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ABSTRACT BOOK

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THURSDAY JUNE 2
Practical approach to BTK-disease, based on state of the art data

Lecture. Scaffolding with or without drugs BTK?

Martin Werner
Hanusch Krankenhaus, Wien, Austria

The optimal treatment of BTK disease is not known. Balloon angioplasty with or without drugs is limited due to a high restenosis rate. This presentation reviews the current evidence on stents in the infrapopliteal segment, focusing on the randomized trials on drug eluting stents.

Practical approach to BTK-disease, based on state of the art data

Case. Atherectomy in the Btk arteries

Martin Werner
Hanusch Krankenhaus, Wien, Austria

Case presentation of a patient with critical limb ischemia and occlusion of all 3 BTK arteries. Patient was treated with the Diamondback 360 Orbital Atherectomy System and Drug Coated Ballon. Step-by-Step explanation of this case and discussion of this new approach in BTK treatment.
**Practical approach to BTK-disease, based on state of the art data**

*Lecture.* Final judgement about angiosome theory: myth or fact?

Vlad-Adrian Alexandescu, François Triffaux  
Princess Paola Hospital, Marche-en-Famenne, Belgium

**INTRODUCTION**
Since its first anatomical description made by Taylor in 1987, the Angiosome theory (AT) gradually provided new therapeutic perspectives and related controversies, particularly focusing on critical limb ischemia (CLI) interventional treatment.

**OBJECTIVE**
As clinical knowledge about angiosome applications in limb salvage continually expands, several new challenges rise for practitioners in daily CLI practice:

a) What is the real meaning of “Direct Revascularization” (DR)?

b) How can we effectively identify the “right” angiosome(s) to target?

c) What is the best method to assess DR in each patient?

d) How can we validate genuine usefulness of the AT considering the three phases of post-ischemic reperfusion and among documented five stages for wound healing?

**MATERIALS AND METHODS.**
This analysis encompasses a review over contemporary angiosomes applications in CLI, evincing eventual morphological and physiological implications in revascularization and wound recovery.

**RESULTS**

a) Available literature on AT applications in CLI gathers rather heterogeneous groups analysis data, with little prospective structured evidence.

b) While a majority of surgical and endovascular CLI series examine DR throughout specific angiosomal foot arterial branches, other researchers rate “Wound Directed Revascularization” via complete/incomplete foot arches, or throughout large arterial-arterial remnant collaterals.

c) The choice for suitable angiosome-targeted revascularization relies on synergic macro- and microcirculation assessment (owing specific techniques for each evaluation). No method alone has proven so far entire eligibility for solitary DR guiding.

d) It appears that specific CLI categories of patients (ie, diabetic and renal presentations) exhibiting notable foot collateral destruction may particularly avail from AT applications.

**CONCLUSION**
Angiosome-targeted revascularization appears to enhance encouraging wound healing results, whenever feasible, particularly in CLI collateral deprived patients. For appropriate judgment, AT needs complementary clinical data issued from unitary diagnostic, and homogeneous inclusion and follow-up CLI series.

**AAA**

*Hot Topics. Best practice in fEVAR in 2016*

Barend Mees, Geert Willem Schurink  
Maastricht University Medical Center, Maastricht, The Netherlands

fEVAR has become an increasingly popular alternative treatment for pararenal aortic aneurysms. fEVAR is a technically challenging operation. The duration, blood loss, risk of limb ischaemia, contrast-induced nephropathy and reperfusion injury are higher than after standard endovascular aneurysm repair (EVAR). However, fEVAR has demonstrated good early clinical results with technical success rates of > 95% and 30-day mortality of < 5%, and late survival and target vessel patency are satisfactory. This presentation focuses on the current commercially available devices, ranging from custom-made to off-the-shelf to surgeon-modified in-situ fenestrated endografts, on planning and design, on intra-operative techniques and current limitations of fEVAR.
AAA Hot Topics. EVAS and chEVAS will replace EVAR and chEVAR

Francesco Torella
Liverpool Vascular & Endovascular Service, Liverpool, United Kingdom

Although EVAR is now an established treatment for infrarenal aortic aneurysms, it is still marred by a discrete failure rate. The EVAR I trial results suggest that, at 15 years, patients treated with EVAR have greater all-cause mortality, aneurysm related mortality and cancer incidence than those treated by open repair. Late aneurysm rupture still occurs, and is largely caused by stent failure (type IIIb endoleaks) or failure of seal/fixation (type I endoleaks). Life expectancy has increased by six years in the past ten years so these data cannot be easily dismissed, particularly now that screening programmes result in early detection of aneurysms in many countries. EVAR was first used twenty-five years ago. Despite incremental marginal gains, largely due to improved stent design, until recently, the principles of endovascular aortic repair have remained the same as those described by Palmaz, Barone and Parodi in 1991. Now, however, EVAS can treat aneurysms by different means: unlike EVAR, EVAS obliterates the aortic lumen completely, potentially preventing the late causes of aneurysm rupture seen after EVAR. EVAS can be performed more expeditiously and with less radiation than EVAR. It can be extended to the suprarenal segment using visceral chimney (chEVAS) as an alternative to FEVAR, which, despite widespread adoption, remains a complicated procedure. We report a case of a 55-year-old male, who had a previous aortic valvular substitution and thoracoabdominal endoprosthesis placement for aortic dissection in another center, presented after 5 years in our Department with an angio-CT evidence of type 1 endoleak. Open-surgery treatment wasn’t possible because of many comorbidities, so we decide to perform an endovascular treatment through surgical access. Through a femoral access the false lumen was selectively and in this place was released an endoprosthesis. The endoleak embolization was then performed through a caval filter into the endoprosthesis and several large volume macro-coils caught into the filter. We released 829 cm of coils’ total length in only 60 minutes of procedure. The patient was dismissed after few days, without any complications. At the 3 months follow-up angio-TC the endoleak was excluded and the true lumen obtained a restored vascularization.

References

AAA Tips and Tricks. Double barrel graft-assisted coiling in chronic aortic dissection

Lorenzo Moramarco, Stefano Pirrelli, Ilaria Fiorina, Mario Torresi, Riccardo Corti, Pietro Quaretti
Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

We report a case of a 55-year-old male, who had a previous aortic valvular substitution and thoracoabdominal endoprosthesis placement for aortic dissection in another center, presented after 5 years in our Department with an angio-CT evidence of type 1 endoleak. Open-surgery treatment wasn’t possible because of many comorbidities, so we decide to perform an endovascular treatment through surgical access. Through a femoral access the false lumen was selectively and in this place was released an endoprosthesis. The endoleak embolization was then performed through a caval filter into the endoprosthesis and several large volume macro-coils caught into the filter. We released 829 cm of coils’ total length in only 60 minutes of procedure. The patient was dismissed after few days, without any complications. At the 3 months follow-up angio-TC the endoleak was excluded and the true lumen obtained a restored vascularization.

Tips and Tricks.

Double barrel graft-assisted coiling in chronic aortic dissection

Lorenzo Moramarco, Stefano Pirrelli, Ilaria Fiorina, Mario Torresi, Riccardo Corti, Pietro Quaretti
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Venous & thrombectomy
What might bring a new wavelength for endovenous laser?
Lowell kabnick
New York, USA

What might bring a new wavelength to the market for endovenous saphenous laser ablation is an easy question to answer. Most importantly, we would want to achieve a painless intraoperative and postoperative patient experience. However, would we find the “holy grail” with a new wavelength, fiber, or combination of the two? A new wavelength range of 1920-1950, whose chromophore is water, would need to be entered into clinical trials. Since water absorbs energy more efficiently than hemoglobin, one could postulate that less energy output would be needed to have the same result as the already-existing wavelengths. In addition, in comparison to 1470nm, this new range of laser wavelength lies at higher peak of water absorption; thus theoretically, it reduces the needed energy output to achieve the same effect. Both in vitro and in vivo studies are underway. During this presentation, in addition to the new wavelength, I will shed some light on fiber importance. The final question that remains is: Is it the wavelength or is it the fiber that is more important for endolaser saphenous ablation?

References
Fiber type as compared to wavelength may contribute more to improving postoperative recovery following endovenous laser ablation. Kabnick, L, and Sadek, M. JVSV2015:12:004


Venous & thrombectomy
Should we really treat varicose tributaries?
Sarah Onida
Imperial College London, London, United Kingdom

Varicose veins affect up to 40% of the population1, are associated with a significant clinical burden, negative effects on quality of life2, and represent an important expenditure, equating to up to 2% of the national health budget.

Although evidence for the treatment of truncal vein reflux has increased over the last ten years, particularly with the development of minimally invasive techniques such as radiofrequency ablation and endovenous laser ablation, the treatment of varicose tributaries is still a matter of debate.

Treating varicosities as a single sitting combined with truncal ablation reduces the need to perform further procedures and reduces the varicose reservoir. However, with evidence suggesting that a significant proportion of patients do not require secondary procedures following truncal ablation3, are we over treating patients with the former approach? Should delayed varicosity treatment be performed instead, reducing procedure time? Combined treatment is associated with improved clinical and quality of life improvements4, however, is this at the expense of an increased risk of venous thromboembolic events5?

In this talk the literature will be appraised to gain a comprehensive understanding, evidence permitting, of what is the optimal approach for varicose tributary treatment is.

References
Venous & thrombectomy

Hemodynamics of development of the varicose disease: do we really have a new knowledge?

Sarah Onida

Imperial College London, London, United Kingdom

The beauty of chronic venous disease is that it is so much more than valve failure. Important haemodynamic principles underlie not only the development of reflux patterns but also of signs and symptoms of chronic venous disease, including varicose veins. However, there is a paucity of evidence concentrating on haemodynamic concepts, despite their importance in the assessment and management of individuals with this condition. This is reflected by numerous guidelines favouring imaging techniques such as duplex ultrasound, which, though providing information on venous anatomy and patterns of reflux, do not provide data to fully appreciate the physiological basis of disease, particularly with respect to flow, pressure, compliance and resistance of the venous system. Haemodynamic assessments, such as plethysmography and volumetry, are considered as adjuncts to venous duplex ultrasound in the investigation of the patient with CVD. 4. Haemodynamic surgery, as represented by CHIVA, is also the remit of physicians expert in the technique, and not a routine management strategy endorsed by international clinical practice guidelines3, 4.

Recently, the importance of the role haemodynamics in CVD has been recognised by a consensus statement of the Union Internationale de Phlébologie (UIP): Exposing known haemodynamic principles, data regarding the correlation between the severity of signs and symptoms of chronic venous disease and haemodynamic measurements, as well as opportunities for further research in this field, this document brings haemodynamics at the forefront of the CVD debate.

In this presentation, the evidence regarding haemodynamics in CVD development, assessment and management will be reviewed in light of the latest evidence.

References

Venous & thrombectomy

Enovascular treatment of extended iliac vein occlusion: what are the limits?

Ailun Davies

Imperial College London, London, United Kingdom

Iliofemoral deep venous thrombosis (DVT) accounts for 20% of all lower limb DVTs, with significant sequelae, including the development of pulmonary embolism (PE) and post thrombotic syndrome (PTS); this affects up to 85% of patients1, with development of disability and significant reduction in quality of life2. The management of acute DVT centres, initially, around anticoagulation. This prevents thrombus propagation and recurrent thrombosis, but is not able to dissolve the existing thrombus or reduce venous outflow obstruction. Alternative measures include thrombectomy and thrombolytic therapy. However, these techniques have a limited role in chronic occlusions.

Percutaneous transluminal angioplasty (PTA) and self-expandable stent deployment are now the recommended treatment combination to consider in chronic ilio-caval or ilio-femoral DVT3. Modern imaging techniques, such as intravenous ultrasound (IVUS), can help determine more reliably the extent of stenosis and obstruction in an iliac vein segment. PTA and stent deployment provide symptom relief and clinical improvement, with acceptable patency rates (up to 80% at 1 year) and reduced morbidity when compared with surgical bypass. However, long term data is not widely available; furthermore, the quality of the evidence supporting deep venous stenting to treat obstructive chronic venous disease has been classified as weak in a recent systematic review4.

With the advent of new technology, the role of endovascular treatment is set to continue increasing in this patient population. However, long term data is necessary to obtain a complete picture regarding the efficacy of this intervention. In this talk, I will review the evidence supporting endovascular therapy in iliac vein occlusion, exploring the current limitations and directions for future research.

References
Venous & thrombectomy
Management strategies for patients with varicose veins (C2-C6): results of a worldwide survey

Alun Davies
Imperial College London, London, United Kingdom

Internationally, both the clinical background of healthcare providers in chronic venous disease (CVD), and the delivery of services to CVD patients can be extremely heterogeneous. This has been recognised at a European level, with the establishment of the European College of Phlebology¹ to help develop an international, multidisciplinary, standardised approach to the care of the venous patient.

Worldwide, chronic venous disease is the remit of vascular surgeons, angiologists, phlebologists, dermatologists and physicians, including nursing staff when it comes to venous ulceration (C6 disease). These individuals may have differential approaches to the assessment and management of patients with CVD depending on their own professional experience and formation, leading to differences in service provision. Furthermore, the development of new technologies over the last 15 years has led to a plethora of techniques available to healthcare providers. The result is that management strategies may be very diverse for patients depending on the clinical background of the individual caring for them and their experience of novel technology. Finally, the availability of resources, as well as health care policies in different countries, further contribute to management heterogeneity.

The Worldwide Survey performed by van der Velden and colleagues² evaluated how patient characteristics and duplex ultrasound factors influence the management of individuals with chronic venous disease by practitioners from 43 different countries and from diverse training backgrounds, highlighting that, despite the presence of numerous international clinical practice guidelines³⁵, the management of the patient with CVD is still very heterogeneous and significantly influenced by local factors.

References
FRIDAY JUNE 3
Modern approach of carotid artery disease
Standard operating protocol in stroke management at my hospital – a multidisciplinary approach is mandatory

Alison Halliday
University of Oxford, Oxford, United Kingdom

Stroke care has evolved rapidly in the last 10 years. It now includes intravenous and intraarterial thrombolysis, intracranial thrombectomy, carotid endarterectomy and stenting, as well as secondary care and prevention of reoccurrence of stroke.

This presentation will outline the SOP in Oxford, UK where stroke care is provided by three types of physicians and two neuroradiology services as well as vascular surgery.

Venous & thrombectomy
The glue for the treatment of varicose veins?

Lowell Kabnick
New York, USA

There is a paucity of long-term data regarding cyanoacrylate and its use for saphenous ablation. There are two different polymers of cyanoacrylate on the market and, with the altered set-up times for the cyanoacrylate, there are two different procedures.

The VenaSeal procedure uses a segmental application, while the Variseal procedure dictates continuous pull-back application. Both chemical adhesives have entered pivotal trials using radiofrequency or laser as the comparator.

The trial results have been excellent and ripe with data regarding efficacy, complication rate, and quality of life indicators.

Venaseal, a multicenter, prospective randomized trial, VeClose, just reported 24 month results. Of note, these results demonstrated continued non-inferiority to RFA with regards to efficacy and quality of life.

Variclose, in a 12 month single center randomized pivotal trial, published equal efficacy and quality of life outcomes with comparison to 1470nm laser ablation.

References
Venous & thrombectomy
Post-operative compression after varicose vein treatments: yes or no?
Roshan Bootun
Imperial College London, Fulham Palace Road, United Kingdom

Application of compression post-treatment is an area of great contention in the management of varicose vein disease. The belief is that compression reduces post-operative swelling, haematoma formation and pain following surgery for varicose veins. No irrefutable evidence, however, exists so far.1

In a survey of the members of the Vascular Society of Great Britain and Ireland, Edwards et al. (2009) found that three-quarters of them used bandages post-operatively, with a similar percentage changing to compression stockings afterwards.2

Two randomised controlled trials (RCTs) looking at compression following endovenous laser ablation (EVLA) appeared to demonstrate a benefit of compression therapy in the short-term, but are limited by considerable drop-outs in both studies.3,4 RCTs investigating compression following foam sclerotherapy, for their part, did not demonstrate any significant differences, although compliance was an issue.5,6

Extensive heterogeneity noted in these studies was highlighted in a recent systematic review which found that the evidence available is insufficient to produce guidelines. The main limitations found were insufficient number of patients, different compression regimens and variable duration of compression application.2

The 2013 National Institute for Health and Clinical Excellence (NICE) Guidelines on varicose veins are unable to provide any clearer guidance either, other than stating a limit on the number of days compression bandaging, or hosiery, is prescribed for, when offered.2 Elucidating the role of compression after varicose vein treatment would enable us to improve our current management even further and, hopefully, well-conducted and adequately powered randomised controlled studies will be able to provide an answer.2,3

References

Venous & thrombectomy
Treatment of acute venous femoro-iliac thrombosis: change the paradigm?
Roshan Bootun
Imperial College London, Fulham Palace Road, United Kingdom

Venous thromboembolism (VTE) is estimated to occur annually at a rate of 114 new cases per 100,0007 and is fast being recognised as an important medical ailment. For extended periods, the management of the condition, including with involvement of the ilio-femoral segment, has been limited to using anticoagulation with vitamin K antagonists (VKA) and compression therapy.8

Over the past few years, however, newer methods have become increasingly available to enhance the diagnosis and treatment of patients, especially those with ilio-femoral deep vein thrombosis (DVT). Newer anticoagulants (oral non-vitamin K antagonists), such as rivaroxaban, are increasingly being used and offer the advantage of reduced need for monitoring. So far, they appear to be at least equivalent to the more conventional treatment in the management and prevention of thrombus recurrence. Thrombosed veins can reconstitute following initiation of anticoagulation therapy, but it is believed even better clinical outcomes, such as prevention of post-thrombotic syndrome, could be achieved by artificial removal of the clots. Catheter-directed thrombolysis (CDT), one such method to restore venous flow, shows promise and could be further aided by using adjuncts to accelerate the lytic process and reduce the duration of treatment. Stenting of the iliac segments, combined with the novel anticoagulants, may additionally restore and maintain the vein patency for longer. Furthermore, advances made in imaging modalities allow identification of thrombi most susceptible to thrombolytic therapy.

References
Venous & thrombectomy
Endovenous thermal ablations: consensus and polemics

Lowell Kabnick
New York, USA

Regarding Endovenous thermal ablation procedural methods, there is generally more agreement than polemic. The procedures are standardized, but with modifications amongst interventionalists. However, the RFA procedure is better scripted than the EVLA procedure, which allows for less variation when it is administered.

Most physicians are in agreement to treat C3-C6 with corresponding and appropriate reflux. Where there is dissention, it is within the C2s category. Postoperative care varies amongst clinics and ranges from exercise to compression.

In addition, there is considerable variation in the field with regard to treating endothermal heat induced thrombosis, when to perform adjuvant therapy, and whether sclerotherapy or phlebectomy is superior to endovenous thermal ablation procedures.

References
PERSPECTIVES SOIGNANTES
Une équipe hybride pour une salle hybride

Valérie Doussin¹, Erwan Gouiffes²

1. Cadre de Santé IBODE
2. Cadre Santé MERME, CHU Nantes

L’évolution des techniques radio-interventionnelles notamment la création de salles hybrides au sein des blocs opératoires conduit au développement du travail en équipe interprofessionnelle entre manipulateurs en électroradiologie et infirmiers de bloc opératoire. Le contexte médico-économique nous amène à une réflexion sur les niveaux de complémentarité et de coopération entre les métiers soignants sur les plateaux techniques médico-chirurgical.
Iliac branched devices outcomes and surveillance modality
Iain Roy, Vallabhaneni Srinivasa, Richard McWilliams, Robert Fisher
Liverpool Vascular & Endovascular Service, Liverpool, United Kingdom

BACKGROUND
Sealing in ectatic iliac arteries is associated with poor durability after EVAR. Internal iliac (IIA) embolization with external iliac extension is an alternative but carries risks of gluteal claudication, impotence and colonic ischemia. Iliac branched Devices (IBDs) offer a solution by excluding aneurysmal iliacs while preserving IIA perfusion.

METHODS
The first 33 IBDs used in our institution were reviewed. Discharge letters, post-operative clinic letters and surveillance imaging reports were reviewed to ascertain clinical details and subsequent symptomology. Surveillance results were obtained from our prospectively maintained clinical EVAR database.

RESULTS
Between 2010-2016 33 IBDs (24 Cook, 9 Gore) were implanted in 32 patients, in combination with 1 bEVAR, 4 fEVAR and 24 EVAR stent-grafts. 2 iliac devices failed to achieve intra-operative success; 1 mal-deployment with occlusion of IIA, and one failed IIA cannulation.

These were the only 2 IIA occlusions (6%) recorded throughout median follow-up of 22 months (IQR 16-33). 5 (16%) patients underwent 5 re-interventions for their IBD’s during follow-up. 2 patients died during follow-up, not aneurysm related. Patients underwent surveillance based on their proximal device type. All included at least CTA and duplex ultrasound (DUS) at 1 month and DUS and abdominal x-ray annually thereafter, with a compliance of 98% with surveillance visits. CTA visualised the IIA adequately on all occasions. DUS visualised IIA on 46% of occasions, overly failed on 15% and IIA was un-reported on 37% of occasions. Iliac aneurysm size was recorded and graft related endoleaks excluded on 100% DUS.

CONCLUSIONS
IBDs are a safe and successful method of preserving IIA blood supply with durable short term outcomes. Surveillance may be limited by the imaging modality with CTA as the gold standard. DUS reliably identifies common iliac diameter and presence of endoleak but may not confirm internal iliac flow in nearly half of cases. Specific DUS protocols may improve the visualisation rate.

Endovascular treatment of aortic arch using relay branched stent grafts
Bertrand Saint-Lèbes
Rangueil University Hospital, Toulouse, France

INTRODUCTION
Endovascular treatment of aortic arch aneurysms using branched stent graft provide attractive alternative for elderly patients.

METHODS
The branched stent grafts used are a custom-made version of RELAY NBS. A large access in the graft, with one or two internal tunnels proximally oriented, allow the extension to the supra aortic branches.

RESULTS
34 patients, were treated between 2010 and 2015 with branched stent grafts and were reviewed from a prospective database. All were deemed high risk for conventional surgery. 8 patients had a single branch (1woman) and 26 (5 women) had a double branched stent grafts. 29 had arch aneurysms and 5 patients had a chronic dissection. 30 patients out of 34 had uneventful placement of the prostheses, with successful exclusion of their aneurysms. Aneurysm exclusion without endoleak was achieved in all patients. Of the target vessels, all were successfully cannulated and preserved. The pre-discharge CTA findings showed in all cases the patency of the different part of the stent-grafts without endoleak. 8 patients died during the follow up, 5 before discharge and 3 patients after 4 months.

CONCLUSIONS
We have demonstrated the technical feasibility of a new modular trans femoral branched stent graft for treatment of aortic arch aneurysms. The method is relatively safe based on initial experience, and we currently recommend it to high-risk patients with aneurysms involving the aortic arch and suitable anatomy. Safety and efficacy will be better defined with longer follow-up and increased worldwide experience.
Profile of secondary interventions after EVAR: how are they triggered and what are the implications for surveillance?

Iain Roy, Srinivasa Vallabhaneni
Liverpool Vascular & Endovascular Service, Liverpool, United Kingdom

BACKGROUND
Despite improvements in device performance and changing views about indications for secondary intervention, all EVAR patients still require surveillance to trigger secondary interventions that prevent late failure.

METHODS
We examined secondary interventions, indications and imaging modality that triggered interventions in relation to stent-grafts implanted after 2008 in one center. A total of 638 patients underwent standard EVAR between 2008 and 2015. Bi-planar radiography (AXR) and duplex ultrasound (DUS) was performed at 1 month and annually thereafter. CTA was routinely performed at one month. (prompting CTA when required) continues to be effective in detecting complications and interventions. The value of Plain X-rays (promting CTA when required) continues to be effective in detecting complications and interventions. The primary modality of surveillance imaging that triggered intervention was AXR in 8 (9%), CTA in 24(28%) and DUS in 65 (75%). In 10 (11%) patients the relevant complication was detected on two modalities during the same surveillance visit.

RESULTS
553 patients undertook surveillance locally, median follow-up was 34 months (IQR 16-50 m). 1,382 completed patient-years of surveillance were analysed. Secondary interventions performed during this period were reviewed.

79 (14%) patients underwent 110 secondary interventions in this period. Interventions were planned procedures on 95 occasions of which 8 were triggered by symptomatic presentation while the remaining 87 were triggered by surveillance imaging (9 of whom did have symptoms on direct questioning but failed to self-present). The remaining 15 interventions were emergencies or treating complications of other interventions.

CONCLUSION
Surveillance remains as important as ever despite a change in the profile of complications and interventions. The value of Plain X-rays is evident from this analysis. Surveillance based on DUS and AXR, prompting CTA when required) continues to be effective in detecting the need for intervention.

Giant Abdominal Aortic Aneurysms: clinical significance and surgical management

Calì Filippo1, Salvina Diliberti1, Michele Savaia1, Ernesto Doffria1, Ginevra Fernando1, Salvatore Dell’Aira2, Nicola Reina1
1. Vascular Surgery Unit P.O. «S. Elia» Caltanissetta, Caltanissetta, Italy, Italy
2. Vascular Interventional Radiology Unit P.O. S. Elia, Caltanissetta, Italy

BACKGROUND
With increasing age of the general population, a higher awareness of the disease, better screening methods and the option of less invasive therapeutical strategies, the incidence of abdominal aortic aneurysms (AAA) is rising steadily. Giant (≥8 cm) abdominal aortic aneurysm (GAAAs) is nowadays a rare event . The authors report about 25 patients with GAAAs.

MATERIAL AND METHOD
From October 2012 to March 2016, 25 individuals underwent AAA open surgery, 3 women and 22 men with giant AAA including 14 emergency operations. Demographic and aneurysm-specific data, comorbidities, operative morbidity, mortality, and late outcome were analyzed. Social, cultural and economic factors were associated with GAAS patients and a great familial predisposition (9 patients/25), a high incidence of current smokers and a high incidence of chronic obstructive pulmonary disease were observed. All patients were successfully operated in 4 cases using an aortoiliac Y-graft bypass technique, in 20 using an aorto-aortic graft and in 1 case using a aorto-bifemoral bypass. In all cases a Cell saver technique was used during the surgical procedure.

RESULTS
Seven patients died during intensive care after emergency surgical procedure, four of these died of multi-organ failure and three of myocardial infarction. Eighteen patients had good postoperative outcome. In our experience procedure-related outcomes showed significant differences in operative blood loss and length of hospital stay compared with AAA < 8 cm patients, both in elective surgery and open surgery, 3 women and 22 men with giant AAA including 14 emergency operations. Demographic and aneurysm-specific data, comorbidities, operative morbidity, mortality, and late outcome were analyzed. Social, cultural and economic factors were associated with GAAS patients and a great familial predisposition (9 patients/25), a high incidence of current smokers and a high incidence of chronic obstructive pulmonary disease were observed. All patients were successfully operated in 4 cases using an aortoiliac Y-graft bypass technique, in 20 using an aorto-aortic graft and in 1 case using a aorto-bifemoral bypass. In all cases a Cell saver technique was used during the surgical procedure.

CONCLUSIONS
The midterm outcome of large aneurysms after EVAR was associated with increased rates of aneurysm-related death, unrelated death, and rupture. Surgical open treatment of Giant AAAs has showed that it can be performed safely and effectively. Anyway Aneurysms with greater diameter are related to a higher risk of perioperative death after surgical emergency operation, a shorter life expectancy, and a higher risk of rupture and aneurysm-related death.
Compliance with surveillance following endovascular aortic aneurysm repair

Iain Roy, Srinivasa Vallabhaneni
Liverpool Vascular & Endovascular Service, Liverpool, United Kingdom

BACKGROUND
Surveillance is considered essential after EVAR, but difficulties in achieving compliance have been commented upon as a significant barrier. In our institution one whole-time-equivalent administrator manages the EVAR programme and surveillance. The administrator organises all appointments, coordinated for the same day whenever possible and contacts patients that fail to attend. Surveillance is transferred if they relocate and discontinued if they become too frail to have a secondary intervention. EVAR co-ordinator also ensures that significant findings are reviewed.

METHODS
We performed a retrospective service review of compliance with surveillance following standard EVAR. All EVAR patients enrolled into our local surveillance programme after EVAR between 2008 and 2015 were included.

RESULTS
Of the 553 patients enrolled into surveillance, 130 (24%) died while on surveillance and 21 (4%) were discharged due to frailty or relocation. The remaining continue to be invited for surveillance and have completed a total of 1392 patient surveillance-years with a median follow-up of 34 months (IQR 16-50 months). A total of 1930 surveillance visits were indicated during the period, of which 1795 were taken up representing a compliance with 93% of appointments. Only 34 (6%) patients were lost to follow-up, defined as missing their last two surveillance visits. Utilisation of plain film radiography was better than DUS or CTA, which were additionally affected by patient suitability (BMI & renal function).

CONCLUSION
Excellent compliance with EVAR surveillance is achievable within a large volume institution with dedicated administrative support. Poor compliance with surveillance, if noted, is a remediable problem.

Fenestrated and branched thoracic endografts for complex arch pathology

Robert Ma, Ming Yii
Monash Medical Centre, Melbourne, Australia

Aortic arch pathology presents the surgeon with a complex challenge. The advent of thoracic stenting for aneurysmal disease has added to the armamentarium, in often comorbidly burdened patients, however to date, treatment has often required major debranching or bypass procedures to ensure an adequate landing zone. The development of scalloped, fenestrated and/or branched thoracic endografts may help in providing a solution to some of these more complex cases. We present five consecutive thoracic fenestrated and or branched endograft cases, and discuss key features of case planning, procedural tips, and the outcome in a cohort which included 2 patients with Kommerel’s diverticulum. Our cases demonstrate that thoracic fenestrated/branched endografts can provide a safe solution for complex thoracic anatomy without the requirement for simultaneous or staged debranching procedures.
Comparing the efficacy of an angiosome-directed versus an indirect approach to arterial revascularisation in optimising wound healing outcomes for patients with diabetes and critical limb ischaemia: a literature review

Benedictine, Y.C. Khor1, Pamela Price1
Glasgow Caledonian University, Glasgow, United Kingdom

BACKGROUND
Ischaemic ulcerations have been reported to persist and/or deteriorate despite technically successful revascularisations; a higher incidence of which affects patients with diabetes and critical limb ischaemia. Specifically in the context of wound healing, it is unclear if applications of the angiosome concept (Taylor & Palmer, 1987; Attinger et al., 2006) in lower-limb vascular surgery in ‘direct revascularisation’ would be able to improve local perfusion to the site of ulceration better than the current ‘best vessel’ or ‘indirect revascularisation’ strategy (Forsyth et al., 2015).

METHODOLOGY
A literature search was conducted in eight electronic databases, specifically AMED, CINAHL, MEDLINE, ProQuest Health & Medicine Complete, ProQuest Nursing & Allied Health Source, The Cochrane Library, TRIP database and ScienceDirect. Articles were screened against a pre-established inclusion and exclusion criteria to determine eligibility, and the Newcastle-University Scale was used to appraise the methodological quality of included studies.

FINDINGS
Four retrospective studies (Fossaceca et al., 2013; Söderström et al., 2013; Acín et al., 2014; Lejay et al., 2014) of varying methodological quality were eligible for inclusion in this review. Focusing on studies of higher methodological quality, giving a representative sample of 280 subjects, direct revascularisations was found to be superior than indirect revascularisations (p-values 0.04 and <0.001), and appear to result in a nearly twofold increased probability (HR, 1.97; 95% CI, 1.34-2.90) for subjects undergoing direct revascularisations in achieving wound healing for patients with coexisting diabetes and CLI.

CONCLUSION
Within the limits of technical feasibility, it appears that re-calibrating the revascularisation strategy to incorporate the angiosome concept may be more efficacious than an indirect approach to revascularisations in achieving wound healing for patients with coexisting diabetes and CLI.

References

Percutaneous mechanical rotational thrombectomy in complex bypass occlusions

Bruno Migliara
Casa di Cura Pederzoli, Peschiera del Garda, Italy

INTRODUCTION
By-pass occlusion in patients with critical limb ischemia (CLI) is a very challenging and dramatic situation related to a high risk of death and amputation. The risk of limb loss is from 20 to 50% in literature 1.2. The treatment of this condition could be: surgery, thrombolysis, thromboaspiration or mechanical thrombectomy.3,4,5

MATERIAL AND METHOD
From April 2014 to February 2016 (22 months), we performed 28 (23 male / 5 female; median age = 71.3 y) percutaneous rotational mechanical thrombectomies in patients with CLI (5 Rutherford 4; 21 Rutherford 5 and 3 Rutherford 6) and occluded bypass. The by-passes were: 12 femoro-popliteal above the knee; 17 femoro-popliteal below the knee or femoro-tibial. In 7 cases we used a double access: antegrade from the common femoral artery and retrograde from the tibial vessels (5 cases) or retrograde directly from the occluded bypass (2 cases). The average time to obtain complete restoration of distal flow was 11.4 minutes.

RESULTS
The immediate success rate was 100%; with 6 occlusions (20,7%) during follow-up, that were treated: 1 with percutaneous mechanical thrombectomy; 2 with redo bypass surgery; 3 with major amputation. Amputation free survival is 88,7%. We have had no major complications related to the procedure: death, cerebral haemorrhage or haemorrhage with transfusion. We only have had 5 minor complications: 1 distal native artery dissection; 1 vein bypass perforation; 1 distal tibial artery perforation; 2 distal embolizations. All of these were resolved during the same procedure.

CONCLUSIONS
Percutaneous rotational mechanical thrombectomy is an effective and safe treatment in patients with CLI and bypass occlusion, with a high rate of limb salvage, with a very rapid blood flow restoration, without major complications and with only minor complications, all treated during the same procedure.

References

Exclusive endovascular treatment of severe TASC C and D external iliac artery occlusive disease with a new dual component stent

Bertrand Saint-Lebes
Rangueil University Hospital, Toulouse, France

PURPOSE
External iliac artery occlusive lesions are difficult to treat. Especially when the disease is close to common femoral artery, such as in TASC C and D lesions. In this type of severe lesions, surgery remains the first line treatment. Endovascular treatment is less invasive, however it seems to offer a lower long-term patency. We present our results of external iliac artery TASC C and D lesions stenting through this prospective, multicenter study.

MATERIAL AND METHODS
All patients with severe occlusive external iliac artery disease were treated by endovascular way in 3 vascular surgery unit. We performed a systematic angioplasty and stenting. All stenting were performed with a new generation self-expanding stent to adapt to the biodynamic constraints of the external iliac artery. The stent naturally conforms and allows vessel movement, especially when disease is close to femoral artery.

RESULTS
From 09/2012 to 11/2015, we treated 104 limbs in 96 patients (74 men, sex ratio 77%). The mean age was 66 years (range 46-92). Majority of them were Rutherford III (60 patients, 61%) and Rutherford IV (14 patients, 14%). They presents severe occlusive disease of the external iliac artery, classified TASC C in 58% (57 cases), and TASC D in 42% (42 cases). All procedures were completed with a 100% success rate. More frequent risk factors was tobacco (95%), dyslipidemia (81%), obesity (47%). Out Follow up was 13 months (1 to 37 months). 1 patients died at 1 months during an aortic procedure (peri operative mortality rate : 0.9%). One thrombosis occurred (0.9%) and 4 stenoses (3.8%) were treated during FU. Our limb salvage was 100% without any major amputation. The late survival rate was 98% at 24 months and the primary patency was 94% at 12 and 24 months and 88% at 36 months. The assisted patency was 98% at 36 months. All patients become asymptomatic after treatment (< Rutherford II), with 83% Rutherford II and 17% Rutherford I.

CONCLUSION
The new generation stents offer a mechanical design allowing greater conformability for high flexibility areas such as the external iliac artery. Our results are promising in patients with high selected TASC. A randomized study with long term follow up will assess the safety and accuracy of this indication.

The impact of angiosome-targeted distal endovascular procedure on healing rate and outcome in critical lower limb ischemia

Alec Duijslaeger*, Timothy Versyck, Alexander Croo, Caren Randon, Frank Vermassen
1. Ugent, Hamme, Belgium

INTRODUCTION
3-10% of the worldwide population is suffering from peripheral arterial disease and 1-3% will ultimately develop critical limb ischemia (CLI). One of the options to avoid major amputation and secure a better quality of life is an endovascular revascularization. The angiosome-concept divides the foot into six anatomic regions (angiosomes) fed by distinct source arteries arising from the posterior tibial, anterior tibial and peroneal arteries. This study investigates whether an endovascular procedure to the artery directly feeding the ischemic angiosome has an impact on wound healing, major amputation and mortality rate.

MATERIALS/METHODS
Retrospective analysis with prospective follow-up was performed at Ghent University Hospital of 131 non-healing ischemic wounds requiring endovascular revascularization in 109 patients. For every patient the site of the ulcer, the treated artery and the outcome were identified. Based on this information the legs were divided into direct revascularization (DR) and indirect revascularization (IR).

RESULTS
DR feeding the ulcer area was achieved in 88 legs (67%) compared with IR in 43 legs (33%). Revascularization was performed to the anterior tibial artery (49%), posterior tibial artery (28%) and peroneal artery (29%). There were no differences in comorbidities and wound characteristics except for ulcer localization and the treated vessel between the two groups. DR was not able to accomplish a higher healing rate, lower amputation rate or lower mortality rate compared to IR (p= 0.258, p= 0.828, p= 0.775). Wound healing (P = 0.007) reduces the risk of mortality. Wound infection (p= 0.038), high CRP (p= 0.007), renal insufficiency (p= 0.024) and a history of major amputation (p= 0.043) decreases wound healing rate. Patients who need a re-operation have a higher risk for minor amputation (p= 0.004).

CONCLUSION
Revascularization plays a crucial role in the treatment of ischemic lower extremity wounds. Similar results were obtained with regard to healing rates, limb salvage and mortality after DR compared to IR. Therefore revascularization should not be denied to patients in whom only indirect revascularization is possible.
Endovascular treatment of an axillary arterial injury following a traumatic shoulder dislocation

Roger Rodrigues, Ricardo Pereira, Alfredo Gil Agostinho, Óscar Gonçalves, Antonio Albuquerque Matos
Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Shoulder dislocation is a very common shoulder injury that may result from a fall, sports or trauma. Multiple complications have been reported, most commonly, recurrent dislocation, axillary nerve injury and bone defects. Axillary artery injury secondary to an shoulder dislocation without bone fracture is extremely rare. Less than 1% of axillary artery injuries are caused by this type of mechanism. The nature of the injury might range from complete transection of the axillary artery to intimal tears, branch avulsion, or pseudoaneurysm formation. Association with a severe brachial plexus lesion is common in such injuries.

Concomitant orthopedic and vascular injuries are associated with a high rate of limb loss with reports ranging from 18% to 38%. The best intervention to restore blood flow or to stop hemorrhage is not always clear. Open surgery is the classical treatment of such lesions, consisting of direct suture at the site of the rupture or arterial reconstruction with a patch or a bypass.

Minimally invasive percutaneous endovascular therapies offer an attractive treatment alternative.

We report a case of a 74-years-old man who suffered a vascular and neurological injury after a recurrent gelenohumeral joint dislocation and treated with a covered stent implant.

In this case the option for the endovascular treatment was due to changes in hemostasis caused by anticoagulant therapy and because the risk of adverse events in an open surgical revascularization was considerable.

After procedure radial and ulnar pulses were palpable and hand temperature increased. An electromyography was subsequently performed that showed severe damage of the brachial plexus.

References

Chimney CERAB: an alternative new technique for extensive or luxtarenal aortoiliac occlusive disease

Kim Taeymans¹, Peter Goverde¹, Martijn Jijkstra², Michel Reijnen³, Andrew Holden², Andreij Schmidt⁴
1. Vascular Clinic ZNA, ZNA Stuivenberg, Antwerp, Belgium
2. Dept Vascular Surgery, Rijnstate Hospital, Arnhem, The Netherlands
3. Dept Interventional Radiology, Auckland City Hospital, Auckland, New Zealand
4. Dept Angiology, Leipzig University Hospital, Leipzig, Germany

AIMS
Based on the promising results of the Covered Endovascular Reconstruction of the Aortic Bifurcation or CERAB, we wanted to see if this configuration can be used to treat iuxtarenal and extensive aortoiliac occlusive disease in combination of chimney stents to preserve visceral and renal arteries.

METHODS
Patients were treated with the Chimney - CERAB technique. Endovascular bifemoral & brachial access; recanalisation of the both aortoiliac axes and predilatation. For preservation of mesenteric and/or renal vessels placement of, first, an ePTFE encapsulated covered balloon expandable stainless steel stent in the visceral artery (from brachial) and the placement of a 12 mm ePTFE encased covered balloon expandable stainless steel stent in the distal aorta (9 Fr femoral). Simultaneous inflation. If needed postdilatation of the proximal part of the already expanded large diameter stent with a large balloon and extension of the aortic stent distally. Two iliac covered stents are then placed in this distal segment, in a “kissing-stent” configuration and inflated. Both stents are now making a very tight combination, simulating a new bifurcation.

RESULTS
Multi-centre, non-randomised, follow-up study. We treated now around 15 patients (January 2013 – december 2014) with aortoiliac occlusive disease. Technical success rate up till now was 100 %. Follow-up: 3 to 24 months. No 30-days mortality or SAE were observed. All reconstructions are still patent.

References
Multistep endovascular treatment of a complex pathology of the thoraco-abdominal aorta in a patient with high surgical risk

Manuela Cherchi¹, Stefano Camparini²

1. University of Cagliari, Cagliari, Italy
2. AO Brotzu Cagliari, Cagliari, Italy

AIM
Complex lesions of the thoraco-abdominal aorta are a challenging disease to treat both with open and endovascular surgery. Furthermore, morbidity and mortality are strictly related to the pre-operative status of the patient. The aim of our paper is to report a case of multistep endovascular treatment in a patient with high surgical risk.

CASE REPORT
A 74-year-old male was admitted to our Vascular Surgery Unit with 2 PAUs in the aortic arch (respectively 12 and 27 mm) and one 28mm-PAU of the descending thoracic aorta plus a 6cm-pseudoaneurysm of the abdominal aorta and a right common iliac artery aneurysm in the contest of a small type 2 thoracoabdominal aortic aneurysm. He was affected by several comorbidities, such as ischaemic cardiopathy and severe heart failure (EF 18%), arterial hypertension, hypercholesterolemia, COPD and a lung solitary mass under follow-up. Step 1: The patient underwent left carotid-subclavian artery bypass in PTFE 7mm plus TEVAR for the exclusion of the PAUs in the thoracic aorta. The subclavian artery was embolized through the release of an Amplatz plug II. Step 2: After that, he underwent EVAS to exclude the pseudoaneurysm of the abdominal aorta and the right common iliac artery aneurysm. The renal and hypogastric arteries were preserved patent.

RESULTS
The patient was dismissed asymptomatic after both the procedures with total exclusion of the PAUs, the abdominal pseudoaneurysm and the right common iliac artery aneurysm. At a 6months follow-up, there is no evidence of endoleaks. No complications occurred during the operations.

CONCLUSIONS
A multistep endovascular treatment of complex lesions of the thoraco-abdominal aorta revealed to be a valuable solution in a patient with multiple comorbidities and high cardiovascular risk.

Progressive proximal anastomosis aneurysm of an aortobifemoral prosthesis including a dominant accessory renal artery

Kim Taeymans, Peter Goverde, Katrien Lauwers, Paul Verbruggen
ZNA Stuivenberg, Antwerp, Belgium

INTRODUCTION
Male patient 62-y-old with a medical history of aortobifemoral prosthesis presents with a progressive proximal anastomosis aneurysm including a dominant accessory left renal artery. (Figure 1)

METHODS & MATERIAL
We performed a hybrid procedure under general anesthesia. We gained access from a bifemoral and left brachial open approach and placed three 7Fr sheaths. A guidewire was introduced in an antegrade manner and with a pigtail and DSA we visualised the aneurysm and the left accessory renal artery. After catheterisation of this left renal artery we performed a PTA of the narrow renal ostium. We tried to place an ePTFE encapsulated covered balloon expandable stainless steel stent but this was impossible due to the very sharp angle between renal artery and aorta. Then we placed an ePTFE encapsulated covered self expandable nitinol stent and pushed it upwards with a retrograde introduced snare kit. After this step we were able to place the 5x9mm ePTFE encapsulated covered balloon expandable stainless steel stent from the brachial approach in the earlier placed nitinol stent to secure the stent in this position. Placement of a 12x61mm ePTFE encapsulated covered balloon expandable stainless steel stent and postdilatation with a 16x20mm balloon at about 15 mm above the distal stent margin. In the distal conic segment we placed two ePTFE encapsulated covered balloon expandable stainless steel iliac stents in a kissing stent configuration and they were inflated simultaneously.

RESULTS
Angiographic control showed an exclusion of the aneurysm with optimal flow in aorta, iliac arteries and in the renal chimney graft.

CONCLUSION
This case shows that the CERAB (Covered Endovascular Reconstruction of the Aortic Bifurcation) technique can be used safely for the endovascular treatment of difficult proximal anastomotic pseudoaneurysms of aortobifemoral grafts and can be a valuable alternative for a possible EVAR solution.
**Efficacy of relining previous endovascular aortic grafts using endovascular aneurysm sealing (EVAS)**

Maria Karouki¹, Adheeb Rehman¹, Francesco Torella², Richard McWilliams³, Andrew England³, Robert K Fisher⁴

1. Liverpool Vascular and Endovascular Service, Royal Liverpool University Hospital, Liverpool, United Kingdom
2. Department of Radiology, Royal Liverpool University Hospital, Liverpool, United Kingdom
3. Directorate of Radiography, University of Salford, Salford, United Kingdom

**INTRODUCTION**

EVAS is a novel technique for treating abdominal aortic aneurysms, but relining of previous EVAR to treat type 1a/b and 3b endoleaks remains unproven.

**METHODS**

Retrospective single centre observational study performed between December 2013-2015 included patients in whom previous EVAR had been relined with EVAS. Data collection included demographics, indications, operative details and clinical outcomes. Follow up included duplex and CTA at 30 days, 6, and 12 a months. Primary outcomes were successful deployment and resolution of endoleak. Secondary outcomes included peri-operative complications and secondary interventions.

**RESULTS**

Seven patients, (6 males, mean age 82.5 years) underwent EVAS relining of previous EVAR for three suspected and 1 proven type Ilib endoleaks, and 3 confirmed type la endoleaks. In total 13 Nellix devices were successfully deployed (1 aorto-uni-iliac). All 3 type Ilib endoleaks were eradicated using proximal extension through chimney techniques. All 3 type Ila endoleaks remained treated (1-10 months); the proven type surgical intervention. Early post–operative surveillance indicated all type Ilib endoleak diagnosis remains challenging.

**CONCLUSIONS**

EVAS can safely and effectively reline previous EVAR stent grafts and may successfully treat type la and Ilib endoleaks. Chimney techniques may prove useful adjuncts however, type Ilib endoleak remains unproven.

**References**


**Clinical outcome after endovascular aneurysm sealing of Abdominal Aortic Aneurysms (EVAS): a retrospective cohort study**

Maria Karouki¹, Charles Swaelens⁴, Luigi Iazzolino³, Richard McWilliams², Robert K Fisher², Andrew England³, Francesco Torella³

1. Royal Liverpudly University Hospital Vascular Surgery department, Liverpool, United Kingdom
2. Department of Radiology Royal Liverpool University Hospital, Liverpool, United Kingdom
3. Directorate of Radiography, University of Salford, Salford, United Kingdom
4. Liverpool Vascular and Endovascular Service, Royal Liverpool University Hospital, Liverpool, UK, Liverpool, United Kingdom

**PURPOSE**

To present the clinical outcome of endovascular sealing of abdominal aortic aneurysms (EVAS) with the Nellix endoprosthesis in patients with abdominal aortic aneurysms treated in our institution.

**METHODS**

This was a retrospective, single centre, observational cohort study. A departmental database was interrogated in order to extract demographics, clinical information and outcome of all patients treated with EVAS between December 2013 and December 2015. Outcome measures included technical success (successful device deployment and absence of any endoleak at completion angiography), mortality, major complications, incidence of endoleaks, aneurysm rupture and reintervention.

**RESULTS**

Sixty-four patients (48 men) with a mean (SD) age of 78 (6.9) years were successfully treated with EVAS, with no 30-day mortality. The cohort included one patient with ruptured aneurysm, seven patients with late complications of previous aorto-iliac repairs (two open, five endovascular) and three patients who required a total of six visceral chimneys for juxtarenal aneurysms. Four patients (6%) suffered major post-operative complications and three required intervention. There were no early or late endoleaks or aneurysm rupture. After a median (range) follow-up of 12 (0-24) months, there was no aneurysm related mortality; two patients (3%) required aneurysm-related late interventions.

**CONCLUSIONS**

EVAS can be performed with good early and medium term results. Longer follow-up on larger cohorts is needed to prove the efficacy of this technique.

**Keywords**

endovascular aneurysm sealing, abdominal aortic aneurysm, computed tomography, endovascular repair, Nellix®
Tables

Table 1. Comorbidity and smoking habits

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>N. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic heart disease</td>
<td>32 (50)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>18 (28)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>8 (12.5)</td>
</tr>
<tr>
<td>Renal impairment</td>
<td>14 (22.4)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>55 (88)</td>
</tr>
<tr>
<td>History of tobacco use</td>
<td>8 (78)</td>
</tr>
<tr>
<td>Malignant disease</td>
<td>8 (12.5)</td>
</tr>
<tr>
<td>Atrial fibrillation/flutter</td>
<td>9 (14)</td>
</tr>
</tbody>
</table>

Table 2. Anatomical measurements

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortic lumen volume (ml)</td>
<td>41 (15.6)</td>
</tr>
<tr>
<td>Maximum right common iliac artery diameter (mm)</td>
<td>16 (4.9)</td>
</tr>
<tr>
<td>Maximum left common iliac artery diameter (mm)</td>
<td>16 (4.9)</td>
</tr>
<tr>
<td>Maximum right common iliac artery diameter (mm)</td>
<td>16 (4.9)</td>
</tr>
<tr>
<td>Aortic lumen volume (ml)</td>
<td>41 (15.6)</td>
</tr>
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</table>

Table 3. Treatment outside IFU

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous aortic intervention</td>
<td>8</td>
</tr>
<tr>
<td>Large neck (&gt;32 mm)</td>
<td>1</td>
</tr>
<tr>
<td>Short neck (&lt;10 mm)</td>
<td>6</td>
</tr>
<tr>
<td>Occlusive iliac disease</td>
<td>4</td>
</tr>
<tr>
<td>Aortic rupture</td>
<td>1</td>
</tr>
<tr>
<td>Neuraxial block</td>
<td>1</td>
</tr>
<tr>
<td>Narrow aortic bifurcation (≤18 mm)</td>
<td>3</td>
</tr>
</tbody>
</table>

References


Thoracic outlet syndrome complicated by double subclavian artery aneurysms – an hybrid approach

Ricardo Castro-Ferreira, Paulo Gonçalves Dias, Sírgio Moreira Sampaio, Dalila Rolim, José Fernando Teixeira

Hospital de São João, Porto, Portugal

INTRODUCTION

Subclavian artery aneurysm (SAA) can be an extremely rare complication of thoracic outlet syndrome (TOS). The arterial dilation usually occurs distal to the stenosis site causing TOS. We describe a rare case of a patient with neurological TOS with two voluminous SAA proximal and distal to interscalene triangle.

CASE REPORT

A 55-years-old female patient, with no prior medical conditions, was referred to vascular surgery clinic with symptoms of neurological TOS. The radial pulses were absent but the patient had no arterial complaints. In the work-up angio-CT two consecutive SAA (39 and 42mm) divided by anterior scalenus muscle were diagnosed. The aneurysms were excluded by covered stent angioplasty after closure of Willis flow assessment by transcraanial Doppler. Subsequently the patient was submitted to anterior scalenectomy in operating theatre. The symptoms completely reversed and the patient was discharged two days after surgery. Follow-up angio-CT confirmed SAA exclusion. Patient remains asymptomatic 6 months after the treatment.

DISCUSSION

The term thoracic outlet syndrome was originally used in 1956 by RM Paet to designate compression of the neurovascular bundle at the thoracic outlet. Since its original description, a multitude of clinical entities was associated with TOS1. SAA is a rare but potential dangerous complication of TOS2. Whereas historically SAA have been managed by open surgery, the novel endovascular devices offer an elegant and safer approach to this condition. Although first rib resection is emerging as the regular method of thoracic outlet decompression3, this particular case imaging was highly suggestive of scalenus muscle compression. This case exemplifies how endovascular and open approaches can elegantly work together with remarkable results. To the best of our knowledge, this is the first description of a double subclavian artery aneurysm in the context of TOS.

References

Percutaneous treatment of stenosis and aneurysmatic dilatation of the common carotid artery and left internal carotid artery with self-expandable novel mesh covered stent in patient submitted to thromboendoarterectomy previously

Cinzia Moncalvo, Vincenzo Puma, Angelo Laurenza, Giuseppe Carosio, Paolo Cioffi
ZNA Stuivenberg, Antwerp, Belgium

HISTORY
P.A.B., man, 72 y.o. suffering from norm hypertension, dyslipidemia, polyneuropathy, partial gastrectomy, anemia. Doppler ultrasound: critical stenosis of the left internal carotid artery, confirmed by the angiography (01.22.2015) because of it the patient was submitted to thromboendoarterectomy. 04/15/2015: Doppler ultrasound detected a critical restenosis at distal edge of the patch on the distal portion of the common carotid artery and at the bifurcation with the left internal carotid artery. Angiography: aneurysmatic dilatation of the patch on the distal portion of the common carotid artery and at the bifurcation with the carotid artery.

TREATMENT
Right femoral arterial access with 8 F sheath, guiding catheter AL 0.75 8 F, a distal embolic protection filter is positioned and two self-expandable stents covered with a novel PET mesh (C-Guard 8 x 40 mm x 40 mm 9 distal and proximal) are implanted and partially overlapped. Post-dilatation with 5.0 x 20 mm balloon inflated at 10 atm. Good final result. No complications. Angiographic control after two months: maintaining of the good angiographic result, complete exclusion of the aneurysm, no evidence of endoleaks or restenosis.

CONCLUSIONS
The stent C-Guard can be considered the stent of choice in presence of aneurysm of the carotid artery because: the PET mesh that covers it reduces the risk of embolization immediately upon release and during the postdilatation, once released the stent exerts a radial force directed outward on the vessel walls, re-establishing the patency of the vessel, it prevents plaque prolapse and late embolic events, it allows to exclusion of the aneurysm providing a more physiological laminar flow into the lumen.