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Abstracts Sunday 9
Venous session: Endovenous procedures for superficial vein insufficiency: are there long-lasting and permanent procedures?

Long term follow-up after endovenous laser ablation

Centro multidisciplinare di day surgery-Hospital-University, Padova, Italy

INTRODUCTION

Even though in the literature authors report that data related to 2/3-year follow-up are long-term results, the latter actually apply to a 5-year follow-up period or longer, the same as in oncologic surgery standards. Papers on long-term follow-up of endovenous laser ablation (EVLA) are rare, often retrospective and report few patients evaluated at the end of follow-up.

MATERIALS AND METHODS

Our group carried out and published a prospective observational study of 190 patients operated on with EVLA for great saphenous vein incompetence between 2003 and 2004 and followed up with both clinical and echocolor doppler assessment for 6 years (1). The presence of a refluxing sapheno-femoral junction, isolated or in association with a reflux of one of its collaterals, especially of the anterior accessory saphenous vein (AASV) or of a recanalized saphenous trunk, was defined as echocolordoppler failure (ECDF). RESULTS We observed a difference between clinical and echocolor doppler results. Most of the patients showed improvement or disappearance of symptoms (88.4%), but one third of them (30%) revealed an ECDF. We categorized 3 kinds of ECDF:

1. isolated refluxing junction (10.5%);
2. refluxing junction associated with AASV reflux (11.5%);
3. refluxing junction with recanalized saphenous trunk (11.5%).

At the ECDFs appeared within the first 2 years of follow-up (22% during the first and 8% over the second year). About half of the patients with ECDF of the saphenous trunk and of the AASV received ultrasound guided foam sclerotherapy due to the recurrence of varices and/or, more rarely, of symptoms. The multiple logistic regression analysis of the data showed that a diameter of the junction and/or of the saphenous trunk larger than 8 mm is an ECDF risk factor. As a consequence, this parameter should be collected using a standardized method of measurement and therefore reported in all papers.

DISCUSSION

We have chosen the ECDF as main outcome, because echocolor doppler results are more reliable and consistent than clinical ones. As for recurrent symptoms and/or varices, the clinical relevance of some of these ECDFs, especially the isolated refluxing junction, is still unknown in the very long term. For example, in the case of isolated refluxing junction, we frequently observed the appearance of neoangiogenesis, which did not vary over the 6-year follow-up, with or without symptoms or varices recurring. Nevertheless, in a chronic progressive disease as varicose veins is, the persistence of a leakage point at the junction does need a longer follow-up period. The multiple logistic regression analysis of the data shows that a diameter of the junction and/or of the saphenous trunk larger than 8 mm is an ECDF risk factor. As a consequence, this parameter should be collected using a standardized method of measurement and therefore reported in all papers.

REFERENCE


Venous session: Endovenous procedures for superficial vein insufficiency: are there long-lasting and permanent procedures? Update on RCTs of endovenous ablation

M. Perrin
Unite Pathologie Vasculaire Jean Kunlin, Chassieu, France

This article reviews the randomized controlled trials in varicose endovenous treatment published since 2002 until October 2012 including endovenous procedures versus other operative treatment as well as endovenous procedures versus endovenous procedures Successively are displayed and commented 36 RCT’S reported in 45 articles Radiofrequency Ablation versus Conventional Open Surgery 7 RCT’S Endovenous Laser Ablation versus Conventional Open Surgery 10 RCT’S Endovenous Laser Ablation versus cryoablation 3 RCT’S Chemical ablation versus Conventional open surgery 7 RCT’S Endovenous Laser Ablation versus Radiofrequency Ablation 5 RCT’S Endovenous Laser Ablation versus Endovenous Laser Ablation 5 RCT’S Endovenous Laser Ablation versus foam 1 RCT Chemical ablation versus Thermal ablation versus Conventional Open Surgery 1 RCT After analysis of all groups some comments can be drawn, RCT’s are important in the evaluation of new procedures. Skepticism about conventional RCT’s in non-pharmacological interventions such as surgery remains and so called expertise-based RCTs are suggested as an alternative where participants are randomized to clinicians with expertise in intervention A or clinicians with expertise in intervention B, and the clinicians perform only the procedure they are experts in. Accurate analysis of the presented RCTs is difficult as hidden bias can be hard to identify. For illustrating this point in some RCT’s operative procedures were performed either under local tumescent anesthesia or general anesthesia that should influence short-term evaluation. The final conclusion based on the presented RCT’s is that the differences between modern open surgery and the new endovenous procedures are insignificant and that no treatment modality can be recommended as superior to another in terms of efficacy.

Table 1: COS versus RFA

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<tr>
<th>Operative Procedure</th>
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<tbody>
<tr>
<td>GSV</td>
<td>Hinrichs RJ et al. A prospective randomised controlled trial of VNUS Closure versus surgery for the treatment of recurrent long saphenous varicose veins. Eur J Vasc Endovasc Surg 2006;31:212-8</td>
<td>16 patients presenting REVAS with persistent GSV trunk</td>
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<td>RF VNUS Closure bipolar catheter versus redo-groin surgery + AASV ligation + Perforator ligation +/- tributary phlebectomy; DUS=duplex ultrasound; F-U=follow up; GSV=Great saphenous vein; HL=High ligation; S =Stripping; RFA=Radiofrequency ablation</td>
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<td></td>
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<td>Procedure shorter P = 0.02</td>
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<td>Less post-operative pain. P = 0.02</td>
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<td></td>
<td></td>
<td>Less bruising P = 0.03</td>
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<td>Nanfarad B, et al. Radiofrequency ablation (VNUS Closure) does not cause neo-vascularisation at the groin at one year: results of a case controlled study.</td>
<td>55 patients treated by VNUS closure bipolar catheter versus HL+S (control group)</td>
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<tr>
<td>COS versus RFA</td>
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<td>Anesthesia: no information</td>
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<td>F-U 1 year</td>
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<td>After RFA</td>
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<td>Absence of neo-vascularisation 11 % after HL+S, P = 0.028</td>
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<td>VNUS Closure bipolar catheter versus HL+S</td>
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<td>Anesthesia: no standardization</td>
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<td>F-U 4 months</td>
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<td>With RFA</td>
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<td>Return To normal activity shorter P = 0.02</td>
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<td>Return to work shorter P = 0.05</td>
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<td>Better health-related QoL</td>
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</table>
Conclusions

**COS versus RFA**


**GSV**

85 patients

VENUS Closure bipolar catheter versus H1-L5

Anesthesia: no standardization

F-U 2 years with RFA

Clinical and DUS results at least equal to those after H1-L5

Better health-related QoL


**GSV**

VENUS Closure bipolar catheter (n = 15) versus H1-L5 (n = 13)

General anesthesia

F-U 2 months with RFA

Less post-operative pain P = 0.017-0.036

Shorter convalescence P < 0.001

Cost-saving for society in employed patients


**GSV**

VENUS Closure bipolar catheter (n = 15) versus H1-L5 (n = 13)

General anesthesia

F-U 3 years

No difference in terms of clinical result

**Stößer L, Schaar T, Bockelbrink A. Comparative outcomes of radiofrequency endoluminal ablation, invagination stripping and cryostriping in the treatment of great saphenous vein. Phlebology 2006;21:60-4

**GSV**

VENUS Closure bipolar catheter (n = 20) versus H1-L5 invagination S (n = 20) versus H1-L5 cryostriping

General anesthesia

F-U 1 year

No difference in the physician-assessed clinical status between the 3 groups with RFA

Patients continued to be significantly more satisfied with both their operative procedure P < 0.001 and the cosmetic appearance P = 0.006

**Subramonia S, Lees T. Radiofrequency ablation vs. conventional surgery for varicose veins-a comparison of treatment costs in a randomized trials. Eur J Vasc Endovasc Surg 2010;39 :104-11

**GSV**

VENUS closure bipolar catheter (n = 47) versus H1-L5 (n = 41)

General anesthesia with RFA

Duration procedure was longer, P <0.001

Hospital cost more expensive

Earlier return to work, P = 0.006

**Elkaffas KH, Elkahest O, Elbaz W. Great saphenous vein radiofrequency ablation versus standard stripping in the management of primary varicose veins- a randomized clinical trial. Angiology 2010;62:49-54

**GSV**

180 patients

Incompetent SFJ+ saphenous reflux

VENUS closure bipolar catheter versus H1-L5

RFA local anesthesia with RFA

Lower overall complication rate

Shorter hospitalization, P= 0.001

More expensive P=0.003

F-U 2 years

No difference in term of recurrence

**Table II: COS versus EVLA**

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<tr>
<th>Operative Procedure</th>
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**APG**=

- APG=Air Plethysmography
- AVVQ: Aberdeen varicose vein questionnaire
- DUS=duplex ultrasound
- EVLA=endovenous laser obliteration
- QALY=quality adjusted life year
- QoL=quality of life
- SFJ=saphenofemoral junction
- SFP=saphenopopliteal junction
- SSV=short saphenous vein
- VCSS=Venous clinical severity scoring

**Table II: COS versus EVLA**

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Anesthesia : incomplete information  
Diode 810-nm diode laser, bare fiber, stepwise laser withdrawal + HL (n=47) versus OS (n=48)  
Follow-up 1, 4, 16 weeks  
After EVLA  
Less bruising. P= 0.001  
Longer period of time until return to work P=0.054  
QoL (CIVIQ) no difference |
OS general anesthesia  
EVLA local tumescent anesthesia  
980-nm diode laser, bare fiber, pulse mode (n=69) versus OS (n=60)  
Follow-up 2 years  
Recurrence rates similar  
After EVLA  
Neovascularization less frequent P=0.001 |
General or spinal anesthesia for both procedures  
980-nm diode laser, bare fiber, stepwise mode (n=100) versus OS (n=100) under general or spinal anesthesia  
Follow-up 12 days  
No difference in postoperative pain, use of analgesics and time return to normal activity  
More hematoma in OS group  
More bruising in the EVL group  
Follow-up 1 and 2 years  
No difference in terms of symptoms, VCSS or QoL  
GSV reopening  
EVL =7, OS=0. P<0.051 |
Local tumescent anesthesia for both procedures  
980-nm diode laser, bare fiber, continuous laser withdrawal + postoperative sclerotherapy for persistent varices (n=62) versus OS : HL + phlebectomy + tributary stab avulsion + (n=68)  
For both local tumescent anesthesia  
Follow-up 1-14 days  
After EVLA  
More postoperative pain P=0  
More fatigue in mobility and daily activities P=0  
Follow-up 1 year  
No difference in terms of DUS recurrence |
Local tumescent anesthesia for both procedures  
980-nm diode laser, bare fiber, pulse mode (n=62) versus OS (n=69)  
Follow-up 2 years  
No significant differences  
- Clinical or DUS recurrences  
- Clinical severity scores (cCSS)  
- AVQQ |
OS General anesthesia  
EVLA Local tumescent anesthesia  
Incompetent saphenofemoral junction  
810-nm diode, bare fiber, continuous laser withdrawal, continuous power delivery 14W(n=140)  
under local tumescent anesthesia versus HL+ Inversion stripping (n=140) under general anesthesia  
Tributaries phlebectomy + perforator ligation in both groups  
Follow-up 1 week -1 year  
Both groups significant improvement after treatment  
VQSS & QUALY gain P<0.001  
After EVLA  
Less pain P<0.001  
Better SF-36 in 2 out of 8 domains P=0.004  
QUALY P=0.04  
Shorter return to work P<0.001 |
OS General anesthesia  
EVLA Local tumescent anesthesia  
Incompetent saphenofemoral junction  
810-nm diode, bare fiber, continuous laser withdrawal , continuous power delivery 14W (n=140) versus  
HL+ Inversion stripping (n=140)  
Tributaries phlebectomy + perforator ligation in both groups  
Follow-up 1 week -1 year  
Better initial technical results  
99.3% versus 94.2%. P= 0.005  
AI 1-year  
Clinical recurrence was lower  
4.0% versus 20.4%. P<0.001  
Clinical recurrence was associated with worse AVQ scores P<0.001 |
Tumescent local anesthesia for both procedures  
Incompetent saphenofemoral junction + saphenous reflux at least down the knee level  
810-nm diode laser, bare fiber, continuous laser withdrawal , applied energy 20 J/cm² vein surface (n=185) versus OS (n=161)  
Follow-up 2 years  
PREVAIT: After EVLA 16.2%, OS 23.1 %. P= NS  
DUS recurrence: reflux at the SFJ: EVLA 17.8% (clinically silent in 81%, OS 1.3%. P<0.001  
Clinical venous severity scoring (IWSS): no difference  
QOL (CIVIQ), Recovery time, ability to work: NS  |
SPJ incompetent +SVS reflux  
56-OS vs. 56 EVLA  
Follow-up 1 week -1 year  
After EVLA  
Better initial technical results  
96.2% versus 71.7%. P<0.001  
Postoperative pain lower P=0.05  
Earlier return to work and normal function P<0.001  
Minor sensory disturbance. P= 0.009  
AI 1-year  
VQSS and QoL no difference |
Table III: EVLA versus cryostripping

Abbreviations: AVVQ=Aberdeen Varicose Vein Questionnaire; CA=chemical ablation; HL=high ligation; S=saphenous strip

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<tr>
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<tr>
<td>CA (USGFS) + HL versus HL + S</td>
<td>GSV bilateral 120 patients Anesthesia: general (day case procedure) or local (outpatient procedure) 810-nm dole laser bare fiber, continuous laser withdrawal versus HL+ cryostripping Follow-up 2 years Cryostripping was less costly and more effective: Costs P=0.234 QALY P= 0.824 Cost effectiveness ratio P= 0.788</td>
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Table IV: Table III

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<tr>
<td>GSV</td>
<td>General anesthesia for all procedures Ultrasound-guided foam sclerotherapy + HL (n=30) versus HL + S (n=30) F-U 3 months Early recanalizations in 13% after CA treated by complementary injection CA+ HL less expansive, more rapid return to normal activities P&lt; 0.0001 No difference in terms of complication and occlusion</td>
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<tr>
<td>CA (USGFS) versus HL + S</td>
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2. GSV bilateral 120 patients Anesthesia: general (day case procedure) or local (outpatient procedure) 810-nm dole laser bare fiber, continuous laser withdrawal versus HL+ cryostripping Follow-up 2 years Cryostripping was less costly and more effective: Costs P=0.234 QALY P= 0.824 Cost effectiveness ratio P= 0.788
Conclusions

RFA versus EVLA

Abbreviations: AVVQ=Aberdeen varicose vein questionnaire; EVLA=endovenous laser ablation; GSV=great saphenous vein; RFA=radiofrequency ablation; QoL=Quality of Life

Table V: RFA versus EVLA

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<tr>
<td>CA versus HL or HL+ S or Phlebectomy</td>
<td>Wright D, Gobin JP, Bradbury AW et al. Varisolve® polidocanol microfoam compared with surgery or sclerotherapy in the management of varicose veins in the presence of trunk vein incompetence: European randomized controlled trial. <em>Phlebology</em> 2006;21:180-90</td>
<td>GSV and GSV, C2s,C2s; Surgery: no information on anesthesia 710 patients randomized to foam sclerotherapy (Varisolve polidocanol), surgery (H: 92%, stripping 88%, phlebectomies 53%) or conventional sclerotherapy (92% home made foam) Endpoint ultrasound determined occlusion of truncal veins and elimination of reflux; F-U 12 months Surgery superior to Varisolve foam (86 vs. 63%) Varisolve foam superior to conventional sclerotherapy (90 vs. 76%, P=0.001) Foam resulted in less pain and earlier returns to work than surgery.</td>
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Table VI: EVLA versus EVLA

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<th>Operative Procedure</th>
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<tr>
<td>RFA versus EVLA</td>
<td>Almeida JL et al. Radiofrequency Endovenous Closure FAST® versus Laser Ablation for the Treatment of Great Saphenous Reflux: A Multicentre, Single-blinded, Randomized Study (RECOVERY Study). <em>J Vasc Interv Radiol</em> 2009; 20:752-759</td>
<td>69 patients GSV Local tumescent anesthesia for both procedures RFA Closure Fast® vs. EVLA Diode 980 nm barefiber Follow up 2 weeks With RFA All scores referable to pain, ecchymosis, and tenderness were statistically lower in the Closure-Fast group at 48 hours, 1 week, and 2 weeks. Minor complications were more prevalent in the EVL group P &lt;0.0210 Venous clinical severity scores and QOL measures were statistically lower in the Closure-FAST group No difference in terms of postoperative vein occlusion and truncal elimination reflux between RFA and EVLA</td>
</tr>
<tr>
<td>EVLA versus GSV and EVLA</td>
<td>Shepherd AC, Goiol MS, Brown LC, Metcalfe MJ, Hamish M, Davies AH. Randomized clinical trial of VNUS Closure-FAST radiofrequency ablation versus laser for varicose veins. <em>Br J Surg</em> 2010;97:810-8</td>
<td>131 patients GSV General anesthesia for both procedures RFA Closure Fast® vs. EVLA Diode 980 nm barefiber Follow up 6 weeks With RFA Less postoperative pain (3-10 days, P=0.012/0.001) Less analgesic tablets (3-10 days, P=0.033/0.00) RFA vs. EVLA QOL: AVVQ et SF-12 No difference</td>
</tr>
<tr>
<td>EVLA versus GSV and EVLA</td>
<td>Gale SS, Lee JN, Walsh ME, Wijarnowski DL, Comercato AA. Randomized, controlled trial of endovenous thermal ablation using the 810-nm wavelength laser and the ClosurePLUS radiofrequency ablation methods for superficial venous insufficiency of the great saphenous vein. <em>J Vasc Surg</em> 2010;52:645-50</td>
<td>141 lower extremities GSV Local tumescent anesthesia for both procedures RFA ClosureFast® vs. EVLA Diode 810 nm barefiber 24 bilateral, 94 unilateral 49 RFA, 48 EVLA Follow up 1-4 weeks -1year With RFA Less bruising and discomfort Recanalization more frequent à 1 year. P=0.002</td>
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Table VII: EVLA 980 nm bare-tip fibre versus EVLA 1470 nm radial fibre

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<td>EVLA 980 nm bare-tip fibre versus EVLA 1470 nm radial fibre</td>
<td>Dagnini S, Demirdikic U. Comparison of 980 nm Laser and Bare-tip fibre with 1470 nm laser and radial fibre in the treatment of great Saphenous vein varicocities: A prospective randomized controlled trial. <em>Eur J Vasc Endovasc Surg</em> 2010;40:254-9</td>
<td>GSV 106 limbs Intradural sedation EVLA 980 nm bare-tip fibre versus EVLA 1470 nm radial fibre Follow up 1 month With 1470 nm radial fibre Less postoperative pain and better VCSS scores</td>
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</table>
Operative Procedure | Article | Conclusions
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**EVLA 1470 nm Warm vs cold tumescence anesthesia**


GGV 85 Limits Group A Warm = 37 °C (n=42)
Group B Cold = 5 °C (n=43)
No difference in terms of occlusion
Group B Postoperative course Light pain reduction
Significant intake of analgesic reduction

**EVLA 980 nm vs EVLA 1500 nm**


GGV 180 Limits Local tumescence anesthesia
EVLA 980 nm bare-tip fibre versus EVLA 1500 nm bare-tip fibre Follow up Immediate postoperative course

With 1500 nm Less induration, P=0.002
Less need to take analgesics
Better quality of Life CIVIQ 2 P=0.018
6 months No difference in terms of occlusion

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<th>Table VII: EVLA + Phlebectomy vs CA</th>
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<td><strong>Abbreviations:</strong> AK=above knee; AVVQ=Abbeeen Varicose Vein Questionnaire; EVLA=endovenous laser ablation; GSV=great saphenous vein; UGFS=ultrasound guided sclerotherapy; VCSS=venous clinical severity score; VFI=venous filling index</td>
</tr>
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</table>

**Operative Procedure | Article | Conclusions
--- | --- | ---
**EVLA + Phlebectomy vs CA**

Lattimore C R, Azam M, Kabzinski E, Shawlin E, Geroulakos G. Cost and Effectiveness of Laser with Phlebectomies Compared with Foam Sclerotherapy in Superficial Venous Insufficiency. Early Results of a Randomised Controlled Trial. JEVS 2012;43:S94-600

100 patients C2-C3 randomized UGFS versus EVLA + phlebectomy under local anesthesia F-U 3 weeks-3 months

At 3 months AK GSV obliteration rate, AVVQ, VCSS, VFI no significant difference
UGFS significantly outperformed EVLA in cost, treatment duration, pain, analgesia requirements and recovery

**RESULTS**

By the end of the follow-up, 92% of SV were completely occluded. 7.2% partially occluded: only one SV (0.6%) was totally permeable. Procedures and their postoperative course were uneventful and particularly well tolerated: mean pain score was 2 for the procedure (visual analogue scale 0-10, max.=10) and 1 for 10 days after the procedure. Quality of life survey showed that good resumption to normal life. Satisfaction score on average was 9.2 (max.=10). However, transient paraesthesia were described in 13 cases (7.8%) which involved 7 GSVS and 6 SSV, the application time for these patients was 9 sec/cm on average.

**DISCUSSION**

Our study confirms both the security, and good efficacy for the bipolar RAFI RFITT, obtained with an average application time of 6 sec/cm (mean P 19W). On another hand a high energy delivered (application time ≥ 9 sec/cm), may increase the risk of paraesthesia. Consequently, the new settings (P 18W and application time 2.5 to 6 sec/cm), recommended by the manufacturer, seem to be realistic, but currently, a basis of application time of 5-6 sec/cm should be used. Actually, it should be noted that, using a Celon® device at P 18 W, an application time of 5 sec/cm corresponds to deliver energy of 63 J/cm. This can be compared to other TA techniques:

- EVLA: energy of at least 60 J/cm is recommended
- ClosureFast®: a processing cycle (20 seconds) is provided at an energy of 60 J/cm
- Steam: a pulse corresponds to 60 Joules

**CONCLUSION**

The bipolar Radiofrequency RFITT® procedure appears to be well-tolerated, safe, and effective for SV occlusion in the medium term. For a P 18W, we recommend a basis of application time of 5-6 sec/cm.

**VENOUS SESSION: WHAT IS THE LATEST ON ENDOVENEIOUS TECHNIQUES?**

**We have some newcomers**

**Radiofrequency ablation by bipolar catheter**

C. Hamel-Denisons, P. Denisons

Saint Martin Private Hospital, Caen, France

Thermal ablation (TA) consisting of radiofrequency (RFA) or endovenous laser ablation (EVLA), has become the first-line treatment for insufficiency of saphenous veins (SV), taking precedence over conventional surgery. The CELON RFITT® procedure (Radiofrequency Induced Thermal Therapy; Olympus Company, Hamburg, Germany), dedicated to this indication, is a procedure perfected in 2007 and marketed in France from 2008. The Celon® action is based on the thermal destruction of the venous wall, using a radiofrequency current that induces localised heat. This heat reaches a temperature of 65°C to 95°C on the inside of the venous wall, this being sufficient to destroy the collagen (minimum heat necessary = 60°C), while avoiding lesions to neighbouring tissue. The bipolar applicator is introduced directly into the SV lumen using a 5 or 6 French introducer; it has a 13mm active medium. The temperature is monitored by an insulator. The application of heat is performed in a continuous activation mode, with an acoustic signal making it possible to control the speed of withdrawal. During the procedure, the tissue impedance of the vein is checked constantly by the unit and, where appropriate, the power (P) output is automatically reduced, with a resulting change to the acoustic signal. In 2007, the settings recommended by the manufacturer were a P of 25W and a withdrawal speed of 15 cm/min. Since then, the manufacturer reviewed this recommendation and the settings recommended by the manufacturer, currently, a P of 14W and a withdrawal speed of 6 cm/min (mean P 19W). On another hand a high energy delivered (application time ≥ 9 sec/cm), may increase the risk of paraesthesia. Consequently, the new settings (P 18W and application time 2.5 to 6 sec/cm), recommended by the manufacturer, seem to be realistic, but currently, a basis of application time of 5-6 sec/cm should be used. Actually, it should be noted that, using a Celon® device at P 18 W, an application time of 5 sec/cm corresponds to deliver energy of 63 J/cm. This can be compared to other TA techniques:

- EVLA: energy of at least 60 J/cm is recommended
- ClosureFast®: a processing cycle (20 seconds) is provided at an energy of 60 J/cm
- Steam: a pulse corresponds to 60 Joules

**OBJECTIVES**

To investigate the effectiveness and the safety of bipolar Radiofrequency Celon RFITT® for thermal ablation of saphenous veins (SV) performed in a medical centre.

**METHODS**

168 incompetent SV consisting of 126 great saphenous veins (GSVs), 36 small saphenous veins (SSVs), 6 accessory saphenous veins (ASVs) were treated in 120 patients (71% women) whose average age was 58 and body mass index 25. The average trunk diameter was of 8 mm. Mean lengths (cm) of treated veins were respectively: GSV 48, SSV 24, ASV 19. No sedation was administered and all procedures were performed strictly under tumescent local anaesthesia. On average, the power used was 19W and application time 6sec/cm. Average follow-up was 28 months (> 36 months for 41 patients).
Venous session: What is the latest on endovenous techniques?
We have some newcomers

Ablation of large recurrent varicose veins by steam

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Steam ablation of varicose veins has been used in Spahenous Trunks since 2007. We have developed a specific catheter, the Trib Vein to extend its use in large superficial varicose veins.

MATERIAL AND METHODS
Material
The SVS generator (CermaVein) is the same as when treating trunks. The specific catheter is made in PEEK, a thermo-resistant polymer and has a built-in unidirectional valve to avoid backflow of blood into the handpiece.

Technique
Under echo-guidance, all the veins to be treated are entered with a 18G/2i Terumo Surflo Teflon catheter. Local anesthesia is applied around the entry point and under the skin in the area of the varicose vein: at each location 10 cc are injected. The solution is stronger than for tumescent anesthesia: 20 cc of 1% Lidocaïne without adrenalin and 80 cc of saline fro 100 cc. Before heating the vein we chek by ultrasound and by blood refluxing in the catheter that the tip in still in the vein after anesthesia. Then the Trib Vein is inserted and 6 pulses are emitted, each pulse carries 60 Joules of energy in the vein. Non compressibility is checked by ultrasound and if not obtained 6 more pulses are emitted. Immediately after heating tumescent solution is injected in the area.

RESULTS
Large varicose veins can be obliterated. In our prospective serie of 30 patients a mean of 8 entry points per leg were treated. Out of 240 veins treated 218 were obliterated at 1 month (28 patients) and 203 at 3 months (26 patients). Non closed veins were injected with 1% Aetoxysclerol foam. Pain level at 8 days was 0.8 on a scale of 10 (28 patients). Pigmentation was observed at 38 injection sites with a level of 2 on a scale of 5.

CONCLUSION
Steam obliteration of large varicose veins can be used instead of Surgical phlebectomy, it is invaluable in cases where the veins are adhering to the skin, or if lipodermatosclerosis is observed.
Which treatment of varicose veins do you prefer? The most efficient or the most cost effective? What are the stakes? We have now a choice of treatments: Surgery (historical high ligation and stripping, or mini invasive like ASVAL and CHIVA), Endovenous thermal ablation, whether with Laser (with an increased choice of wavelengths and fiber tips), Radio-Frequency (new devices too) and steam, Endovenous, Chemical ablation under ultrasound guidance (AKA: U-S guided sclerotherapy with foam (USFGS), Pharmacomechanical (Clarivein®), SAPHEON “Super-glueing”), and several others… But prices are really different! Then, what are the actual criteria of choice? Efficacy = improved outcome = improvement of status - Side effects, complications and comfort of procedure - Recurrences after Rx: Short and Long term F/U - Cost of initial procedure (unique or several) - Cost of re-do Rx - Cost of maintenance Rx - To evaluate outcomes, we have: Patient reported outcomes; Health related Quality of life: generic/specific, Visual Analog Scales evaluation of symptoms, cosmetic improvement, etc. - Recommendation to friends: (rare, all methods). - Is efficiency or cost effectiveness more important? - Are all methods known/taught everywhere? - Are all methods affordable everywhere? Will we choose the best even if we lose money? Other reasons: Demand of patients, Financial arrangements with industry. Do we have a full choice? Medical reasons: Most Rx give acceptable outcomes, but with very different comfort! (Rasnumsen). Does the diameter change the outcome? (e.g. <7mm: foam); Economic reasons: Are all methods available everywhere? are all methods affordable everywhere? Will we choose the best even if we lose money? Other reasons: Are all methods known/taught everywhere? The consumer’s view: CEA/EBM information may help increase consumers’ confidence with decision making and knowledge of treatment options. However, deeply routed in consumers are: More is better. Newer is better. Less invasive is better. You get what you pay for (and who is paying) Let’s take two examples: France - USGFS is priced about 40 €/session, reimbursed well, Insurance often considers experimental, Will conservative Rx first Reimbursement trending down but still significant (3,000kr-4,000 $ USGFS: no specific CPT codes, Not reimbursed well, Insurance often considers experimental, Will we choose the best even if we lose money? EvLA not considered for rebate as of today - Surgeons do stripplings, with downward trend in # of cases and potential professional conflict with phlebologists! I think return of surg procedures with trend of ASVAL USA - Stripping is being done less and less - mainly in rural areas and smaller hospitals where the endovenous approach has not yet penetrated Reimbursement ~500 $ - Endovenous ablation procedures increasing in # Insurance push back stricter criteria, requirements for conservative Rx first Reimbursement trending down but still significant (3,000kr-4,000 $ USGFS: no specific CPT codes. Not reimbursed well, Insurance often considers experimental, Will we choose the best even if we lose money?
Venous session: Deep veins
Long term results after Pelvic vein embolization

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INTRODUCTION
Pelvic congestion syndrome (PCS) consists in the increase in the number and size of intrapelvic venous structures. These are veins with a varicose morphology, tortuous and ectasic venous with a delayed flow dependent of hypogastric and gonadal tributaries branches, which are also dilated, avaluated with a reversed flow. Pain is its main symptom and its signs are genital and atypical varices in lower limbs (LL). The diagnosis can be made by transvaginal Doppler ultrasound (TVDU) and pelvic venography may confirm PCS allowing simultaneously perform an embolization procedure. The aim of this work was to evaluate the long-term results of pelvic vein embolization in patients with symptoms and signs of PCS.

MATERIALS AND METHODS
100 patients with a mean age of 42 years (range 21-64 years) who attended to Vascular Surgery Unit of the Hospital Ruber Internacional, from Madrid, with signs of PCS and who underwent an embolization procedure between February 2008 and October 2009 were selected in order to show the post-operative results. The mean follow-up was 14 months (range 12-18 months) at six month intervals.

RESULTS
The TVDU pre-embolization studies showed that 50% patients had chronic venous disease of the LL and PCS signs, 19% presented PCS signs without varices, 12% had recurrent varicose veins in LL, 10% showed varicose veins and 9% vulvar and LL varicose. Postoperative studies based on pain level showed that 64% patients had no pain, 29% improved and 7% remained unchanged.

CONCLUSION
Pelvic varices and LL leaks are caused by a venous hyper-tension whose main causes are pregnancy and complications. Sometimes, the tributaries of the internal iliac vein and the ovarian veins are simultaneously incompetent, justifying a multiple embolization treatment to reach the possible sources of the varicose veins and its symptoms. Furthermore, treatment of pelvic and lower limbs can correct the pelvic reflux that causes genital varices, atypical and recurrent in LL. In our unit, we have observed that embolization of the pelvic veins reduces the signs and symptoms of pelvic and LL venous stasis, decreasing varicose recurrences with a few complications and a short hospitalization period.

Venous session: Deep veins
Do we need RCT to assess CCSVI

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The goal of this presentation is to show the difficulties in achieving high levels of scientific evidence via RCT in patients with CCSVI.

SUBJECT
The MS patients are difficult to assess with RCT, because of quite a few reasons. First of all every MS patient is desperately searching for the cure. Secondly it is practically impossible to find a patient with no treatment, which makes it hard for the researchers to form a control group. And finally, most of the patients are “travelers” so it will be quite difficult to collect reliable and objective data in the potentially quite long follow-up period.

RESULTS
The results of the clinical trials are highly variable and inconclusive, because primary diagnosis is based on ultrasound examination, which depends on the operator’s experience. Further – it is difficult to define CCSVI gradual states and changes, thus “vascular” effectiveness of endovascular treatment is hard to be proven and followed with non-invasive methods. So, for the vascular effectiveness of the treatment we need an invasive follow-up, which is difficult to organize in an MS population. On the other hand, a real “BLIND” trial is impossible even with sham maneuvers because in most of the cases the effective (non-understood) endovascular treatment is painful and some ethics committees and RAs might find unethical to allow the application of an invasive potentially harmful procedure in a group of patients and to name it “Control group”. The lack of standardization of the treatment protocol is another problem. There are still at least several approaches in terms of endovascular technique. These need to be harmonized and only the best be uniformly applied. The antithrombotic regimen intra- and post-procedurally is extremely important and needs also to be harmonized. All published results so far adopted quite different schemes of anticoagulation and anti-aggregation. The CCSVI treatment has no dedicated endovascular materials (balloons, stents, etc.) and thus the outcomes might be poorer than best achievable.

CONCLUSION
As a conclusion, before initializing RCT for CCSVI we need standard and optimal technique and materials, well controlled registries with long follow-up period to collect more data and optimize every detail of the CCSVI endovascular treatment and follow-up objectives and finally we need to collect more evidence of surrogate biomarkers change such as blood gas analysis, MRI/ nuclear brain perfusion before and after treatment, to assess the post procedural results.

Keywords: CCSVI, RCT, MS, Clinical trial.
Aortic emergencies: Case reports and recorded video cases

Ruptured pseudoaneurysm after bypass surgery for aortic coarctation treated with TEVAR and plug

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PURPOSE
To discuss different strategies to handle thoracic aortic emergency due to graft infection after previous open repair

CASE REPORT
In 1955, at eleven years age, the patient had an operation due to an aortic coarctation. A reoperation with a new graft took place in 1983. The old graft was bypassed and anastomosed in the mid-part of the descending aorta. In 1998 mechanical AVR was performed due to AI suspected to be secondary to an endocarditis. A suture of an ASD was also performed and a minor defect in the mitral valve was also detected. In November 2011 the patient presented with acute hemoptysis with pulmonary edema and atelectasis on plain X-ray. CTA showed a ruptured pseudoaneurysm of 6.5 cm, located at the distal graft anastomosis. The original aorta was occluded at the level of the coarctation with an Amplatz plug inserted through a left axillary access. A minor endoleak was detected in the native aorta at postoperative CTA but it resolved spontaneously. Since then, the patient had several events of pneumonia and in March 2013 he presented with clinical signs of cardiac failure and a paravalvular leakage with significant AI was detected at cardiac echo. The 69-years old patient had a biological valve replacement. Once again a minor ASD and a minor mitral valve perforation was sutured. An endocarditis was considered as well as a separate graft infection. In blood samples haemophilus influenza had been cultured but also coagulase-negative staphylococcus has been suspected. The patient has long-term antibiotic therapy but will be considered for other options to treat the graft infection.

Aortic emergencies: Case reports and recorded video cases

Spontaneous aortocaval fistula with paradoxical pulmonary embolism

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A 79-year-old man presented to the emergency department with a 2-day history of progressive shortness of breath, anuria and abdominal pain. Prior to admission, he had experienced increasing edema, cyanosis and bluish-mottled lower extremities. Laboratory data showed impaired renal function (creatinine 4.2mg/mL) and 65% arterial oxygen saturation in ambient air. The patient became markedly hypotensive, hypoxemic and developed respiratory arrest requiring intubation. Immediate multidetector row contrast-enhanced computed tomography (CT) evaluation revealed multiple thrombi in the pulmonary arteries, the largest occluding the superior left pulmonary artery (Panel-a). A 8.0cm abdominal aortic aneurysm (AAA), largely thrombosed, and ruptured in inferior vena cava (IVC) was also diagnosed: early and synchronous contrast enhancement of the aorta and the IVC and a large (3cm) aortocaval contrast passage just above the iliac bifurcation were visible (Panels-b-c; arrow shows fistula). An aortic aneurysm thrombus was the most likely source of paradoxical emboli through the aortocaval communication (Panel-d:pathophysiology). The patient was immediately transferred to the operating room and underwent caval filter placement (OPTEASE, Cordis, Johnson-&-John son, The Netherlands) and emergency repair of the ruptured aneurysm with an aortic bifurcated stent-graft (Excluder, Gore, Flagstaff, AZ). Completion angiography showed successful exclusion of AAA, fistula coverage and presence of a small type II endoleak. The patient had a full and uneventful recovery and was discharged after 22 days with IVC filter in place. His edema had resolved and there was no evidence of congestive heart failure. He remained in good health during the next 6 months when follow-up CT showed resolution of pulmonary thrombi, decreased AAA diameter (6.1cm) and marked decrease of type II endoleak (Panel-e; black arrow:IVC filter; white arrow: stent-graft).
Aortic emergencies: Ruptured AAA
EVAR requires regionalization of vascular services to be effective

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BACKGROUND
The effect of endovascular repair (EVAR) on the population of patients with ruptured abdominal aortic aneurysms (rAAA) remains undefined. Contemporary clinical trials of open versus endovascular repair of rAAA will provide robust comparative data, but will only randomise a small proportion of the entire patient cohort. This study investigates the effect of EVAR on the population of England and includes data on patients not offered operative intervention.

METHODS
Demographic and clinical data were extracted from English Hospital Episode Statistics for patients with ruptured AAA from 1998 to 2010. The decision to offer surgery, thirty-day mortality in all-comers, and postoperative thirty-day and five-year survival were analyzed by generalized linear mixed models and frailty models assuming proportional hazards.

RESULTS
12,978 patients had a hospital admission for rAAA, of whom 7970/12978 (61.41%) died within 30 days of diagnosis. The 30-day mortality for patients undergoing operative repair was 2528/6653 (38%) in all cases, 2332/6091 (38.28%) for open (p=0.002), 6252/12978 (48.74%) did not undergo rAAA repair, with an in-hospital mortality of 5439/6325 (85.99%). A greater proportion of patients treated by rEVAR and greater volume (caseload) of patients treated by rAAA per centre were significant independent predictors of mortality. These data support the performance of rAAA surgery in centers with permanently available endovascular expertise.

CONCLUSIONS
Endovascular repair was associated with significant survival benefit for all-comers with rAAA. This effect may be attributed to reducing the palliation rate as well as lowering operative mortality. These data support the performance of rAAA surgery in centers with permanently available endovascular expertise.

Aortic emergencies: Ruptured AAA
You can stent everyone with rAAA, a stent first policy

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PURPOSE
To present the combined 14-year experience of two university centers having an “EVAR-whenever-possible” approach to treat ruptured abdominal aortic aneurysms (rAAA).

METHODS
During the study period (Jan 1998 to Dec 2011), 477 consecutive patients with rAAA were managed. Four patients were rejected due to staff or facility unavailability and for the 473 remaining patients, none were excluded from the analysis because of hypotension, circulatory collapse or cardiac arrest after presentation. Patients were treated by an “EVAR-whenever-possible” approach until April 2009 (EVAR/OPEN period) and after that according to a “100% EVAR” approach (EVAR-ONLY period). Straightforward cases were treated by standard EVAR. More complex rAAA were managed during EVAR-ONLY with adjunctive procedures in 17/70 (24%). Standard coil or Onyx embolization embolization of branches or relevant endoleaks was carried out when indicated.

RESULTS
During EVAR-only period since May 2009, all rAAA but one has been treated by EVAR with a 30-day mortality of 24% (17/70). Total cohort mortality (including medically treated patients) for EVAR/OPEN was 32.6% (131/400) compared to 27.4% (20/73) for EVAR-ONLY (p=0.376). During EVAR/OPEN, 10% (39/400) of patients were treated medically compared to 4% (3/73) during EVAR-ONLY. In EVAR/OPEN, open repair showed a statistically significant association with 30-day mortality (adjusted OR=3.3 (95% CI 1.4-7.5) p=0.004). For patients with no abdominal decompression (AD), there was a higher mortality with open repair than EVAR (adjusted OR 5.6). In patients with AD by laparotomy there was no difference in mortality (adjusted OR 1.1).

CONCLUSIONS
The “EVAR-ONLY” approach has allowed EVAR treatment of nearly all incoming rAAA with low mortality and lumbar down rates. Although the observed association of a higher EVAR mortality with abdominal decompression needs further studies, our results support superiority and more widespread adoption of EVAR for the treatment of rAAA.

References
Aortic emergencies: Ruptured AAA
Top 10 tips for rEVAR; it’s not what you do, it’s the way you do it

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Despite all therapeutic improvements, open surgical treatment of ruptured abdominal aortic aneurysms (RAAAs) has a high mortality (40-70%) and an unacceptable morbidity.

Our experience and that of several other centers throughout the world have shown that endovascular techniques, including the use of endo grafts, have reduced the 30-day mortality of treatment for RAAAs to 10-25%. Strategies, adjuncts and techniques that have contributed to this reduced mortality include the following:

1. Hypotensive hemostasis or restriction of fluid resuscitation, allowing the systolic blood pressure (BP) to fall to levels as low as 50 mm Hg without giving fluids.
2. Placement, preferably via a femoral approach under local anesthesia, of a guidewire and catheter in the supraceliac aorta.
3. Using this catheter angiography is performed to define infrarenal aortic neck and iliac anatomy and to determine suitability for endovascular graft repair of the aneurysm using either an aorto-unilateral graft or a bifurcated modular graft.
4. In the event that circulatory arrest or collapse (BP < 40 mm Hg) occurs, a large (14-16 Fr) hemostatic sheath is placed via one femoral artery into the supraceliac aorta.
5. A large compliant balloon is inserted through this sheath and inflated with dilute contrast under fluoroscopic control to occlude the supraceliac aorta. The balloon position is supported by leaving the hemostatic sheath in place.
6. The position of the renal arteries are determined, and an aortic endograft is then deployed via the opposite femoral artery while the inflated supraceliac balloon is left in place.
7. If an aorto-unilateral graft is used, the balloon is then deflated and removed through its insertion sheath.
8. If a modular bifurcated graft is used, the main body is fully deployed, and a second compliant balloon is placed within the body of the graft and inflated.
9. The supraceliac balloon is deflated and removed through the large sheath which is then removed.
10. The remainder of the operation is completed. This includes common iliac occlusion and a femorofemoral bypass if an aorto-unilateral graft is used.
11. If abdominal compartment syndrome is suspected because of the need for increased ventilatory pressures or elevated bladder pressure, a minilaparotomy is performed with evacuation of the retroperitoneal hematoma.
12. The abdomen may have to be left open and sealed with a VAC dressing.

Use of these methods and techniques will contribute to improved survival rates with endograft treatment of RAAAs and will decrease the morbidity of treatment. They will facilitate acceptance of the concept that endovascular grafts and techniques are the best way to treat most AAAs, and every vascular surgeon should be able to use these techniques.

Aortic emergencies: Ruptured AAA
Is it true? Most US EVAR’s are done outside the IFU with negative impact on outcome

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The majority of AAA repair in the US are EVAR - 65% - 88%. The outcomes for EVAR are believed to correlate with implantation compliance with IFU; device design and compatibility with patients anatomy; presence of endoleak and progression of underlying atherosclerotic disease. Schanzer and colleagues reviewed pre and post-operative M2S images for 1,228 EVAR patients and found IFU compliance to range between 42% - 69%. 41% of cases had 5 year post EVAR sac enlargement and this appeared to correlate with age > 80 years; aortic neck diameter > 28mm; aortic neck angle > 60° and common iliac artery diameter > 20mm. The limitations of Schanzer’s study are that most vascular surgeons do not use M2S imaging services except for research trials or cases with challenging anatomy. Additionally, AAA size increase was based on comparative diameter (+ 5mm) rather than comparative sac volume changes.

Schanzer’s data did not seem representative of our practice so we elected to compare it to EVAR outcomes in patients treated at Scott & White Healthcare and the Central Texas Veterans Health Care System between 2000 – 2012 and in whom we had a minimum of 5 years follow-up. We also compared his findings to FDA IDE Core-Lab data provided by the major US endograft manufacturers. Review of this data, which included 887 EVAR patients from Scott & White and the VA and 2756 manufacturer IDE Core-Lab patients, showed generally excellent results with freedom from sac enlargement ranging from 92% - 98.1% and freedom from aneurysm rupture ranging from 98% - 100%. One has to assume that all of the manufacturers’ IDE cases were IFU compliant. In the SW/VA series, 738 (83.2%) of patients were done within the IFU and 149 (16.8%) were done off-label and outside the IFU by at least one parameter – neck issues, diseased access vessels or iliac arteries > 2cm in diameter. There was essentially no difference in EVAR complications between those done within or outside the IFU. The incidence of Type II endoleak was unrelated to IFU compliance and was 10.8% (95 patients). These patients accounted for the majority of the post-operative CT scan surveillance costs and interventions for sac enlargement.

We concluded that EVAR produces durable long-term outcome which was verified by the manufacturers FDA IDE follow-up data and our own series of patients treated within the IFU. It should be noted that deviation from the IFU did not result in excessive EVAR complications or adverse outcomes in our patients thus far.
Aortic emergencies: Ruptured AAA
Endovascular treatment in emergency of para-anastomotic aneurysm (true or false)

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OBJECTIVE
Para-anastomotic abdominal aneurysms (PAAA) involving the aorta and the iliac arteries after open aortic surgery are under-estimated and range from 2 to 29%. The endovascular option is a valid alternative to open surgery with less morbidity and mortality particularly in the patient at high-risk.

MATERIALS AND METHODS
From January 2010 to December 2012 four patients were treated for PAAA and two underwent an emergency intervention for hemorrhagic shock due to the rupture of the PAAA. In all cases the diagnosis was based on the computerized tomography angiography (CTA) scan and clinical picture. In three cases the PAAA were involving the proximal aortic anastomosis, two true PAAA, of which one with rupture in the retroperitoneum, and one PAA pseudoaneurysm and the last fourth patient presented a ruptured known distal iliac para-anastomotic pseudoaneurysm (PAIA), not treated before for the advanced age. Two patients with proximal PAAA were electrically treated with the chimney technique and a tube endograft (Gore TAG), the other two, one proximal PAAA and one distal PAIA (fig 1), underwent emergency insertion of an endoprosthesis, a Gore tube graft proximally and a Gore Viabhan in the common iliac artery (fig. 2 and 3).

RESULTS
Technical success was achieved in all patients and no peri-procedural complications were observed. During the follow-up no complications occurred, however, one of the patient treated in an emergency setting for proximal PAAA, died for cerebral hemorrhage one year after the endograft procedure. Endoleaks were not observed in our small experience, but the literature shows as the most frequent complication of the endovascular option for PAAA treatment. We have to take into account that these patients are all very elderly and long-term results are affected just by age.

CONCLUSION
The endovascular repair of PAAA involving the aorta and iliac arteries seems to be technically feasible leading to a low perioperative morbidity and mortality vs. open surgery. Close follow-up is required to identify endoleaks. However, the long-term survival is limited as most of these patients are very elderly. Endovascular stent graft repair can be recommended for PAAA in anatomically suitable patients.

REFERENCES
Aortic emergencies: Other Emergencies
Endovascular treatment of type A dissections

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BACKGROUND
Open surgical aortic repair is actually the standard management for type A aortic dissection (TAAD), although highly invasive and associated with a significant in-hospital mortality. Endovascular procedures offer a minimal invasive alternative for treating thoracic descending aortic diseases, and it has been proposed in very limited and selected TAAD patients. The aim of this study is to report our experience with endovascular stent graft repair of the ascending aorta in TAAD patients.

METHODS
Inclusion criteria were: 1. entry tear in the ascending aorta; 2. proximal landing zone at least 2 cm; 3. distance between entry tear and brachio-cephalic trunk at least 0.5 cm; 4. no signs of cardiac tamponade or severe aortic regurgitation; 5. no signs of ischemia of aortic branches. Patients with cardiac vascularization from ascending aorta were excluded.

RESULTS
From April 2009 to April 2013, 37 patients with TAAD were admitted to our hospital. 28 underwent surgical repair and 9 were considered at high surgical risk by cardiac surgeons. Among these 9 patients, 4 met our inclusion criteria and underwent endovascular repair in emergent setting, one of them 2 days after the onset of symptoms. A left to right carotid-carotid-subclavian bypass was necessary in one case. Technical success and clinical success was achieved in all patients. No mortality was registered during follow up. One patient experienced a nonvascular/cardiac pulmonary edema 2 months after the procedure. Control CT scan demonstrated no migration of the graft, complete false lumen thrombosis in 3 patients and partial false lumen thrombosis in 1 case, without aortic enlargement.

CONCLUSION
Endovascular treatment of TAAD by placement of a stent graft in the ascending aorta is a challenging but feasible procedure in a selected subset of patients. Before this treatment can be implemented in the daily practice, further research is mandatory.

Aortic emergencies: Other Emergencies
Traumatic rupture of the Aorta, is there still a place for surgery?

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ABSTRACT PURPOSE
To evaluate the safety and effectiveness of the CTAG Device for the endovascular repair of traumatic aortic transections.

METHODS
A prospective, non-randomized, multicenter trial was conducted at 21 sites. Primary safety endpoints included 30-day all-cause mortality. The effectiveness endpoint was freedom from a major device event (MDE) requiring re-intervention through one-month follow-up.

RESULTS
Fifty-one subjects were enrolled between December 2009 and January 2011 with polytraumatic injuries and a mean injury severity score (ISS) of 32 ± 14. The proximal mean intimal aortic diameter measured 24 mm, while the mean distal intimal diameter was 22 mm. A total of 57 CTAG Devices were implanted (mean: 1.1/subject, range: 1-2) with a mean patient age of 44 years (range: 21-87) and a male-to-female ratio of 2:1. Technical success was 100% with no aortic enlargements. No device compressions or MDEs were reported. Overall mortality at 30 days was 7.8% and all were adjudicated by the CEC as not being device or procedure related. Serious adverse events occurred in 39.2% of patients through 30 days. To date there have been no conversions to open repair. Two site-reported minor endoleaks were detected during the mean follow-up of 4.2 months which did not require reintervention.

CONCLUSIONS
The CTAG Device was demonstrated to be a safe and effective treatment for traumatic aortic transection based on 30-day outcomes. There were no device-related serious adverse events.

ENDOVASCULAR THERAPY
Aortic emergencies: Other Emergencies

Outcome after intervention for acute type B dissection

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INTRODUCTION
Acute type B aortic dissection is being diagnosed with increasing frequency due to the widespread use of CT scans in accident and emergency departments. All patients are treated with hypotensive therapy which should include beta-blockers. Patients who have complications are treated with intervention. Complications can have a wide range of severity ranging from rupture and end-organ ischaemia through to refractory pain and hypertension. The contention of this paper is that the outcome after endovascular intervention for acute type B aortic dissection is dependent upon the indication for intervention.

PATIENTS AND METHODS
Data was collected on a consecutive series of patients presenting to our institution with acute aortic dissection requiring endovascular repair. The indication for intervention and outcome were entered prospectively onto a computerized database. 43 patients were identified of whom 16 (37%) had rupture, 15 (35%) have end-organ ischaemia and 12 (28%) had refractory pain.

RESULTS
Technical success was 95%; one patient had the stent graft deployed inadvertently into the false lumen and in another patient rupture of the false lumen occurred three days post-intervention. Overall in-hospital mortality was 11.6% (five patients). There was one death in those presenting with rupture (mortality 6%). There were three deaths in those with end-organ ischaemia (mortality 26%) and one patient with refractory pain died of multi-organ failure (mortality 8%). The major adverse event rate (death, stroke and paraplegia) was 25% for those with rupture, 46.7% for end-organ ischaemia and 8.3% for pain. Patient presenting with pain had a significantly better outcome compared to those with end-organ ischaemia (p=0.04), but was not significantly different to those presenting with rupture. There was no difference between those presenting with end-organ ischaemia and rupture.

DISCUSSION
There is a considerable variation in the literature concerning the outcome after endovascular intervention for acute type B aortic dissection. The results from the ADSORB trial, a randomised trial of best medical therapy with or without stent graft for uncomplicated type B aortic dissection showed a zero mortality for both groups. The International Registry for Acute Aortic Dissection (IRAD) has shown that patients classified as “uncomplicated” have an overall 4% in-hospital mortality. Those patients who were treated solely with medical therapy had a mortality of 1.5% if these patients developed complications requiring intervention then the mortality for endovascular intervention was 9% and increased to 28% for surgery. The guidelines from the Society of Vascular Surgery suggest that endovascular repair of complicated patients who have end-organ ischaemia or rupture have a major adverse event rate with a mortality 10.6%, stroke 9.4%, paraplegia (9.4%) and renal failure (9.4%). Another small study on acute complicated type B dissection treated with endovascular repair had a mortality of 21% and a morbidity rate of 76%. These included 46% with rupture, 33% with end-organ ischaemia and 21% with pain. The VIRTUE registry showed a mortality of 8% in 50 patients, 11 of whom had rupture, end-organ ischaemia in 16 and pain and hypertension in 40.1 Much lower adverse events were reported by Guanqai et al. in a study which showed an in-hospital mortality of 1.4% and a stroke rate of 4.2%. The majority of patients were treated for hypertension, pain or an aortic diameter greater than 5cm with less than a third treated for malperfusion and rupture. Another study by Shu et al. showed a low in-hospital mortality of 4.4% in 45 patients treated for complicated acute type B dissection. The indications for treatment in this study was impending rupture in 50%. The definition of impending rupture was an enlarged aortic diameter in the dissected region with evidence of haemothorax with no evidence of extravasated contrast medium. This is not widely used as an indication for intervention and highlights the difficulty in making comparisons between studies.

CONCLUSIONS
The results from studies reporting the results of endovascular treatment of acute complicated aortic dissection vary widely from 1.4% to 21%. The indication for intervention can be end-organ ischaemia and rupture at the most severe end of the spectrum to pain and “impending rupture” at the opposite extreme. It is important that the indication for intervention is clearly stated as comparison between studies is otherwise very difficult to make.

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Aortic emergencies: Other Emergencies
Outcome of endovascular repair of ruptured TAAA

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PURPOSE
Rupture of a thoraco-abdominal aortic aneurysm (TAAA) is usually fatal if extravasation and hemodynamic instability is present. Patients with contained rupture have traditionally been offered open repair but this procedure is associated with high mortality and morbidity rate especially in older patients. Outcome after visceral hybrid procedure will be discussed as well as novel strict endovascular techniques.

METHODS
Visceral hybrid procedures have been described since 1999 and combines open renal and visceral bypass surgery with endovascular exclusion of the aneurysm. Thoraco-laparotomy and aortic cross clamping can be avoided and organ ischemia time can be minimized. The operation is normally performed as a staged procedure. The chimney technique offers a strict endovascular alternative and is based on different techniques where long chimney stent grafts are used in order to get long sealing zones (sandwich technique). By using reverse (pericope) technique it is possible to increase the number of chimney that can be used.

RESULTS
In a literature review from 2009 the analysis of visceral hybrid procedures was based on a number of case reports and recorded video cases. Visceral hybrid procedures and chimney techniques offer alternative to open repair of ruptured TAAA.

CONCLUSION
Visceral hybrid procedures and chimney techniques offer alternative to open repair of ruptured TAAA.

References

FULLY IMMERSSIVE VR SIMULATION
Orcamp (Ozono, Gothenberg, Sweden; Figure 1) is a fully immersive simulated angiolute, consisting of a mobile C-arm, operating table, control panel and multi-screen displays.

The first successful endovascular repair of a ruptured abdominal aortic aneurysm (rEVAR) was reported almost 20 years ago. Recent case series highlight the morbidity and mortality advantages of endovascular repair over open surgery for ruptured aneurysms.1,2 and the results of randomized controlled trials are eagerly awaited.3,4 The proportion of ruptured abdominal aortic aneurysms (rAAA) treated endovascularly is increasing and in some centres rEVAR has become first line management for all patients admitted with rAAA.5,6 However, the overall number of patients presenting with rAAA is decreasing and experience in rEVAR remains low in most centres. Moreover, successfull performance of this technically advanced emergency procedure requires understanding and sophisticated interaction between numerous physicians, including anesthesiologists, vascular surgeons, interventional radiologists and techni-
TECHNICAL PERFORMANCE METRICS

Expert team leaders were significantly faster than trainees in achieving proximal control through inflation of an intra-aortic balloon supported by a long sheath and deployment of the main body stent graft. Only three trainee team leaders were able to cannulate the contralateral limb graft within the 45-minute session allowed for the simulation. At expert team leader level, were able to cannulate the contralateral limb graft during the simulation and all excluded the ruptured aneurysm within the allotted time, whilst no trainee was able to do so.

Face validity of eVAR simulation and potential utility for technical and human factor skills training

Pooled responses from all participants (N=22) scored reallity of the simulated angioplasty environment highly, with a median of 4 of 5 on the Likert scale. Participants found the simulation useful in terms of acquisition of technical skills, including evaluation of tools required and C-arm positioning, with a median score of 4/5. The simulation exercise and environment was thought to be particularly suited as a learning environment for teamwork, and communication skills. Moreover, participants believed that this type of training may lead to improvements in patient safety by enhancing operative flow and aiding overall team performance. Questionnaire responses also highlighted the potential use of the simulation for mission rehearsal involving the whole team prior to performing the real case.

DISCUSSION

Operations with high mortality rates and low error tolerance, such as emergency repair for rAAA, are also often those that occur less frequently. This relative lack of real-world procedure experience makes it challenging to maintain the highest levels of technical and team performance, particularly in cases where team members do not work together on a regular basis. Although the proportion of rAAA treated by endovascular means is increasing and mortality rates following eVAR have improved - a decrease in the number of patients presenting with rAAA has, amongst other factors, resulted in a decline in the availability of appropriately trained teams with consequent inability to perform eVAR in suitable patients. Simulation training may therefore be crucial in extending the scope to offer endovascular repair to patients with rAAA and improving patient outcomes. Current technology allows fully immersive high fidelity VR simulation of crisis endovascular scenarios such as eVAR to be created and carried out by multidisciplinary teams, enabling whole team training and assessment. At the Imperial Course rAAA simulation course we have integrated VIST-C VR simulators with Occamp and creation of a simulated eVAR scenario that can be used to train and evaluate endovascular teams. Comparison of objective performance metrics between expert and trainee team leaders showed that experts were significantly faster to achieve critical procedural steps in this simulation, providing initial evidence of construct validity for this model. Simulators have been criticised in the past, particularly in terms of haptic feedback and tactile inaccuracies of guidewire manipulation. However technology is fast evolving and modern endovascular VR simulators have improved haptics and incorporate sophisticated software that allows dynamic physiological patient representation according to task performance. Participants on our course reported that the VR simulators realistically simulated an actual eVAR procedure. Representing the next step in evolution of endovascular simulation, Occamp is the only full physical, immersive hybrid angioplasty simulator available on the commercial market. Although costly and not portable, the simulator enables whole team training with procedure rehearsal, including C-arm manipulation and fluoroscopy without exposure to ionising radiation. When integrated with VR simulators, such as VIST-C in this study, the environment allows training of both technical endovascular and human factor skills, with expectation of better transferability to skills to real-world procedures. Post-procedural questionnaire responses also suggest that this crisis scenario in an immersive environment may be used not only to improve technical skills, but more importantly human factor skills such as teamwork, and enhance patient safety. Since most intra-operative errors during endovascular procedures arise from failures in situational awareness, teamwork and communication skills - multidisciplinary team training in fully immersive endovascular simulators that enable deliberate practice and formative feedback, may be key to improve patient outcomes. In conclusion, recent advances in VR simulation technology mean that fully immersive simulation of complex endovascular procedures such as eVAR are now possible. We believe that the greatest potential of such simulations is in whole team training, with consequent benefits in not only technical skills, but also, and perhaps more importantly, human factor skills. Whole team training using high fidelity crisis simulation has the potential to enhance team performances and reduce errors during high-risk emergency procedures such as eVAR.

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vascular simulation influences interventionists performing coro-


Case reports and recorded video cases
Complication after EVAR: to intervene or not to intervene?

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64yo male with multiple health problems presented with hemoptysis, constant left chest pain and respiratory distress. His other medical problems included presence of coronary artery disease, s/p myocardial infarction in 1992 and 2007 and subsequent multiple coronary stent procedures. He also had CHF with an EF of 35%, arterial hypertension, hyperlipidemia, chronic obstructive lung disease and cachexia. In 1993 he underwent a surgical repair of his descending thoracic aortic dissection. In 1995 the CT revealed an enlarging thoraco-abdominal aortic aneurysm involving the visceral arteries and extending to the infrarenal abdominal aorta. The same year he underwent a surgical repair of his thoraco-abdominal aortic aneurysm with a Dacron tube graft and reimplantation of his visceral arteries. In 2007 he developed a recurrent thoracic aortic dissection extending above and below the previously placed Dacron tube graft. The same year, elsewhere, he underwent an endoluminal repair of his thoracic aortic dissection with placement of two overlapping stent grafts. Since 2007 until 2011 he had multiple prolonged hospitalizations for mediastinal abscess, bacteremia with E. Coli and the presumed infected endograft. The diagnosis of aorto-esophageal fistula was established and the patient underwent Gastro-Esophageal plasty with gastric and omental flap repair. He was given a prolonged intravenous and then oral broad-spectrum antibiotic therapy, which he continued until his admission. He had multiple admissions for left lung atelectasis, pneumonia and hemoptysis that required multiple blood transfusions. At the current hospitalization the CT angiogram and bronchoscopy indicated persistent Aorto-bronchial fistula. The thoracic aortogram also revealed presence of Aorto-bronchial fistula and a type III endoleak between two stent graft components. He underwent an endovascular endoleak repair with endovascular coil embolization and placement of Onyx. The post intervention CT revealed a persistent filling of the fistulous tract and endoleak, which achieved subsequent obliteration of the inflow and outflow vessels and resolution of the endoleak. Multiple 5x5 mm platinum coils (Cook Medical, Bloomington, IN) were placed at the site of the fistula and the endoleak, which achieved subsequent obliteration of the inflow and outflow vessels and resolution of the endoleak. The patient was discharged on oral broad-spectrum antibiotics. In the following two months his appetite improved and he gained 10 pounds. His CT scan at one year and at two-year follow-up revealed satisfactory findings and he remained afebrile and free of hemoptysis and chest pain.

Abstracts Monday 10

Conclusions: Endovascular treatment of Aorto-Bronchial fistula is usually a palliative procedure, however, it is considered a reasonable approach in high risk surgical patients. The infected stent grafts usually require surgical removal and extra-anatomical bypass or lifetime treatment with antibiotics. Clear definition of type of endoleak is mandatory to select the best approach to resolve the problem. Transthoracic or trans-lumbar CT guided treatment of complex endoleak with coil embolization and Onyx is beneficial when other techniques fail. Complex type II endoleak can also be treated by transfemoral perigraft access, when other techniques fail.
Acute stroke & carotid management
Which stroke can benefit from Lysis and Thrombectomy?

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Despite advances in prevention, diagnosis, and management, ischemic stroke remains the leading cause of long-term disability in the United States according to the most recent report from the American Heart Association. Intravenous thrombolysis with tissue-plasminogen activator (tPA) is the only FDA-approved medical therapy for acute ischemic stroke; unfortunately, only 3-5% patients who present with acute stroke are eligible for and receive this treatment. Over the last decade, various endovascular intra-arterial approaches have been developed for the treatment of patients with acute ischemic stroke who present with severe neurologic deficits. Single-arm prospective studies showed greater ability to achieve revascularization in strokes due to large vessel occlusion – a primary target for endovascular therapy – with endovascular approaches compared with intravenous tPA therapy. Yet, three recently published trials (MIV III, MR RESCUE, and SYNTHESIS Expansion) failed to demonstrate significant benefit of endovascular intra-arterial techniques (either in combination with intravenous tPA or as a single treatment approach) over tPA alone. This presentation will review the current role of stent retriever technology in the treatment of acute stroke. It will include a discussion of potential critical limitations of recent randomized trials comparing endovascular with standard medical therapy and how these limitations influenced the results of those trials. Finally, the current status and future of endovascular acute stroke studies will be discussed based on lessons learned from previous trials.

Acute stroke & carotid management
Carotid surgery for acute stroke

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Nowadays, stroke is still one of the leading cause of death and disability in developed countries. Brain ischemia can develop through different mechanisms, intra and extracranial. Cerebral artery occlusion following an intracranial arterial plaque disruption or extracranial arterial plaque rupture and embolization appears the most frequent occurrence. In carotid-related stroke removal of the source of embolism is essential to preserve the still vital brain areas and to re-perfuse suffering cells in order to improve clinical conditions. All guidelines on carotid treatment agree that carotid-related brain ischemia should be treated as a real emergency but still many of them recommend treatment within 2 weeks from onset of symptoms, when the benefit of early surgery may be outweighed by the risk of recurrent neurological events. In 2000 our Vascular Division in Rome, Italy, started a close collaboration with a new-born Stroke Unit at our Academic Teaching Hospital. A recruitment protocol for urgent CEA was drawn, borrowing inclusion and exclusion criteria for brain revascularization from fibrinolytic experiences on ischemic stroke patients. From 2000 more than 250 patients have been recruited and treated following the protocol, with results proving the safety of the procedure, with a low risk of hemorrhagic transformation, the benefit of it, with good capability of recurrence prevention, and the therapeutic aim of the protocol, with an improvement of neurological status in the majority of patients because of the quick restoration of brain blood flow supply. In January 2010 a randomized controlled trial comparing the effects of very early CEA (within 48 hours from onset of symptoms) and early CEA (within 2 weeks from onset of symptoms) was started in Italy (Surgical Treatment of Acute Cerebral Ischemia Italian Trial – STACI.IT). At present more than 60 patients have been randomized and preliminary results are eagerly awaited.
Acute stroke & carotid management
How to organize the workflow within and outside the hospital? Logistic of stroke management

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Time is running against the patient with the onset of the first clinical stroke signs. The time window from cerebral ischemia to irreversible brain damage depends on the anatomical location of the stroke and on individual factors, especially on the collateral blood flow to the endangered brain area. A tissue perfusion rate of less than 20 ml/min/100 g of brain tissue indicates imminent cell death. Some patients have an irreversible infarction already one hour after the appearance of the first stroke signs. In other patients the time window might be 6 to 12 hours until the definitive infarction is established. Thrombolysis studies have shown that the patients will not benefit from this treatment after 6 hours, but up to 4.5 hours. Therefore, the patient must be brought to a hospital with a stroke unit and neurointerventional service in the shortest possible time. Emergency physicians and ambulances must have an action plan how to proceed when they are called to a stroke patient. As soon as the stroke event is confirmed by them they should inform the hospital. The stroke neurologist informs the radiologist immediately and before he has received the patient. The radiologist keeps a CT unit free for the patient to avoid any delay within the hospital and informs the neurointerventional team. When CT has ruled out cerebral bleeding and a visible ischemic infarction functional imaging and CTA will reveal the location and size of the ischemic area, the level of arterial blockade as well as the length of the thromboembol. With this information neurologist and neuroradiologist decide if the patient undergoes thrombectomy, thrombolysis or is brought to the stroke unit for conservative therapy.

Acute stroke & carotid management: Case reports and recorded video cases
From functional imaging to stroke cure

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In the past the treatment decision in acute stroke patients was based on the time window and a native CT. A time interval of up to 4.5 hours indicated intravenous thrombolysis. Cerebral bleeding, visible infarction or severe comorbidity led to conservative treatment. But some patients have an irreversible infarction already one hour after the appearance of the stroke signs and will not benefit from thrombolysis. In other patients the time window might be 4.5 to 12 hours until the definitive infarction is established. They are excluded from thrombolysis and therefore they will not be cured. The proportion of patients suited for thrombolysis was only in the range of 3 to 10%. Thrombolysis failed when the occlusion was longer than 6-8 mm. Recanalization of the artery was achieved in about 60% of the patients. Thrombectomy with stent retrieval systems is a highly efficient, clears the arteries in more than 90% and improves the chances of the patient to suffer from no or a minor infarction. Functional imaging includes a CT perfusion study and CTA. This additional imaging adds 5 to 10 minutes to the native CT. Alternatively, MRI and MRA can be used, but require more time. These examinations reveal the location and size of the ischemic area, the level of arterial blockade and the length of the thrombotic occlusion. When the blood volume of the affected area is not significantly reduced and the internal carotid, the M1 or M2 segment of the MCA, A1 of the ACA or the basilar artery are occluded a thrombectomy will be performed. More peripheral occlusions of cerebral arteries are treated with intravenous thrombolysis. Functional imaging improves the chance of the patients to be cured compared to the old categorical time window.
Carotid angioplasty for asymptomatic patients: Case reports and recorded video cases

CAS with proximal protection: Mo.Ma. system

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Unfavorable aortic arch configuration and variants (type II-III, diseased or bovine aortic arch configuration) are anatomic conditions that frequently make CAS difficult. Indeed, they have been found to increase both the rate of technical failure and cerebral complications especially from the femoral approach. This case report is a 60-y-o-w who were incidentally discovered to have an asymptomatic, severe stenosis of the left internal carotid artery (LICA) during a work-up for knee surgical replacement treatment. CT-angiography showed a sub-occlusive, lipid lesion, with tortuous ICA distal course and lumen collapse (near occlusion). Moreover, a type 2 bovine aortic arch configuration was present. The patient could not be operated on with CEA. According to our experience we proposed to the patient the following endovascular strategy: brachial approach, proximal protection with the 8F MO.MA system, lesion predilation and closed-cell design stent. Bivalirudin as anticoagulant. Cerebral microembolization was assessed by intra-procedural trans-cranial Doppler and NMR-DW imaging was carried out pre and at 48 hours post-CAS. The procedure did well and the f/u was uneventful. Complex anatomy of the aortic arch should not be a limiting factor for CAS in asymptomatic patients. An alternative approach – right radial/brachial - to standard femoral catheterization may be a valuable option for CAS in asymptomatic patients with «complex anatomy» of the aortic arch.

Carotid angioplasty for asymptomatic patients: Case reports and recorded video cases

CAS in post-CEA restenosis and intimal flap asymptomatic patient

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INTRODUCTION
More and more carotid endarterectomy (CEA) and carotid artery stenting (CAS) methods are safe, reliable and effective in the treatment of stenosis of the extracranial internal carotid artery. Unfortunately complications could occur, even after operations carried out with extreme care and by experienced operators.

CASE REPORTS
A 67 years old man, come to our Institution for an asymptomatic left carotid artery stenosis. Due to the young age of the patient, we decide to performe a CEA with dacron patch. The postoperative course was uneventful. At regular dopplex follow-up an intimal flap in the internal carotid artery was discovered, the patient experienced no neurological symptoms. We decide to performe an endovascular procedure in order to fix the intimal flap. The patient underwent CAS with cerebral protection system (FilterWire EZ) and closed cell stent placement (Carotid Wallsten 9x30mm).

Prior and after the stent placement, we used optical coherence tomography to asset the preoperative diagnosis and in order to confir the complete flap fixation. The postoperative course was uneventful and the patient was discharged on postoperative day two.

CONCLUSION
Our experience shows that more and more CAS and CEA should be considered complementary methods. Both methods are safe and effective in experienced hands, and so must be considered. What we like to emphasize is how CAS and CEA are fundamental to remedy the one at the other complications. This therapeutic approach is only possible in centers of Vascular Surgery, the only ones that can offer both the procedures with the same technical skill.
Carotid angioplasty for asymptomatic patients

BMT is the future for asymptomatic carotid stenosis—what are the proofs?

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The basis for invasive treatment of all carotid stenosis patients are the so-called Landmark trials comparing carotid endarterectomy (CEA) with best medical treatment vintage 1990 to 1995. These trials which include NASCET, EClT, ACAS, ACST and others involved both symptomatic and asymptomatic patients. The benefits for symptomatic patients undergoing CEA were highly significant and quite dramatic in patients with >70% stenotic lesions. The benefits were less dramatic in asymptomatic patients with 50-69% stenoses and in all patients with asymptomatic lesions.

In such asymptomatic patients, all studies showed a reduction of stroke rates from about 2% per year to about 1% per year by CEA, and that it takes about six years for this benefit to outweigh the morbidity of the operation. Even then about 16 CEsAs must be performed to prevent one stroke. Moreover, since completion of these Landmark trials, best medical treatment has improved markedly with the introduction and widespread use of statins, beta blockers, improved antithrombotic agents, ACE inhibitors and better control of diabetes and hypertension. Many of these treatments have been clearly shown to decrease stroke and death rates. It is therefore likely that current best medical treatment will be as effective as CEA in preventing strokes, particularly in asymptomatic patients. However, this remains to be shown in appropriate trials comparing CEA with current (2008) best medical treatment.

Moreover, since no convincing Level I evidence yet exists to show that carotid angioplasty and stenting (CAS) is as effective and safe as CEA, there is also a pressing need not only to show this equivalence, but also to compare CAS with current best medical treatment.

Since all studies have shown that both CEA and CAS have known complications, a small mortality rate and are costly, one can make a case that most patients with asymptomatic carotid stenosis should be treated by best medical therapy until such time as CAS and CEA can be shown to produce better outcomes. In addition to the need for appropriate studies to demonstrate such superior outcomes for interventional treatments, there is a need to develop better methods to determine which asymptomatic carotid stenosis are at a high risk of having a stroke so that invasive treatments can be used more selectively to reduce this risk.

With the predicted rise in stroke mortality, the need for preventive strategies is high. Currently, the debate whether medical treatment alone is sufficient for the treatment of asymptomatic carotid stenosis or another form of intervention is needed, is still very active. Data from ACST-1 and other trials clearly show that intervention in asymptomatic patients provides a long-term protection from stroke. However, current guidelines all seem to contradict one another, some radically dismissing CAS as a suitable intervention for asymptomatic patients, while some, like the NICE guidelines, urge clinicians to recruit their asymptomatic patients into clinical trials.

It is clear that a number of questions still remain unanswered, and most importantly, which intervention, CEA or CAS, provides the most benefits in the shorter and longer term. ACST-2 is currently the largest investigator-led trial comparing CAS and CEA in asymptomatic patients. Our goal to recruit 5000 patients, will allow us to draw significant conclusions on the non-inferiority of CAS versus CEA in this patient group.

The trial will be well placed to influence future clinical practice, because we look at real-life clinical situations. Clinicians in ACST-2 have extensive clinical experience, surgeons as well as interventional radiologists, meaning we can compare good surgeons with good radiologists, in contrast with earlier industry sponsored trials, better reflecting daily practice. Furthermore, ACST-2 is complementary to other trials that address similar questions in different patient populations or compare medical treatment with intervention. Meta-analysis of all data will provide us invaluable information as to how best manage carotid stenosis.
Carotid angioplasty for asymptomatic patients

Indication of CAS and on recent trial results

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There has been much controversy over the role of carotid artery stent (CAS) placement in the treatment of carotid artery occlusive disease and particularly in the management of asymptomatic patients. There are three options for asymptomatic patients with high-grade stenoses: treat with endarterectomy, stent placement or treat medically.

Carotid endarterectomy (CEA) has been established in the late 20th century as the preferred treatment to prevent stroke for average-risk asymptomatic patients with >60% carotid stenosis compared with medical therapy. In the right hands and centers, this is an excellent choice. In the US under Medicare guidelines, the role of CAS includes those patients with symptomatic stenosis >70% and high risk for CEA due to cardiopulmonary and anatomical comorbidities. Patients who are enrolled in FDA-approved clinical trials can receive carotid artery stenting for symptomatic stenosis >50% and asymptomatic stenosis >80% with clinical high-risk criteria for CEA.

There are those who feel that asymptomatic patients should only medical therapy alone. They argue the role of optimal medical therapy for carotid disease using antplatelet agents, angiotensin-converting enzyme (ACE) inhibitors, statins, and smoking cessation has not been addressed aggressively.

I agree that for those patients who have low grade lesions, then medical therapy is probably prudent, but not for severe lesions greater than 80% and for lesions characterized as high risk. As imaging modalities improve, we know that certain features shown on ultrasound (Inglese et al.) and being displayed in MRA, CTA and OCT reveal that these asymptomatic lesions vary in their risk. As we learn more about these features, we can determine who could receive medical therapy, and who needs intervention. Asymptomatic patients are not all asymptomatic. In our earliest CAS cases in the 1990’s, I was surprised how many patients were able to draw, read or do other functions that they had “lost” over the years. This viewpoint was later confirmed by Rod Roabe’s work. Not all patients are the same and neither are their lesions. For severe stenoses in asymptomatic patients, the reality is that the first symptom in 25% will be a sudden permanent stroke (Hallett, Veith 2010). Despite best medical treatment, the degree of stenosis will not be reduced, and neither will the threat of a major stroke, and that is why they need intervention.

68yo asymptomatic female and avid golfer was referred to us for endovascular treatment of a severe right carotid artery stenosis. She underwent elsewhere CEA 6 years prior to this admission. Her past medical and surgical history was pertinent for arterial hypertension, hyperlipidemia, bilateral iliac artery stenting and CAB. Her physical exam revealed right sided carotid bruit and diminished femoral pulses. Her carotid Doppler revealed 80-99% right internal carotid artery stenosis and common carotid artery pseudoaneurysm. Her MRA confirmed the Doppler findings. Her carotid angiogram revealed a pseudoaneurysm at the site of the right CEA and patch angioplasty and 90% right common and internal carotid artery stenosis. The procedure was performed via the right femoral percutaneous approach with a 7 Fr Shuttle Select sheath and J1 SlipCath (Cook, Bloomington, IN), which were advanced over .035 super stiff Glide wire (Terumo, Japan) to the right external carotid artery. An 8mm in diameter Amplatz II Vascular Plug (St. Jude Medical, Minneapolis, MN) was then deployed in the right external carotid artery. The Shuttle Select sheath was then pulled distally to the right common carotid artery and a 6 mm NAV distal protection device (Abbott Vascular) was then deployed in the right internal carotid artery, three centimeters above the stenosis. A tapered 6x 8x 40 mm Acculink stent (Abbott Vascular) was then deployed in the right internal and common carotid artery, followed by deployment of 5x35 mm, 5x15mm, 7x25 mm Heparin coated Viabahn stent grafts in an overlapping fashion (WL Gore &Associates, Flagstaff, AZ) in the common carotid artery to exclude the pseudoaneurysm from the arterial circulation. The post deployment angiogram revealed excellent results. The IVUS (Volcano) revealed adequate expansion of the stent graft, without evidence of infolding. The patient had an uneventful post-procedural hospital course and was discharged the following day on Clopidrogel and Aspirin, which she continued taking. The carotid duplex at 9 month follow-up revealed intact restenosis with peak systolic and diastolic velocities of 494/261 cm/sec. Of note, the patient plays golf competitively. Carotid angiograms revealed severe proximal and distal stenosis inside the Viabahn stent grafts, which was confirmed by IVUS (Volcano, San Diego, CA) to be ~90%. The proximal right external carotid artery remained occluded at the site of the Ampliator Plug II stent. The patient underwent a redo stenting of the right carotid artery restenosis with use of a modified MOTA proximal protection device (Medtronic, Minneapolis, MN) and 8x 40 mm ProGelb stent (Abbott, Vascular, Sunnyvale, CA) for the internal carotid artery and with a 8x40mm Precise stent (Cordis, J&J, Warren, NJ), followed by balloon angioplasty with 5x30 mm and 7x30 mm Aviator balloons (Cordis, J&J, Warren, NJ). The angiography and the IVUS revealed excellent final result. The patient did not experience any neurological problems and was discharged the following day on Clopidrogel and Aspirin. She was advised to avoid vigorous rotation and movement of her neck. Conclusions: Proximal edge restenosis has been reported after Viabahn deployment in peripheral arteries. This has been attributed to aggressive angioplasty and trauma and marginal dissection beyond the Viabahn, which was not the case in our patient. Restenosis within the stent graft is rare but possible due to formation of neointimal hyperplasia. Using a telescoping technique of placing several different sizes of Viabahn stent grafts may have contributed to restenosis. Golfing with frequent aggressive rotation of the neck after complex carotid artery stenting may have contributed to restenosis. Further improvement in stent graft designs is necessary to offer the patients with restenosis and Pseudoaneurysm better long term results.
South Africa
Endovascular management of HIV vasculopathy

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The highest prevalence of HIV is found in Sub-Saharan Africa, with the epicentre in KwaZulu-Natal, South Africa.

The pathophysiology of the vascular disease remains poorly understood, as are the implications of the management and the associated outcomes.

HIV vasculopathy presents as either occlusive or aneurysmal disease. Occlusive disease is secondary to: (i) acute arterial thrombosis, or (ii) accelerated atherosclerosis presenting with chronic occlusive disease. Other factors may aggravate occlusive disease, such as concomitant smoking and antiretroviral therapy e.g. protease inhibitors. Local studies suggest that primary amputation rates are significant for occlusive disease (47% Robbs et al, 31.9% van Marle et al) with poor limb salvage rates for infrainguinal disease (36.1% van Marie et al) and significant graft sepsis rates. The endovascular approach to HIV occlusive disease may therefore be an attractive option to improve outcomes while minimising septic complications. There is however currently little evidence to confirm this assertion.

HIV aneurysms occur at atypical sites, are often multiple and usually have a saccular configuration. Peri-aneurysmal inflammation and septic complications make open surgery technically challenging. Stent grafts can however be used in most anatomical sites with complete exclusion of the aneurysm. HIV aneurysmal disease appears to carry a poorer long-term prognosis than HIV occlusive disease (Botes et al).

I will present endovascular surgical outcomes data from a local MRC vascular surgical study (Biccard et al). I will discuss patient selection, and technical considerations concerning poor runoff, appropriate stent selection and crossing complex aneurysms.

References
Aortic branch malperfusion
Update on «Off-the-shelf devices»

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INTRODUCTION

Two devices are currently undergoing investigation as “Off-the-Shelf” designs in order to help reduce treatment delay in patients. The first is the Cook Zenith p-Branch device. This device design is centered around a fixed fenestration for the superior mesenteric artery (SMA). A double-wide or triple-wide scallop is used to incorporate the celiac artery and two pivot fenestrations provide flexibility in the treatment locations of the renal arteries. There are currently two different configurations of the device to accommodate a larger proportion of patients. The extent of aneurysmal disease can extend up to the level of the base of the SMA. The renal fenestrations are also pre-cannulated making it easier to catheterize the target vessels. There are several centers with early access to the renal artery fenestration is accomplished by having fabric redundancy in the midsection without attaching it to the stent frame. A non-aneurysmal neck length of 15 mm must exist below the SMA in order to achieve aneurysmal exclusion. The report of the first fifteen implants was recently published. Among these patients there was no perioperative mortality and all vessels were successfully treated. With 11 of the 15 patients having reached their 6-month follow-up, there have been no Type I or III endoleaks with only one patient experiencing renal insufficiency that resolved within 30 days. The other device undergoing evaluation is the Ventana fenestrated device from Endologix. It incorporates a large scallop for the SMA and celiac artery with two fenestrations for the renal arteries. Flexibility in the location of the renal artery fenestration is accomplished by having fabric redundancy in the missection without attaching it to the stent frame. A non-aneurysmal neck length of 15 mm must exist below the SMA in order to achieve aneurysmal exclusion. The report of the first fifteen implants was recently published. Among these patients there was no perioperative mortality and all vessels were successfully treated. With 11 of the 15 patients having reached their 6-month follow-up, there have been no Type I or III endoleaks with only one patient experiencing bilateral renal artery stenosis. Early reports of these devices are encouraging however the approval will require more extensive clinical trial enrollment and follow-up.

Aortic branch malperfusion
Which place for emergent intervention in complicated acute type B dissection

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San Filippo Neri Hospital, Rome, Italy

It has generally recommended to treat patients with type B aortic dissection (TBAD) without complications with medical therapy in an intensive care unit. In about 30% to 42% acute TBAD is complicated by hemodynamic instability, impending rupture or aortic branch malperfusion syndrome. TEVAR has been suggested as more suitable and less invasive than open repair in this group of patients. We report our experience in emergency TEVAR for TAAD. From January 2005 to April 2013 95 patients were admitted to our Emergency Department for acute TBAD. 38 patients (40%) underwent TEVAR: 2 patients (5.2%) for acute renal ischemia, 3 patients (7.9%) for acute lower limb ischemia, 7 patients (18.4%) for aortic impending rupture, 5 patients (13.3%) for severe hypotension, 8 (21%) patients for refractory pain not responding to medical therapy, 13 (34.2%) patients for uncontrolled hypertension. Thoracic endografts were used in 36 (94.7%) patients, while in two cases TX2 for dissection system was used. Left carotid-subclavian by pass was necessary in 9 (23.7%) cases for an adequate proximal landing zone, while carotid-carotid-subclavian by pass in other 10 (26.3%). Malperfusion syndrome was treated with 2 renal artery stenting (5.2%), 2 left iliac axis stenting and 1 bilateral common iliac artery stenting (kissing stent). In three patients the false lumen thrombosis with Amplatzer plug and metal coils was performed. Technical success was 100%. No death was registered. Median hospital stay was 8.1 days (range 3-17 days). Median follow up was 43.8 months (range 1-98 months). No death was registered. Malperfusion syndrome recovered without sequelae. Endovascular treatment of complicated acute type B aortic dissection offers promising immediate and long term results. Accurate follow up is necessary to detect and promptly correct potential complications.
Aortic branch malperfusion
The multilayer stent may change the parameters of aortic branch malperfusion

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Arizona Heart Foundation, Phoenix, United States

Multilayer Flow Modulator (MFM)
In spite of the numerous reports and successful techniques to reduce or eliminate aortic branch malperfusion in the treatment of thoracoabdominal aneurysms, there are no large trials and the procedures vary greatly in both the pathology and the technology applied making comparative data and outcome information almost impossible to obtain in addition, the procedures being performed today, hybrid, CHIMPS, branched and fenestrated devices all are variations of the same concept. The MFM is based on an entirely different principal-flow modulation and lamination resulting in progressive thrombosis of the aneurysm with preservation of branch perfusion. This presentation will explore this principal concept and discuss examples of its clinical applicability. The table below is a single example of comparative data between the MFM and a similar cohort of patients receiving branched or fenestrated grafts. The results are significant.

<table>
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<th>MFM Patients</th>
<th>Type</th>
<th>30-day Mortality</th>
<th>Amputations</th>
<th>Paraplegia/paraparesis</th>
<th>Death or 31 days</th>
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</tbody>
</table>

Most Recent Comparative Studies of Endovascular Treatment of Thoracoabdominal Aneurysms

<table>
<thead>
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<th>Year</th>
<th>Technique</th>
<th>Type</th>
<th>30-day Mortality</th>
<th>Amputations</th>
<th>Paraplegia/paraparesis</th>
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<tbody>
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<td>2.4%</td>
<td>17%</td>
</tr>
<tr>
<td>2013</td>
<td>Cock</td>
<td>Type</td>
<td>6%</td>
<td>4.2%</td>
<td>1.6%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

INTRODUCTION
Type B dissections are usually classified as acute (<14 days) or chronic (>14 days) according to the onset of symptoms. Medical treatment was considered historically the treatment of choice for uncomplicated type B dissections, but newer evidence supports a role of endovascular repair in a larger proportion of uncomplicated acute type B dissections. The results of the ADSORB randomized trial are awaited soon and will bring additional evidence with regard to the role of endovascular treatment in acute uncomplicated dissections. Treatment in the acute phase is clearly advocated for dissections complicated by rupture, abdominal end-organ ischemia, low limb ischemia, persistent pain, and refractory hypertension. Endovascular treatment is undoubtedly the first-line treatment in acute complicated type B dissections, with several studies suggesting a survival benefit of endovascular management over open surgery. The role of endovascular repair in chronic post-dissection aneurysms, however, is still less clear.

NATURAL HISTORY OF TYPE B AORTIC DISSECTION
Approximately 20% to 30% of patients suffering an uncomplicated acute type B dissection will develop a post-dissection thoracic or thoracoabdominal aneurysm. This long de novo process is characterized by extensive remodeling of the aorta and increasing fibrotic stiffness of the intimal flap, resulting in a secondary aneurysm that presents diverse technical challenges. Treatment of a post-dissection aneurysm aims to completely exclude the aneurysm, as in the case of non-dissection aneurysms. Due to the lack of an adequate distal landing zone above the visceral branches, fenestrated and branched grafts are frequently used in this setting. However, additional technical challenges arise. One specific feature is the usually narrow true lumen and this need to be taken into account when deciding whether to use fenestrations or branches. Branches are more suitable when target vessels present with sharp downward take-off, but require more room in the true lumen. This extra room can be created by deployment of a tube graft first with a distal landing zone a few cm above the visceral branches of the aorta, so as to expand the true lumen. Fenestrations must be coherently from below and require less true lumen space, but require more accurate planning with regard to orientation. A second technical challenge relates to visceral branches originating from different lumina. In such cases, perforation of the stiff chronic dissection flap is required to obtain access to the vessels originating from the false lumen. Puncture of the dissection flap with a needle (e.g. TIPS needle) or the stiff end of a wire have been used to address this issue. Our initial experience with fenestration and/or branched grafts to treat post dissection aneurysms has shown favorable early results. Meanwhile 12 patients have been treated in our department (Table 1). Technical success was achieved in all cases (100%). There was one death (8.3%) in the early post-operative period due to multi-organ failure. One patient (8.3%) with impaired pre-operative renal function required permanent dialysis at six months. No cases of paraplegia occurred. Mean follow up was 12 months. In three cases the length of the bridging occurred, despite stenting too short after remodeling, resulting in a type II endoleak from a side branch. This was successfully treated with a longer bridging stent-graft. Type II endoleaks were witnessed in five cases with three of them resolving spontaneously. One patient died at 13 months from an unrelated cause. No aneurysm-related deaths were observed during follow up.

ENDOVASCULAR REPAIR OF TYPE B CHRONIC DISSECTIONS
In acute and sub-acute dissections coverage of the proximal intimal tear is supposed to promote false lumen thrombosis and aortic remodeling. This simple management is however not effective in a chronic post-dissection aneurysm, as in this case treatment aims to exclude the aneurysm. Conventional thoracic endografting can be a viable approach for secondary aneurysms limited to the thoracic aorta. Several studies have reported positive results after endovascular repair of chronic type B dissections with early mortality rates of 0-5% and neurologic complication rates ranging from 0% to 9%. Estimated survival rates of 86%, 82% and 80% at 12, 24 and 36 months respectively, have been reported. Nevertheless, the postoperative aortic remodeling (i.e. decrease in aortic diameter) in these cases seems to be limited to the stent-grafted segment of the aorta, not influencing the distal untreated segments. Complete thrombosis of the entire false lumen after standard thoracic endografting is uncommon in patients with extensive dissections. In chronic type B dissections involving the thoracoabdominal aorta complete aneurysm exclusion requires utilization of fenestrated and/or branched endografts. The favorable results and durability of fenestrated and branched grafts for athero-obliterative thoracoabdominal aneurysms have been demonstrated in several reports. In secondary post-dissecting aneurysms, however, additional technical challenges arise. One specific feature is the usually narrow true lumen and this need to be taken into account when deciding whether to use fenestrations or branches. Branches are more suitable when target vessels present with sharp downward take-off, but require more room in the true lumen. This extra room can be created by deployment of a tube graft first with a distal landing zone a few cm above the visceral branches of the aorta, so as to expand the true lumen. Fenestrations must be coherently from below and require less true lumen space, but require more accurate planning with regard to orientation. A second technical challenge relates to visceral branches originating from different lumina. In such cases, perforation of the stiff chronic dissection flap is required to obtain access to the vessels originating from the false lumen. Puncture of the dissection flap with a needle (e.g. TIPS needle) or the stiff end of a wire have been used to address this issue. Our initial experience with fenestration and/or branched grafts to treat post dissection aneurysms has shown favorable early results. Meanwhile 12 patients have been treated in our department (Table 1). Technical success was achieved in all cases (100%). There was one death (8.3%) in the early post-operative period due to multi-organ failure. One patient (8.3%) with impaired pre-operative renal function required permanent dialysis at six months. No cases of paraplegia occurred. Mean follow up was 12 months. In three cases the length of the bridging occurred, despite stenting too short after remodeling, resulting in a type II endoleak from a side branch. This was successfully treated with a longer bridging stent-graft. Type II endoleaks were witnessed in five cases with three of them resolving spontaneously. One patient died at 13 months from an unrelated cause. No aneurysm-related deaths were observed during follow up.

Aortic branch malperfusion
TEVAR for chronic Type B TAD: when and how?

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2. Department of Vascular Surgery, Leuven University, Leuven, Belgium

INTRODUCTION
Type B dissections are usually classified as acute (<14 days) or chronic (>14 days) according to the onset of symptoms. Medical treatment was considered historically the treatment of choice for uncomplicated type B dissections, but newer evidence supports a role of endovascular repair in a larger proportion of uncomplicated acute type B dissections. The results of the ADSORB randomized trial are awaited soon and will bring additional evidence with regard to the role of endovascular treatment in acute uncomplicated dissections. Treatment in the acute phase is clearly advocated for dissections complicated by rupture, abdominal end-organ ischemia, low limb ischemia, persistent pain, and refractory hypertension. Endovascular treatment is undoubtedly the first-line treatment in acute complicated type B dissections, with several studies suggesting a survival benefit of endovascular management over open surgery. The role of endovascular repair in chronic post-dissection aneurysms, however, is still less clear.

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## references

Aortic branch malperfusion:
Case reports and recorded video cases
Two cases of endovascular treatment of aortic arch

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We report a case of a 84 years old male patient, affected by hypertension, diabetes mellitus and atrial fibrillation, who arrived in emergency to our center due to a ruptured aortic arch aneurysm. The preoperative planning, performed with a dedicated workstation on CT scan imaging, highlighted a suitable landing zone for an endograft above the origin of the innominate artery. The patient underwent an urgent endovascular repair with “chimney” technique using a thoracic endograft for the aortic arch and parallel covered stents for supra aortic vessels revascularisation. No complications were reported at 6-month follow-up.

Lower extremity challenges and some ideas on how to solve them:
Endovascular management of a complex aortoiliac occlusion utilizing an IVUS re-entry device

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Reading Hospital Medical Center, Reading, United States

Patient is a 43 yr old female with history of pain in the bilateral lower extremity for the past 8 months. Pain is much worse in the right side and can only walk few feet with a cane. She has pain at night and chronic numbness of the right foot. PMH: Hypertension, COPD, HIV+Social History: 25 yr smoking-Medication: Oxycodone, inhalersPhysical Exam: Absent B/L femoral pulses, absent B/L pedal pulses. Right foot was cooler than left. ABI: right .36 left .64 Abdominal duplex scan: distal aorta-bilateral common iliac artery occlusion and proximal right external iliac artery occlusion. Patient bilateral distal external iliac and common femoral arteries. Patient refused open surgical intervention. Left brachial artery access was obtained with a miro-puncture kit. A 4 Fr. Sheath was inserted followed by a pig tail catheter into the distal abdominal aorta. Abdominal arteriogram showed distal aortic occlusion extending to bilateral common iliac arteries. On the left side there was reconstitution of the left external iliac artery and on the right side a faint external iliac artery was visualized. Under road mapping a micro-puncture sheath was placed in the bilateral common femoral arteries. Because of poor IV access, a 4 Fr. Sheath was inserted into the left common femoral vein. On the right side a 5 Fr. Sheath and on the left side a 6 Fr. Sheath was inserted in the common femoral artery. Selective arteriogram on the right side, through the sheath, showed more extensive disease involving the right common iliac and proximal external iliac artery compared to the left side. Selective arteriogram on the left side through the sheath showed patent left external iliac artery with occlusion of the common iliac artery. Using a .035 hydrophilic wire in combination with a 4 Fr. Vertebal tip catheter for support, the occlusion involving the right iliac artery was crossed. The patient distal aortic lumen was entered using wire and catheter technique through the right common iliac artery occlusion. On the left side, the same technique was used to cross the common iliac artery occlusion; however, the aortic true lumen could not be entered. The .035 wire was exchanged for a non-hydrophilic .014 wire. A Pioneer Catheter (Re-entry device with an IVUS tip) was inserted through the left 6 Fr. Sheath to the reconstitution point at the level of distal abdominal aorta. Using the IVUS, the true lumen was identified with flow of blood on the top of the screen. At this point the needle from the Pioneer catheter was advanced, and under fluoroscopy, the .014 wire was passed into the aorta without difficulty. By measuring the depth of the penetration on the IVUS the needle can be adjusted on the Pioneer to penetrate through the occlusion. The needle is retracted and the Pioneer is removed. A .035, lumen, straight catheter is inserted over the .014 wire and the wire is exchanged for a .035 wire. At this point, the patient is given IV heparin and bilateral iliac angioplasty and stenting was performed. Stenting was done using a self-expandable stents. Post stent angioplasty was done to create iliac lumens with no pressure gradient. Patient tolerated procedure well without complications and was discharge home the next day on a anti-platelet agent. Patient was seen in one week follow up and had palpable bilateral femoral pulses with ABIs of .80 on the right and .90 on the left. Her symptom of pain, completely resolved involving bilateral lower extremities.
Lower extremity challenges and some ideas on how to solve them

What is the optimal treatment for in-stent restenosis?

The endovascular management of peripheral arterial disease, despite the important advantages that offers, still has to overcome many obstacles in the infra-inguinal arterial bed. In-stent restenosis (ISR) is the main disadvantage of peripheral angioplasties with a recurrence rate that can reach up to 50% in the first post-interventional year, depending on the artery treated. (6-8) Intimal hyperplasia is the main mechanism of ISR, which based on various theories, (5) may be due to a) fracture of the stent, the rigid atheroma, the intimal hyperplasia of the diseased artery, b) the rigid atheroma, which is situated at the site of angioplasty with the deposition of fibrous tissue and lipid components. Though several efforts towards the prevention of intimal hyperplasia have been made, the goal of prevention of ISR is still elusive. Thus, ISR is a clinical entity that a vascular surgeon will quite often have to confront with. The absence of randomized control trials for the treatment of ISR, raises concern on the appropriate and most successful therapy of this situation. Our aim is to present a review of the current therapeutic techniques for this difficult and frequent complication.

METHODS

A systematic review of the available literature over the last 5 years (2008-2013) was conducted. No randomized control trials were found to address this issue. Single-centre studies, retrospective and prospective follow-up studies have been published that compare the various therapies for the treatment of ISR. The available basic treatment options are conventional balloon angioplasty and the use of cutting-balloon. Other treatment options include the various atherectomy catheters, either mechanical like rotational atherotomes (SILVERHAIRK, PathWay PV atherectomy system), or modern atherectomy like Excimer Laser (6), for the break-down of the Intimal Hyperplasia. Finally, endovascular stenting (DES) and Drug Eluting Stents (DES) are frequently used in the coronary arteries and are well described in this field. (5,7) However, their contribution in the treatment of ISR in the peripheral arteries is still under evaluation.

RESULTS

The reported primary patency rates after angioplasty for ISR range between 33-47% among the various studies. The Target Lesion Recanalization rate (TLR) following the use of conventional-balloons angioplasty of ISR in a series of 428 patients was 73% six months following treatment. (5) The only study that revealed better results in comparison with all the other techniques was a small series of patients (n=10) treated with DES, that showed no recurrence of stenosis 8 months following treatment. (6) In the cases where mechanical atherectomy was used, an important rate (7.6%) of distal embolization in the case of micro or macro-embol was observed, with 7.3% of the patients needing some kind of operation for acute lower limb ischemia. (7)

CONCLUSION

Despite the technological progress, the results of the treatment of ISR are poor, with a long-term patency rate. Consideration must be taken to the fact that ISR is a dynamic disease, during mechanical atherectomy for the break-down of neo-intimal filaments. Drug Eluting Balloons may be the solution to this problem, but until today, the high cost of these materials and the lack of satisfactory documentation, limit their use.

REFERENCES

done and the Glide wire is gently manipulated into the true lumen. Otherwise the angle Tempo-Aqua is slightly pulled back, and rotated to push the wire into the true lumen in a different direction. This should be done under Road mapping (done through the sheath) with image intensifier magnification. Rotating the tip of the angle Tempo-Aqua allows entering the true lumen through an alternative subintimal channel. All efforts should be done to advance the wire into the true lumen at the “End” point using this technique. Advance the loop wire further cause extension of the dissection plane into the native SFA jeopardizing major collateral or future short bypass.

Devices to assist with CTO

With chronic arterial occlusion, passage of the wire might be difficult, especially into the proximal cap. The FRONTRUNNER XP CTO Catheter: Use of this device facilitates the intraluminal placement of a conventional guidewire beyond the lesion. The Frontrunner can easily be shaped to facilitate steerability. The distal assembly of the device can be cycled repeatedly as required in various planes to separate and/or fracture the plaque in the vessel segment. In doing so, the device will facilitate a space either by dissection into the true lumen or the sub-intimal space between the plaque and the true lumen. The rate limiting step to a successful CTO is passage of the wire into the distal “true lumen”. At times, this can be difficult by just using wire and catheter. Outback Re-entry catheter allows re-entry from a subintimal space back into the true lumen. The OUTBACK LTD Re-entry Catheter is a sterile, single-use, 6F sheath compatible, disposable catheter designed to place standard 0.014” guide wires in select regions of the peripheral vasculature (excluding the carotid and cerebral vasculature). The OUTBACK LTD Re-entry Catheter employs three steps to re-enter the vessel lumen from the subintimal space. These steps are performed under standard fluoroscopy to properly align the cannula to the reconstitution point in the vessel. It is done in three steps: Locate, Tune and Deploy.

References

Renal and visceral: Case reports and recorded video cases

The Pickering-syndrome: a forgotten cause of curable terminal renal insufficiency that requires emergent renal angioplasty!

S. Greciano
Colmar, France

In subocclusive renal artery stenosis (RAS), malignant hypertension (MH) may be the kidney’s only chance to survive, described as ‘PICKINGER SYNDROME’ (PS). Lowering of MH, as indicated in acute pulmonary oedema with hypotensive drugs or acute dialysis may provoke renal artery thrombosis and terminal renal insufficiency (RI) especially in case of single (functional) kidney, or bilateral RAS. Emergent renal artery angioplasty allowed weaning of dialysis in the first case and not to start it in second. Respectively 1 year and 6 months later, both patients are free from dialysis with renal function as 10 years before. When starting dialysis for unknown terminal insufficiency, it is class 1 ACC/AHA recommendation to such for subocclusive RAS. Because PS mostly occurs in case of bilateral RAS or single functional kidney, it might not be as safe as taught by nephrologists, letting thrombose critically stenosed RAS in patients with almost no renal insufficiency due to a well working contra-lateral kidney.

Renal and visceral
Other indications of RDN

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2. Istituto di Cardiologia Policlinico A. Gemelli Roma, Roma, Italy

OTHER INDICATIONS OF RENAL DENERVATION
Renal artery denervation (RDN) is a new effective technique for treatment -resistant essential hypertension. The action principle of RDN is the sympathetic nervous hyperactivity decrease, as a result decreasing sympathetic renal nervous afferent and efferent activity between kidney and brain is resistant hypertension decreasing. These action principle is demonstrated effective also in other several deseases: diabetes, chronic kidney disease, heart failure, obstructive sleep apnea, left ventricular hypertrophy, atrial fibrillation. All of these deseases, as known, have as action principle, sympathetic nervous hyperactivity. Then the renal denervation, decreasing these hyperactivity, can treat these deseases with good results. Renal sympathetic denervation affects on glucose metabolism in patients with resistant hypertension. Sympathetic activity mediates vascular resistance; blood flow is shifted from striated muscle (insulin sensitive) to visceral tissue (insulin resistant). RDN is a potential new treatment modality for polycistic ovary syndrome (PCOS). PCOS is associated with increased sympathetic activity, insulin resistance, hypertension. RDN in congestive heart failure (CHF) affects on modulation of central chemoreceptors, fluid balance, heart rate reduction, peripheral vascular resistance, then RDN affects improvement in exercise capacity, decrease in dyspnoea, improvement in biochemistry. Several studies show increased sympathetic activity in chronic renal disease (CKD) with progressive deterioration of renal function. RDN, reducing sympathetic activity affects beneficial blood pressure effects in patient with stage 3 / 4 CKD and resistant hypertension. RDN reduces number of episodes at least 10 consecutive seconds per hour in patients with resistant hypertension and sleep apnea. RDN reduces atrial fibrillation recurrency in patients with refractory symptomatic atrial fibrillation and resistant hypertension tyreated with pulmonary vein isolation.
Renal and visceral
Vascular vessels' aneurysm: when should they be treated and how

A. Rampoldi

Ospedale Niguarda, Milan, Italy

Visceral vessels aneurysms (VVAs) are rare with a reported incidence of 0.01 to 0.2%. However, VVAs are clinically important and potentially lethal: 22% of all visceral artery aneurysms present as clinical emergencies; 8.5% result in death, and 5% are classical complications involving the origin of one or more segmental branches. Treatment of VVAs and pseudoaneurysms (PSA) is an alternative to conventional surgery with specialized embolization techniques such as Onyx or multi-layered stents could be used. Endovascular treatment of VVAs and PSA is a highly technical procedure with significant associated risk of bowel ischemia and infarction, lower procedural mortality and morbidity, and with high technical and clinical success rates. It’s crucial the knowledge of the interventionist radiologist in complex vascular interventional techniques. Special attention should be used to challenging local vascular anatomy and anatomic limited access which is difficult the transcathereter treatment.
Renal and visceral
MFM stents: indications and results in visceral vessels’ aneurysm

M. Ferri
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VAA is a rare pathology, but is a potentially lethal one. In the literature, mortality rate after VAA rupture has been reported to be in the range of 10-36%, whereas a rate of 5% has been reported during elective treatment. Even if the history of untreated VAA remains unclear, the indications for treatment of asymptomatic VAA remain controversial because of the lack of prospective studies providing evalutative evidence of the natural history of these lesions. The therapeutic strategies include surgical treatment (revascularization, vessel ligation, aneurysmal sac exclusion) or endovascular treatment (coil embolization, stent placement). Authors reported a multicenter experience with a new endovascular device stent (Cardiatis FluidSmart 3D Multilayer stent). The multilayer stent, by virtue of its three-dimensional geometry, reduces flow velocity within the aneurysm vortex while improving laminar flow in the main artery and surrounding vital branches. This allows for pressure reduction within the aneurysmal sac, stasis, and the formation of an organized thrombus. This technique minimizes the chances of aneurysm rupture and maintains patency of collateral vessels coming from the aneurysmal sac. Results show that this new technology could be a safe and effective new method for VAA exclusion. Obviously, endovascular treatment is a technically difficult technique that requires a specific training and a learning curve.

Diabetic foot & BTK disease
Angiosome concept - Multi-center trials of PAD patients in Japan

O. Iida
Amagasaki-shi, Japan

OBJECTIVE
To investigate the population who could be obtained better outcome by angiosome-oriented EVT.

BACKGROUND
Who should be really treated with angiosome concept has not well examined in clinical setting.

METHODS
We used a multicenter database of 718 consecutive CLI patients with ischemic tissue loss due to isolated below-the-knee lesions. All the patients underwent primary endovascular therapy (EVT). The primary outcome measure was major amputation or any reintervention (modified major adverse limb event: mMALE). Cox proportional hazard regression model was used to assess the association of angiosome-oriented revascularization with the outcome. The influence of baseline characteristics on the association was evaluated by their interaction effects.

RESULTS
They were 70 ± 11 years old and 501 patients (70%) were male. The prevalence of diabetes mellitus and end stage renal disease (ESRD) on dialysis was 75% (n = 538) and 68% (n = 486), respectively. A total of 307 patients (43%) underwent indirect EVT. In univariate analysis, indirect EVT was significantly associated with mMALE (p = 0.041), the hazard ratio (HR) and its 95% confidence interval was 1.25 (1.01, 1.55). When assessing interaction effects, indirect EVT had a significant interaction with CRP levels (p < 0.004), but not with the other baseline characteristics (p > 0.05). Indeed, the HR of indirect EVT for mMALE was calculated to be 1.84 (1.28, 2.66) in patients with high CRP levels (≥ 3 mg/dl), whereas it was 0.96 (0.73, 1.27) in those with low CPR levels (< 3 mg/dl). When the study population was categorized into four subgroups according to indirect EVT and CRP levels, the subgroup with indirect EVT and high CRP levels (≥ 3 mg/dl) had a significantly higher risk for mMALE, compared to those without indirect EVT or high CRP levels. The HR was 2.08 (1.56, 2.78).

CONCLUSION
Indirect endovascular revascularization is inferior to direct endovascular revascularization in limb prognosis only when wound is so infectious that CRP levels are elevated.
Diabetic foot & BTK disease Results of Drug Eluting balloons

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The natural means of PAD progress and the physiologic response associated with endovascular treatment of occlusive disease are similar. These cell driven repair mechanisms, permanently recreated by repetitive endothelial injury due to shear stress or remaining implants represent the Achilles heel of intervention. The need for durable mechanical success at the lesion site and inhibition of myointimal hyperplasia have become the challenging goals of endovascular therapy.

**METHOD**
A variety of cell inhibiting agents and application forms have been used in trials and registries. Recently published or presented data concerning Drug Eluting Technology (DET) in BTK arteries have been reviewed concerning the technical and clinical results and the potential benefit in the “real world” situation as well as their cost effectiveness compared to standard techniques.

**RESULTS**
The trials comparing drug eluting stents (DES) with bare metal stents (BMS) and drug eluting balloons (DEB) with non coated balloons (POBA) below the knee could show a significant superiority concerning late lumen loss, patency and target lesion revascularization (TLR) but the definition of the above mentioned endpoints represents the weakpoints of these trials and registries. Additionally, in the DES trials only focal lesions have been treated. The DESTINY trial (85% vs. 54% (p> 0.0001)) as well as the ACCHILES trial (19.4% vs. 41.9% (p=0.006)) did show a significant superiority of the DES compared to BMS concerning the study endpoints. The DEBATE-BTK and the In.Pact BTK registry (lesion length up to 18 cm representing more the “real world” findings in patients with diabetes and CLI) included longer lesions and showed promising results concerning patency and TLR. Being not sufficiently powered none of the trials or registry could reveal a advantage with regards of limb salvage and mortality. Further trials are pending (PICCOLO trial).

**Key words:** drug eluting technologies, DEB, preventive intervention, cost effectiveness

**DISCUSSION**
DET offer significant advantages concerning patency and target lesion revascularization for patients with critical limb ischemia, diabetes and renal failure. Umb salvage and mor- tality benefits cannot be evaluated, yet. The higher costs of these treatment options have to be discussed especially in healthcare systems with the need for strict cost containment. The need for early re-intervention in POBA or BMS treatment accounts for higher costs which might argue for DET with a significant decrease of redo interventions. In regard of the available data from the various registries and trials a liberal use of drug eluting stents or balloons in the tibial vessels remains questionable. Trial results are produced mainly by experienced centers and do not reflect the real world situation. The additional question whether re-do intervention in restenotic lesions after ulcer healing or preventive intervention in diabetics with functional limb ischemia is feasible and cost effective remains unanswered. Further trials are mandatory to evaluate the beneficial effect of DET in different health care environments.

**References**

**INTRODUCTION**
The association of vascular and endovascular procedures (Hybrid procedure) in patients with chronic arterial obstruc- tive disease of the lower limbs, offers the possibility of a single treatment for multilevel lesions, which in the past were treated by traditional invasive surgical procedures performed at different times. This approach provides better results patency and reduces the risk of open surgery.

**MATERIALS AND METHODS**
From January 2003 to January 2012, 111 patients (91 males and 20 females), with severe limb ischemia (SII) underwent combined treatment of open and endovascular surgery. In 77 patients (69.4%) femoro-distal bypass, above or below-knee, was performed after PTA/stenting of the iliac arteries (group 1) and in the other 34 patients (30.6%) endovascu- lar procedures were performed on the tibial vessels after a below-knee femoropopliteal bypass (group 2). In the group 1 PTA + stenting was carried out at the level of the common iliac artery in 41 patients (53.3%); of external iliac artery in 13 patients (16.9%) and of both arteries in 23 cases (29.8%). In this group 56 femoropopliteal below-knee bypasses were performed (72.7%), 18 femoropopliteal above-knee (23.4%), 2 femoropopliteal above-knee bypasses with a jump on the posterior tibial (2.6%), and 1 femoro-pediatrica bypass (1.3%). In the group 2 the below-knee femoropopliteal bypasses were followed by a PTA of the tibial vessels in 27 cases (79.4%) and a tibial primary stenting in 7 (20.6%). The autologous saphene- nous vein in situ or reversed was employed in 75 patients (67.6%), a Teflon reinforced ePTFE in 32 cases (28.8%), and a small saphenous vein in situ or reversed was employed in 75 patients (67.6%), a Teflon reinforced ePTFE in 32 cases (28.8%), and a biological Omniflow type I prosthesis in 4 cases (3.2%). During the follow-up, ranging from 12 to 60 months, all patients were followed by colour duplex scanning; TC angiography or an- giography was reserved only for cases with complications.

**RESULTS**
Six patients died due to myocardial infarction (5 – 4.5%) and colon neoplasia (1 – 0.9%) and 7 were lost during the follow- up. The occlusion of bypass occurred in 21 patients in the group 1 (21/71 – 29.6%) and in 15 of the group 2 (15/27 – 55.5%). In 22 out 36 patients with occluded bypass (61.1%) acute limb ischemia occurred and fibrinolitic treatment was carried out. In 14 of them we observed the resolution of the clinical feature and a good patency of the bypass after a redo endovascular procedure: in 6 patients, fibrinolysis was unsuccessful, and in the last 2 patients an open surgical revisi- on was needed. An amputation of a leg was performed in 5 cases (5/22 – 22.7%). In the remaining 14 patients the medical therapy was carried out and in 3 of them a major amputation was needed. However primary patency was 63.3% and secondary patency 79.6%.

**CONCLUSIONS**
The hybrid procedures for multilevel arterial lesions of the lower limbs is effective, offering a less invasive treatment and a good long-term results. A review of the international liter- ature has not yet led to the standardization of protocols for those procedures 1-3 so that this choice is still restricted to the subjective experience of the surgeon. A careful selection of patients is needed, as well as a rigorous and accurate tech- nique, but further evaluations are still necessary.

**References**
Diabetic foot & BTK disease: Case reports and recorded video cases

Recanalization of occluded BTK vessels crossing stentstruts: a case report

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With an increasing number of patients presenting with diabetes and impaired renal function vascular occlusive diseases more often involves the distal vessel segments. When syndromal or non-syndromal vasculopathies or coagulation disorders are also present this multiples the risk of limb loss ischemia. Surgery offers durable solutions for critical limb ischemia but only when feasible vein material is available.

We report a case of a 45 year old patient with the history of diabetes mellitus, normal weight, impaired renal function, arrhythmias and venous surgery on both limbs for varicose veins now presenting with a forefoot infection and PAD Rutherford V. The angiographic result showed an advanced disease with occlusion of the posterior tibial artery, distal occlusion of the peroneal and proximal occlusion of the tibial anterior artery being on effective anticoagulation. The proximal vessels were patent with no significant stenosis.

The questions to be discussed are whether to use bypass surgery with ePTFE or patch work venous bypass or an endovascular approach as first line option. Whether to decide for reconstruction of a single vessel for straight inflow to the foot or to maximize inflow by complex and more costly reconstruction of vessel bifurcations. In this case PTA resulted in dissection and local thrombosis with the need for thrombolysis and stenting, if necessary. Endovascular therapy can be aggressively used until surgical bail out options are not precluded.

Unimpaired inflow to the foot is an independent risk factor for limb salvage as well as patency and durability of surgical and endovascular solutions especially in patients with diabetes and critical limb ischemia, which have a high risk of limb loss independent from age. Amputation at any level is accompanied with an increase of mortality and further amputation. In consideration of the individual risk and costs for treatment and limb loss it is justified to maximize the efforts to restore inflow by any option including local thrombolysis and stenting, if necessary. Endovascular therapy can be aggressively used until surgical bail out options are not precluded.

Figure 1: shows the necrotic right forefoot of a patient with PAD and diabetes.

Japan session: Japanese techniques for CTO recanalization

State of the art knuckle wire technique

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Recanalization of chronic total occlusions (CTOs) is still challenging in peripheral artery disease. In general, the successful recanalization rate of iliac occlusion is 80-85% and 81-94% for femoropopliteal occlusion. However, the success rate of popliteal occlusion is much lower than iliac and femoropopliteal arteries. In order to achieve the initial success, the safe recanalization method is required without complications, such as vessel rupture and perforation. To facilitate successful re-entry, knuckle wire technique by guidewire with j-shaped loop can be very effective for subintimal recanalization. This session introduces the subintimal approach using a 0.035 inch J tip Glidewire (Terumo) in popliteal CTOs.
Japan session: Japanese techniques for CTO recanalization

Various distal punctures including plantar puncture

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When we perform an endovascular treatment of infrapopliteal lesion, distal puncture is one of the procedures which need to be mastered by all means. Complicated cases are sometimes hard to accomplish by antegrade approach only. If the bi-directional approach is completed by a distal puncture, the success rate will go up markedly. In general, a dorsalis pedis artery, the distal portion of an anterior tibial artery or a posterior tibial artery are chosen in many cases for puncture site because of the ease of procedure, and the less likelihood of complications. When those parts are not suitable as punctures site, the proximal part of an anterior tibial artery and peroneal artery are used. Recently, the plantar artery, the metatarsal artery and the plantar arch may also be chosen for puncture sites. However, using these sites can have some serious complications such as compartment syndrome and are not always easy to puncture. In some cases, however, there is no other choice in order to save the legs, they are one of the essential techniques in complicated cases.

Japan session: Japanese techniques for CTO recanalization

Wire Rendez-vous technique

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In recent years, Endovascular therapy (EVT) had been widely spread as a therapeutic strategy of revascularization for peripheral artery disease. In daily practice, we sometimes experienced many complex EVT in which contained long chronic total occlusion (CTO). Guidewire passage for long CTO was challenging. The most important procedure for crossing to long CTO was “bi-directional wiring”. When we established the situation “bi-directional wiring”, our procedure was in a fair way to success. There are many options for success the procedure, such as kissing wire technique, controlled antegrade and retrograde subintimal tracking (CART) technique. I thought the most fantastic technique was a “Wire rendez-vous”. In Japan, many interventional cardiologists challenged such an impressive procedure. Wire rendez-vous technique was defined as “guidewire insertion to opposite site microcatheter intentionally”. This technique seemed to be very tricky, but it didn’t truly understand. When we performed to “Wire rendezvous” inside of the CTO body, there was no escaped space for guidewire and microcatheter. The guidewire easily advanced, as it had been absorbed into opposite site microcatheter. As a result of this impressive success, the guidewire reached opposite site true lumen automatically. When we challenged this technique, we should find the “rendezvous point”. Rendez-vous point was the best location for achieving the rendez-vous, in almost case, rendez-vous point equaled closest point guidewire to opposite site microcatheter in two fluoroscopic directions. If you could feel the microcatheter with tip of your guidewire, here was the rendez-vous point and you got the big chance for achieving the wire rendez-vous. Wire rendez-vous technique had a great utility for guidewire passage of CTO lesion. When you achieved a mastery of this fantastic procedure, there was a great possibility to have been change your EVT strategy.

Figure 1: Schema of Wire Rendez-vous

Figure 2: Fluoroscopic image of the successful case of «wire rendez-vous». Wire rendez-vous defined as «guidewire insertion to opposite site microcatheter intentionally»
ABSTRACTS

MEET – SICVE Session

Fenestrated Anaconda stent graft. A step forward in making easier the juxtarenal AAA treatment

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INTRODUCTION
Up to now widespread use of Fenestrated EVAR (FEVAR) in the treatment of juxtarenal aneurysms is limited. Authors present their preliminary experience with Fenestrated AnacondaTM stent graft (Vascutek, Inchinnan, UK) characterized by features that broaden anatomical applicability and reduce technical difficulty.

CLINICAL CASE
A Caucasian 85-yr-old man, with multiple comorbidities, presented at our institution because an iuxtarenal 6 cm AAA accidentally shown by an abdominal duplex scan. The enhanced abdominal-CT showed a 26 mm infrarenal aortic neck diameter. It was delivered a 30 mm fenestrated endograft for both renal arteries whereas the origin of superior mesenteric artery was served by anterior scallop. An Advanta 6x28 covered stent was put in the left renal artery. On the contrary, after 45 minutes of attempts and a total amount of 300 ml of contrast medium, we couldn’t engage the right renal artery despite several trans femoral and brachial approaches. So we gave-up, leaving a leak type 2 from the right renal fenestration, and we completed the procedure with a bifurcated endograft and renal stents, without any leak.

CONCLUSION
The repositionable Anaconda fenestrated main body graft, without a top cap allows visceral arteries engaging from top down with accurate alignment of the fenestrations with target vessel ostia. Delayed follow-through second step of the procedure can be safely performed allowing the best clinical and procedural conditions.

Part 1: New devices for aorta

Do we need new devices? Clinical outcome of new generation grafts. An update from the engage registry

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PURPOSE
The rapid extension of EVAR technology has been complemented by improved access to a new-generation device. To detect improvement of this technology, long-term follow-up is required. Given that the existing published randomized trials show results of the old device generation, an analysis of the Engage Registry (Endurant Stent Graft Natural Selection Global Postmarket Registry) and a comparison with the previous generation devices, might be helpful to put current early results in perspective.

MATERIAL AND METHODS
From March 2009 to April 2011, 1262 AAA patients (89.6% men; mean age 73.1 years, range 43-93 years) were enrolled from 80 sites in 30 countries and treated with Endurant endograft. Results are described following the reporting standards for EVAR. Follow-up data were collected for all 1262 patients at a 30-day and 1-year follow-up and for the first 500 patients at a 2-year follow-up.

RESULTS
Intra-operative technical success was achieved in 99.0% of cases. Within 30 days, adverse events were reported in 3.9% of patients, including a 1.3% mortality rate. Type-I or eIII endoleaks were identified in 1.5% of cases. Estimated overall survival, aneurysm-related survival and freedom from secondary interventions at 2-year were 86.4%, 98.1% and 93%, respectively. At 2-year, aneurysm size increased >=5 mm in 2.4% and decreased >=5 mm in 56.1% of cases.

CONCLUSIONS
This exploration in the real-world global experience shows promising results and indicate that Endurant endograft is safe and effective across different geographies and standards of practice. The use of new technology appears to have better technical and clinical outcome compare to the previous generation device; however, longer-term follow-up data are necessary to assess the durability of these results.
Part 1: New devices for aorta
The Dutch experience with the AFX device

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One of the drawbacks of the current generation modular endografts is the risk for limb occlusion, especially in patients with a small aortic bifurcation (<20 mm) or stenotic and calcified iliac arteries. The AFX endograft, which separates fixation from seal, has been designed to be used in small aortic bifurcations and challenging access arteries. The unibody of the endograft is sitting on the aortic bifurcation and only the main body of this device is at the aortic bifurcation. The limbs of the endograft are in the common iliac arteries and not competing in the aorta itself. One of the features of this device is to avoid the risk of limb occlusion.

A prospective, multi center study was performed in three Dutch hospitals (St.Antonius Hospital Nieuwegein, Rijnstate Hospital Arnhem, and St.Elisabeth Hospital Tilburg) to evaluate the results of the AFX endograft for elective EVAR. Inclusion started from Jan 2012 and all data were prospectively gathered. Post-EVAR follow-up was performed at 1, and 12 months including CT scans. During the study period, 82 patients have been treated (mean age 74 years, mean diameter of the AAA 59 mm). Twenty eight patients (34%) had an aortic bifurcation <20 mm, and 21 patients (25%) had an aortic bifurcation <16 mm. The smallest aortic bifurcation was 12 mm. Initial technical success was 100%, mean operation time 95 minutes. During follow-up no type I endoleak was seen, whereas 1 patient suffered from a type III endoleak at the connection zone between the unibody and proximal cuff. Additional ballooning solved this type III endoleak. Nine patients (11%) had a type II endoleak, but none of them had progression of the native aortic diameter. One limb occlusion (1.2%) occurred during follow-up, which was successfully treated with PTA. So far, the results of the AFX endograft are very encouraging in patients with challenging (distal) aortic anatomy. Taking into account the small aortic bifurcation in 34% of patients limb obstruction rate was very low. Long-term data are eagerly awaited.

Part 1: New devices for aorta
First Italian experience with the fortevo endograft

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PURPOSE
Proximal migration of the stent is frequent cause of failure of endovascular treatment of abdominal aortic aneurysms (EVAR) during follow-up. The Fortevo Aplus system presents an innovative method for proximal fixation with independent endostaplers (FPESI). The aim of our study was to evaluate the feasibility and short-term efficacy of EVAR with FPESI.

METHODS
From 01/01/11 to 01/04/2012 of 137 patients with indication for treatment of an abdominal aortic aneurysm (AAA), 102 were candidates for EVAR, of these, after approval by the local ethics committee, 17 were evaluated to perform a EVAR with FPESI. This procedure is in addition to the release of an endovascular catheter-grid application guidance of a minimum of 4 microanchors (4 x 3mm) to ensure an across the wall fixation of the proximal portion of the prosthesis to the aortic wall. Primary outcomes of the study were: the technical success (defined as the completion of the release and FPESI) and freedom from reoperation at 1 month. Secondary outcomes: the rate of migration and embolic and hemorrhagic complications due to FPESI to 1 month.

RESULTS
5 patients were considered candidates for EVAR with FPESI and entered into a prospective registry. All operations were performed under regional anesthesia with surgical femoral access. Were placed 4.8 microanchors (range 4-6) per patient. Technical success and freedom from reoperation at 1 month were 100%. At one month has not been detected to control TC no migration of type I endoleaks.

CONCLUSIONS
The application of FPESI in patients with AAA appears in our experience is safe and practicable. Longer-term data will clarify the effectiveness of the system. The use of new anchoring systems may expand the eligible patients to EVAR increasing the long-term efficacy and reducing the need for reoperation.
Part 1: New devices for aorta
The Ventana endografts

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Fenestrated Pre-Loaded Endograft System for Managing Supra-Para-Juxta-Renal Aneurysms: The Ventana System

Historical management of juxta-para-supra-renal aneurysms has been through open surgery. The results have proven durable but have been associated with significant mortality and morbidity including reported incidence of post-operative renal dysfunction ranging from 10% - 22%. Endovascular repair of these aneurysms has been suggested as an alternative to open surgical repair but it has been an “off-label” use of endografts and has been associated with Type 1 endoleaks; significant secondary intervention rates; increased risk of rupture and 30-day mortality as reported by Antoniou, et al in 2012.

Fenestrated EVAR has been felt to be appropriate for extending the EVAR technique to treat para- and juxta-renal aneurysms. These devices expand the seal zone to the infrarenal neck and include renal arteries. Currently, two manufacturers produce fenestrated devices for the treatment of juxta-para-supra-renal aneurysms – Endologix and Cook. The Cook device is custom made and requires a 6-12 week fabrication lead time. The Endologix device, the Ventana Fenestrated System, is an “off-the-shelf” device with moveable fenestrations and pre-loaded guide catheters to facilitate renal artery cannulation. The intricacies of the Ventana System are shown in a series of cartoons and actual case related X-rays. The Ventana System obtained CE Mark in Europe as a result of a multinational clinical trial which involved 7 centers from around the world including – Auckland, New Zealand; Santiago, Chile; London, England; Paris, France; Indiana; Cleveland and Los Angeles in the US. 51 patients were screened and 31 met the inclusion criteria for the CE Trial. The aneurysm size averaged 6.9 ± 3.4mm and the infra SMA seal zone averaged 27 ± 11mm. The device is produced in 12 models. Only 5 of the 12 models were used for the 31 selected patients and 60% (20 patients) received the same 28mm Ventana device. There were five major adverse events at 30 days (16%); four of which were related to blood loss of > 1000cc. Compared to off-label use of infrarenal endografts and open surgical control series, the major adverse event rate at 30 days was 8.3% and 6% respectively. There was one iliac limb occlusion and one severe renal dysfunction ranging from 10% - 22%.

The US FDA IDE trial is currently in progress and has enrolled 75 of 122 patients thus far. The safety and effectiveness of the Ventana System has been satisfactorily demonstrated in the CE Trial series. Further clinical experience and long-term follow-up will be required to fully assess the durability of this device system.

INTRODUCTION
Endovascular aortic repair (EVAR) has emerged as a promising, less invasive alternative to conventional open surgery for the treatment of infrarenal abdominal aortic aneurysms (AAA). In the last 20 years, the application rate of EVAR and its clinical results have significantly improved thanks to the evolution of stent-grafts and endovascular delivery systems. However, further development is still needed to reduce the incidence of complications and secondary re-interventions. The Treovance abdominal aortic stent-graft (Bolton Medical, Barceloña, Spain) is a new-generation endovascular device, developed to increase flexibility, lower profile, improve deployment and sealing mechanisms. In particular, it is provided with some innovative features as a double layer of proximal barbs (suprarenal and infrarenal) for supplemental fixation, dual barbs between modules to avoid potential leg disconnections, detachable outer sheath provided with a new-design haemostatic valve, and a double improved mechanism (slow motion and “pin and pull”) for precise stent-graft deployment.

METHODS
A European prospective, non-randomized, multi-institutional, “first-in-human” trial (the ADVANCE trial) was conducted from March to December 2011 to assess the safety and performance of the Treovance stent-graft system before commercialization. Thirty patients with anatomically suitable non-ruptured AAAs were enrolled at five clinical sites in Italy (2 sites), Spain (2 sites), and Germany (1 site).

RESULTS
EVAR was completed successfully in all patients (30/30). The stent-graft was delivered and deployed safely even in heavily angulated or calcified anatomies. Operators’ feedback regarding device introduction into entry site, device advancement to lesion site, accuracy of stent-graft deployment, and device fluoroscopic visualization was positive in all cases. No 30-day device-related complications nor deaths were observed. A post-operative follow-up of 395 days, all-cause mortality was 10% (3/30), due to a car accident (1), pancreatic cancer (1) and myocardial infarction (1), with no instances of device-related deaths. Late graft-limb occlusion was observed in 3 patients (10%), treated by means of secondary endovascular procedures in 1 case, extra-anatomic bypass in 1 case, and conversion to open repair in 1 case. In each of these 3 cases, an anatomical factor predisposing to the risk of graft-limb occlusion was found at post-hoc CT-scan analysis, excluding issues directly related to the endovascular device. No stent-graft migration, no kinking or twisting, no stent fractures nor aortic ruptures were recorded. A total of 7 endoleaks were observed (1 type I, and 6 type II), requiring an endovascular secondary procedure in 1 case. Maximum aneurysm diameter decreased > 5 mm in 46% of cases, remained stable in 50% of cases, and increased in 4% of cases.

CONCLUSIONS
The Treovance abdominal aortic stent-graft system is a new-generation endovascular device, developed to increase flexibility, lower profile, improve deployment and sealing mechanisms. The experience with this stent-graft within the ADVANCE trial was satisfactory with regard to technical success and 1-year clinical results, even in highly angulated anatomies and through small, tortuous or calcified accesses. Anatomic constraints, such as the presence of a small and calcified aortic bifurcation or iliac stenosis, should be carefully evaluated and recognized as a risk factor for late graft-limb occlusion.
Peripheral artery aneurysms (PAA) are clinically relevant because of their high incidence of rupture. Surgical repair has historically been considered the treatment of choice. Endovascular techniques (covered stents and/or embolization) represent an effective alternative option, and are particularly useful in high surgical risk patients. However, these techniques may be unsuitable for patients with complex anatomy. Moreover, these methods may cause occlusion of parent vessels.

Recently, a new endovascular device (Multilayer Flow Modulator Cardiatis) (MFM cardiatis, Cardiatis, Ixelles, Belgium) has been introduced for the treatment of PAA. The MFM cardiatis is a bare, self-expanding, braided wire tube of metallic cobalt alloy wire constructed in multiple interconnecting layers. Spatial three-dimensional stent design of MFM cardiatis, by virtue of its geometry, slows and laminates blood flow inside the aneurysm (up to 90% reduction in flow velocity), potentiating chances of aneurysm rupture, while preserving blood flow into the collateral branches. The ability to exclude the aneurysm sac while maintaining distal perfusion and patency of side branches in a single step theoretically makes the MFM cardiatis the ideal stent for the treatment of PAA. MFM cardiatis seems to be particularly indicated in patients with complex anatomy, and when crucial structures would be sacrificed by standard endovascular treatments. However, due to the lack of evidence in the literature, nowadays MFM cardiatis appears indicated only in cases, not suitable for surgical or standard endovascular treatment.

We will present our experience with the use of MFM cardiatis in the treatment of 8 peripheral and visceral artery aneurysms (n=4 iliac aneurysms, n=2 popliteal artery aneurysms, n=2 renal artery aneurysm) and of one thoracoabdominal aneurysm.

In conclusion MFM cardiatis represent a promising new option in the treatment of PAA. However, further clinical trials are needed to confirm initial results.

References
Part 2: New devices for peripheral angioplasty
New tools and techniques for Pedal CTO

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Endovascular therapy (EVT) for critical limb ischemia (CLI) patients often requires aggressive treatment. In some CLI cases, recanalization of tibial artery and/or peroneal artery may not be enough to obtain complete wound healing mostly because of the existence of more distal disease. In those cases, EVT beyond ankle level would be necessary. Since below-the-ankle (BTA) arteries are very fine and have some tortuosity, guide wires used for these arteries should have smooth surface and superior maneuverability. We have used Cruise guide wire (0.014”, 2g tip weight with plastic jacket) (Neos, Japan) for this purpose, and it has worked quite well. So far, we have used conventional micro-catheters which are compatible for 0.014” guide wire to support the handling of guide wires. However, those micro-catheters were sometimes unable to pass through very fine and often calcified BTA arteries. In order to overcome such problem, a new micro-catheter, Prominent-BTA (Tokei Medical Product, Japan) was developed recently. Unique feature of the micro-catheter is that distal 30cm from the tip has the same diameter 1.6F without tapering. The performance of this micro-catheter is superb, and it easily passes through very fine BTA arteries in most cases.

In this presentation, I would like to overview the usefulness of Prominent-BTA on several CLI cases, and also introduce wiring techniques to obtain successful results in very complex cases.

Part 2: New devices for peripheral angioplasty
Drug eluting balloons: the solution for tibial recanalization

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The restenosis rate after plain old balloon angioplasty is very high. This is especially true for long and diffuse lesions which reflect the main cohort of patients. In those lesions the restenosis rate might exceed 50% after the 3-6 months period. Bare metal stents might be useful in below the knee arterial interventions – nevertheless unlike in the superficial femoral artery different trials did not show any superior patency rates followed by stent administration. DEBs can reduce neointimal proliferation also in below the knee arteries. Schmidt et al. showed much better patency rates in long lesions with a mean lesion length of 17 cm compared to a historic control. In addition in the DEBELBUM trial the authors could show a significant effect of DEBs compared the uncoated balloons both in the superficial femoral artery and below the knee. In contrast to the reduced restenosis rates the limb salvage rate was also very high in the patients who received uncoated balloons. Therefore it is currently uncertain how the clinical effect of DEBs in CLI patients should be defined. Several prospective trials are under the way investigating these issues. The biggest ongoing trial is the In.Pact deep trial in which more than 300 patients where randomized either to receive an uncoated or a coated balloon. The results will be available in 2014.
Part 2: New devices for peripheral angioplasty
Are the aterectomy devices useful for tibial CTO

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The author has an active practice in below knee recanalisation and angioplasty but must confess to not having used atherectomy devices in this anatomy. The presentation will be based on a review of the literature to see if the available evidence is sufficient to justify using this technology and also to assess if the economic arguments have been made which will allow funding of these devices to be uncomplicated.

Part 2: New devices for peripheral angioplasty
State of the art EVT techniques for CLI patients

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The Endovascular treatment has a high success rate, almost 100%, in the iliac and femoropopliteal lesions even in situations where there is no approved reentry devices or new devices in Japan. On the other hand, below the knee, especially below the ankle intervention sometimes remains challenging. One possible reason may be that Japan is known as the kingdom of hemodialysis, the vessel conditions in CLI patients are very poor such as long chronic total occlusion with severe calcification, below the ankle disease and so on. The key to a successful procedure is how we can cross the wire well, and the most important thing is to establish “a bidirectional approach” for such lesions. In order to establish the bidirectional approach, we have to consider transcollateral approach, transpedal arch approach, distal puncture, etc., however all procedures require a highly developed technique. Moreover, after establishing bidirectional approach, I think it is important to cross a wire to the true lumen safely and certainly using a wire rendezvous technique. It can be possible to acquire a high success rate by making full use of these techniques even in the tough CLI cases.
Parallel symposium: Radial approach for peripheral angioplasty
Aorto iliac diseases

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Percutaneous interventions of the coronary and peripheral vessels have historically been performed using a femoral artery approach. There has been increasing recognition of post-procedural bleeding complications and its impact on short- and long-term mortality. Because of its now recognized safety, the transradial approach has recently emerged as a preferred method compared to the transfemoral approach. The limitations associated with the distance from the puncture site to the lesion location are being addressed as new tools are developed for the endovascular treatment of peripheral arterial disease. The radial approach is ideal for renal interventions because of the cranio-caudal course of renal arteries after their origin in the aorta, especially in cases of calcified renal or iliac vessels with marked iliac tortuosity. Technically, the left radial approach should be preferred because of the shorter length and reduced need for catheter manipulation. Longer guiding catheters (>120 cm) are available. Mesenteric and celiac angioplasty are also feasible via the radial route, while aorto-iliac and iliac lesions are associated with lower complication rates via transradial access. In cases of absent femoral pulses, severe bilateral iliac artery disease, obesity or conditions prohibiting prolonged supine rest, the proximal superficial femoral artery also can be treated via radial access with very long guiding catheters (>120 cm). Radial access in peripheral interventions appears safe and feasible in carefully selected cases and is likely to carry the same reduction in access-site complications as in coronary interventions. However, developing new access-site specific equipment is strongly encouraged to maximize applicability, feasibility and outcomes.
Acute aortic thrombosis (AAT) presenting as an isolated acute onset of paraplegia is rare (2-5%). It is an uncommon vascular emergency, requiring prompt diagnosis and management to reduce morbidity and mortality.

We report three patients with AAT who presented with sudden onset of paraplegia.

A 25-year-old man with a history of endovascular exclusion of a traumatic, contained rupture of the descending thoracic aorta (DTA), presented 7 months later with sudden bilateral weakness of the lower limbs, rapidly evolving to paraplegia. Duplex ultrasound and CTA confirmed the diagnosis of an AAT of the infrarenal aorta, caused by a traumatic aortic dissection. Emergency surgery restored lower-extremity perfusion (aortic tube graft replacement) and the patient recovered uneventful.

A 32-year-old female was admitted to our hospital a few hours after a traffic accident with motor function loss of both lower limbs. On admission she was in agony due to bilateral limb ischemia. Duplex ultrasound and CTA confirmed the diagnosis of an AAT of the infrarenal aorta, caused by a traumatic aortic dissection. Emergency surgery restored lower-extremity perfusion (aortic tube graft replacement) and the patient recovered uneventful.

Although isolated paraplegia is a rare initial sign of AAT, it is life threatening and requires prompt recognition and immediate treatment to improve neurologic recovery and reduce morbidity and mortality in these patients.
EVAR stent migration
A single-centre retrospective analysis

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BACKGROUND
Stent migration following endovascular aneurysm repair (EVAR) is related to complications including endoleak. Society for Vascular Surgery (SVS) standards define migration as >10mm, but data regarding incidence of migration, particularly below this cut-off is sparse. The aim of this study was to investigate migration of EVAR stents post-procedure and variation with time and aneurysm diameter.

METHODS
CT scans of patients who underwent a single EVAR at our district general hospital between 1st March 2006 and 30th September 2011 were retrospectively studied. Patients with EVAR to post-EVAR CT scan interval <365 days and post-EVAR CT to most recent CT scan interval >300 days were included. Maximum anteroposterior (AP) diameter of aneurysm was measured on pre-EVAR CT scan. Post-EVAR and most recent CT scans were examined for proximal stent migration (defined as change in distance from superior mesenteric artery (SMA) to top of bare metal stent) and distal stent migration of both limbs (defined as change in distance from bottom of stent to a fixed anatomical point).

RESULTS
76 patients were studied. Mean proximal caudal migration was 1.55mm (95% CI = 0.70–2.40mm). Mean distal caudal migration was 0.64mm for the right limb (95% CI = -0.27–1.55mm) and 0.03mm for the left limb (95% CI = -1.22–1.28mm). There was one case of migration by >10mm (18.4mm caudally). There was no correlation between proximal migration and either AP diameter of the AAA (Pearson’s Product-Moment Correlation Coefficient (PPMCC) = 0.12) or interval between post-EVAR CT scan and most recent CT scan (PPMCC = 0.10).

CONCLUSIONS
Change in distance of SMA to bare metal stent is a reliable indicator of stent migration. Average stent migration is small and migration by >10mm is rare. There is no relationship between scan interval and stent migration, indicating it is likely an initial rather than progressive event.

Acute aortic syndrome: Current management strategies in a tertiary referral centre

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BACKGROUND
Acute aortic syndrome (AAS), referring collectively to penetrating aortic ulcer (PAU), intramural haematoma (IMH) and aortic dissection, can be catastrophic. Treatment options range from best medical therapy, endovascular therapy, to open surgery. We describe the treatment modalities and outcomes in four cases treated in our unit in the last six months.

METHODS
Retrospective review of patients with AAS over six months period were identified. Radiographic and biochemical investigations undertaken to differentiate each pathology were reviewed. Operative and non-operative management strategies, with consequent outcome were evaluated.

RESULTS
Four patients were identified. All patients were between 55 to 75 years old, all presented with severe, migratory chest pain and underwent CT angiography. All patients required intravenous antihypertensive medication to achieve satisfactory blood pressure control. Further investigations to identify vasculitic, infectious and thrombophilic pathology were undertaken. None had any identifiable inflammatory or infectious pathology. Two patients were managed conservatively with good outcomes. Two patients continued to progress and within two months required surgery. One patient underwent thoracic endovascular repair; and one patient required open type II thoraco-abdominal aortic aneurysm repair. Good outcomes were achieved in both patients.

CONCLUSIONS
Physicians should be aware of this pathology and refer promptly to the Vascular surgeons as progression of disease is unpredictable. Although presenting similarly, the management differs for each pathology and should be tailored to symptoms and disease progression on imaging.
Supraceliac balloon control of the aorta during endovascular repair of ruptured abdominal aortic aneurysms: a systematic review and meta-analysis

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OBJECTIVE
The use of aortic occlusion balloon (AOB) has been proposed as a means of providing quick and effective control of the proximal aorta and facilitating endovascular repair of ruptured abdominal aortic aneurysms (RAAAs) in hemodynamically unstable patients. We aimed to summarize the world experience with the use of AOB during endovascular repair of RAAAs.

METHODS
A systematic review and meta-analysis of the English language literature was undertaken through to February 2013. Articles reporting data on outcome after endovascular repair of RAAAs were identified and information regarding the use of AOB was sought.

RESULTS
A total of 39 eligible studies (1277 patients) were included. The pooled peri-operative mortality was 22.9% (95% CI 19.5-26.5%). In addition, 23.2% (12.4-26.3%) of patients had been operated upon under local anesthesia, 56.8% (41.5-71.5%) received bifurcated endografts, 29.5% (23.3-36.1%) were considered hemodynamically unstable, and 7.5% (4.8-10.7%) developed abdominal compartment syndrome post-operatively. A total of 200 patients required balloon occlusion with an estimated pooled proportion of 11.4% (7.3-16.4%). There was significant within-study heterogeneity (Cochran Q statistic 230.0; df=38; P < 0.0001), but no publication bias (Egger bias 0.843; P=0.534).

CONCLUSION
In this collective series, roughly one in ten patients required AOB. Including this step in the algorithm for treating unstable RAAA patients with endovascular repair may improve the results. However, larger studies are needed to clarify this issue.

Ruptured abdominal aortic aneurysm after previous endovascular repair: treatment with complete endograft preservation and external banding of the proximal neck

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OBJECTIVE
Rupture of an abdominal aortic aneurysm (AAA) after previous endovascular repair (ER) represents the Achilles’ heel of the procedure. When this occurs, open surgery becomes even more challenging as it may require endograft explantation. We describe the successful treatment of a ruptured AAA after previous ER with complete endograft preservation and aortic banding.

METHODS & RESULTS
A 72-year-old male presented in extremis with abdominal and back pain. Nine months earlier, he had undergone ER of an AAA with a bifurcated ENDURANT (MEDTRONIC) endograft at another institution. The patient did not attend any follow-up imaging post-operatively. On this occasion, an urgent CT scan revealed a ruptured AAA and a type Ia endoleak. He was immediately taken for a laparotomy and proximal control was achieved by clamping both the aorta and the endograft main body just below the renal arteries. The sac was opened and there were no back bleeding lumbar arteries. On gradual release of the clamp, there was bleeding from between the posterior left aortic wall and the endograft body, confirming the presence of the type Ia endoleak. The endograft was fixed to the proximal neck along the anterior and lateral sides with interrupted 2/0 Nylon sutures in a fashion similar to the construction of a conventional proximal aortic anastomosis. The repair was also completed by external wrapping of the infrarenal neck to eliminate the proximal endoleak and the sac was closed as for open repair. He had a slow but uneventful recovery and was discharged home the 14th post-operative day.

CONCLUSION
Rupture AAA after a previous ER due to a proximal endoleak may be successfully treated with proximal suturing and aortic banding. Endograft preservation minimizes the magnitude of the procedure and may reduce mortality and morbidity.
Impact of Endovascular Thoracoabdominal Aortic Aneurysm Repair on Crawford Classification: Does it Alter Mortality or Paraplegia Incidence?

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INTRODUCTION
Endovascular pararenal (PR) or thoracoabdominal aortic aneurysm (TAAA) repair excludes more aortic length than open repair. This study determines the frequency of postoperative Crawford class change (upstaging) and assesses the impact on mortality and paraplegia.

METHODS
113 patients [mean age 73±8 years, 31 (27%) women, mean aneurysm diameter 67±10 mm, 53 (47%) with prior aortic procedures] underwent multi-branched endovascular PR/TAAA repair in a prospective, single-center study. Anatomic Crawford class was determined from pre-repair CTA (length of PR/TAAA). Effective Crawford class was determined from post-repair CTA (length of prosthetic/relined aorta).

RESULTS
Anatomic Crawford class was I—2, II—23, III—25, IV—31 and PR—32. Post-repair, mean length of prosthetic/relined aorta was 72±17% of the left SCA-to-bifurcation distance, resulting in higher Crawford class (upstaging) in 56 patients (50%), 43 by one, 11 by two and 2 by three Crawford classes. 81% of PR aneurysms became Type IV (N=17), Type III (N=7) or Type II (N=2). 55% of Type IV aneurysms became Type II (N=13) or Type II (N=4). 48% of Type III aneurysms became Type II (N=11). Two Type I TAAA became Type II. The resulting post-repair Effective Crawford class became II—42, III—35, IV—32 and PR—4.

There were 5 perioperative (4.4%), and 5 (4.4%) late-related deaths, 4 with Crawford upstaging and 6 without. Six patients (5.3%) were permanently paralyzed—3 without Crawford upstaging; 3 upstaged from PR to Type III (N=1) or Type III to Type II (N=2). Overall 97 patients (86%) were treated without major adverse outcome (death, paralysis, dialysis, aneurysm rupture).

CONCLUSIONS
Multi-branched endovascular PR/TAAA repair resulted in Crawford class upstaging in over half of treated patients. The change in Crawford class did not increase the risk of death or paralysis, particularly important for patients with PR and Type IV TAAA.

Severe proximal aneurysm neck angulation: early results using the aorfix stent-graft system

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PURPOSE
To evaluate early results of an Aorfix stent-graft for the treatment of patients with infrarenal aortic aneurysms (AAA) with severe neck angulation.

METHODS
Between May 2007 and May 2012, 119 patients with AAA were examined. Nineteen pts (12 men and 7 women, mean age 69.5±5.4 years) had proximal neck angulation between 60º and 90º (mean 74.6º±15.5º). They were selected for endovascular repair with Aorfix bifurcated stent-graft. Outcomes were primary technical success, 30 day and short term (30 days-6 months) clinical success and other patient morbidity at 30 days.

RESULTS
Initial technical success was 94.7% (n = 18). One stent deployed too low and required an unplanned proximal extension. Intra-operatively 3 patients initially had type I endoleaks, but all were resolved by balloononing. 30 day clinical success was 100%: there were no type I or type III endoleaks observed, and no reports of graft thrombosis or migration. No aneurysm-related interventions were required during follow-up. At 6 months in all patients control CT scan and duplex ultrasound showed excluded aneurysms with no endoleaks. No patient has died due to aneurysm rupture or required removal of the endograft.

CONCLUSION
Aorfix currently offers early results, which are at least as good as other modern stent-grafts. It has given satisfactory results with highly angulated proximal necks and may improve the treatment outlook for these patients.
Late complications after treatment of AAA with Vanguard endoprosthesis

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A 68-year-old patient presented in 1998 with an infrarenal AAA of 5.6 cm, and a small thoracoabdominal aneurysm. The AAA was treated with a Vanguard endograft. The immediate postoperative follow-up was uneventful. Follow-up consisted of CT-scan and X-ray every 6 months and later on yearly. Six months after the intervention, a type II endoleak was discovered on CT-scan, but angiography could not demonstrate its origin. It resolved spontaneously after 1 year.

In 2005, a progressive increase of the thoracoabdominal aneurysm to 5.5 cm was noticed, which reached 6.5 cm in 2007. The patient preferred a conservative approach since she had reached the age of 75 years at that time, and a hybrid procedure would have been associated with a high morbidity.

In 2011 the patient was admitted with fever and vague complaints on the internal ward. A CT-scan revealed a contained rupture of 10 cm diameter between the thoracoabdominal aneurysm and the treated AAA. There was a complete disintegration of the top stent of the endograft. Two units of PC were given, and the patient was discharged after 1 week since she had remained stable over time. More than one year later, in November 2012, she was again admitted because of exhaustion. CT revealed an increase of the contained rupture of 16 cm diameter. Two units of PC were administered, and repeated in December. Again, the patient refused surgical treatment.

In April 2013, the patient was still doing well, and no controls were scheduled. A review of the literature confirms the high complication rate after Vanguard implantation. The findings in this case report demonstrate that of lifelong follow-up with X-ray and CT-scan is warranted in patients treated with Vanguard endografts, as complications can occur after more than 13 years. This case also illustrates that a patient can survive with a contained posterior rupture for 24 months.

Treatment of enlarging aneurysms post-EVAR without clamping of the aorta

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Three cases of aneurysmal sac growth post-bifurcated EVAR (Excluder, W.L. Gore 2005 and 2009 Zenith, Cook, 2000) have been treated in the last year. Completion angiogram and postoperative CTA noted type II endoleaks that were initially regarded as ‘benign’.

However, post-EVAR the aneurysmal sac continued to enlarge with patent type II endoleaks. The IMA and lumbar branches were successfully coiled in two cases. Nonetheless, the aneurysms continued to enlarge (diameters: 79, 90, 107 mm) and ultimately warranted an open intervention proceeded by an on-table angiogram. Conversion was not an option due to comorbidities.

In the first case (Gore 2009), 4 years post-EVAR, an angiography revealed multiple type II endoleaks despite previous coiling. The aneurysmal sac was opened and the branches were oversewn followed by a plicature of the aneurysmal sac. Banding of the proximal neck was also performed although no type I endoleak was shown.

In the second case (Cook 2000) an initial proximal banding was carried out followed by opening of the aneurysmal sac.
Direct puncture of the deep femoral artery to treat occlusion from external iliac artery to peroneal artery in the patient with critical limb ischemia

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An 87-year-old female presented with her right leg pain at rest more than 3 months before. Her clinical stage of PAD was Fontaine grade 3 and Rutherford grade 4. The CT angiography showed a total occlusion from right external iliac artery (EIA) to peroneal artery, and a patency of right internal iliac artery and deep femoral artery.

Our original strategy of endovascular intervention was to reopen the CTO segment from external artery to deep femoral artery to solve her pain at rest. A 6Fr sheathless guiding catheter was inserted through her left common femoral artery and advanced to right common iliac artery and deep femoral artery. The self-expanding stent was deployed at the right iliac artery, and subsequent balloon dilatation was done from the implanted stent iliac stent to DFA. We succeeded in performing the initial strategy, however the angiogram showed suboptimal flow below the CFA, because of the occlusion of the internal iliac artery (it was the main donor artery of collateral channels). Thus we had to add second revascularization therapy from SFA to peroneal artery. The 0.018 guide wire could manage to cross against CTO segment distal peroneal artery. The self-expanding stents were deployed from popliteal artery to the EIA. We finally succeeded in making one straight line to her right foot. After the endovascular therapy, her right leg pain at rest disappeared.

Direct puncture of the deep femoral artery was effective in understanding distribution of the collateral artery. The tractability of the guide wire, 2) enough back up force for advancing to occlusive lumen, 3) Device delivery from both access site. We make a great suggestion for new approach facilitates the achievement of success the collateral channel tracking success was 92.3% (12/13, one case easily?). One (6Fr) is inserted to the CFA to SFA, and the other (4Fr) is inserted to CFA to DFA (See Figure). We can manipulate the antegrade and retrograde guide wire in completely independent system. It provide us these benefit: 1) good tractability of the guidewire, 2) enough back up force for advancing to occlusive lumen, 3) Device delivery from both approach site.

In Sep. 2011 to Feb. 2013, we performed consecutive 13 cases SFA CTO, had well-developed collateral channel candidate for TCA. All procedure was performed with this new access. Procedural success was 100% (13/13), collateral channel tracking success was 92.3% (12/13, one case change the strategy to distal SFA puncture because minor dissection of the collateral channel). There was no major complication related procedure. We propose this extreme, new approach facilitates the achievement of success the collateral channel tracking and procedure for SFA CTO.

An extreme access for chronic total occlusive superficial femoral arteries – How to perform the trans-collateral angioplasty more easily?

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Endovascular therapy (EVT) for long chronic total occlusion (CTO) of superficial femoral artery (SFA) is challenging. The guidewire passage of long occlusive lumen is very difficult. Sometimes we cannot success the guidewire passage with only antegrade approach. In such cases, we have to perform bi-directional (antegrade and retrograde) wiring. There are many methods for retrograde approach, for example, popliteal puncture, distal SFA direct puncture and tibial puncture. The most challenging retrograde approach is “trans-collateral approach (TCA)”. TCA include some problems. In crossover approach from contralateral common femoral artery (CFA), the tractability of the guidewire is too bad for collateral channel tracking (it needs gently procedure). In ipsilateral antegrade approach, it contains a great risk of puncture site hematoma due to accidental removal of the access site sheath. We make a great suggestion for solving these problems. When we perform the TCA for SFA CTO, we insertion two another sheaths ipsilateral antegradely. One (6Fr) is inserted to the CFA to SFA, and the other (4Fr) is inserted to CFA to DFA (See Figure). We can manipulate the antegrade and retrograde guidewire in completely independent system. It provide us these benefit: 1) good tractability of the guidewire, 2) enough back up force for advancing to occlusive lumen, 3) Device delivery from both approach site.
Patency and clinical results of nitinol Astron pulsar® stent in the superficial femoral artery (SFA)

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OBJECTIVES
To evaluate retrospectively the patency and clinical improvement of the nitinol Astron pulsar® stent in the treatment of symptomatic lesions of the SFA.

MATERIALS AND METHODS
Between January 2009 and October 2012, 133 patients (73 men; mean age 72.9 years) were treated by astron pulsar® stent implantation in the SFA. 82 patients (62%) were in Rutherford class 3, 13 patients (10%) in Rutherford class 4, and 38 patients (28%) in Rutherford class 5 or 6. 52 patients (39%) were diabetics. Average lesion length was 87.6 mm (10 to 200) and the occlusion rate was 31%. The calcification encompassed all the circumference of the artery wall in 27 patients (20%).

Follow-up was performed by a clinical control and a duplex examination every 6 months.

RESULTS
Technical success was 100%. Two patients presented a complication at the puncture site. At 12 months, the mean Rutherford score decreased from 3.05 to 2.15 after the intervention. The 12 month primary patency was 79% and the binary restenosis rate (>50%) was 8%.

CONCLUSION
The 12 month patency of the astron pulsar® stent in the SFA is excellent and needs to be confirmed in the long term.

Medium-term results of primary stenting in the management of femoropopliteal occlusive disease

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AIMS
Outcomes of primary stenting for femoropopliteal (FP) occlusive disease remain unclear. As a result, there is no consensus on the optimal form of intervention used in this segment. We investigated the durability of primary FP stenting in patients with peripheral arterial disease to identify factors influencing medium-term outcome.

METHODS
During a 7-year period (2004-2011), all consecutive patients undergoing FP stent implantation for de novo lesions were analysed in this single-centre retrospective study. Patients were enrolled on a three-monthly ankle-brachial pressure index and duplex surveillance programme over two years. Treatment failure was defined as recurrent haemodynamically-significant stenosis in the treated segment, and/or clinically-directed reintervention. Kaplan-Meier survival estimates were plotted and compared by log-rank method.

RESULTS
A total of 263 primary FP stents were performed in 249 patients (median age 74y [IQR 67-82], 67.9% male). Median lesion length was 13cm (IQR 8-24). 133 lesions (50.6%) treated were TransAtlantic Inter-Society Consensus (TASC) II A/B and 130 (49.4%) were TASC C/D. 75 stents (28.5%) were deployed for life-limiting claudication, 170 (64.6%) for critical ischaemia and 18 (6.8%) for acute limb ischaemia. Technical success was achieved in 251 limbs (95.4%).

Median follow-up time was 24mth (IQR 16-27). Treatment failure was found in 122 limbs (46.4%) during follow-up, with a median time to stent failure of 7 months (2.3-13.8). Overall primary (PP), primary assisted (PAP) and secondary (SP) patencies were 64.7%, 79.3% and 84.5% at 1 year, and 50.5%, 72.7% and 83% at 2 years, respectively. PP rates were significantly lower in TASC C/D lesions (p=0.04) and multiple (≥2) implanted stents (p=0.02).

CONCLUSIONS
Primary FP stenting achieves medium-term patency rates comparable to angioplasty. In addition to TASC C/D lesions, deployment of multiple overlapping stents is significantly associated with reduced durability. This should be carefully considered to optimise patient selection and operative decision-making for this procedure.
Comparison of AngioSeal and manual compression in patients undergoing transfemoral coronary and peripheral vascular interventional procedures

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Vascular closure devices (VCDs) were introduced in the early 1990s with the goal of limiting the time, labor, bed rest and patient discomfort associated with manual compression (MC) for hemostasis after cardiovascular interventions. However, its advantage over MC has not been extensively studied, especially after angioplasty. The aim of this study was to do a prospective, randomized study comparing the safety and efficacy of the Angio-Seal (AS) to that of MC in patients undergoing transfemoral coronary and peripheral vascular interventional procedures.

METHODS

A prospective, randomized trial was undertaken on consecutive series of patients admitted to King Fahd Hospital of the University for trans-femoral coronary and peripheral vascular interventional procedures over one year. The study was designed to compare the hemostasis time in minutes and the incidence of vascular complications in patients receiving AS with those undergoing MC. All patients were on antiplatelets and received heparin during the procedure. All patients had color duplex 24 hours after the procedure. We defined minor complications as those requiring no further treatment and major complications as those requiring surgery or blood transfusions.

RESULTS

During the study period 160 patients were included, 80 in each group. Mean time to hemostasis was 0.42±0.04 minutes for the AS and 15.83±1.63 minutes for MC (p<0.001). There was a trend toward fewer minor complications when AS was used (2.5% vs. 8.8% in MC, p = 0.09). However, major complication rate did not significantly differ between the 2 groups (1.3% in AS vs. 2.5% in MC, p = 0.56).

CONCLUSIONS

Angio-Seal was found to achieve rapid closure of the femoral access site safely in patients undergoing coronary and peripheral vascular interventional procedures under antiplatelets and systemic heparinization.

Endovascular treatment of common femoral artery obstructions for critical limb ischemia

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BACKGROUND

Endovascular procedures for critical limb ischemia (CLI) have evolved to the mainstream treatment for revascularization. However, CLI for common femoral artery (CFA) obstructions is limited by the potential of a suboptimal acute outcome due to poor response of balloon dilatation, and by future surgical option. We investigated the efficacy and feasibility of endovascular treatment for common femoral artery obstructions in patients with critical limb ischemia.

METHODS

We retrospectively analyzed the outcomes of percutaneous interventions of the CFA for atherosclerotic disease and assessed technical success, in-hospital complications, primary patency, limb salvage rates.

RESULTS

Between 2006 June and 2011 April, 23 patients (26 limbs) underwent angioplasty alone or with bailout stent implantations; target sites included 18 common femoral arteries, the origins of 2 superficial or 3 profunda femoris arteries, and 3 bypass anastomoses. All cases were CLI. Technical success was achieved in 100% of cases. 11 cases required stent implantations. In-hospital major or minor complications rate was 0.87%. At 12, 24 months patency rate was 82.6%, 78.3%, limb salvage rate was 95.7%, 91.3%.

CONCLUSIONS

The results show an acceptable primary patency rate after 24 months, adequate limb salvage rate was obtained in this patient cohort with endovascular therapy of CFA obstructions for critical limb ischemia.
Evaluation of the mechanical performance of the Supera stent by dynamic angio CT scan in heavily calcified femoro-popliteal artery

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AIM
To evaluate the dynamic behaviour and short-term patency of the Supera stent, a self-expanding interwoven nitinol stent with high radial strength, in heavily calcified lesions of the femoro-popliteal axis.

MATERIALS AND METHODS
Between April 2011 and July 2012, we carried out a prospective study including 24 patients (15 men – 9 women, mean age 75 years). Sixteen patients (67%) were in Rutherford class 2 or 3 and 8 (33%) in class 4, 5 or 6. They all presented with angiographically confirmed femoro-popliteal artery disease. Between April 2011 and July 2012, we carried out a prospective study in 24 patients (15 men – 9 women, mean age 75 years). Sixteen patients (67%) were in Rutherford class 2 or 3 and 8 (33%) in class 4, 5 or 6. They all presented with angiographically confirmed femoro-popliteal artery disease.

RESULTS
Stent implantation was successful in all patients. The primary patency at 9 months was 83%. One patient presented with an occlusion and another with a significant in-stent restenosis. On angio CT scan, we noted no kinking, no stent fracture or dynamic stenosis in the flexed knee position.

CONCLUSION
The implantation of the Supera stent in heavily calcified femoro-popliteal lesions is safe and effective in terms of clinical improvement and short-term patency. Its dynamic behaviour seems excellent in several different positions of the knee. Although these short-term clinical outcomes are encouraging, a larger number of patients with longer follow-up is necessary to confirm these results.

The Use of Video-motion Analysis to determine the Impact of Anatomical Complexity on Endovascular Performance in Carotid Artery Stenting

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INTRODUCTION
Video-motion analysis (VMA) is a novel method for assessment of endovascular performance which can reliably differentiate levels of endovascular expertise, and utilises fluoroscopy screen pixel co-ordinate data to calculate efficiency of performance. The objective of this study was to evaluate effect of anatomical complexity on VMA data in simulated carotid artery stenting (CAS).

METHOD
20 novice interventionalists, pre-trained in CAS, each performed a standardised easy, medium, and difficult CAS case in random order on an Angiomentor® Express simulator (Simbionix, Cleveland, OH, USA). A previously validated scoring system based on anatomic criteria was used to define complexity of the three cases, and videos of all performances were analysed by a single assessor using VMA software. Endovascular performance was expressed in terms of 2D guide wire tip trajectory distance (path-length [PL]), Friedman’s test was used to identify differences in performance across the three related groups. Post-hoc analysis was performed with Wilcoxon-signed rank test, and following Bonferroni adjustment, a p-value of <0.017 was considered significant.

RESULTS
The interventionalists completed the difficult case with significantly longer total trajectories (median 17372.9 pixels (IQR: 11495-26594) vs. 9039.8 (5974-14553) vs. 5000.6 (4076-5403.2), p<0.001) in comparison to the intermediate and easy cases, respectively. Similarly common carotid artery (CCA) cannulation in the difficult case was completed with a significantly longer trajectory (median 8844.7 (9554.5-15767.9) vs. 3273.6 (1544-8142) vs. 748.6 (603-1403), p<0.001). There were no observed differences across the groups of anatomical difficulty for the phases of arch navigation (p=0.44), external carotid manipulation (p=0.4) and internal carotid manipulation (p=0.7).

CONCLUSION
VMA software is able to differentiate levels of anatomical complexity. Furthermore, it is able to discern specific phases of the CAS procedure which may cause technical difficulty. CCA cannulation appears to be the discriminating procedural phase and excessive movement within the arch are a prominent feature of difficult cases.
Safety and efficacy of carotid stenting in the treatment of carotid artery stenosis: immediate results and long term follow-up in our experience

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BACKGROUND
Carotid artery stenting (CAS) may be an alternative to surgical endarterectomy for the treatment of atherosclerotic carotid artery stenosis.

PURPOSE
To analyze retrospectively the procedures of CAS performed in our Centre between January 2004 and December 2012.

METHODS
This analysis includes 604 procedures performed in 554 patients (382 men; mean age: 72 years old). Symptomatic patients with carotid artery stenosis > 50% were the 45%; we treated asymptomatic patients affected by > 70% stenosis. 398 patients (72%) were considered at high surgical risk: 35 patients (6%) presented restenosis main disease or trivascular coronary artery disease, severe or unstable angina, poor left ventricular function, left cardiac valve disease; 108 (19%) patients underwent staged CABG one month after CAS. Distal cerebral protection devices were used in 85% of the procedures. Soft plaques were present in 110 patients (18%). 49 (9%) patients were submitted to CAS for bilateral carotid artery stenosis.

RESULTS AND INHOSPITAL COMPLICATIONS
We obtained a successful immediate angiographic result in 99% of the patients. Major complications occurred in 11 patient (1.9%) and included: death (1 fatal stroke), major stroke (3), intracerebral hemorrhagic stroke (1), minor stroke (5), acute instant thrombosis (1 patient treated with thromboendarterectomy and stent removal). Puncture site hematoma occurred in 4 patients treated with vascular surgical repair; one patient died for hemorhagic shock.

FOLLOW-UP
We have a complete follow up in 95% of the patients. Instant restenosis occurred in 6 patients (1%) and was successfully treated with a new CAS. 50 patients died (22 for cardiovascular causes), but no one died for causes directly related to CAS.

CONCLUSIONS
In our experience CAS is a safety procedure with low complications also in high risk patients; the long term efficacy of CAS is very good with low rate of restenosis.

Optimal (endo)vascular treatment of high-grade carotid artery stenosis in women

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BACKGROUND
Treatment of (a)symptomatic atherosclerotic carotid artery disease has been subject of discussion especially in women who are often excluded or underrepresented in randomized controlled trials. High-volume centers and operators propose a patient-tailored approach based on clinical status, comorbidities and anatomical factors.

OBJECTIVES
To retrospectively review management of carotid artery disease in men versus women at a single academic institution and to compare with level I evidence resulting into a flow chart for managing high-grade carotid artery stenosis in women.

METHODS
A retrospective analysis of patient records was performed to evaluate stroke, myocardial infarction and death rate at 30 days and long-term TIA/stroke and restenosis rate at a single center after carotid treatment. A review of the literature was conducted to identify if patient outcomes are similar in men and women after open or endovascular treatment of symptomatic and asymptomatic carotid disease.

RESULTS
Between 1999-2012, carotid endarterectomy (CEA) or by transmural carotid artery stenting (CAS) was carried out in 651 carotids with significant stenosis. This study population with a median age of 70 years included 25.4% females who were slightly older (72 vs. 69 years p<0.05). About 28.6% of patients were symptomatic and 5.2% referred for CAS because of a significant restenosis. Major stroke, myocardial infarction and death rate at 30 days was 2.6%, with no influence of gender or clinical status. Median follow up was 46 months. Restenosis and occlusion occurred infrequently. This is in contrast with the literature where symptomatic women after CEA did better than CAS due to higher perioperative stroke risk. In asymptomatic high-grade stenosis, the stroke risk is similar in both sexes independent of the treatment modality.

DISCUSSION
In contrast to the literature, women with significant carotid artery stenosis independent of the lesion status did as well as men when treated by (endo)vascular means possibly because of a patient-tailored approach. Based on this literature review and our own experience, a flow chart has been created to optimize carotid artery disease management in women taking clinical status, plaque characteristics, comorbidities and anatomical factors into account.
Aneurysm exclusion and preservation of functional tissue in endovascular treatment of peripheral renal artery aneurysms - 12 to 48 month follow up after stent supported coil embolization

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OBJECTIVE
To demonstrate the feasibility and long term efficacy of stent supported coil embolization for renal artery aneurysms in terms of aneurysm exclusion and preservation of vessel patency and kidney function.

MATERIAL AND METHOD
8 patients with the diagnosis of peripheral renal artery aneurysms were treated with stent supported coil embolization under local anaesthesia using a femoral access. The aneurysm size ranged from 1.9 to 3.7 cm in diameter. Different Nitinol stents dedicated for intracranial use (1) of below the knee vessels (7) were used. Routine Follow up including ultrasound every 6 month and CT-Angiography every 12 months was continued for up 48 months. Serum creatinin levels and blood pressure were controlled, dual antiplatelet therapy was maintained for 4 weeks after the primary procedure, aspirin in a daily dose of 100mg was given continuously.

RESULTS
All aneurysms could be treated successfully, no further growth, renal infarction or other adverse events were detected. Flank pain as a primary symptom showed no recurrence, hypertension improved during the follow up period, no significant elevation of the serum creatinine level occurred.

Discussion
Treatment of peripheral renal artery aneurysms can be performed with covered stents or coil embolisation under local anaesthesia using a femoral access. The aneurysm size ranged from 1.9 to 3.7 cm in diameter. Different Nitinol stents dedicated for intracranial use (1) of below the knee vessels (7) were used. Routine Follow up including ultrasound every 6 month and CT-Angiography every 12 months was continued for up 48 months. Serum creatinin levels and blood pressure were controlled, dual antiplatelet therapy was maintained for 4 weeks after the primary procedure, aspirin in a daily dose of 100mg was given continuously.

Key words
Renal artery aneurysms; vessel preservation, stent supported coil embolization

Effective emergent endovascular recanalization for left subclavian artery ostium occlusion after CABG using left internal mammary artery to improve cardiogenic shock due to ACS

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A 78-year-old female was admitted because of multiple bone fracture caused by falling down. She undertook CABG using left internal mammary artery (LIMA) to left circumflex artery (LCX) and obtuse marginal branch, and gastro-epiploic artery (GEA) to left anterior descending artery (LAD) about 10 years ago. She complained chest pain on the day of admission with hypotension. Electrocardiogram revealed ST elevation in aVr lead and ST depression in I, aVl, V2-6 leads. Echocardiography showed hypokinesis of antero-septal and lateral wall of left ventricle. We suspected acute coronary syndrome from these data. We performed emergent angiogram, and it revealed total occlusion of left subclavian artery (SCA) ostium and GEA, and severe stenosis of left main trunk coronary artery (LMT), proximal LAD and LCX. We considered that main culprit lesion was left SCA ostium occlusion. We recanalized left SCA ostium inserting Express stent 7.0x27mm. Hemodynamics and symptom dramatically improved after recanalization of SCA ostium. We inserted additional coronary stent in LMT. We should evaluate SCA when we meet cardiogenic shock after CABG using LIMA. If culprit lesion is SCA, emergent endovascular recanalization for SCA might be very effective to stabilize hemodynamics.
E-posters
**'The (almost) full spectrum of endoleaks’**

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A 73-year old patient who previously underwent an open repair of an infrarenal AAA presented with a ruptured thoracic aorta aneurysm. An endovascular exclusion using a Gore endoprosthesis 37mmx20 cm and 40mmx20 cm was performed. Postoperatively, a minor endoleak type II arising from dorsal arteries was detected. After 4 months an expansion of the aneurysm sac was observed due to an endoleak type IB. We elongated the stent graft. However, he was readmitted with severe thoracic pain, probably based on a pleuritis. The endoleak type II was unchanged and in retrospective, a type III had diminished. 4 months later, he was again readmitted with shortness of breath due thoracic compression of the left atrium by an enlarged aneurysm sac. A relining was performed with another Gore endoprosthesis. During the procedure, the III endoleak was reconfirmed but also showed the initial type II endoleak. This procedure didn’t improve the clinical status. A new CT scan unexpectedly showed a diminished type II and type II endoleak with no further expansion of the aneurysm sac. We decided to wait. During this period, our patient underwent a semi-urgent CABG. A few weeks after discharge, CT scan reaffirmed a type I and II endoleak without further expansion of the aneurysm sac. A complete repair for this patient wasn’t feasible. Instead, a banding of the aorta and ligation of intercostal branches was opted. Angiography showed no endoleak. Our patient recovered well. Despite precautions however, our patient developed a left-sided hemiparesis.

**Endovascular treatment of an aneurysm of the aortic arch**

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Aneurysm of the aortic arch is a rare location. The risk of complications and essentially breaking justifies the therapeutic indication that can be surgical or endovascular. Endovascular treatment is less invasive than surgery, but has its own complications including illness poly aneurysmal. We report the case of a men, 74 years, hypertensive disease carries a poly-aneurysmal location with ilio-femoro-popliteal left that ligation of the internal iliac artery was That a well practiced reconstrution of femoral junction left by a PTFE prosthesis (10 diameter), and a location symptomatic aneurysm of the aorta chest. The exploration CT showed an aneurysm 60mm in which the collar is located at the foot of endoprosthesis. A second stent was then placed and postoperative course was marked by a dilation of the aorta next to the stent distal then migrated. Endovascular treatment of aneurysms of the aortic arch provides an attractive solution but has some limitations such as illness poly aneurysmal and abnormal elastic tissue.
Fenestrated AnacondaTM stent graft. A step forward in making easier the iuxtarenal AAA treatment

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INTRODUCTION
Up to now widespread use of Fenestrated EVAR (FEVAR) in the treatment of iuxtarenal aneurysms is limited. Authors present their preliminary experience with Fenestrated AnacondaTM stent graft (Vascutek, Inchinnan, UK) characterized by features that broaden anatomical applicability and reduce technical difficulty.

CLINICAL CASE
A caucasian 85-yrs old man, with multiple comorbidities, presented at our institution because an iuxtarenal 6 cm AAA accidentally shown by an abdominal duplex scan. The enhanced abdominal-CT showed a 26 mm infrarenal aortic neck diameter. It was decided a 30 mm fenestrated endograft for both renal arteries whereas the origin of superior mesenteric artery was served by anterior scallop. An Advanta 6x28 covered stent graft for right renal artery. The 1 month aortogram CT showed the correct patency of the bifurcated endograft and renal stents, without any leak.

CONCLUSION
The repositionable Anaconda fenestrated main body graft, without a top cap allows visceral arteries engaging from top down with accurate alignment of the fenestrations with target vessel ostia. Delayed follow-through second step of the procedure can be safely performed allowing the best clinical and procedural conditions.

Life-Threatening Pseudoaneurysm of the Ascending Aorta occurring 18 years ago after coronary artery bypass grafting: a case report of successful exclusion by percutaneous approach with a Relay NBS

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INTRODUCTION
Ascending aortic pseudoaneurysm (AAP) is a rare but possible and serious complication after cardiac surgery. The most life-threatening consequence of this rupture is rupture so the early and suitable treatment is needed to avoid high risk of mortality. The purpose of this abstract is to describe the successful exclusion of this AAP of the Ascending Aorta by percutaneous approach with custom-made Relay NBS Thoracic Stent Graft.

CASE PRESENTATION
A 57-year-old with a past medical history of hypertension, dyslipidaemia and diabetes mellitus (type 2) did a coronary artery bypass grafting in the 1995. The postoperative period was not complicated. He referred persistent angina so he had done multiple percutaneous coronary angioplasties. He was presented to our hospital for persistent sternal fistula. He had done multiple percutaneous coronary angioplasties. He performed thorography angiography (CTA) which showed incidentally AAP (17 x 18 mm) with origin 23 mm upstream. We performed percutaneous angiography (CTA) which showed incidentally AAP (17 x 18 mm) with origin 23 mm upstream.

COMMENT
The presentation of our case report is to promote the successful result of this procedure characterized by the proper coordination between cardiac surgeons, vascular surgeons, interventional radiologists, cardiologists and cardiothoracic anaesthesiologists. Therefore we want to emphasize the spreading of the hybrid surgical and endovascular procedure. This will be the future frontier for our patient and our health.

References
Endovascular Repair in Marfan Patients: is it feasible?

**T. Martens, L. Desender, I. Van Herzeel, F. Vermassen**

**INTRODUCTION**

The course of a Marfan’s disease patient can be eventful and difficult to manage. The vascular hazard in Marfan’s Disease is characterized by aortic dilation and dissection with valvular abnormalities. Treatment by an endovascular approach has been described in case studies with variable results. However, no large trials have been reported in literature. We present a Marfan patient for whom endovascular therapy proves to be a satisfying option.

**CASE**

At the age of 33, our patient underwent a Bentall procedure for a proximal ascending aortic aneurysm. Fifteen years later an acute type A dissection occurred, requiring reconstruction of the distal ascending aorta and aortic arch. Only one year later, he developed an aneurysm of the descending thoracic aorta (maximum diameter 62 mm) with an intimal tear. An endovascular exclusion was performed (Talent Valiant 32-150mm, Medtronic, USA), reaching from the left subclavian artery to the distal thoracic aorta (level T11). Postoperatively, there was a progressive enlargement of the thoraco-abdominal aorta (maximum diameter 60 mm) with residual dissection up to the femoral arteries. This resulted in a final intervention four years later. After discussing the further treatment of this case at our multidisciplinary team meeting, a Gelsoft (20/10 mm) bifurcated prosthesis was inserted between the infrarenal aorta and both common iliac arteries. The right renal artery was bypassed using a Gelsoft (6mm) tube graft between the right limb of the bifurcated graft and the distal right renal artery. The left renal artery, celiac trunk and superior mesenteric artery were successfully dilated by the plain old balloon angioplasty (POBA) with pressure gradient reduction from 60 mmHg to less than 10 mmHg; however, the wire was not crossed to the chronic total occlusion of the left IIA by contralateral access despite the microcatheter back up. One month later, second EVT was performed by bidirectional approach via left femoral artery and left brachial artery and a self-expandable stent was successfully implanted to the left IIA lesion. The second EVT brought complete relief of his symptoms and significant prolongation in walking distance. He has been free from symptom for more than six months. Buttock claudication caused by internal iliac artery stenosis can be successfully treated by EVT. Although distinguishing vascular claudication and neurological symptoms is difficult, attention should be brought to the IIA lesions when encountering a patient with upper leg and buttock pain with normal ABI.

Successful endovascular therapy for buttock claudication caused by isolated internal iliac artery stenosis and occlusion

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Stenosis of internal iliac artery (IIA) causes various symptoms and relationship between localization of the lesion and the symptoms is not usually obvious, which makes primary diagnosis of IIA stenoses difficult. We present a case of buttock claudication caused by isolated IIA stenosis and occlusion, whose symptom completely relieved by successful endovascular therapy (EVT) to IIA lesion.

A 75-year-old man was presented to our hospital complaining of pain isolated in both buttock regions when walking. His symptom worsened during exercise, which was suggestive of ischemia. His ABI was normal. The enhanced CT revealed right IIA stenosis and left IIA occlusion. We first attempted primary EVT for both IIAs by right femoral access. The right IIA was successfully dilated by the plain old balloon angioplasty (POBA) with pressure gradient reduction from 60 mmHg to less than 10 mmHg; however, the wire was not crossed to the chronic total occlusion of the left IIA by contralateral access despite the microcatheter back up. One month later, second EVT was performed by bidirectional approach via left femoral artery and left brachial artery and a self-expandable stent was successfully implanted to the left IIA lesion. The second EVT brought complete relief of his symptoms and significant prolongation in walking distance. He has been free from symptom for more than six months. Buttock claudication caused by internal iliac artery stenoses can be successfully treated by EVT. Although distinguishing vascular claudication and neurological symptoms is difficult, attention should be brought to the IIA lesions when encountering a patient with upper leg and buttock pain with normal ABI.
Femoral angioplasty and stenting without use of intraoperative angiography (direct intraluminal vision)

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OBJECTIVE
The feasibility of femoral recanalization, angioplasty and stenting (TASC A - lesions) without use of contrast dye using fluoroscopy and intraluminal angiography control (direct intraluminal vision – DIV).

MATERIALS AND METHODS
We present our original technique of femoral recanalization through the common femoral artery access, without injection of contrast product.

The position and/or the length of the stenosis/occlusion is estimated using DIV, fluoroscopy and radiopaque marking tape.

After crossing the stenosis with the guide wire or recanalization of the lesion an accurately sized stent is deployed. Subsequently, using DIV, the proximal and distal landing zone, the interior part and global permeability of the stent and the femoral artery proximally and distally are carefully inspected.

CONCLUSIONS
The technique using DIV for angioplasty and stenting of short femoral lesions without contrast injection is feasible and can be particularly advantageous in patients with impaired renal function.

Tactics of complex treatment on aggressive arterial occlusions in patients with critical limb ischemia. A retrospective review of short and midterm outcome.

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THE AIM OF STUDY
is to evaluate the results of combination of drug treatment and balloon angioplasty in cases of peripheral longer occlusions.

MATERIALS AND METHODS
We observed 3 patients with occlusions of CIA, EIA, CFA, SFA and PA (CTO). Clinical class was III-IV Fontaine. The average age of the patients was 59. All of the patients were male. The cause of arterial occlusions in 2 (66.6%) cases was atherosclerosis and in 1 (33.3%) case –aortoarteritis.

In all cases diagnostic complex included clinico-laboratory exams, duplex scan and CT-angio.

Comorbidities: Ischemic heart disease in 2 cases (66.6%), diabetes mellitus in 1 cases (33.3%), arterial hypertension in 2 case (66.6%).

All patients received before revascularization drug complex (LMWH, sulodexide, antiplatelet therapy, metabolic therapy, NSAIDs and including glucocorticoids in patient with aortoarteritis) and pronounced painful syndrome was relieved by continuous epidural analgesia. PTA of CIA, EIA, femoral and popliteal arteries was made.

RESULTS
We observed improvement of blood flow and arterial pulse of peripheral arteries in all cases.

CONCLUSIONS
The combination of preoperative preparation and endovascular revascularization is adequate treatment of peripheral arterial longer occlusions.