesthesiology score was 3. We propose a two steps strategy. First: right carotid-subclavian bypass and distal closure. Second: left carotid-subclavian by-pass, left iliac conduit and Relay tapered custom made aortic endograft.

Outcome: leak type 2, bulk compression syndrome, declined general conditions. We suggest: sternotomy, sac decompression and leak exclusion. CT scan control shows correct endograft position and no leak. Symptoms disappears and quality of life is good.

CONCLUSION
Best strategies are still unclear, however rupture and dissection of these aneurysms have been reported. In a review of 32 patients, Austin reported a rate of rupture of 19%. Cina reported a rate of rupture of 53% and Kouchoukos reported a rate of dissection of 20%. Symptoms like severe dysphagia, cough, recurrent nerve palsy are very debilitating. This case shows a by stages hybrid endovascular strategy to offer less invasive procedure and a treatment for unfavourable outcome.
Aortic arch pseudoaneurysm on penetrating ulcer: delayed closure after endovascular treatment

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OBJECTIVE

Standard open repair of true or false aneurysms of the aortic arch usually require cardiopulmonary bypass, hypothermia and circulatory arrest, associated with increased mortality and morbidity rates. Thus, an alternative strategy that avoids cardiopulmonary bypass (CPB) and hypothermic circulatory arrest would benefit the patient.

Endovascular stent-grafting has developed as a safe and effective treatment for descending aortic pathologies. We share our experience with the endovascular approach to pseudoaneurysm of the aortic arch in a patient with high risk for aortic arch replacement under extracorporeal circulation.

METHODS

A 65-year-old patient with history of hypertension, chronic obstructive pulmonary disease, non-insulin dependent diabetes, obesity, and hyperlipidemia was referred to our Hospital for evaluation of thoracic pain and dysphonia. A chest Computed Tomography (CT) scan showed a penetrating ulcer 1.2 cm distal to the origin of the left common carotid artery and immediately proximal to the left subclavian artery. A large pseudoaneurysm sac measuring 63 mm x 67 mm, was located on the anterior left side of the aortic arch towards the wall chest (Image 1). The patient’s EuroSCORE was 13, and predictive mortality was 41.12%.

We approached the aortic arch through a left femoral artery approach. Endoprosthesis was introduced under fluoroscopy control and controlled hypotension (80 mm Hg). Medtronic Valiant endoprosthesis with a diameter of 26 mm and a length of 100 mm was used. The endoprosthesis was deployed in such a way that the free end was on the origin of the left common carotid artery (Image 2).

Fluoroscopy was performed to confirm appropriate graft deployment and the presence of small type I endoleak partially refilling the pseudoaneurysm.

RESULTS

Patient’s pain resolved soon after placement of the stent graft. A CT scan, performed 7 days later, confirmed the presence of a small endoleak with slow pseudoaneurysm refilling (Image 3). The postoperative period was event free, and the patient was discharged on day 8. A follow-up at twenty days after the procedure, suggested progressive thrombosis of the pseudoaneurysm with complete resolution of the endoleak (Image 4-6). The patient is actually alive and completely asymptomatic.

CONCLUSIONS

The endovascular treatment should be considered as a potential alternative to conventional aortic arch aneurysm surgery in high-risk patients.

Our case show that an optimal result can be obtained in selected cases through a progressive obliteration of the pseudoaneurysm sac, secondary to the hemodynamic changes triggered by the endovascular prosthesis.

Are there opportunities in daycase surgery to improve training in radiofrequency ablation?

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INTRODUCTION

Vascular surgery has evolved into an independent specialty and requires a definitive training pathway that allows trainees to develop essential skills in core procedure including varicose vein (VV) operations. Recent changes in NHS funding implemented locally in April 2010 restrict treatment to complicated VV. These are likely to significantly reduce the overall number of procedures performed, reducing training opportunities. Radiofrequency ablation (RFA) is viewed by some as the gold-standard method to treat VV. We aim to investigate the impact on NHS funded VV procedures post guideline changes and highlight training opportunities in DSU RFA procedures.

METHODS

Theatre records were reviewed for RFA performed in DSU and general theatres at a large Foundation Trust between January 2007 and 2012. Data collected included lead and assistant-surgeons involved and procedure time (PT).

RESULTS

A total of 783 VV procedures were performed prior to guideline changes (yearly-mean 241). Post-guideline changes, 326 VV procedures were performed (yearly-mean 186): 33% of these were RFA. After RFA was formally introduced locally in Jan 2010, a total of 111 RFAs have been performed since then, 51%(n=57) in DSU and 49%(n=44) main theatre. 91%(n=101) of RFAs were performed by consultants, trainees took the lead in 9%(n=10) of procedures having attended 22%(n=47). Mean PT was 46 minutes for consultants and 52 minutes for trainees (p=0.516).

CONCLUSION

The number of VV operations has significantly decreased in both DSU and general theatres, since implementation of the new guidelines. A significant number of these are now being done as RFA procedures in DSU. Trainers attended less than half of overall RFAs, taking the lead in even fewer cases, with no statistically significant differences in PT. Trainees should be encouraged to attend more VV operations and take the lead in appropriately selected cases under adequate supervision, if high standards are to be maintained.
Major pelvic trauma. The role of vascular-endovascular surgeon at our hospital

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BACKGROUND
Major pelvic fractures account from 4 to 9% and could be considered as marker of severe trauma. Mortality ranges from 6 to 15% but with hemorrhagic shock can raise till 65%. We retrospectively analyse our experience considering the Emilia-Romagna “Hub and Spoke” trauma network system. Data come from hospital administrative form.

METHODS
We examine major trauma with pelvic fractures admitted from January 2006 to September 2011. To simplify we can consider venous and arterial bleeding. The first are effectively treated by fixation, the second not at all. CT scan is a strong predictor of arterial bleeding and gives us a good road map to more specific selective-superselective angiography and transcatheter arterial embolization (TAE). We observed 92 pelvic fractures needing for orthopedic fixation, the second not at all. Ct scan is confirmed by Ct scan.

RESULTS
In hospital mortality has been 20% in emergency group mainly due to persistent shock. Technical success for TAE has been 85% with complete bleeding stop at the end of the procedure. We didn’t have observed complications due to the procedure.

CONCLUSION
Major pelvic trauma represent a life-threatening condition when associated to hemorrhagic shock and, of course, other lesions. Dominate the pelvic exsanguinations is a priority and the “golden hours” is the right time. Transcatheter arterial embolization is safe and effective when arterial bleeding is confirmed by CT scan.

Omega-3 fatty acid decreases both systemic inflammation of reticuloendothelial system and inflammation at vascular plaque

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PURPOSE
Hypertriglyceridemia (high TG) is associated with small dense LDL particle formation and low level of HDL. Omega-3 fatty acids reduces hyperglycemia and is beneficial for prevention of post-myocardial infarct cardiovascular events. It also reported that it decreases inflammation at carotid plaque in patients with carotid stenosis. But, we do not know that reduction of inflammation by omega-3 fatty acid is limited to local vascular plaque or extended to whole body tissues including reticuloendothelial system in patients with high TG.

We would like to know whether reduction of inflammation by omega-3 fatty acid administration is limited to vascular tissue or extended to whole body tissues including reticuloendothelial system in patients with high TG.

METHODS
Using whole body combined fluorodeoxyglucose positron emission tomography/computed tomography imaging, we observed total 46 subjects consisted of high TG patients (n=21, 57±12 years) and controls (n=25, 57±8 years). To compare the local vascular plaque inflammation and systemic inflammatory RES activation, maximal standard uptake value (max SUV) of the highest regions of interest was calculated in the vascular tissues such as right carotid artery, ascending and descending aorta, and RES system such as liver, spleen, bone marrow, lung and visceral fat. We also measure repeated max SUV at same sites after omega-3 fatty acid 1.5g for 6 months.

RESULTS
The SUV of high TG patients in the carotid artery and ascending and descending aorta were significantly higher than controls. The SUV of high TG patients in the liver, spleen, bone marrow, lung and visceral fat were significantly higher than controls. The SUV of high TG patients in the liver, spleen, bone marrow, lung and visceral fat were significantly higher than controls. The SUV of high TG patients in the liver, spleen, bone marrow, lung and visceral fat were significantly higher than controls. The SUV of high TG patients in the liver, spleen, bone marrow, lung and visceral fat were significantly higher than controls.

CONCLUSION
These findings suggest that the administration of omega-3 fatty acid reduces inflammation not limited to local vascular tissue but generalized inflammatory organs in patients with hyper TGs.
Evidence based management in the endovascular era

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BACKGROUND
There has been a trend towards favouring endovascular repair for much acute aortic pathology. We undertook a review of the literature to determine if an endovascular approach could complement the traditional treatment of aortocaval fistulas (ACF), a rare complication of abdominal aortic aneurysms (AAA).

METHODS
A literature search was undertaken on PubMed using appropriate search terms. Case series and reviews reporting presentation, diagnosis and operative management (open and endovascular techniques) of ACF were selected and discussed.

RESULTS
Open surgical treatment of ACF has an associated morbidity and mortality - mainly from excessive blood loss. Open repair mortality rates are reported around 30%, but some centres report far lower rates based on pre-operative diagnosis of the ACF. These rates appear to be reduced when using endovascular repair in selected cases, with success rates of up to 96%. Reiteration of the importance of diagnosis of ACF pre-operatively was the common denominator with both open and endovascular repair.

CONCLUSIONS
Endovascular exclusion appears to be an efficacious means of treating ACF and averting the significant blood loss commonly encountered in conventional repair of these lesions. However some reviews have suggested equal success with open repair. There is limited available published literature on ACF management and outcome, and likely reporting bias attached to both open and endovascular results that are published. With a randomised, controlled trial unlikely to occur, a prospective registry may provide better outcome data.