

EJVES VASCULAR FORUM ABSTRACTS

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Temporary Vascular Debranching to Facilitate Retroperitoneal Tumour *en bloc* Resection

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Background: Oncovascular teams are known to be a cornerstone in planning and facilitating *en bloc* resection of large retroperitoneal masses. Vascular surgeons can help with dissection close to major vessels by vascular reconstruction when necessary, and also in performing specific procedures that can facilitate safe and optimal tumour mass resection. Two cases are reported where temporary vascular debranching of major arteries allowed safe tumour harvesting.

Case reports: A 68 year old man with a necrotic retroperitoneal carcinoma underwent *en bloc* resection with temporary debranching of the coeliac trunk, superior mesenteric artery, and right renal artery using a multibranched bypass from the axillary artery. The post-operative course included septic shock related to pulmonary infection requiring a 10 day stay in the intensive care unit (ICU). Renal function was normalised on day two. The patient was discharged on day 18. However, he died 78 months post-operatively from pulmonary metastases after anti-angiogenic treatment.

A 34 year old man with a retroperitoneal mature teratoma underwent *en bloc* resection with temporary debranching of the coeliac trunk, superior mesenteric artery, left and right renal arteries, and left and right common iliac arteries, with a multibranched bypass from the axillary artery. Post-operatively he required a five day stay in the ICU. Acute kidney injury (AKI) was noted, but it resolved without dialysis. The patient was discharged on day 16. After 78 months follow up he presented with chronic renal failure requiring dialysis. Follow up computed tomography angiography showed pulmonary metastases; although the metastases were manageable with surgical treatment, the patient refused further care.

Conclusions: Temporary extra-anatomical bypass from the axillary artery to the visceral arteries could be considered as an option to provide adequate perfusion and to prevent visceral ischaemia during *en bloc* resection of large retroperitoneal masses.

Superior Mesenteric Artery Pseudoaneurysm Induced by Accidental Ingestion of a Foreign Body: Case Report

Ahmed Al Harthy, Alexandre Belot and Patrick Feugier

Background: Superior mesenteric artery (SMA) pseudoaneurysm is a very rare condition, typically associated with trauma, inflammation, and infection, and as a post-operative complication. If left untreated it can lead to serious consequences such as rupture and fatal haemorrhage.

Report: A 17 year old male presented to the emergency department with a history of intermittent progressive epigastric pain with no preceding significant symptoms of a possible cause. He was initially treated conservatively until the intensity of pain was so severe an abdominal computed tomography (CT) scan was justified. A pseudoaneurysm of the SMA was found. Full inflammatory and immunological workup was unremarkable. Repeat CT scan showed the SMA pseudoaneurysm was larger, mandating surgical intervention; the vascular surgeon suggested an exploratory laparotomy. Intra-operatively, unexpectedly, a wooden foreign body measuring 5.0 × 0.3 × 0.5 cm was seen once the aneurysm sac was opened. The pseudoaneurysm was repaired and the abdomen closed after ascertaining that all other organs were intact. The patient had a simple recovery with no complications and was discharged home. The follow up CT scans were unremarkable.

Conclusion: Pseudoaneurysm of the SMA in the paediatric age group is an extremely rare and life threatening phenomenon. The clinical presentation may be subtle, leading to delayed diagnosis. Early surgical intervention may be lifesaving and prevent further complications.

EVAR Solution For Acutely Thrombosed Abdominal Aortic Aneurysm in a Patient with COVID-19

Alessandro Robaldo, Dimitri Apostolou, Federica Persi, Enrico Peano and Massimo Maione

Introduction: Acute thrombosis of an infrarenal abdominal aortic aneurysm (ATAAA) represents an uncommon but catastrophic pathology, which can lead to life threatening complications. This is a report of the infrequent use of an endovascular solution to successfully treat ATAAA in a

patient with COVID-19 viral pneumonia and ischaemia induced lower extremity neurological deficits.

Report: An 89 year old white male, with a history of cardiovascular comorbidities was admitted to the emergency room with dyspnoea associated with the sudden onset of abdominal and back pain followed by partial motor and sensory deficits in both legs. The CT scan showed both an 8 cm infrarenal AAA with middle (inferior mesenteric artery patent) and distal thrombotic occlusion of the sac and non-aneurysmal but thrombosed common iliac arteries. An additional finding was imaging features typical of interstitial pneumonia. After the molecular test detected active COVID-19 infection, the patient was treated as an emergency with an aorto-uni-iliac stent graft and femorofemoral crossover graft. The post-operative course was uneventful with AAA exclusion and disappearance of ischaemic symptoms. There were no vascular complications. At three month follow up the patient remained asymptomatic and was looking after himself.

Discussion: This case supports the feasibility and safety of a minimally invasive endovascular procedure to treat ATAAA in selected patients with favourable anatomy and high risk of respiratory complications in the context of the COVID-19 pandemic.

Spontaneous Isolated Bilateral Iliac Artery Dissection in a Patient with Relapsing Polychondritis

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Introduction: Isolated iliac artery dissection (IAD) is a rare form of arterial dissection. The most commonly known causes of non-traumatic isolated iliac dissection are connective tissue diseases. Relapsing polychondritis (RP) is a rare inflammatory and multisystemic disease, typically affecting cartilage and connective tissue. Cardiovascular complications occur in approximately 25% of patients with RP.

Case description: The first case of spontaneous isolated bilateral iliac artery dissection in a patient with RP is reported. A 48-year-old woman presented with a two year history of severe right leg intermittent claudication (Rutherford category 3). The complaints were initially attributed to joint pathology associated with RP. However, clinical examination and computed tomography angiography led to a diagnosis of bilateral IAD. A dissection in the left common iliac artery (CIA) began at its origin and ended at the origin of the internal iliac artery, with the true and false lumen both comprising half of the entire lumen. The right CIA was completely occluded from its origin to the origin of the right internal iliac artery. The patient was treated endovascularly by bilateral CIA stent placement with covered stent grafts (Bentley BeGraft), 8 × 57 mm on the right side and 8 × 37 mm on the left. The patient recovered pedal pulses, the stent remained patent, and the patient was asymptomatic at the one month follow-up.

Discussion: Early identification of intermittent claudication is necessary to prevent the progression of complications in

patients with RP. Vascular surgeons should be aware of IAD as the potential first presentation of underlying systemic disease. Internists should also keep vascular complications in mind in patients with systemic diseases like RP suffering from unexplained complaints in the lower limbs, undertake a basic vascular examination, and make a vascular referral where appropriate.

Cystic Adventitial Disease of the Popliteal Vein, a Rare Cause of Lower Limb Deep Vein Thrombosis

Ricardo Correia, Nuno Gião, Rita Bento, Rita Garcia, Nelson Camacho and Maria E. Ferreira

Introduction: Cystic adventitial disease (CAD) is characterised by the accumulation of gelatinous fluid within the adventitial layer of a blood vessel. Over 90% of CAD occurs in the arterial system. Venous CAD most commonly involves the iliofemoral rather than the popliteal segments.

Report: This is the report of a 49 year old female patient with a previous right leg deep vein thrombosis (DVT). She presented to a vascular outpatient appointment with recurrent right lower extremity swelling. Venous duplex ultrasound showed an ectatic and incompetent right popliteal vein. Computed tomography (CT) venography showed focal ectasia of the right popliteal vein resulting from an eccentric low density cyst with a diameter of 15 mm. Under general anaesthesia, the patient was placed in the prone position. A lazy S incision was performed in the right popliteal fossae. The popliteal vein had an eccentrically thickened lateral bulge. After systemic heparinisation, a longitudinal venotomy, endophlebectomy, and *en bloc* cyst removal were performed sequentially. Patch popliteal venoplasty was performed subsequently using the ipsilateral small saphenous vein. After six months, the patient remains on rivaroxaban. A follow up venous duplex ultrasound showed vein reflux through a standard calibre popliteal vein without evidence of cyst recurrence.

Conclusion: Venous CAD is a rare disease and should be considered if previous DVT or symptoms mimicking DVT occur. Cyst resection and reconstruction with vein patch, venous or synthetic graft is the most commonly used strategy and has lower rates of cyst recurrence and need for re-operation.

Early Experience with the New Ovation Alto Stent Graft in Endovascular Abdominal Aortic Aneurysm Repair

Gianmarco de Donato, Edoardo Pasqui, Claudia Panzano, Giuseppe Galzerano, Alessandro Cappelli and Giancarlo Palasciano

Introduction: Since 2010, the Ovation Abdominal Stent Graft System has offered a new sealing concept, achieved by a sealing ring filled with polymer 13 mm from the renal arteries. In the latest version, called Ovation Alto, the sealing ring is relocated 6 mm closer to the top of the fabric. This study describes the early clinical outcomes, after

CE Mark approval in August 2020, of endovascular aneurysm repair with the Alto endograft.

Report: Eleven patients underwent endovascular aneurysm repair with implantation of Ovation Alto endografts. All patients were male, and the median age was 75 (IQR 5.5) years. Hostile proximal aortic neck (<10 mm) was identified in six cases (54.5%). All procedures were performed using bilateral percutaneous approaches with no groin complications. The median procedure time was 58 (IQR 7.2) minutes, the median contrast volume used was 65 (IQR 4.2) mL, and the median blood loss 40 (IQR 12.4) mL. Technical success was achieved in all cases. The median stent graft landing distance between the top of the fabric and the lowest renal artery was 1.4 (IQR 0.8) mm. No intra-operative high flow endoleaks were registered. At one and six month follow up, there was 100% clinical success (no type I/III endoleak, sac enlargement, stent graft migration, polymer leakage, abdominal aortic aneurysm related mortality, or secondary intervention).

Discussion: Initial experience confirms the early technical and clinical success of the new Ovation Alto stent graft. Technical modifications to the endograft could allow for accommodation of a more comprehensive range of anatomies on label. Further studies are needed to evaluate long term durability outcomes.

The Impact of the First COVID-19 Wave on European Vascular Education

António Pereira-Neves, Liliana Fidalgo Domingos and Stefano Ancetti

Introduction: Public health was severely affected by the first wave of the COVID-19 pandemic, imposing major daily life changes across the world, including health services that had to restructure significantly.

Report: Considering the potential side effects on the quality of vascular training, a digital survey (Survey Monkey®) was developed and submitted to vascular trainees from 7 July to 20 September 2020 through European mailing lists and social media platforms. The aim was to evaluate the standpoint of vascular education across Europe during the first wave of the COVID-19 pandemic and to identify possible measures to mitigate the negative effects on vascular trainees. A total of 104 answers across 27 European countries were received. The mean age of the responders was 31.2 ± 3.58 years, of whom 60.6% were male. Forty-four (42.3%) of the vascular trainees actively participated on the COVID-19 front line; 76.9% of them reported a decrease in surgical procedures performed and/or assisted, with 60% reporting a reduction >50%. Emergency procedures were the only surgical activities for 7.5% of the trainees. Annual or final examinations were re-scheduled or cancelled for 16.3% and 10.6% of the participants, respectively. According to the survey, 73.5% of the responders claimed that the first wave of the COVID-19 pandemic had a negative impact on vascular education and 73.4% agreed the need for “compensation measures” to be taken.

Discussion: The first wave of the COVID-19 pandemic brought a significant negative impact on vascular education. Considering an extended pandemic situation, it is believed that compensatory measures should be addressed to maintain the high standards of vascular education and develop new educational tools for future trainees.

Arterial Embolisation of Paediatric Mesenteric Pseudoaneurysm Secondary to Blunt Abdominal Trauma

Chris Bent

Introduction: Ruptured post-traumatic pseudoaneurysms of the superior mesenteric artery (SMA) are potentially life threatening and rarely reported in the paediatric population. The purpose of this report is to highlight the potential of endovascular treatment in this age group.

Report: A 16 year old male presented to the emergency department (ED) with seizure like activity. He was hypotensive and tachycardic with worsening abdominal distension. Past medical history was significant for a motor vehicle accident 16 days previously for which he was hospitalised and underwent emergency surgery. During the previous hospitalisation the patient was found to have liver and renal lacerations, haemoperitoneum, and small and large bowel serosal injuries. At surgery, haemostasis of liver lacerations was achieved, a traumatic anterior abdominal wall hernia was repaired, and short segment small and large bowel resections with primary anastomoses were performed. The patient was discharged uneventfully from the outside hospital eight days prior to presentation. Computed tomography in the ED at presentation identified haemorrhage from a ruptured 2 cm SMA pseudoaneurysm. This was successfully treated by transcatheter microcoil embolisation. The patient was discharged uneventfully and was without abdominal complaints at the 29 month clinic follow up.

Discussion: Post-traumatic SMA pseudoaneurysms in the paediatric population are rare; endovascular management may be a successful alternative or adjunct to surgical repair.

Acute Phase Pilot Evaluation of Small Diameter Long iBTA Induced Vascular Graft “Biotube” in a Goat Model

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Objective: There is a need for small diameter vascular substitutes in the absence of available autologous material. A small diameter, long tissue engineered vascular graft was developed using a completely autologous approach called “in body tissue architecture technology (iBTA)”. The aim of this pilot study was to evaluate “Biotubes”, iBTA induced autologous collagenous tubes, for their potential use as small diameter vascular bypass conduits.

Methods: Biotubes (internal diameter 4 mm, length 50 cm, wall thickness 0.85 mm) were prepared by subcutaneous embedding of plastic moulds (Biotube Maker) in three goats for approximately two months. Allogenic Biotubes (length 10 cm [$n = 2$], 15 cm [$n = 2$], 22 cm [$n = 2$]) were bypassed to both carotid arteries by end to side anastomosis with their ligation between the anastomoses in another three goats. Residual Biotubes were examined for their mechanical properties. After four weeks, the harvested Biotubes were evaluated histologically.

Results: All Biotubes had sufficient pressure resistance, approximately 3000 mmHg. Although wall thickening occurred at two proximal anastomosis sites, all six grafts were patent without luminal thrombus formation, stenosis, or aneurysm deformation throughout the implantation period. Endothelial cells covered both anastomosis sites almost completely, with partial covering in the central portion of the grafts. Furthermore, α smooth muscle actin positive cells infiltrated the middle layer along almost the entire graft length.

Conclusion: This preliminary study showed that small diameter, long, tissue engineered Biotubes could function properly as arterial bypass conduits in a large animal for one month without any abnormal change in vascular shape. Thus, small diameter, long Biotubes are potentially viable conduits, which are biocompatible and labour non-intensive, and therefore, suitable for clinical practice. Additionally, Biotubes can start the regeneration process in a short period of time.

Multidisciplinary Team Decisions in Management of Abdominal Aortic Aneurysm: A Service and Quality Evaluation

Daniel J. Drayton, Susannah Howard, Christopher Hammond, Hilary L. Bekker, David A. Russell and Simon J. Howell

Objective: To investigate whether decisions made by the multidisciplinary team (MDT) were implemented and review the MDT process to identify areas for improvement.

Methods: This was a retrospective service evaluation project. Consecutive cases of abdominal aortic aneurysm (AAA) from vascular surgery MDT meetings were reviewed. MDT outputs were extracted and compared with implemented clinical management obtained from the electronic health record (EHR) to determine concordance. Cases were re-reviewed to understand reasons why planned management was not implemented.

Results: From 42 MDT meetings, 106 patients were identified. Twenty four patients were discussed at two MDTs and four patients were discussed three times. Of the 106 patients, 91 (85.8%) were treated as planned, seven (6.6%) declined planned management and opted for conservative management, four (3.8%) patients died before treatment, and four (3.8%) had alternative management for individual

reasons. Of the patients discussed multiple times, 15 (53.6%) needed review by a consultant anaesthetist or additional investigations.

Conclusion: This service evaluation found a similar proportion of cases as in existing oncology literature where the MDT decision was not implemented. However, the natural history of AAA brings nuance to this finding. Facilitating patient preference is an important problem that will require future study. This evaluation resulted in local improvements to the MDT process for AAA.

Five Year Outcomes in Patients with End Stage Renal Disease Who Received a Bioengineered Human Acellular Vessel for Dialysis Access

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Objective: Patients with end stage renal failure who require haemodialysis suffer morbidity and mortality due to vascular access. Bioengineered human acellular vessels (HAVs) may provide a haemodialysis access option with fewer complications than other grafts. In a prospective phase II trial from 2012 to 2014 (NCT01744418), HAVs were implanted into 40 haemodialysis patients at three sites in Poland. The trial protocol for this "first in man" use of the HAV contemplated only two years of follow up, and the trial results were initially reported in 2016. In light of the retained HAV function seen in many of the patients at the two year time point, follow up for patients who were still alive was extended to a total of 10 years. This interim follow up report, at the long term time point of five years, assessed patient and conduit status in those who continued routine dialysis with the HAV.

Methods: HAVs are bioengineered by culturing human vascular smooth muscle cells on a biodegradable polymer matrix. In this study, patients with patent HAV implants at 24 months were followed every three months, starting at month 27 through to month 60, or at least five years post-implantation. This report contains the follow up functional and histological data on 29 of the original 40 patients who demonstrated HAV function at the 24 month time point.

Results: Eleven patients completed at month 60. One patient maintained primary patency, and 10 maintained secondary patency. Secondary patency was estimated at 58.2% (95% confidence interval 39.2–73.1) at five years, after censoring for deaths ($n = 8$) and withdrawals ($n = 1$). No HAV conduit infections were reported during the follow up period.

Conclusion: This phase II long term follow up shows that the human acellular vessel (HAV) may provide durable and functional haemodialysis access for patients with end stage renal disease.

Hybrid Management for Anterior Nutcracker Syndrome: Left Renal Vein Stenting with Laparoscopic Stent Exofixation

Sébastien Multon, Jérémie Jayet, Raphaël Coscas, Isabelle Javerliat and Marc Coggia

Introduction: Left renal vein stenting (LRVS) for the treatment of anterior nutcracker syndrome (NCS) has been associated with a significant risk of stent migration into the inferior vena cava or right ventricle.

Surgical technique: A hybrid technique is reported for the treatment of NCS to prevent stent migration. The first part of the procedure consists of LRVS at the level of the aortomesenteric compression. The second part consists of laparoscopic stent exofixation through a transperitoneal direct approach. The left renal vein is exposed in order to visualise the stent meshes through the venous wall. Stent exofixation is performed with a simple transfixing polypropylene stitch, reinforced with a Teflon pledget.

Discussion: The hybrid treatment of anterior NCS combining laparoscopic stent exofixation with left renal vein stenting is a simple and low morbidity technique. Further follow up data are needed to evaluate its potential benefit in reducing the risk of left renal vein stent migration.

Systematic Reviews of the Literature Are Not Always Either Useful Or the Best Way To Add To Science

Janet T. Powell and Mark J.W. Koelemay

Systematic reviews are becoming more popular as a way of doing research; however, not all systematic reviews are clinically useful and sometimes another type of review (scoping, topical, or critical) would be of greater value to the clinical and scientific community. The different types of review and their use are described, illustrated by examples relevant to vascular surgery.

Outcomes of Acute Limb Ischaemia in Patients with Underlying Malignancy: A Systematic Review

Aisling Kelly, Conor Toale, Michael A. Moloney and Eamon G. Kavanagh

Objective: Previous studies have demonstrated amputation and mortality rates to be 14.3% – 30% and 11.4% – 28.9%, respectively, for all patients presenting with acute limb ischaemia (ALI). Rates of ALI are higher in patients with malignancy than in those without. Despite this, there remains uncertainty with regards to the most appropriate management for patients with cancer presenting with ALI. This is because of previously published high rates of associated morbidity and mortality in this population. The aim of this review was to summarise the available evidence reporting on outcomes of ALI in patients with underlying malignancy.

Method: A systematic review was performed in August 2020 in accordance with the PRISMA guidelines. The Medline, Scopus, Cochrane, and Embase databases were searched with the following search string ((acute limb ischaemia) OR (acute limb ischemia)) AND ((cancer) OR (malignancy)). A total of 849 papers were identified and reviewed; six studies were included. Studies were assessed for bias using the National Institute of Health/National Heart, Lung and Blood Institute Quality Assessment Tool. Data including demographics, Rutherford classification, baseline performance scores, method of revascularisation, and peri-procedural outcomes were extracted and analysed. Data were pooled based on outcomes of interest and pooled prevalence was reported with 95% confidence intervals (CI).

Results: Six studies with 284 patients with cancer were included for analysis. The pooled overall risk of amputation was 15% (95% CI 5.9 – 26.9). The pooled 30 day mortality rate was 24% (95% CI 14.7 – 34.6).

Conclusion: Despite limitations of interstudy selection bias and some clinical heterogeneity, the included studies demonstrated acceptable short and medium term outcomes for patients with cancer undergoing revascularisation for acute limb ischaemia. This is in line with current recommendations that patients with underlying malignancy should be considered strongly for revascularisation.
