

# PORTO VASCULAR CONFERENCE 2018

---

ABSTRACTS  
E-BOOK

## EVST CLINICAL CASES

### RUPTURED IDIOPATHIC SPLENIC ARTERY PSEUDOANEURYSM – A CASE REPORT AND LITERATURE REVIEW

Andreia Coelho<sup>1,2</sup>; Daniel Brandão<sup>1,2</sup>, Miguel Lobo<sup>1</sup>; Jacinta Campos<sup>1,2</sup>; Rita Augusto<sup>1,2</sup>; Nuno Coelho<sup>1,2</sup>; Ana Carolina Semião<sup>1</sup>, João Pedro Ribeiro<sup>1</sup>, Evelise Pinto<sup>1</sup>, Alexandra Canedo<sup>1,2</sup>

1. Serviço de Angiologia e Cirurgia Vascular; Centro Hospitalar de Vila Nova de Gaia e Espinho;

2. Faculdade de Medicina da Universidade do Porto

**Aim:** Splenic artery pseudoaneurysms represent a rare clinical entity typically caused by sequelae of pancreatitis or abdominal trauma. Unprovoked, spontaneous splenic artery pseudoaneurysms are exceedingly rare, with only two other case reports in the literature up to date. In this case report we pretend to present a ruptured idiopathic splenic pseudoaneurysm successfully treated endovascularly.

**Methods:** Relevant medical data were collected from hospital database.

**Results:** The patient is a 75-year-old male with no past history of pancreatitis, abdominal trauma or abdominal surgery. He was admitted in the emergency department with thoracalgia with interscapular irradiation with few hours of evolution. He referred food intolerance with vomiting for approximately 7 days.

In the diagnostic work-up, a computed tomography angiogram (CTA) was performed and revealed a previously unknown voluminous hiatus hernia and a ruptured 25 mm splenic artery pseudoaneurysm with active bleeding into a 104x98 mm perigastric collection in the left hypochondrium extending to the thorax, a 34 mm peri-pancreatic and a 35 mm pararenal collection.

He was rushed to the angiography suite, and after selective catheterization of the splenic artery, pseudoaneurysm origin was identified and embolized

both proximally and distally with coils (Helix EV3 coils Covidien® and Tornado Embolization Coils Cook®). The end result angiogram was apparently successful.

CTA was repeated and revealed complete embolization of the pseudoaneurysm, with no evidence of bleeding. Peri-aneurysmatic collections remained unchanged in size and splenic infarction was evident in 50% of parenchyma. He was discharged 10 days after the initial procedure.

**Conclusions:** Endovascular surgery seems a good option for splenic pseudoaneurysms even in rupture, with good short-term results. In this case, it was admitted that endovascular surgery could be a bridge to open surgery with aneurysmectomy and splenectomy, but given the good clinical recovery post-embolization, no further surgery was considered. Nowadays there is little consensus on follow-up, and long term results are largely unknown.

## ACUTE ISCHEMIA GONE BAD

G. Uijtterhaegen, I. Mostaert, K. Jacobs, J. De Letter, E. Decoster

*Department of Vascular Surgery, AZ Sint Jan, Bruges*

**Introduction:** Acute limb ischemia is one of the most urgent indications for surgical revascularisation. In case of an iliac occlusion that cannot be passed, an axillofemoral bypass is one of the surgical possibilities. Detachment of an anastomosis is one of the feared complications. It is most frequently associated with graft infection, but in rare other cases it can also be caused by other factors.

**Case report:** We describe a case of a 65 year old male patient with an extensive medical and vascular history. He was admitted to the emergency room with acute ischemia of the left leg due to an acute external iliac, common femoral and femoropopliteal bypass occlusion 4 months after iliofemoral and femoropopliteal bypass. 48 hours after an urgent iliac revascularisation procedure there was a new occlusion. It was impossible to restore the inflow due to severe iliac calcification and stent occlusion. Axillofemoral bypass was necessary to revascularize the left leg. Fasciotomy of the lower leg was performed because of a compartment syndrome but eventually an upper leg amputation was required because lack of outflow. On the 19<sup>th</sup> postoperative day, a graft detachment at the level of the axilla occurred after brutal mobilisation of the patient.

**Discussion:** We describe a case of a patient with acute limb ischemia and complex revascularisation. Eventually an axillofemoral bypass was constructed to revascularize his leg. Detachment of the graft occurred several weeks after surgery. In this case we light up the technical aspects, the surgical decision making and we discuss what could have been improved.

## A SACCULAR ANEURYSM 3 MONTHS AFTER TEVAR FOR AORTIC DISRUPTION

Karen Jacobs MD, Ilse Mostaert MD, Gilles Uijtterhaegen MD, Jan De Letter MD, Eva-line Decoster MD

*Department of vascular surgery, AZ Sint Jan, Bruges*

**Introduction:** Stent-graft repair is a feasible and effective approach for traumatic aortic rupture. Although, careful follow-up is mandatory to check for the development of possible complications.

**Methods:** We describe a case of a saccular aneurysm that occurred 3 months following TEVAR because of an aortic disruption.

**Case report:** A 66-year-old female was admitted at our facility after a jump from the third floor. Full body CT revealed intracranial hemorrhage, multiple fractures and an aortic rupture. On arrival the patient was hemodynamically unstable. A thoracic endovascular aortic repair was performed with a Valiant Captiva (2.8x2.8x10cm), placed just distally from the left common carotid artery, covering the left subclavian artery for sufficient proximal landing zone. Also the most pressing other lesions were treated.

A follow-up angio-CT was performed 3 months postoperatively. It revealed a saccular aneurysm of the aortic arch (3.6x1.3x3.2cm), creating a maximal diameter of the aorta at the proximal end of the endoprosthesis of 4cm. The indication for elongation of the endograft was set. The first step was a debranching of the aortic arch with reimplantation of the supra-aortic vessels. A Maquet silver impregnated aortic bifurcation prosthesis was used for revascularization. Around the anastomosis a triple lead wire was sutured for identification of the distal end of the anastomosis.

One week later the elongation of the thoracic endoprostheses was performed. The proximal covered part was positioned just distal from the marker. Control angiography showed a good result and also the postoperative course was uneventful.

**Conclusion:** Even on short term complications can occur after endovascular thoracic aortic repair. Therefore close postoperative follow-up is necessary. When a saccular aneurysm occurs proximal of the stent-graft, a multidisciplinary approach can be warranted. In this case debranching of the aortic arch with reimplantation of the supra-aortic vessels was necessary, before elongation of the endograft.

## ENDOVASCULAR MANAGEMENT OF LIFE-THREATENING CAROTID BLOWOUT SYNDROME AFTER OSTEORADIO-NECROSIS OF THE MANDIBULA – A CASE REPORT

Andreia Coelho<sup>1,2</sup>; Miguel Lobo<sup>1</sup>; Gustavo Coelho<sup>3</sup>, Jacinta Campos<sup>1,2</sup>, Marta Azevedo<sup>3</sup>, Rita Augusto<sup>1,2</sup>; Nuno Coelho<sup>1,2</sup>; Ana Carolina Semião<sup>1</sup>, João Pedro Ribeiro<sup>1</sup>, Evelise Pinto<sup>1</sup>, Horácio Costa<sup>3</sup>, Alexandra Canedo<sup>1,2</sup>

1. Serviço de Angiologia e Cirurgia Vascular; Centro Hospitalar de Vila Nova de Gaia e Espinho;

2. Faculdade de Medicina da Universidade do Porto

3. Serviço de Cirurgia Plástica, Reconstrutiva e Craniomaxilofacial; Centro Hospitalar de Vila Nova de Gaia e Espinho;

**Aim:** Carotid blowout syndrome is a rare but devastating complication of head and neck malignancy, and is associated with a reported mortality and neurologic morbidity of 40% and 60% respectively. It is an emergency situation, and the classical life-saving approach is carotid artery ligation, taking into account the technical difficulty associated with repairing a previously irradiated and/or infected territory. The aim of this case report is to present our experience with a single case of massive haemorrhage from the internal carotid artery in a previously irradiated neck treated with a covered stent maintaining carotid artery patency.

**Methods:** Relevant medical data were collected and review of the literature was performed.

**Results:** The patient is a 61-year-old male with a previous history of head and neck cancer submitted to radical surgery and chemo and radiotherapy in 2010. Seven years later, the patient was diagnosed with osteoradiation necrosis of the mandibula and submitted to surgery. Hospital stay was prolonged due to local infection and suture dehiscence. No previous episodes of sentinel bleeding were registered. Life-threatening haemorrhage from the surgical wound started acutely in the ward. Under manual compression, the patient was rushed to the angiography suite and on diagnostic angiography active bleeding from the internal carotid artery (ICA) was ascertained. A stentgraft Atrium Advanta V12, Maquet was deployed maintaining ICA patency. After stent deployment, haemorrhage was controlled and manual compression was finally released. The patient

was subsequently submitted to surgical reconstruction with latissimus dorsi muscle and had an uneventful recovery.

**Discussion:** Management of acute carotid blowout syndrome is critical, often requiring a multidisciplinary approach. Covered stent placement is a highly feasible and effective approach with much lower morbimortality rates when compared to surgical repair/ ligation or endovascular coil embolization. Long term results with patency rates are currently lacking.

## FLOATING THROMBUS – A RARE DISEASE WITH A CONTROVERSIAL TREATMENT

Roger Rodrigues, Gabriel Anacleto, Óscar Gonçalves

Serviço de Angiologia e Cirurgia Vascular, Centro Hospitalar e Universitário de Coimbra

**Aim:** Floating thrombus is defined as the presence of mobile thrombus in the DTA (descending thoracic aorta) that may be a potential source of life threatening peripheral arterial emboli to visceral organs or the limbs. This is a very rare condition with approximately 100 cases described in the literature and is a disease entity different from the thrombus of an atherosclerotic aorta.

We report a case of a floating thrombus in the descending aorta lumen and discuss management options.

**Methods:** The authors describe the case of a 46-year-old woman presented to the emergency department with abdominal pain, upper left limb and lower ipsilateral limb pain.

Physical exam showed no left radial and ulnar pulse. The posterior tibial pulse was absent on the left and the dorsal pedis decreased on the right. She performed a computerized angiotomography that revealed the presence of a floating thrombus at the level of the descending aorta (Fig. 1). The exam also showed the presence of ischemic foci in the left kidney and spleen and occlusion of the left brachial artery.

**Results:** A thromboembolectomy was performed via the left brachial artery. She subsequently underwent continuous heparin perfusion with significant improvement of lower limb symptoms. She was discharged with indication to maintain anticoagulation and repeat angiotomography after one month. The thrombus was no longer visible after one month of treatment

**Conclusion:** A floating thrombus in a healthy thoracic aorta is a rare event and is commonly associated with an underlying thrombophilia. In many cases the aetiology remains unknown.

Prompt diagnosis and treatment are necessary to avoid severe complications. The diagnosis of floating thoracic aortic thrombus is usually made after debilitating embolic events.

The treatment strategy for this disease remains controversial and is determined by the location and extension of the thrombus, presence of complications, the patient's comorbidities, and the physician's preferences. Options include anticoagulant therapy, aspiration thrombectomy, surgical thrombectomy, or endovascular repair by covered stent deployment.

## ACUTE TYPE B DISSECTION AND AORTIC COARCTATION, NOW WHAT?

G. Uijtterhaegen, I. Mostaert, K. Jacobs, J. De Letter, E. Decoster

*Department of Vascular Surgery, AZ Sint Jan, Bruges*

**Introduction:** Acute type B dissection is a rare complication in patients with aortic coarctation. Medical therapy is the standard therapy for an uncomplicated acute type B dissection. Nowadays aortic coarctation should be treated by endovascular means. We describe a case of a patient with an acute type B dissection and a silent coarctation.

**Case report:** A 58-year old man was admitted to another hospital with acute interscapular thoracic pain radiating to the left shoulder. CT-scan revealed a Stanford type B dissection with secondary dilatation up to 6 cm and a hematoma in the adjacent fatty tissue suspect for impending rupture. Patient was referred to our centre for treatment. A new CT-scan did not show any evolution, there was no malperfusion and the pain was under control. He was admitted to the intensive care unit for observation and antihypertensive therapy. Further investigations with transthoracic echocardiography showed a bicuspid aortic valve, a dilated arch and descending aorta, and a suspicion of aortic coarctation. Because of the impending rupture, the dilated descending aorta and the persisting limited thoracic pain we decided to treat the dissection after 14 days. A thoracic endografting was successfully performed, covering the entry point of the dissection, the coarctation and the dilated part of the descending aorta.

**Discussion:** In this case we describe a rare case of a patient with an acute type B dissection and an underlying coarctation, treated with a thoracic endograft. We discuss the preoperative work-up and surgical decision making, the technical aspects of thoracic endografting and the results of the procedure.

## RUPTURED POPLITEAL ARTERY PSEUDOANEURYSM: A DELAYED MANIFESTATION OF A SARCOMA – A CASE REPORT

Bárbara Pereira, Luís Antunes, Gabriel Anacleto, João Alegrio, Óscar Gonçalves

*Centro Hospitalar e Universitário de Coimbra*

**Aims:** Many peripheral PSA (pseudoaneurysms) are the result of a blood vessel trauma and the region around the knee is the most common presenting site for its development. Common causes of PSA around the knee include blunt or penetrating trauma, fractures, previous surgical procedures, infections, and in rare cases osteochondromas. Local tumor invasion is even a rarely cause.

**Methods:** 71-year-old male referred to our department with a ruptured PSA of the popliteal right artery with a symptomatic active bleeding. The patient was anticoagulated because of a previous diagnosis of ipsilateral inferior extremity venous thrombosis 4 months prior (not confirmed).

He presented with oedema and severe pain of the leg. No decreased temperature or sensory neither motor weakness. No trauma history.

At physical examination the patient had an entire and severe right leg swelling with maintenance of the pulse of the posterior tibial artery.

Medical history included hypertension, diabetes, dyslipidemia and depression. Computer tomography (CT) indicated a fusiform PSA of the right popliteal artery, with an atypical configuration and a huge hematoma surrounding it; plus a soft tissue paratibial mass.

**Results:** Endovascular repair was the chosen technique.

The PSA was approached through a direct incision at the proximal/mid segment of the thigh, in a segment supposedly hematoma-free. Superficial femoral artery was controlled and 2 endoprothesis were employed and excluded the PSA.

**Conclusion:** Soft tissues sarcomas are often delayed diagnosis because of the painless nature of the tumor.

The pattern of metastasis is hematogeneous, 70–80% to the lung, and rarely spread to the skin, soft tissues, bone, liver and brain.

In case of a PSA with a hostile tissue area an endovascular technique, being less invasive, can be more easily performed, not compromising a surgical approach, if needed.



## SUPRA-AORTIC ANEURYSMS, HOW TO SOLVE THEM?

Rita Augusto<sup>1,2</sup>, Pedro Sousa<sup>1</sup>, Jacinta Campos<sup>1,2</sup>, Andreia Coelho<sup>1,2</sup>, Nuno Coelho<sup>1,2</sup>, Ana Semião<sup>1</sup>, Evelise Pinto<sup>1</sup>, João Ribeiro<sup>1</sup>, Daniel Brandão<sup>1,2</sup>, Alexandra Canedo<sup>1,2</sup>

1. Serviço de Angiologia e Cirurgia Vascular, Centro Hospitalar de V.N. Gaia/Espinho, Vila Nova de Gaia

2. Unidade de Angiologia e Cirurgia Vascular da Faculdade de Medicina da Universidade do Porto

**Introduction:** Aneurysms involving the supra-aortic vessels are rare (0.4 and 4% of all aneurysms) but carry serious risk. Subclavian artery is the vessel most commonly affected of the supra-aortic sector (50% - 2/3 on the right side). Innominate artery aneurysms are even rarer (3% of supra-aortic vessel aneurysms). Surgical resection of the aneurysm followed by an interposition has been the standard treatment. However, with the evolution of endovascular techniques, endovascular management and hybrid repair have emerged as valid alternatives.

Accordingly, we report two cases that have been treated by hybrid techniques.

**Case 1:** A 59 year-old male with a prior medical history of bicuspid aortic valve, HIV positive, hypertension and smoking was referred to vascular surgery due to a finding of a left subclavian aneurysm in a computed tomography angiography (CTA). The aneurysm involved the ostium and was located proximal to the vertebral artery in the intra thoracic region, with 42 mm of diameter. We decided to perform a hybrid approach. First we exclude the aneurysm placing a thoracic endoprosthesis. Twelve days after, we performed an open surgery approaching through a left-side supraclavicular incision with an endo and exoaneurysmorrhaphy and a subclavian–carotid transposition, with ligation of vertebral artery. The postoperative course was uneventful and the patient has now 12 months of follow-up.

**Case 2:** A 78 year-old male with a prior medical history of prostatic cancer, dyslipidemia and smoking was referred to vascular surgery because of an asymptomatic innominate aneurysm of 60 mm. Initially he was submitted to a carotid-subclavian transposition. After the initial open approach, we performed an endovascular surgery excluding the aneurysm deploying a covered stent in the trunk and subclavian artery. The final angiography

showed a type 1b endoleak. We decided to perform prompt endovascular embolization of the referred endoleak. After catheterizing the endoleak space with a 4 Fr MP catheter, a 2,7 Fr microcatheter was placed and the endoleak space was filled with 0,018" detachable coils. After that, Onyx 34 was slowly injected into the interstices between the coils to provide complete occlusion of the endoleak cavity. Final angiography showed patency of the covered stents with satisfactory exclusion of the endoleak. The patient was discharged but died from respiratory disease 4 months after.

**Conclusion:** Supra-aortic aneurysms are rare and when found, treatment is indicated in order to prevent complications. The approach should be chosen on a case-by-case basis, however, less invasive approaches to the classic median sternotomy appears to be feasible, safe and effective to achieve technical and clinical success, as we demonstrated in these cases.

## VASCULAR INJURIES DURING UROLOGIC PROCEDURES – FROM STILL WATERS INTO A NIGHTMARE

Jacinta Campos, Pedro Sousa, Andreia Coelho, Rita Augusto, Nuno Coelho, Evelise Pinto, Carolina Semião, João Ribeiro, Paulo Barreto, Alexandra Canedo

*Department of Angiology and Vascular Surgery, Centro Hospitalar de Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal*

**Aim:** The authors present two cases of iatrogenic vascular injuries during urologic procedures, with different surgical approaches, resulting in the injury of two different vascular structures.

**Methods:** Presentation of two rare case reports of iatrogenic vascular injuries during both laparoscopic and open surgical procedures. These challenging cases require prompt management to preserve adequate revascularization or control bleeding, and minimize morbidity and mortality.

**Results:** We report an unusual case of aortic, superior mesenteric and right renal artery ligation with an automatic suture system during a laparoscopic left nephrectomy in a 67 year-old male with pyelonephritis. The patient was stabilized at the origin department and transferred to our center where, after an angiotomography, explorative laparotomy was achieved. Intraoperatively, prompt reestablishment of aortic continuity by interposition of an aorto-aortic graft was done, with inferior mesenteric artery reimplantation. After vascular reconstruction, a bowel inspection revealed descending colon ischemia, requiring a segmental colectomy and colostomy. The patient was admitted at the intensive care unit, started hemodialysis and received large broad-spectrum antibioticotherapy. Unfortunately, he died of septic shock eighteen days after the surgery.

We present another case of a femoro-femoral bypass injury, during a cistostomy to remove a foreign body from the bladder in a 75 year-old male patient. The bleeding was controlled with graft transfixive ligation, and the urologists' aborted the surgery. The patient presented ischemic signs of the left lower limb after surgery, and was transferred to our institution where graft reconstruction was achieved with an end-to-end anastomosis. The post-procedural course was uneventful, and the urologic surgery was completed during the hospital stay at our institution. The patient was discharged home eleven days after the vascular procedure, with ankle-brachial index similar to the last consultation during follow-up.

**Conclusion:** The incidence of major vascular injuries in literature is 0,05%, but the true incidence of these complications is difficult to estimate because results are not always comparable and there is a possibility of underreporting. These two cases are representative examples of the diversity of these lesions, sailing from still waters into a nightmare with different consequences, even when a prompt and expeditious treatment is achieved.

## EVST PRIZE SESSION

### OUTCOMES AFTER SALVAGE TIBIAL ANGIOPLASTY FOR CRITICAL LIMB ISCHAEMIA – A 5 YEAR FOLLOW-UP

JM Hintze, A El-Mallah, DB O'Connor, M Connolly, O Eltayeb, E Boyle, B Egan, S Tierney

*Department of Vascular Surgery, Tallaght Hospital, Dublin 24*

**Introduction:** Distal bypass surgery for critical limb ischaemia (CLI), is technically challenging and risky in ageing frail population. Data from BASIL trial, have shown that endovascular revascularization is a viable option for CLI however long-term outcome studies are lacking.

**Aim:** Is to evaluate technical success and primary patency rates after salvage tibial angioplasty, mortality and amputation-free survival as well as long term outcome.

**Methods:** A retrospective study included consecutive tibial angioplasties performed from December 2009 to May 2014 at single tertiary center. Disease severity was classified according to Graziani classification from digital subtraction imaging. Primary outcomes were technical success, major and minor amputation rate, patient's survival and long-term outcome.

**Results:** Sixty two angioplasties were performed in 54 patients (M:F=42:12). The mean age was  $70 \pm 11$  years, 83% diabetics, 50% hypertensives and 64% were current or ex-smokers. Multivessel disease was present in 52% of cases. Overall mean follow-up was  $3.96 \pm 2.7$  years and  $6.15 \pm 1.5$  years amongst alive patients. Technical success, as defined at → one patent vessel with improved completion pedal flow, was achieved in 81%. Wound healing was 69% and was significantly associated with technical success ( $p < 0.001$ ). Five year survival was 49%. Only 16% required major amputations and 46% minor amputations. Patients required reangioplasty were 9.5%. Chronic kidney disease (CKD) was a strong predictor of poor wound healing and major amputation ( $p = 0.02$ ). Disease severity was not associated with poor outcome.

**Conclusion:** Tibial angioplasty is effective as treatment for CLI. Technical success and CKD are predictors of poor wound healing and major amputation.

## BYOSYNTHETIC PROSTHESIS: A NEW APPROACH IN THE TREATMENT OF VASCULAR PROSTHETIC INFECTION

Cristina Lozano Ruiz, María José Morales Olmos, Mercedes Cambronero Aroca, Luciana Antonella Collantes Chávez, Soraya Fernández González, Carolina Fernández Catalán, Martín Landaluce Chaves

*Angiology and Vascular Surgery Department, University Hospital Albacete, Spain*

**Aims:** It is well known that the prosthetic infections cause a high morbidity and mortality rate, a great concern for the vascular surgeon. The current accepted treatment is based on the creation of an autologous vascular reconstruction and a total explantation of the infected grafts. We assess early results after prosthetic graft replacement with biosynthetic collagen prosthesis in a case of graft infection and in the absence of a suitable autologous venous graft.

**Methods:** Between January 2015 and November 2017, 6 patients with infected prosthetic vascular grafts underwent a replacement of an infected graft with a biosynthetic prosthesis. Different variables like the length of stay in hospital, mortality, limb salvage, graft patency and reinfection were analyzed.

All of them were male. Average age 65 (range 35-82) years. As a factor of cardiovascular risk, they suffered from arterial hypertension. One of them was immunocompromised due to a kidney transplantation. 4 patients presented infected inguinal prosthetic grafts (Szilagyi 3: one patient with crossover with femoro-femoral venous graft, another patient with an axillofemoral bypass graft and the last two was performed a femoral graft reconstruction previously). Two patients have an axillary and a humeral graft. 3 early infections (<3 months after implantation) and 3 late infections (> 3 months after implantation). In all cases, there wasn't a suitable autologous vein graft. The replacement surgery was performed successfully in the 6 patients without intraoperative complications. Three patients were under a composite axillo-popliteal graft with ePTFE bypass. Microbiological cultures revealed intraoperatively infection in all cases.

**Results:** Median length of stay was 39 (range 9-180) days. Average monitoring was 16,7 (range 2-68) months. We observed a >3 months graft reinfection in one patient (an explantation was performed). In the rest of patients there was no graft reinfection, early or late occlusion, degeneration or rupture of

the grafts. There were no early or late major amputations. One patient died of pneumonia 2 months postoperatively.

**Conclusions:** In our institution, in the absence of adequate autologous vein material, biosynthetic grafts seem to be a safe alternative to replace infected grafts, with a low reinfection and reocclusion rate

## PREDICTION OF SURVIVAL AFTER 48H OF ICU FOLLOWING REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSM IN THE ERA OF EVAR – A MODIFIED PREDICTION SCORE FOR 30-DAY MORTALITY

Andreia Coelho<sup>1,2</sup>; Miguel Lobo<sup>1</sup>; Jacinta Campos<sup>1,2</sup>; Rita Augusto<sup>1,2</sup>;  
Nuno Coelho<sup>1,2</sup>; Ana Carolina Semião<sup>1</sup>, João Pedro Ribeiro<sup>1</sup>, Evelise Pinto<sup>1</sup>,  
Alexandra Canedo<sup>1,2</sup>

1. Serviço de Angiologia e Cirurgia Vascular; Centro Hospitalar de Vila Nova de Gaia e Espinho;

2. Faculdade de Medicina da Universidade do Porto

**Aim:** Ruptured abdominal aortic aneurysm (rAAA) remains a critical life-threatening condition. Therefore, we aimed to evaluate rAAA management in our centre focusing on predictors of mortality at 48 hours of intensive care unit (ICU) in an era in which both EVAR and open repair (OR) are available.

**Methods:** Clinical data of all patients admitted in our hospital from January 2010 to December 2017 with the diagnosis of rAAA were retrospectively reviewed. Statistical analysis was performed with SPSS V.25.

**Results:** A total of 78 patients were included in this study, 21 EVARs, 56 ORs and one case of conservative management. Intra-operative mortality in EVAR and OR groups was 0% versus 24.6% respectively ( $p=0.012$ ). 30-day mortality reached 50% and 33% in the OR and EVAR groups. For patients alive at 48 hours, 30-day mortality diminished to 27.6%.

Several pre-operative predictors of outcome were identified: smoking( $p=0.004$ ), hemodynamic instability( $p=0.004$ ) and elevated international normalized ratio (INR) ( $p<0.0001$ ). Dutch Aneurysm Score and Vascular Study Group of New England (VSGNE) Score were also significant predictors of outcome (ROC AUC 0.89 and 0.79 respectively;  $p<0.0001$ ).

Intra-operative predictors included increased blood loss ( $p=0.007$ ) and fresh frozen plasma and red blood cells transfusion requirements ( $p=0.021$  and  $p=0.001$ ).

At 48h of ICU stay, high lactate level, high SOFA (Sequential Organ Failure Assessment) score, need for haemodialytic technique and haemodynamic instability were significant risk predictors for 30-day mortality ( $p<0.05$ ).

VSGNE score was modified with the inclusion of 2 variables: haemodynamic

instability and lactate level at 48hours. Comparing AUC for VSGNE and modified VSGNE scores for patients alive at 48 hours, the latter was significantly better (AUC 0.775 versus 0.852; p=0.039).

**Conclusions:** The policy in our Department is to try surgical repair in all cases, as decision to withhold life-saving treatment is extremely difficult. Hence the low conservative management rate (1.3%) and the relatively high intra-operative mortality rate (14.1%).

It remains important however to identify whether late deaths can be predicted, so that unnecessary prolonged treatment can be avoided. A modified VSGNE Score was delineated predicting 30-day mortality significantly better in patients alive at 48 hours. External validation is required and currently ongoing.

## OUTCOME OF HYPOGASTRIC ARTERY OCCLUSION WHILE UNDERTAKING ENDOVASCULAR AORTIC ANEURYSM REPAIR

Pedro Pinto Sousa<sup>1</sup>, R. Machado<sup>2</sup>, R. Almeida<sup>2</sup>, P.S. Pinto<sup>2</sup>

1. Vascular Surgery, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova De Gaia

2. Vascular Surgery, Centro Hospitalar do Porto, Porto

**Aim:** There are some abdominal aortic aneurysms with specific anatomic characteristics where endovascular repair treatment (EVAR) implies complex technical approach or coverage of the hypogastric artery (CHA) by a stent-graft. The authors proposed to determine the outcomes in this specific group of patients.

**Material and methods:** A retrospective study of all elective abdominal aortic aneurysms treated by EVAR between January 2011 and December 2017 was conducted. Primary outcomes were morbidity and mortality, development of post intervention buttock claudication, sexual dysfunction or pelvic ischemia. Secondary outcomes were endoleak or need for re-interventions related to the first procedure.

**Results:** We analyzed 173 patients, 165 males, with a mean age of 79 years-old submitted to elective EVAR. There were 8% minor complications with no major events registered during the procedure. Peri-operative mortality was 2,3%. In most cases, 132 (76%) the landing zone was on the common iliac artery, while in 41 (24%) there was extension to the external iliac artery. In this last group, the majority (n=35) had hypogastric artery coverage. None patient received bilateral hypogastric artery exclusion. Buttock claudication occurred in six (17%) patients with CHA and one (2,8%) patient developed sexual dysfunction but there were no registries of pelvic ischemia. None of the patients with hypogastric artery revascularization faced buttock claudication or the other complications analyzed. Endoleak development reached an overall rate of 18% with 7% requiring reintervention with no statistical significance between groups.

**Conclusion:** With statistical significance ( $p=0,04$ ), we found an association between CHA during EVAR and buttock claudication development. Notwithstanding some selected patients with aorto-iliac aneurysms may safely undergo CHA, we believe that it increases the risk of complications, in particular, buttock claudication. Consequently, CHA should be avoided whenever possible and, at least one hypogastric artery should be revascularized.

## DEEP VENOUS STENTING PATENCY IN CANCER RELATED ACUTE AND DEEP VENOUS OBSTRUCTION

João Rocha Neves<sup>1,2,3\*</sup>, Ahmed Khairy Sayed<sup>4\*</sup>, Gerrard O'Sullivan<sup>5</sup>

1. Hospital São João, EPE – Department of Angiology and Vascular Surgery, Porto, Portugal

2. Faculty of medicine of Porto – department of Surgery, Porto, Portugal

3. Faculty of medicine of Porto – department of biomedical sciences – Unity of Anatomy, Porto

4. Assiut University Hospital – Department of Vascular and Endovascular Surgery, Faculty of Medicine, Assiut University, Assiut, Egypt

5. University Hospital of Galway, Galway, Ireland

\* equally contributed for this work

**Aims:** Endovenous stenting of the iliac veins is increasingly considered in the presence of symptomatic obstructive venous lesions in the ilio caval segment. No report describing a neoplastic population submitted to deep vein revascularization were found, despite the increased exposure to venous thromboembolism.

The aim of this study was to evaluate the prognostic implications of deep vein interventions in this population.

**Methods:** Symptomatic ilio caval venous obstruction and associated neoplasia in a single European center were retrospectively evaluated between 2008 and 2015. Patients with acute or chronic iliofemoral DVT (deep venous thrombosis) as well as patients with non-thrombotic iliac lesion, who maintained follow-up and CT/DUS surveillance were included. Patients with primary abdominal, skin and breast cancer were selected if they did not present a recent history of digestive or respiratory haemorrhage. Patients not considered fit to intervention by the surgeon were submitted to anti-coagulation. All patients were submitted to life-long low molecular weight heparin. Endpoints evaluated were primary patency, assisted primary patency and secondary patency of the stented segment. Safety was also assessed.

**Results:** 70 consecutive patients were included (29 male; 41 female; mean age 65). Mean follow-up period was 492 days.

Primary patency was superior in non-cancer vs cancer patients (73.7% vs

65%, p=0,015), cancer compression was associated with worse patency comparing to ganglionar compression (63,2% vs 72,2%, p=0,001).

Cancer patients submitted to thrombolysis had a 77% rate of complete recanalization vs 75% in non-cancer (p=0,854), despite the need for more stents per revascularization (2.9 vs 1.7, p=0,041) and having a anatomical lower extension of the disease (Mean 2.1 sectors, vs 3.1). Concerning procedure safety, echimosis was more common in non-cancer patients (20% vs 5%). No differences were registered in major adverse events – Pulmonary embolism, death, contrast reaction – (Non-cancer vs cancer - 4% vs 7% p=0,22)

**Conclusion:** Non-neoplastic patients have similar patency rates (primary and secondary) comparing to metastatic ganglionar compression, although superior to cancer compression. Stenting in neoplastic patients is a safe and valid procedure in selected patients. Prospective studies with Qol and morbidity assessment are necessary.

## ENDOVASCULAR REPAIR IN THORACIC AORTA PATHOLOGY. 15 YEARS OF EXPERIENCE.

Cristina Lozano Ruiz, María José Morales Olmos, Mercedes Cambronero Aroca, Luciana Antonella Collantes Chávez, Soraya Fernández González, Carolina Fernández Catalán, Martín Landaluce Chaves

*Angiology and Vascular Surgery Department, University Hospital Albacete, Spain*

**Aim:** The development of thoracic endovascular aortic repair (TEVAR) has allowed a minimally invasive approach for management of an array of thoracic aortic pathologies. We analyzed our experience in the treatment of thoracic aortic pathology with TEVAR in our institution for 15 years.

**Methods:** Between August 2002 to July 2017, 38 patients were treated with 42 stent grafts, 32 men and 6 women in 14 urgent interventions and 24 were programmed. The pathologies treated were: true aneurysms (n=21) 55.26%, aortic dissection (n=4) 10.52%, intramural hematoma (n=2) 5.26%, traumatic rupture (n=4) 10.52%, penetrant ulcer (n=6) 15.78% and mycotic pseudoaneurysms (n=1) 2.6%. The mean age was 72 years (range 25-84 years). As a factor of cardiovascular risk 81.57% suffered from hypertension, 63.15% were smokers, 47.36% had dyslipidemia and 10.52% were diabetics.

**Results:** Successful deployment of the endovascular stent grafts was achieved in all patients. The left subclavian artery was covered in 6 (15.79%) patients. Four patients underwent hybrid procedures: two carotid-carotid bypass previous implant of the device and two total aortic arch debranching with bypass from the thoracic descend aorta till brachiocephalic trunk and left common carotid artery. No patient required an open conversion. One patient presented neurological deficit with complete functional recovery in 2 days. 94.73% of patients are free of complications related to the procedure. 30 days mortality was 10,52% (n=4). Thirty-three patients remain alive and clinically stable after a mean follow-up interval of 13 months (range 1-120 months).

**Conclusion:** Endovascular thoracic aortic surgery can be performed as an alternative to open surgery as a reliable option for a variety of disease due to the lower morbidity of this approach.

## USE OF COVERED STENT GRAFTS IN THE REPAIR OF PERIPHERAL ARTERIAL TRAUMA

Ortiz de Salazar Linaza L., Bonmati Saso G., Apodaka Diez A., Fonseca Legrand J.L.

Vascular Surgery Department. Cruces University Hospital, Barakaldo (Biscay). Spain

**Aim:** The use of covered stent grafts is a less invasive alternative in the management of arterial trauma. This endovascular technique has been previously established; however, there is little evidence of long-term outcomes. The aim of this study is to report the results of the endovascular repair of peripheral arterial trauma and its characteristics in our center.

**Methods:** A retrospective review was conducted from cases registered in our hospital's surgical database from January 2013 to January 2018, including data from demographics, mechanism of injury, type of intervention, complications, need of reintervention and follow-up. Results were analysed using descriptive statistics.

**Results:** Over the study period, 11 patients underwent endovascular repair due to peripheral arterial injuries, 6 of whom were male (66%), with an average age of 77 years (range 56-91 years). The mechanism of injury was in 8 cases (70%) from iatrogenesis, 1 blunt injury, 1 fracture and 1 tumoral process. Diagnosis was made in 81% by CT-Angio. The most frequent anatomic location was superficial femoral artery (6 [54%]), followed by common femoral artery (3 [27%]), subclavian artery (1 [9%]), and axillary artery (1 [9%]). At diagnosis, 7 (63%) presented with image of broken pseudoaneurysm -in two cases with arteriovenous fistula associated-, 3 (27%) contrast extravasation compatible with active bleeding and 1 (9%) canalization of venous line in no compressive artery. 18% presented with hemodynamic instability at the moment of diagnosis. Injuries were repaired with the implant of a covered stent with a technical success of 100%. No patient required further reinterventions or reconversion to open surgery with a limb salvage rate of 100%; average follow up of 9 months (range 1-24 months).

**Conclusion:** Iatrogenesis due to invasive procedures is the main cause of arterial peripheral trauma in our environment. Endovascular repair using covered stent grafts, in selected cases, is a secure and effective technique with satisfactory medium- term results.

## DIABETES MELLITUS AND ARTERIOVENOUS FISTULAE: A SINGLE-CENTRE'S EXPERIENCE

Andrew Nickinson<sup>1,3</sup>, Phillip Bennett<sup>2,3</sup>

1. Specialist Registrar in Vascular Surgery

2. Consultant Vascular Surgeon

3. Norfolk and Norwich University Hospitals NHS Foundation Trust, UK

**Aims:** Diabetes mellitus is the commonest cause for end-stage renal failure worldwide, with the prevalence of the condition having nearly doubled in the last 20 years. To date evidence about the effects of diabetes on arteriovenous fistula (AVF) patency is mixed. We aimed to compare fistula patency, intervention and survival rates between diabetic and non-diabetic patients following AVF formation.

**Methodology:** Single-centre, retrospective analysis of all patients undergoing AVF formation during 2015. Patients were grouped into diabetic (D) or non-diabetic (ND). We compared rates of early failure (failure or intervention within 6 weeks of formation) and primary patency (fistula requiring no intervention). Data on further intervention and fistula failure were also compared. Follow-up finished in January 2018. Chi square and Mann-Whitney U Tests were employed to test for statistical significance.

**Results:** 102 procedures were performed in 97 patients (male=57, median age 71 years). 44 patients were diabetic with a median pre-operative HbA1c of 50mmol/l (IQR 43.8-60.3). Age between the two groups was comparable (D=68, ND=72, p=0.19). Brachiocephalic fistula was the most common AVF procedure performed (RCF=32, BCF=52, BBF=14, other=1) in addition to 3 graft procedures.

There was no difference in rates of early failure (D=9.3%, ND=10.3%, p=0.84) or primary patency at 6 months (D=73.7%, ND=61.4%, p=0.22) and 12 months (D=37.1%, ND=37.0%, p=0.99). Interestingly the rate of intervention was higher in the non-diabetic group (D=57.9%, ND=77.2%, p=0.05). At the end of follow-up there was no difference in the rate of fistula failure (D=18.2%, ND=24.1%, p=0.44) or time to failure (p=0.24). The mortality rate was noted to be significantly higher in the diabetic group (D=38.6%, ND=19.0%, p=0.05).

**Conclusions:** Intervention rates were higher in non-diabetic patients, however there was no difference in primary patency or overall fistula survival. The higher mortality rate and excellent diabetic control in our cohort may confound our results.

## VALUE OF EARLY MANAGEMENT OF VENOUS HYPERTENSION POST-ACCESS CONSTRUCTION

Abo El Neel H., MD, Sabbour A., MD PhD, Essam S., MD PhD, Rizk M., MD, Abdulrahman A., MD

*Vascular Surgery Department, Faculty of Medicine-Ain Shams University, Cairo, Egypt.*

**Introduction:** Venous Hypertension after access construction is a significant problem for the patients on regular haemodialysis that result in disabling upper extremity oedema and impairment of arteriovenous access function.

**Objective:** is to evaluate the value of early detection and intervention of patients with venous hypertension on the short term outcome.

**Methods:** Prospective cohort study on patients with venous hypertension after being grouped into early group: presented within the past 6 months and late group: presented more than 6 months.

**Results:** 27 diagnosed venous hypertension cases from multiple centres underwent intervention after being divided into early and late groups as mentioned before for 1 year follow up. 18 of patients were categorized as early group while 9 of them were categorized as late group. Intraoperative venous angiography showed that 21 of patients had subclavian vein lesion, 16 of patients with innominate vein lesion, total occlusion found in 10 patients and stenotic lesions in 17 patients. As regard technical success rate 85.2% (early= 94.4%, late= 66.7%)(*p* value 0.09), 1ry stenting 63% (early=64.7%, late= 100%). The patency rates were 52% for 3 monthes, 47.8% for 6 monthes and 37% for 1 year patency with 17.4% recurrence, 3 of the them underwent successful intervention. The complication rate was 29.6%. Regarding technical success rate in relation to lesion character, total occlusion success was 60% while stenotic lesions was 100% (*p* value 0.01).

**Conclusion:** Although earlier intervention seems to be beneficial but of minimal statistically difference for further future studies.

## COMPARISON OF PRESENTING CHARACTERISTICS AND CARDIOVASCULAR OUTCOME BETWEEN INDIGENOUS AND NON-INDIGENOUS PATIENTS WITH PERIPHERAL ARTERY DISEASE.

Tejas P. Singh<sup>1,2,3</sup>, Joseph V. Moxon<sup>1</sup>, Genevieve N. Healy<sup>3</sup> Yvonne Cadet-James<sup>4</sup>, Jonathan Golledge<sup>1,2</sup>

1. Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, Queensland, Australia.

2. Department of Vascular and Endovascular Surgery, The Townsville Hospital, Townsville, Queensland, Australia.

3. The University of Queensland, School of Public Health, QLD, Australia.

4. Indigenous Centre, James Cook University, Townsville, Queensland, Australia.

**Aim:** The risk factors for Peripheral Artery Disease (PAD) are more common in Indigenous than non-Indigenous Australians, however the presentation and outcome of PAD in Indigenous Australians has not been previously investigated. The aim of this prospective cohort study was to compare the presenting characteristics and clinical outcome of Indigenous and non-Indigenous Australians with PAD.

**Methods:** PAD patients were prospectively recruited since 2003 from an outpatient vascular clinic in Townsville, Australia. Presenting symptoms and risk factors in Indigenous and non-Indigenous patients were compared using Pearson's  $\chi^2$  test and Mann Whitney U test. Kaplan Meier survival analysis and Cox proportional hazard analysis compared the incidence of myocardial infarction (MI), stroke or death (major cardiovascular events) among Indigenous and non-Indigenous patients.

**Results:** 401 PAD patients were recruited, of which 16 were Indigenous and 385 were non-Indigenous Australians. Indigenous Australians were younger at entry (median age 63.3 [54.7-67.8] vs 69.6 [63.3-75.4]), more commonly current smokers (56.3% vs 31.4%), and more frequently had insulin-

treated diabetes (18.8% vs 5.2%). During a median follow-up of 2.5 years, five and 45 combined events (MI, stroke or death) were recorded amongst Indigenous and non-Indigenous Australians, respectively. Indigenous Australians were at a 4-fold greater risk of major cardiovascular events (adjusted hazard ratio 4.03 [95% confidence intervals 1.17-13.87],  $p=0.027$ ) compared to non-Indigenous Australians.

**Conclusions:** These findings suggest that Indigenous Australians with PAD present at a younger age, have higher rates of smoking and insulin-treated diabetes, and poorer clinical outcomes compared to non-Indigenous Australians.

## A COMPARISON OF MAJOR AMPUTATION RATES AND OUTCOMES FOR INDIGENOUS AND NON-INDIGENOUS AUSTRALIANS IN A MAJOR TERTIARY HOSPITAL.

Tejas P. Singh<sup>1,2</sup>, Samantha Peden<sup>1</sup>, Ammarah Tahir<sup>1</sup>, Vikram Iyer<sup>1,2</sup>, Ramesh Velu<sup>1</sup>, Joseph V. Moxon<sup>1</sup>, Yvonne Cadet-James<sup>3</sup> Jonathan Golledge<sup>1,2</sup>

1. Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, Queensland, Australia.

2. Department of Vascular and Endovascular Surgery, The Townsville Hospital, Townsville, Queensland, Australia.

3. Indigenous Centre, James Cook University, Townsville, Queensland, Australia.

**Aim:** Indigenous Australians are at high risk of developing diabetes-related foot complications requiring major lower limb amputations. The aim of this study was to assess the incidence and outcome for Indigenous Australians and non-Indigenous Australians undergoing major amputations (MA) at the main tertiary hospital in North Queensland, Australia over a 16-year period.

**Methods:** This was a retrospective study assessing all patients who underwent a MA at The Townsville Hospital between 2000 and 2015. Clinical characteristics were compared using Pearson's  $\chi^2$  test and Mann Whitney U test. MA rates (per 100,000) were calculated using the census data as the standard population. Kaplan Meier survival analysis and Cox proportional hazard analysis compared the incidence of all-cause mortality among both groups.

**Results:** A total of 374 MA occurred between 2000 and 2015. Seventy MA occurred in Indigenous Australians and 304 occurred in non-Indigenous Australians. Indigenous patients were younger ( $p<0.005$ ), more likely to be females ( $p=0.002$ ), have diabetes ( $p<0.005$ ), end-stage renal failure ( $p=0.003$ ), and were more likely to die during follow-up ( $p=0.028$ ). Overall, rates of MA in Indigenous and non-Indigenous patients with diabetes was 291.9 and 70.1 per 100,000 respectively. MA rates increased in Indigenous (~15%) and non-Indigenous patients (~50%) with diabetes between 2000-2007 and 2008-2015 ( $p=0.505$ ). Indigenous patients were at a ~2-fold greater risk of all-cause mortality ( $p=0.027$ ) compared to non-Indigenous patients. This association was lost in the multivariate analysis (HR 1.24 [0.82-1.89],  $p=0.314$ ).

**Conclusion:** The burden of MA has increased in North Queensland and is greater in Indigenous Australians.

## THE BURDEN OF POST-THROMBOTIC SYNDROME IN A LONG-TERM RETROSPECTIVE COHORT

Inês Andrade<sup>1\*</sup>, Marina Dias-Neto<sup>1,2\*</sup>, João Rocha-Neves<sup>2</sup>, Armando Mansilha<sup>1,2</sup>

1. Faculty of Medicine, University of Porto, Portugal.

2. Department of Angiology and Vascular Surgery, São João Hospital, Porto, Portugal.  
Alameda Professor Hernâni Monteiro 4200-319 Porto.

\* Both authors contributed equally to this paper.

**Introduction:** Post-thrombotic syndrome (PTS) is a frequent, potentially disabling complication of deep venous thrombosis (DVT). Its incidence is not described in the Portuguese population. The main objective of this study is to determine the cumulative incidence and severity of PTS after a first episode of DVT.

**Methods:** This is an observational, unicentric, retrospective cohort of patients who had a first episode of DVT in the lower limb, documented with Duplex ultrasound (n=101). The modified Villalta score (mVS) was applied by phone interview for the diagnosis and staging of PTS. Patient quality of life was measured by the adjusted CIVIQ 14 classification.

**Results:** Median follow-up was six years. Severe PTS (mVS →7) was present in 27% of patients, and moderate PTS (mVS 4-6) in 33%. In univariate analysis, highest education levels (RR=0.53, p=0.033) and sport activity at the time of interview (RR=0.45, p=0.006) had significantly lower proportion of PTS. Patients with weight increase after DVT (p=0.005), history of surgery at the onset of DVT (RR=1.49, p=0.032) and antecedents of previous ipsilateral superficial venous thrombosis (RR=1.71, p=0.048) showed higher proportion of PTS. Quality of life correlated with PTS status, being 90±17, 64±18 and 43±15 in patients without PTS, with moderate PTS and with severe PTS, respectively, (p<0.001).

**Conclusion:** This is a unique report, of substantial duration, on the incidence of PTS from a nationally representative cohort of patients. A high incidence of PTS was shown, correlating with worse adjusted CIVIQ 14 scores. Large studies of prospective nature could provide more definitive evidence.

## GP ABSTRACTS

### SÍNDROME PARANEOPLÁSICO: UM DESAFIO NA HIPOCOAGULAÇÃO

Daniela Catalão; Isabel Ferreira Amorim

*Internas de Formação Específica de Medicina Geral e Familiar; Unidade de Saúde Familiar Canelas; ACeS Espinho/Gaia*

**Enquadramento:** Existe uma relação bem estabelecida entre neoplasias malignas e estados de hipercoagulabilidade. O tromboembolismo venoso representa a segunda causa de mortalidade em doentes oncológicos, sendo fundamental a sua prevenção.

**Descrição do Caso:** Sexo feminino, 56 anos. AP: AVC (2007); síndrome depressivo. MH: AAS 100mg sid, simvastatina 20mg sid, perindopril 4mg sid e sertralina 50mg sid. Em outubro de 2016, foi diagnosticada com carcinoma adenoescamoso do endométrio; adenocarcinoma endometrióide do ovário esquerdo e neoplasia maligna mista - PNET/neuroblastoma com adenocarcinoma endometrióide da parede uterina. Nesse mês teve AVC isquémico lacunar e TEP, iniciando hipocoagulação com enoxaparina. Foi submetida a histerectomia total, anexectomia bilateral e seis ciclos de quimioterapia, concluídos em março de 2017. Em maio de 2017, a enoxaparina foi substituída por acenocumarol e teve alta da consulta de imunohemoterapia. Passou a ser vigiada em consulta de hipocoagulação na USF apresentando INR dentro do intervalo terapêutico (2-3) até janeiro de 2018. Desde então, com valores consecutivos acima do intervalo ( $>7$ ) apesar dos ajustes posológicos de acenocumarol e da suspensão do AAS. A 05/02/2018, teve um episódio de gengivorragia com INR 8, tendo sido encaminhada para o SU. Voltou a ser vigiada em consulta de imunohemoterapia, sem controlo do INR ( $>8$ ) até à data.

**Discussão:** O AVC e o TEP podem ser interpretados como um síndrome paraneoplásico pelo estado protrombótico associado às neoplasias ginecológicas. Segundo a literatura, tal constitui indicação para tratamento anticoagulante. No tratamento inicial, os fármacos de primeira escolha

são a HNF ou HBPM. Este último, assim como, o edoxabano são usados na terapêutica de manutenção durante, pelo menos, três a seis meses (em detrimento dos AVK ou outros NOACs). Neste caso, mesmo após a suspensão do AAS, o INR manteve-se em valores supraterapêuticos. Assim, devem ser investigados potenciais fatores causais como: adesão terapêutica, estado nutricional, tabagismo, abuso de álcool, estados hipermetabólicos, alterações hepáticas, renais ou cardíacas. Seria, ainda, pertinente a articulação multidisciplinar entre médico de família, imunohemoterapia e oncologia para ponderação de eventual mudança do acenocumarol para edoxabano ou suspensão da hipocoagulação, caso a situação oncológica já não constitua um risco elevado para recorrência do tromboembolismo.

---

Bibliografia: Bauer, Kenneth A.; “Treatment of venous thromboembolism in patients with malignancy”; UpToDate [última atualização em 23 de março de 2018]: pesquisa em 25 de março de 2018.

## MONDOR'S DISEASE: CLINICAL CASE

Soares, A.; Mega, M.; Gomes, J.; Gouveia, A.

*Serviço de Cirurgia Geral, Hospital Amato Lusitano — Castelo Branco*

Mondor's disease is a rare entity characterized by thrombophlebitis of superficial veins of the thoracoabdominal wall. It is more frequent in females during third and fourth decades of life. In most cases the cause is unknown but it may be associated with local trauma, surgery, oral contraceptives or other prothrombotic factors and / or conditions. The major concern is its relationship with breast carcinoma, which can reach 12% of cases.

Regardless of the cause, the pathological event responsible is a thrombus in the lumen of the vessel accompanied by an inflammatory reaction of the wall and surrounding tissues. The magnitude of this thrombosis is variable, ranging from small tributaries to large extensions of the saphenous trunks of the lower limbs. Fortunately, most cases have spontaneous remission.

A rare case of Mondor's disease is described in a 49-year-old female patient with a 5-day palpable and painful erythema and cord of the right anterior wall of the abdomen.

## TROMBOFILIA HEREDITÁRIA NUMA MULHER EM IDADE FÉRTIL

Harileny Abreu

Médica Interna de Medicina Geral e Familiar.Centro de Saúde do Bom Jesus,  
SESARAM E.P.E.

**Enquadramento:** A mutação do fator V de Leiden é a mutação genética predisponente mais comum para tromboembolismo venoso. Mulheres portadoras desta mutação têm maior risco de evento trombótico com a toma de contracetivos orais combinados e na gravidez.

**Descrição do caso:** Mulher de 39 anos, pertencente a uma família nuclear, na fase IV do ciclo de Duvall, sem antecedentes familiares relevantes, com antecedentes pessoais de espondilite anquilosante e hipertensão arterial. Durante o ano 2015, apresentou dois abortos do primeiro trimestre, sendo que, durante a última gravidez em 2016, entre as análises requisitadas destaca-se anticorpo anticardiolipina IgM positivo e deficiência de proteína S, não foi requisitado estudo de trombofilias e foi medicada com enoxaparina em dose profilática até a semana 6 de puerpério. Após puerpério, não foi realizado seguimento nem qualquer estudo. Em janeiro de 2018, veio a consulta e em vista destes antecedentes foi requisitado o estudo de trombofilias, na sequência do qual se identificou mutação do fator V de Leiden, sendo referenciada para a consulta de trombofilias de medicina interna. A 17 de abril de 2018, veio à consulta por suspeita de gravidez, foram requisitadas análises, realizada revisão terapêutica, com inicio de enoxaparina em dose profilática e próxima consulta para dia 24/04/2018.

**Discussão:** Este caso traz várias reflexões ao médico de família, entre as quais, a importância da abordagem numa utente com suspeita de trombofilia, tendo em conta, por exemplo, o resultado falso positivo de proteína S encontrado na gestação, a oportunidade de início de heparina de baixo peso molecular no início da gravidez, numa mulher com esta mutação, assim como, posterior seguimento na consulta, e dos seus descendentes.

## RAYNAUD PHENOMENON

Ana Teixeira Fraga, Joana Barroco, Noémia Pinto, Emília Mendes

USF Viver Mais, ACeS Grande Porto III - Maia/Valongo

**Background:** Raynaud's Phenomenon (RP) is common in the general population, with a prevalence ranging from 3 to 21%.

In RP, an exaggerated vasoconstriction over vasodilatation affects the extremities of the body, often triggered by exposure to cold or stress. This condition can be associated with pain, paraesthesia, and, rarely, ulceration of the fingers and toes.

RP is classified as primary in the absence of evidence of an underlying disease, otherwise it is considered secondary. Differentiating primary from secondary RP is important and imposes a challenge for the clinician.

**Case Report:** We report the case of a 24 years old female student, without any significant family history of disease and with a past medical history of Recurrent Parotitis. She was having exuberant cutaneous discoloration in her fingers associated with ulceration and pain, which was compatible with a RP. Her lab results had increased levels of rheumatoid factor and positive anti-nuclear antibodies. Further tests were requested revealing high levels of autoantibodies directed against Ro/SSA and La/SSB antigens. On this basis, the patient was referred to a Rheumatology consultation.

Primary Sjögren Syndrome was diagnosed based on clinical findings, elevated levels of antibodies against ribonucleoproteins and a positive minor salivary gland biopsy. Medical therapy was established with Hydroxychloroquine, Prednisolone in low doses and Pentoxifylline.

**Conclusion:** The vast majority of RP cases identified in Primary Health Care is primary. However, family doctors play a key role in recognizing signs and symptoms that may be associated with secondary causes, being that early recognition is important for therapeutic and prognostic reasons.

## O GIGANTE ADORMECIDO

Mário Gomes<sup>1</sup>, Rita C. Mendes<sup>1</sup>, Maria José Corral<sup>2</sup>, Dagoberto Moura<sup>2</sup>

1. Interno(a) de Medicina Geral e Familiar na USF Faria Guimarães

2. Assistente Graduada em Medicina Geral e Familiar na USF Faria Guimarães

**Enquadramento:** O Aneurisma da Aorta Abdominal (AAA) é uma patologia relativamente frequente, sobretudo na população masculina acima dos 50 anos de idade. A dilatação arterial aneurismática é um processo irreversível e progressivo, podendo conduzir à rotura, situação fatal se não tratada cirurgicamente. Assim, com a apresentação deste caso clínico pretende-se alertar para a existência da patologia, a sua forma de apresentação clínica e a importância do exame objetivo e dos exames de imagem num doente com suspeita de AAA.

**Descrição do Caso:** AJCL, género masculino, 66 anos, mecânico. Família nuclear, fase VI do Ciclo de Duvall, classe social média de Graffar. Antecedentes pessoais de dislipidemia, HTA e tabagismo (20 UMA). Como medicação habitual fazia perindopril + amlodipina - 10 mg + 5 mg e atorvastatina 20 mg. O utente recorreu à consulta aberta da USF Faria Guimarães por desconforto abdominal e náuseas com 12 horas de evolução. Negava febre, vômitos, diarreia, toracalgia, dispneia, tosse ou queixas genito-urinárias. Ao exame objetivo encontrava-se hipertenso (TA - 150/99 mmHg) e normocárdico (FC - 90 bpm). Auscultação abdominal com RHA presentes de timbre e frequência normais e era audível um sopro na região peri-umbilical. À palpação abdominal da região peri-umbilical encontrava-se uma massa com aproximadamente 6 cm de maior diâmetro, pulsátil. Dada a suspeita de AAA enviou-se o doente para o serviço de urgência do Hospital de São João. No SU o doente realizou TAC abdominal que identificou AAA com 7 cm de diâmetro, sem rotura. O doente ficou internado no Hospital São João ao cuidado da cirurgia vascular para colocação de prótese endovascular (stent).

**Discussão:** O médico de família necessita de conhecer a patologia do AAA, os seus fatores de risco e possíveis sintomas para realizar um diagnóstico atempado. O diagnóstico precoce do AAA é essencial, reduzindo o risco de rotura e mortalidade associada.

## UMA DOR ABDOMINAL EM “BOMBA-RELÓGIO”

Daniela Catalão; Isabel Ferreira Amorim

*Internas de Formação Específica de Medicina Geral e Familiar; Unidade de Saúde Familiar Canelas; ACeS Espinho/Gaia*

**Enquadramento:** A dor abdominal é uma queixa muito frequente na prática clínica e a sua abordagem requer uma história clínica detalhada e um exame objetivo completo para que se possam considerar os diagnósticos diferenciais mais prováveis.

**Descrição de caso:** Sexo masculino, 61 anos, caucasiano. AP: Diabetes iatrogénica a pancreatites de repetição; HTA; dislipidemia; FA; obesidade; fumador (40 UMA); abuso crónico de álcool (abstinência há 14 anos). MH: insulina humana isofântica 32+14U; metformina+vildagliptina 1000/50mg bid; telmisartan+hidroclorotiazida 80/12,5mg sid; bisoprolol 5mg sid; rivaroxabano 20mg sid; simvastatina 20mg sid; pantoprazol 20mg sid.

Em Fevereiro de 2016, queixou-se de epigastralgias associadas a enfartamento pós-prandial com 1 mês de evolução. Ao EO: abdómen indolor à palpação com massa pulsátil na linha média. Solicitou-se ecografia abdominal com doppler: “ectasia da aorta abdominal infrarenal estendendo-se longitudinalmente por cerca de 7,6 cm com diâmetro antero-posterior máximo de 37 mm”. Foi pedida TC abdominal: “dilatação aórtica aneurismática da transição toraco-abdominal, com calibre máximo de 57 mm numa extensão crânio-caudal de 10 cm”. Foi referenciado para cirurgia vascular, tendo sido submetido a correção endovascular do aneurisma, sem intercorrências. Mantém vigilância anual em consulta desta especialidade.

**Discussão:** Os AAA são uma entidade multifatorial com fatores de risco bem estabelecidos, nomeadamente, idade, sexo masculino, HTA, tabagismo e raça caucasiana. O risco de rotura associado é responsável por elevada morbimortalidade.

O exame objetivo é fundamental para a suspeição desta patologia e tem boa acuidade diagnóstica nos aneurismas com > 5,5cm. A confirmação diagnóstica requer exames de imagem, tais como, a TC abdominal. A abordagem terapêutica depende do diâmetro dos AAA e da presença de

sintomas. Neste caso, em particular, como o doente tinha um elevado risco de rotura aneurismática (sintomático e diâmetro do AAA >5,5cm ) teve indicação para correção cirúrgica. O método escolhido foi o endovascular, uma técnica menos invasiva, associada a bons resultados e a menor morbimortalidade perioperatória.

O médico de família, como primeiro contacto do doente com os serviços de saúde, tem um papel relevante na suspeição diagnóstica desta doença, sobretudo, em doentes com fatores de risco e/ou clínica sugestiva.

## **“DEDOS AZUIS” – A PROPÓSITO DE UM CASO!**

Débora Alves Fonseca<sup>1</sup>, Ana Costa Cabral<sup>2</sup>

*1. Interna de Medicina Geral e Familiar, USF Além D’Ouro;*

*2. Especialista Medicina Geral e Familiar, USF Além D’Ouro.*

A “Blue toe syndrome” consiste no desenvolvimento de coloração azul ou violácea de um ou mais dedos na ausência de trauma óbvio, lesão grave causada por frio ou distúrbios que produzem cianose generalizada. As principais etiologias podem ser divididas em: diminuição do fluxo arterial, perda de fluxo venoso e outras doenças que causem alterações da circulação. Mulher de 55 anos, raça caucasiana, prestadora de cuidados de saúde. Antecedentes pessoais: Excesso de Peso, Dislipidemia, Perturbação Depressiva e Perturbação do Sono. Sem hábitos etílicos, tabágicos ou consumos aditivos. PNV atualizado, sem alergias medicamentosas conhecidas. Medicada habitualmente com: Duloxetina 60mg, Atorvastatina 20mg. Antecedentes familiares: mãe diabética.

Recorreu ao Serviço de Urgência por aparecimento de cianose na região do 1º dedo do pé direito com uma semana de evolução, sem história de trauma. Foi medicada com Amoxicilina-Ácido Clavulânico 875mg /125mg 3id e Diclofenac 100mg/dia. Cinco dias depois exibiu aparecimento súbito de cianose na região ungueal no 3º dedo do pé esquerdo e calcanhar direito, sem história de trauma, motivo pelo qual recorreu à consulta aberta. Ao exame objetivo apresentava hematoma do 1º dedo do pé direito e do 3º dedo do pé esquerdo, com dor à palpação, sem aparentes sinais de infecção, sem rubor, nem visíveis sinais de trauma. Pulsos periféricos palpáveis, amplos e simétricos. Restante exame sem alterações.

Foi referenciada para o Serviço de Urgência de Cirurgia Vascular para estudo. Foi realizado AngioTac Toraco-Abdomino-Pélvico e Ecocardiograma sem alterações, excluindo fonte embólica.

Teve alta diagnosticada com “Blue toe syndrome” de ambos os membros inferiores e medicada com Ácido acetilsalicílico 150mg/dia, Rivaroxabano 20mg/dia, Iloprost 50mcg/0,5mL.

A cianose dos dedos pode ter várias causas desde trauma a doenças do tecido conjuntivo, no entanto, a causa mais comum do “blue toe syndrome” é a doença ateroembólica ou aneurisma. O diagnóstico diferencial desta síndrome é bastante amplo. O primeiro passo na avaliação do paciente é determinar se a causa está associada a hipoxemia ou trauma. Identificar corretamente a etiologia dos “dedos azuis” é essencial para um diagnóstico adequado, bem como na gestão terapêutica do doente e devido seguimento.

## **HOJE VAMOS MEDIR A TENSÃO ARTERIAL NOS DOIS BRAÇOS!**

Joana C. Silva<sup>1</sup>, Ana Teixeira<sup>2</sup>

*1. Interna de 4º ano de Medicina Geral e Familiar*

*2. Assistente de Medicina Geral e Familiar Centro de Saúde de Santo António,  
Funchal, Madeira, SESARAM E.P.E.*

**Enquadramento:** O controlo da hipertensão arterial (HTA) é das intervenções mais rentáveis na prevenção de eventos cardiovasculares. Contudo, apesar da disponibilidade de fármacos, apenas cerca de 33% dos hipertensos encontram-se controlados.

Todo o ato médico, idealmente, inicia-se com a colheita de uma história clínica (HC) que, quando bem sistematizada, pode permitir o estabelecimento de um diagnóstico. O exame objetivo (EO) complementa os dados da HC e poderá trazer achados que ajudam a estabelecer as hipóteses diagnósticas. A abordagem de um hipertenso não é exceção e, perante doença de difícil controlo, a HC e o EO poderão ser a chave para o problema.

**Descrição do Caso:** Sexo feminino, 87 anos, raça branca, antecedentes de diabetes mellitus tipo 2, dislipidemia e HTA diagnosticada em 2009. Inscrita no Centro de Saúde (CS) da área de residência, sem Médico de Família (MF) até 2013, consultada por diferentes médicos desta Unidade neste período. Ao diagnóstico de HTA iniciou terapêutica com ARA II. Nas consultas de seguimento, apresentava valores tensionais inconstantes, desde HTA grau 3 a tensão arterial (TA) ótima. Causas deste mau controlo foram questionadas sendo proposta a realização de MAPA de 24 horas que recusou, tal como auto-medicação em ambulatório. Ajustes terapêuticos foram uma constante até 2014, quando passa a pertencer a uma lista de MF, iniciando seguimento com o mesmo médico. Após análise do historial e constatação de valores tensionais díspares entre consultas foi avaliada a TA em ambos os membros superiores, verificando-se à direita TA de 211/88 mmHg e à esquerda 88/66 mmHg associado a diminuição da amplitude do pulso radial esquerdo. Perante estes achados, colocou-se hipótese de síndrome de roubo da artéria subclávia e, o Eco-doppler arterial carotídeo e vertebral, corroborou este diagnóstico. A doente foi encaminhada para consulta de Cirurgia Vascular, mantendo seguimento no CS.

**Discussão:** Inicialmente, o quadro clínico simulava uma HTA resistente. Os múltiplos ajustes terapêuticos aliados às reavaliações por diferentes médicos culminaram num atraso no diagnóstico, realçando a importância dos cuidados continuados prestados pelos MF. Sublinha-se a importância do EO no diagnóstico que, aliado à valorização do quadro clínico global e a um elevado índice de suspeição, foram a chave deste caso.

## **ÚLCERA CRÓNICA DO MEMBRO INFERIOR – DIAGNÓSTICO DIFERENCIAL**

Filipe Cabral<sup>1</sup>, Joana C. Paiva<sup>2</sup>, Joana Cameira<sup>3</sup>, Maria João Pires Baptista<sup>2</sup>

1. USF Marco Médico Interno de Formação Específica de Medicina Geral e Familiar

2. USF Renascer Médico Interno de Formação Específica de Medicina Geral e Familiar

3. USF Arco do Prado Médico Interno de Formação Específica de Medicina Geral e Familiar

**Objetivos:** Caracterizar e diferenciar os diversos tipos de úlcera crónica do membro inferior.

**Metodologia:** Este trabalho consiste numa revisão não sistemática da literatura disponível sobre o tema em revistas científicas e base de dados online.

**Resultados:** A Úlcera Crónica do Membro Inferior é uma patologia muito comum nos cuidados de saúde primários, estando a sua prevalência (1.6/1000 habitantes) a aumentar. Para a sua correta avaliação e orientação clínica é indispensável conhecer e diferenciar as etiologias mais frequentes - Úlcera Venosa (UV), Úlcera Arterial (UA), Úlcera Diabética (UD) e Úlcera de Pressão (UP).

Embora o local e a aparência da úlcera possam ser suficientes para identificar a sua etiologia, a anamnese reveste-se também de muita importância devendo focar as características dos sintomas (por exemplo, agravamento da sintomatologia com o ortostatismo da UA vs melhoria na UV) e comorbilidades existentes tais como, diabetes mellitus, doença arterial periférica e trombose venosa profunda. Ao exame objetivo, para além da observação e descrição da lesão e pele circundante, deve ser realizado um exame neurovascular, direcionado para a identificação de neuropatia ou insuficiência arterial e/ou venosa.

As UV localizam-se caracteristicamente na região maleolar medial sobre uma veia perfurante ou ao longo do trajeto das veias safenas, geralmente apresentando exsudado e uma base com tecido de granulação, sendo acompanhadas de edema do membro e reperfusão capilar normal. Pelo contrário, as UA são observadas mais frequentemente no pé sobre pontos de pressão, tipicamente dolorosas e acompanhadas por sinais de insuficiência arterial (extremidade fria, ausência de pulso pedioso).

As UD também são encontradas em áreas de pressão, como a superfície plantar do pé, caracterizando-se por ausência de sensibilidade ao exame neurológico. As UP, apesar de se apresentarem em áreas de proeminências ósseas, são profundas e maceradas, com atrofia da pele e perda de massa muscular no local, distinguindo-se das UD, as quais se associam a pele seca, gretada e com calosidades.

**Conclusões:** O conhecimento por parte do Médico de Medicina Geral e Familiar do diagnóstico diferencial da úlcera crônica é de extrema importância para assegurar a melhor abordagem, tratamento e prognóstico.

## **ABORDAGEM À ÚLCERA CRÓNICA NOS CUIDADOS DE SAÚDE PRIMÁRIOS**

Maria João Pires Baptista<sup>1</sup>, Joana Cameira<sup>3</sup>, Filipe Cabral<sup>2</sup>, Joana C. Paiva<sup>1</sup>

1. USF Renascer Médico Interno de Formação Específica de Medicina Geral e Familiar

2. USF Marco Médico Interno de Formação Específica de Medicina Geral e Familiar

3. USF Arco do Prado Médico Interno de Formação Específica de Medicina Geral e Familiar

**Objetivos:** Criar um protocolo clínico que auxilie na abordagem, vigilância, tratamento e referenciamento da Úlcera Crónica ao nível dos cuidados de saúde primários (CSP).

**Metodologia:** Este trabalho consiste no desenho de um algoritmo baseado na revisão não sistemática da literatura disponível sobre o tema em revistas científicas e base de dados online.

**Resultados:** A Úlcera Crónica do Membro Inferior é uma lesão muito comum nos CSP, com uma prevalência estimada de 1.6 em 1000 habitantes em Portugal, provocando um impacto significativo na qualidade de vida do doente. Desta forma, torna-se essencial a existência de um instrumento de avaliação pragmático e de fácil utilização para o seu seguimento.

O algoritmo desenhado começa pela caracterização da lesão (localização, tamanho e número) e de seguida com a aplicação do score TIME-H modificado, desenvolvido por Ligestri and Bo (2007) e, posteriormente, revisto por Conduit et al (2013). Este score consiste na avaliação das condições locais da lesão (presença de material necrótico - T, infecção - I, maceração - M, ausência de regeneração da epiderme - E) e da condição geral do doente (historial de comorbilidades). De acordo com o score obtido, o seguimento será feito a nível dos CSP ou a nível hospitalar. O algoritmo prossegue a nível dos CSP, com a decisão clínica do tipo de tratamento e periodicidade de vigilância.

**Conclusões:** Com este algoritmo será possível sistematizar e facilitar a abordagem da Úlcera Crónica pelos profissionais dos CSP, tal como aperfeiçoar os critérios de referenciamento para a especialidade, melhorando assim o outcome destas lesões e, subsequentemente, a qualidade de vida do doente.

# PAPEL DOS ANTICOAGULANTES ORAIS DIRETOS NA DOENÇA ARTERIAL PERIFÉRICA: A PROPÓSITO DE UM CASO CLÍNICO DE ISQUÉMIA AGUDA RECORRENTE DOS MEMBROS INFERIORES

Ana Silva; Vânia Morais; Carmen Carrizosa; Leonor Troni

*USF.D.Jordão*

**Introdução:** A doença arterial periférica (DAP) é uma patologia altamente incapacitante. Causada maioritariamente por aterosclerose que pode dar origem a estenoses e oclusões em artérias maior de vários territórios. Os portadores de DAP apresentam um elevado risco para eventos cardiovasculares graves. Estima-se que existam no mundo cerca de 200 milhões de pessoas portadoras de DAP dos membros inferiores. Em Portugal um estudo de 2009 demonstrou uma prevalência de 5,9%.

**Caso clínico:** Homem de 63 anos, leucodérmico, reformado por invalidez na sequência de traumatismo grave da perna esquerda. Portador de DAP dos membros inferiores com o diagnóstico inicial em 2011: doença arterial oclusiva crónica femoro-popliteia direita, estenose da artéria ilíaca e oclusão da artéria femoral superficial bilateralmente, tendo sido submetido a bypass axilo-femoral direito em 2014 por isquémia crítica do membro com posterior necessidade de reintervenção em 2015 e 2016 por oclusão do mesmo. Apresenta também estenose de 80% da artéria carótida interna direita e de 50% da artéria carótida interna esquerda. De salientar como antecedentes pessoais: cardiopatia isquémica, DPOC sob OLD (1L/min durante 15h/dia), hipertensão arterial essencial, dislipidemia, doença hepática crónica, pancreatite crónica e doença renal crónica. Como hábitos relevantes, história prévia de tabagismo (45UMA) cessada há 4 anos e etilismo crónico, em abstinência há 7 anos. Anti agregado com clopidogrel até Dez/2016, altura em que foi submetido a cirurgia por reestenose do bypass, tendo sido iniciado rivaroxabano 20mg depois suspenso na sequência de episódio de epistaxis.

**Conclusão:** Dada a gravidade desta patologia, a sua abordagem atempada é essencial. De acordo com o estudo COMPASS, a associação do rivaroxabano 2,5mg duas vezes por dia ao AAS comparada à utilização isolada do AAS mostrou ser eficaz na prevenção da isquémia aguda

grave, diminuindo significativamente a sua incidência e de outros eventos cardiovasculares graves em 31%. O médico de família tem um papel privilegiado na intervenção terapêutica preventiva de eventos de isquémia aguda importantes, devendo promover a articulação com os cuidados secundários para a otimização da terapêutica da DAP. O extenso arsenal terapêutico atualmente existente para abordagem da DAP permite uma abordagem individualizada, considerando a doença, o doente e as suas co-morbilidades.

## **EFICÁCIA DA TERAPÉUTICA MEDICAMENTOSA NA DOENÇA VENOSA CRÓNICA: EVIDÊNCIA ATUAL**

Ana Silva; Carmen Carrizosa; Vânia Morais; Leonor Troni.

*USF.D. Jordão*

**Introdução e Objetivos:** A doença venosa crónica (DVC) é uma patologia que se associa a múltiplos sintomas, capazes de alterar a qualidade de vida do doente e com um importante impacto socioeconómico. A sua prevalência é de difícil determinação tendo em conta os diferentes critérios de seleção e a definição da doença. Estima-se que esteja presente em mais de 30% da população ocidental e, afetando 10-15% dos homens e 20-25% das mulheres. Atualmente existem várias abordagens terapêuticas disponíveis que deverão ser selecionadas de acordo com o estadio clínico.

Com este trabalho pretende-se fazer uma revisão da eficácia do tratamento farmacológico disponível nas primeiras fases da DVC, nomeadamente os flebotónicos.

**Metodologia:** Foi realizada pesquisa bibliográfica nas bases de dados de medicina baseada na evidência, utilizando como palavras-chave “medical treatment”, “chronic venous disease” e “chronic venous insufficiency”. A pesquisa foi limitada a artigos em inglês, português e espanhol, publicados entre 2005 e 2018. Foram encontrados cerca de 800 artigos, tendo sido seleccionados 99 artigos de acordo com o índice de impacto da revista, tipo de artigo, dimensão da amostra estudada e data de publicação.

**Resultados:** Dos artigos seleccionados obtiveram-se 79 estudos que compararam a diosmina com placebo, no estudo do alívio sintomático; 10 ensaios clínicos e uma meta-análise cuja variável principal versou sobre o tratamento de úlceras utilizando flebotónicos versus placebo e por último, 10 ensaios clínicos em que se avaliava a eficácia dos flebotónicos num contexto geral.

**Discussão:** Da análise dos estudos clínicos, depreende-se que o benefício que aportam os flebotónicos é limitado pois nenhum pode substituir a terapia de compressão ou a cirurgia. No entanto, parece existir um efeito positivo dos sintomas, (edema, “pernas pesadas” e cãibras noturnas) usados de forma adjuvante à terapia compressiva.

O grupo de trabalho para a DVC está de acordo com as guidelines da IESVS de 2015 na recomendação dos MPFF para o tratamento das úlceras venosas, em uso isolado ou associada a terapia de compressão. Os flavonoides são também recomendados para a redução de sintomas comuns como o edema.

# MEDICAL STUDENT E-POSTER

P01

ECEPCs AND BM-MNC IN AUTOLOGOUS TRANSPLANTATION FOR CRITICAL LIMB ISCHEMIA

Afonso Fonseca

P02

LONG-TERM EFFICACY OF THE DIFFERENT TREATMENT OPTIONS FOR GREAT SAPHENOUS VEIN INCOMPETENCE

Ana Isabel Vidal Ferreira Leal

P03

CONTRALATERAL DEEP VENOUS THROMBOSIS AFTER ILOFEMOROCAVAL VENOUS STENTING: A SYSTEMATIC REVIEW

Ana Filipa Pinto

P04

THE IMPORTANCE OF ULTRA-DISTAL VASCULAR STUDIES IN THE EVALUATION OF A DIABETIC FOOT: A CASE REPORT

Ana Luísa Gonçalves Vasconcelos

P05

FEMOROPopliteal BYPASS SURGERY: ANTI-COAGULATION THERAPY PLUS CLOPIDOGREL VS DUAL ANTIPLATELETT THERAPY

Ana Luísa Pinto

P06

VASCULAR MANIFESTATIONS OF ANTI-PHOSPHOLIPID SYNDROME

Ana Maria Meireles

P07

OPEN SURGERY VS TOTAL ENDOVASCULAR REPAIR OF THE AORTIC ARCH USING FENESTRATED ENDOGRAFTS: WHAT WE KNOW?

Ana Marisa Cunha

P08

PELVIC CONGESTION SYNDROME

Ana Raquel Gonçalves

P09

THROMBOANGIITIS OBLITERANS

Ana Rita Cerqueira

P10

THE POSTTHROMBOTIC SYNDROME: RISK FACTORS AND PREVENTION

Ana Sofia Araújo

P11

"BRANCHED VERSUS FENESTRATE ENODRAFTS IN THORACOABDOMINAL ENDOVASCULAR ANEURYSM REPAIR"

André Ferreira

P12

POSTTHROMBOTIC SYNDROME INTERVENTIVE TREATMENT: CHANGING THE PARADIGM

Andreia Lima

P13

POST-THROMBOTIC SYNDROME: THE BENEFITS OF ILIAC VEIN STENTING

Anita Santos

P14

MYCOTIC AORTIC ANEURYSMS. CONVENTIONAL SURGICAL TREATMENT OR ENDOVASCULAR TREATMENT?

António Delmar

P15

TO SHUNT OR NOT TO SHUNT: WHAT TO LEARN FROM THE LITERATURE

António Tomás

P16		P25
<b>REPAIR OF JUXTARENAL AORTIC</b>		<b>CUSTOM-MADE SCALLOPED THORACIC EN-</b>
Beatriz Campos Mota		<b>DOGRAFTS IN HOSTILE AORTIC ANATOMIES</b>
		Catarina Henriques
P17		P26
<b>CASE REPORT OF A NEW TECHNIQUE FOR</b>		<b>POST-EVAR TYPE II ENDOLEAKS</b>
<b>TREATMENT OF POSTCATHETERIZATION</b>		<b>WITH SAC EXPANSION</b>
<b>RADIAL ARTERY PSEUDOANEURYSM</b>		Catarina Vale
Beatriz Carmo		
P18		P27
<b>ANTITHROMBOTIC THERAPY FOR VTE</b>		<b>OUTCOMES AFTER EARLY AND DELAYED CA-</b>
<b>DISEASE: WHAT'S NEW</b>		<b>ROTID ENDARTERECTOMY IN PATIENTS WITH</b>
Beatriz Ferro		<b>SYMPTOMATIC CAROTID ARTERY STENOSIS</b>
		Cátia Juliana Silva
P19		P28
<b>CONCOMITANT CORONARY AND PERIPHERAL.</b>		<b>QUALITY OF LIFE AFTER THERAPY</b>
<b>ARTERIAL DISEASE — TWO SIDES OF THE</b>		<b>FOR VARICOSE VEINS</b>
<b>SAME COIN</b>		Clara Vasco
Beatriz Gil Oliveira Braga		
P20		P29
<b>VASCULAR TRAUMA: MECHANISMS</b>		<b>POST-IMPLANT RUPTURE DUE TO TYPE II</b>
<b>AND PATHOPHYSIOLOGY</b>		<b>ENDOLEAK — DOES IT REALLY HAPPEN?</b>
Beatriz Parreira		Diana Cardoso
P21		P30
<b>A SYSTEMATIC REVIEW OF VENOUS ANE-</b>		<b>ABDOMINAL AORTIC ANEURYSMS (AAA):</b>
<b>RYSMS BY ANATOMIC LOCATION</b>		<b>APPROACH TO GENDER DIFFERENCES</b>
Bruno Barreira		Diogo Brandão da Costa
P22		P31
<b>THE END OF ABI?</b>		<b>CREST: FLAWS AND CRITIQUE</b>
Carina Parente		Diogo Francisco Tomaz
P23		P32
<b>INTERNAL ILIAC ARTERY PRESERVATION</b>		<b>TREATMENT OF RUPTURED ABDOMINAL</b>
<b>STRATEGIES IN THE ENDOVASCULAR TREAT-</b>		<b>AORTIC ANEURYSM: HOW GOOD IS EVAR?</b>
<b>MENT OF AORTOILIAC ANEURYSMS</b>		Diogo Pimentel Mendes Morais
Carolina Parente Robalo		
P24		P33
<b>NEW APPROACHES TO NO-OPTION CRITICAL</b>		<b>ENDOVASCULAR MANAGEMENT</b>
<b>LIMB ISCHEMIA</b>		<b>OF VISCERAL ARTERY ANEURYSMS</b>
Catarina Francisco		Diogo Seabra

P34 <b>DOUBLE LAYER MESH STENTS IN CAROTID ARTERY STENTING</b> Elisabete Campos	P43 <b>PREDICTORS OF LONG-TERM MORTALITY FOLLOWING ELECTIVE ENDOVASCULAR RE- PAIR OF ABDOMINAL AORTIC ANEURYSMS</b> Guilherme Marques-Rios
P35 <b>EXTRACRANIAL CAROTID-ARTERY DISEASE — OUR DAILY PRACTICE</b> Emanuel Matias	P44 <b>THE BURDEN OF POST-THROMBOTIC SYNDROME IN A LONG-TERM RETROSPECTIVE COHORT</b> Inês Andrade
P36 <b>UPPER EXTREMITY DEEP VEIN THROMBOSIS: SYMPTOMS, DIAGNOSIS, AND TREATMENT</b> Fernando Peixoto	P45 <b>ARTERIOVENOUS MALFORMATIONS</b> Inês Carqueja
P37 <b>THE IMPACT OF STATINS ON PERIPHERAL ARTERY DISEASE OUTCOMES</b> Filipa Adan e Silva	P46 <b>RUPTURE OF AN INFECTIVE AORTIC ANEURYSM — A CASE REPORT AND LITERATURE REVIEW</b> Inês Carvalho
P38 <b>ENDOVASCULAR ANEURYSM REPAIR: CUR- RENT STATUS ON DEVICE SPECIFICATIONS AND OUTCOMES</b> Filipa Cordeiro	P47 <b>PERCUTANEOUS ACCESS AS THE BEST FOR ENDOVASCULAR ANEURYSM REPAIR</b> Inês Lopo
P39 <b>QUALITY-OF-LIFE SCALES IN CHRONIC VENOUS DISEASE</b> Filipa Martins	P48 <b>RISK FACTORS FOR VENOUS IN-STENT THROMBOSIS</b> Inês Pais Cunha
P40 <b>POST-THROMBOTIC SYNDROME</b> Filipe Sousa	P49 <b>INTRAVASCULAR ULTRASOUND VS CENTERLINE COMPUTED TOMOGRAPHY</b> Jiele Li
P41 <b>PELVIC VENOUS REFLUX AS A CAUSE OF RECURRENT VARICOSE VEINS IN MALE AND FEMALE PATIENTS</b> Gonçalo da Fonseca	P50 <b>USE OF HYPERBARIC OXYGENATION FOR PREVENTION OF DIABETIC FOOT AMPUTATION</b> Joana Silva
P42 <b>POST-CAROTID ENDARTERECTOMY RESTENOSES</b> Guilherme Loureiro	P51 <b>CALCIFICATION OF AORTIC ANEURYSMS IS ASSOCIATED WITH MORTALITY AND MORBIDITY</b> João Araújo Azevedo Maia

P52	P60
CAROTID ENDARTERECTOMY — WHICH SHUNTING STRATEGY IS THE BEST?	COMPARISON OF TWO FEMORAL VEIN INTERVENTIONS CONCOMITANT WITH ILOFEMORAL STENTING IN PATIENTS WITH POST THROMBOTIC SYNDROME
João Faria	Luís Santos
P53	P61
THE PEDAL- PLANTAR LOOP: AN ALTERNATIVE APPROACH IN NEUROISCHEMIC DIABETIC FOOT	PENETRATING ATHEROSCLEROTIC ULCER OF THE THORACIC AORTA
João Luís Santos Borges	Mafalda Urbano
P54	P62
CAROTID ENDARTERECTOMY — TO SHUNT OR NOT TO SHUNT	TUMORES DO CORPO CAROTÍDEO
João Saraiva	Margarida Peixoto
P55	P63
TO TEST OR NOT TO TEST (INHERITED THROMBOPHILIA MUTATIONS)? VISION OF ANGIOLOGY AND VASCULAR SURGEONS	PREVALENCE OF PERIPHERAL ARTERIAL DISEASE IN PATIENTS WITH CAROTID ARTERY STENOSIS
Joaquim Monteiro	Maria Beatriz Ferraz
P56	P64
IATROGENIC HEPATIC ARTERY PSEUDOANEURYSMS	ANEURISMA DA ARTÉRIA RENAL — O PAPEL DO AUTO-TRANSPLANTE
José Miguel Azevedo	Maria Inês Sousa
P57	P65
ABDOMINAL AORTIC ANEURYSM: WHY WE SHOULD BE DISCUSSING THE IMPLEMENTATION OF A SCREENING PROGRAM IN PORTUGAL?	RESTENOSIS AFTER CAROTID ENDARTERECTOMY: WHAT IS THE BEST TREATMENT?
José Rui Coelho Ribeiro	Maria João Quelhas
P58	P66
FENESTRATED VS PARALLEL-GRAFTS: WHO WINS THIS BATTLE?	ISQUEMIA MESENTÉRICA
Juliana Macedo	Maria José Soares
P38	P67
ENDOVASCULAR ANEURYSM REPAIR: CURRENT STATUS ON DEVICE SPECIFICATIONS AND OUTCOMES	PREDICTORS OF READMISSION AFTER EVAR: REVIEW
Filipa Cordeiro	Mariana Esteves
P59	P68
10 YEARS OF PERIPHERAL ARTERY DISEASE: A RETROSPECTIVE ANALYSIS	CAROTID ARTERY STENOSIS: WHAT ABOUT SCREENING?
Lara Dias	Marta Cerqueira

P69 CONTRAST-ENHANCED ULTRASOUND AFTER ENDOVASCULAR AORTIC REPAIR (EVAR) Marta Dias-Vaz	P78 CANCER AND VENOUS TROMBOEMBOLISM Raquel Palhau
P70 SEXUAL DYSFUNCTION AFTER EVAR AND OPEN REPAIR OF ABDOMINAL AORTIC ANEURYSMS Marta Henriques Costa	P79 THORACIC AORTIC ANEURYSMS: RARE EVENTS OR A RARE DISEASE Ricardo João Clara Teixeira
P71 HYPERBARIC OXYGEN FOR THE TREATMENT OF DIABETIC FOOT ULCERS Mónica Tavares	P80 TYPE II ENDOLEAKS AFTER EVAR FOR RUTURED ABDOMINAL AORTIC ANEURYSM - ARE THEY DANGEROUS? Rui Sampaio
P72 CAROTID ENDARTERECTOMY: PROGNOSIS Nuno Alberto Sousa	P81 USE OF THROMBOLYSIS IN ACUTE DEEP VEIN THROMBOSIS Sara Santos
P73 TREATMENT OF TYPE II ENDOLEAKS FOLLOWING EVAR Nuno Telo Preto Ramos	P82 OUTCOMES OF EVAR IN OCTAGENARIANS Sara Teixeira
P74 THE ROLE OF THROMBOLYSIS IN THE ACUTE TREATMENT OF DEEP VEIN THROMBOSIS Paula Matias	P83 “RECONSTRUCTIVE VASCULAR SURGERY AND THE EXTENT OF TISSUE DAMAGE DUE TO DIABETIC FOOT ULCERS RELATES TO RISK OF NEW ULCERATION IN PATIENTS WITH PAD” Sílvia Ferreira
P75 CAROTID TREATMENT IN ADMINISTRATIVE DATABASES. A COMPREHENSIVE REVIEW Paulo Correia	P84 SÍNDROME DE MAY-THURNER Tiago Chantre
P76 EARLY AND LONG-TERM RESULTS OF ENDOVASCULAR STENTING AND AORTOFEMORAL GRAFTING FOR ILIAC OCCLUSIVE DISEASE Pedro Martins	P85 ENVOLVIMENTO VASCULAR NA DOENÇA DE BEHÇET Leonor Lemos
P77 RARE COMPLICATIONS OF SURGICALLY OPERATED POPLITEAL ARTERY ANEURYSMS Rafaela Lopes	

# ECEPCs AND BM-MNC IN AUTOLOGOUS TRANSPLANTATION FOR CRITICAL LIMB ISCHEMIA



Afonso Fonseca, Ricardo Ferreira, MD 1

Regente da UC Angiologia e Cirurgia Vascular, o Prof. Doutor Armando Mansilha

1. Department of Angiology and Vascular Surgery, CHSJ, Oporto

## Introduction

- Peripheral arterial disease (PAD) is a major burden affecting 20% of the seventies population<sup>1,2</sup>
- 1-2% of the affected by PAD more than 50 years old progress to critical limb ischemia (CLI)<sup>1,2</sup>
- As many patients are not eligible for revascularization, alternatives must be sought<sup>3</sup>

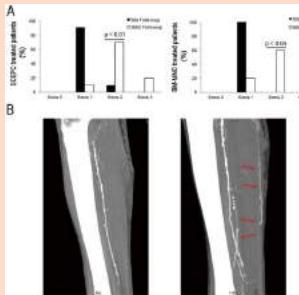
## The endothelial progenitor cells

- Circulating endothelial progenitor cells (EPCs) are a key factor for the development of microcirculation collaterals<sup>3,4</sup>
- Tateishi-Yuyama et al confirmed the clinical efficacy of the intramuscular transplantation of autologous BM mononuclear cells (BM-MNC)<sup>5</sup>. Pignon et al proved the efficacy of these cells in reducing the frequency of major amputations in CLI in a randomized double-blind placebo controlled trial<sup>6</sup>

## A new approach

- A cell-enrichment system was developed based on the immunomagnetic isolation of both CD14+ (including CD14+CD34low) and CD34+ circulating cells, defined "enriched circulating (EC) EPCs".
- Efficacy of an intramuscular injection of autologous ECEPCs in 30 CLI patients was compared with 30 CLI patients injected with BM-MNCs (the older method) in the SCELTA Randomized Trial<sup>7</sup>.
- Rest pain, consumption of analgesic drugs, pain-free walking distance, QoL, ABI and TBI, TC PO2 results did not show statistically significant differences between the two groups, with all the values improved.
- Muscle perfusion also improved, as well as anatomical collaterals, more evident in the ECEPC group in the 3<sup>rd</sup> follow up visit (compared with the 1<sup>st</sup>).
- The fraction of patients who died after a major amputation was higher in HCRG [a group with

similar disease severity (Rutherford classification), matched for age, sex, and comorbidities; also they were not eligible for revascularization] than treated patient group (7/12 [58.3%] vs. 0/7[0%], respectively; P<0.001).

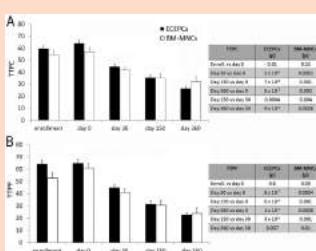


**Figure 1**  
Changes in limb vessels in patients treated with ECEPC or BM-MNC. (A) 0, worsening; 1, unchanged; 2, slight improvement; 3, clear improvement. (B) Radiograms of 1 patient before (Left) and after (Right) ECEPC

- Clinical improvements in the treated patients persisted beyond 360 days (3rd follow-up visit) and some patients in both groups are still in great conditions up to 6 years after treatment.

## Conclusion

The injection of a circulating cell population consisting of monocytes (containing the CD14+CD34low population) and of CD34+ cells, in absence of G-CSF mobilization, induces a differentiation, at least *in vitro*, in endothelial cells<sup>8</sup>. Thus, ECEPC constitute a viable alternative to the SC and BM-MNCs as it was demonstrated in several trials.



**Figure 2** Serial changes in muscle perfusion in patients treated with ECEPC or BM-MNC showing TTP at the calf (TTPC) A. and forearm (TTPF-9) B. Data are the mean P values

- References:  
1. Bellamy N, Fayers M. Clinical and operational validation. *New Engl J Med* 1987; 317: 160-165.  
2. Bellamy N, Fayers M, Stevens JE, Moore M, Harries R, MacLennan G. *Guidelines for the Management of peripheral arterial disease (TASC II). A Consensus Document of the European Society for Vascular Surgery and European Society for Cardiovascular Endovascular Surgery*. *J Vasc Surg* 2005; 42: 355-367.  
3. Attwells A, Smith J. Therapeutic angiogenesis in the management of critical limb ischaemia: current concepts and review. *Crit Rev Oncol Hematol* 2002; 41:105-125.  
4. Lanza P, Lanza C, Lanza F, Lanza G, Lanza M, Lanza T, et al. Human numbers of angiogenesis after arterial gene transfer of platelet-derived growth factor BB in patients with ischaemic limb. *Lancet* 1998; 351: 216-217.  
5. Tateishi Y, Yuyama K, Yamada T, Matsunaga T, et al. Autologous bone marrow mononuclear cell (BM-MNC) transplantation for patients with limb ischaemia due to occlusive thromboembolism of lower extremity arteries. A pilot study and initial control trial. *Surgery* 2002; 133: 457-465.  
6. Pignon P, Assenza M, Rognantini L, Perraud A, Shabot M, Sauer J, et al. A randomized, double-blind, placebo-controlled trial of autologous bone marrow mononuclear cell (BM-MNC) transplantation for patients with critical limb ischaemia. *Am J Cardiol* 2005; 95: 1208-1213.  
7. Lanza P, Attwells C, et al. Therapeutic efficacy of Adipose-Derived Stem Cells in Non-Mobilized Autologous Circulating Endothelial Progenitors in Patients With Critical Limb Ischaemia – The ESD-ADSC Trial. *Crit Rev Oncol Hematol* 2012; 83: 217-227.  
8. Rangelos P, Attwells C, Lanza P, Lanza C, Lanza M, Lanza T, et al. BM-MNCs are enriched with stem cell plasticity and functional features are the major source of circulating endothelial progenitors. *Crit Rev Oncol Hematol* 2005; 55: 214-222.

# LONG-TERM EFFICACY OF THE DIFFERENT TREATMENT OPTIONS FOR GREAT SAPHENOUS VEIN INCOMPETENCE

ANA ISABEL VIDAL FERREIRA LEAL, TIAGO SOARES, FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO  
REGENTE DA UNIDADE DE ANGIOLOGIA E CIRURGIA VASCULAR: PROF. DOUTOR ARMANDO MANSILHA

## INTRODUCTION

Varicose veins are a common medical condition with a prevalence of around 25-40% in the adult population.

Most frequently used treatment options for Great Saphenous Vein (GSV) incompetence are:

- High ligation with stripping (HL+S)
- Endovenous thermal ablation (EVTA): endovenous laser ablation (EVLA) or radiofrequency ablation (RFA)
- Ultrasound guided foam sclerotherapy (UGFS)

## OBJECTIVE

Review and compare the efficacy of different treatment options in GSV incompetence.

## RESULTS

ANATOMICAL SUCCESS RATE	Defined as absence of reflux in the treated vein after 5 years of duplex ultrasound (DUS).
RECURRENT FLUX RATE	At the saphenofemoral junction (SFJ) or in the groin.
VENOUS CLINICAL SEVERITY SCORE (VCSS)	To evaluate clinical outcome. It evaluates pain and clinical symptoms such as edema, skin changes, inflammation and ulcers.
QUALITY OF LIFE	Aberdeen Varicose Vein Questionnaire and Chronic Venous Insufficiency Questionnaire.

ANATOMICAL SUCESS RATES



Fig. 1 Comparisons of the four different treatment groups. (1)

RECURRENT FLUX RATE

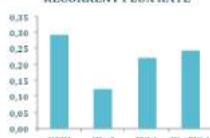


Fig. 2 Pooled proportions of recurrent reflux rates at the SFJ/groin in the different treatment groups. (1)

## DISCUSSION

EVTA and HL+S are the preferred treatment options for GSV incompetence, both with superior long-term results than UGFS.

Looking at long-term treatment success, UGFS is inferior to EVLA, HL+EVL and HL+S and shows higher recurrent reflux rates than HL+S. Quality of Life scores may be lower than in patients treated with EVLA.

There is no clear advantage of adding high HL to EVLA in the long term, as results are similar to EVLA without HL.

When comparing EVLA and RFA, both techniques are reliable and efficient, showing a long-term overall technical success rate.

## CONCLUSION

EVLA and HL+S are more effective in the long-term for GSV incompetence than UGFS.

EVLA and RFA have similar outcomes.

- REFERENCES:** (1) Hamann SAS, et al., Five Year Results of Great Saphenous Vein Treatment: A Meta-analysis, European Journal of Vascular and Endovascular Surgery (2017), <https://doi.org/10.1016/j.ejvs.2017.08.034>.  
 (2) Van der Velden SK, Biemans AA, De Maeseneer MG, et al. Five-Year Results of a Randomized Clinical Trial of Conventional Surgery, Endovenous Laser Ablation and Ultrasound-Guided Foam Sclerotherapy in Patients With Great Saphenous Varicose Veins. BJS 2015;102:1184-94.  
 (3) Balint R, Farics A, Parti k, Vizsy L, Batorfi J, Menyhei G, Balint IB. Which endovenous ablation method does offer a better long-term technical success in the treatment of the incompetent great saphenous vein? Review. Vascular 2016, Vol. 24(6) 649-657

## CONTRALATERAL DEEP VENOUS THROMBOSIS AFTER ILOFEMOROCAVAL VENOUS STENTING: A SYSTEMATIC REVIEW

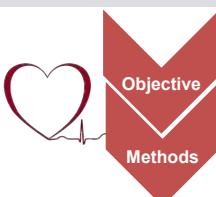
A.F. Pinto<sup>1</sup>, J. Neves<sup>1,2,3</sup>

1. Faculty of Medicine, University of Porto 2. Portuguese Society od Cardiothoracic and Vascular Surgery 3. Portuguese Society of Cardiology

Regente da Unidade de Angiologia e Cirurgia Vascular—**Prof. Doutor Armando Mansilha**

### Background

Endovascular therapy, consisting of a minimally invasive percutaneous technique with stenting of the iliofemorocaval veins, is the first line treatment for Deep Venous Occlusive disease. However, there have been some reports of contralateral Deep Vein Thrombosis (DVT) following venous stenting. Still, such reports have been rare and often disregarded, since they are commonly thought to be attributable to bilateral post-thrombotic disease, rather than a consequence of the vein stenting itself, or any other factor.



•The aim of this work is to gather the information regarding the incidence of DVT following iliac vein stenting.

•Literature that mentioned the number of cases of DVT following vein stenting was reviewed, and the incidence of the phenomenon was evaluated.

### Results

Six papers met the criteria. Two of them were retrospective cohort studies, three were prospective and one was a consecutive case series. All patients were submitted to a venous stenting procedure due to occlusive disease, in a total sample size of 2363 patients. The average incidence of Deep Vein Thrombosis in these patients was 3.33%. Details of patients' clinical aspects can be seen in the following table:

Paper n.	Type	Sample Size	DVT Incidence	Follow-up
1.	Prospective	65	9.7%	2008-2012
2.	Retrospective	376	2.7%	2000-2016
3.	Prospective	755; 982	2%; 0	2006-2010; 2011-2015
4.	Retrospective	982	1.12%	1997-2005
5.	Prospective	46	2.7%	2008-2012
6.	Consecutive case series	139	1.89%	1999-2007

### Conclusion

Contralateral deep venous thrombosis caused by iliofemorocaval venous stenting can jeopardize QoL improvement. In recent series, the risk is below three percent, and in most reports the troubleshooting was reasonable. Despite iliofemorocaval stenting being a safe procedure with few complications to the contralateral limb, patients should be warned about this risk.

### References

- Caliste, X. A., et al. (2014). "The incidence of contralateral iliac venous thrombosis after stenting across the ilio caval confluence in patients with acute or chronic venous outflow obstruction." *J Vasc Surg Venous Lymphat Disord* 2(3): 253-259.
- Khairi, S. A., et al. (2017). "Factors Associated with Contralateral Deep Venous Thrombosis after Iliacaval Venous Stenting." *Eur J Vasc Endovasc Surg* 54(6): 745-751.
- Murphy, E. H., et al. (2017). "Deep venous thrombosis associated with caval extension of iliac stents." *J Vasc Surg Venous Lymphat Disord* 5(1): 8-17.
- Neglen, P., et al. (2007). "Stenting of the venous outflow in chronic venous disease: long-term stent-related outcome, clinical, and hemodynamic result." *J Vasc Surg* 46(5): 979-990.
- Liu, Z., et al. (2014). "Endovascular treatment for symptomatic iliac vein compression syndrome: a prospective consecutive series of 48 patients." *Ann Vasc Surg* 28(3): 695-704.
- Raju, S. and P. Neglen (2009). "Percutaneous recanalization of total occlusions of the iliac vein." *J Vasc Surg* 50(2): 360-368.

## THE IMPORTANCE OF ULTRA-DISTAL VASCULAR STUDIES IN THE EVALUATION OF A DIABETIC FOOT: A CASE REPORT

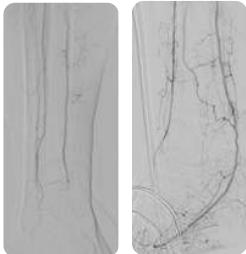
Ana Vasconcelos, Andreia Coelho

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

In 2014, 422 million people worldwide had diabetes mellitus. Diabetes caused 1,5 million deaths in 2012. The rates of lower limb amputation are 10 to 20 times higher in populations with diabetes because of infected, non-healing foot ulcers.<sup>(1)</sup> Neuropathy and angiopathy are the initiating factors that lead to diabetic foot complications, with a different weight in different patients. Differential diagnosis between neuropathic, ischemic or neuroischaemic lesions is essential to determine the need for revascularization. Ischemia should not be excluded as a cause of diabetic foot ulcer unless proven absent. It is recommended to perform further vascular evaluation if the ulcer has not healed after proper treatment after 6 weeks.<sup>(2)</sup>

### ARTERIOGRAPHY



Left: At the malleolar level all runoff vessels occluded  
Right: After angioplasty of the arches of the foot

### PHYSICAL EXAMINATION



### CASE REPORT

A 67 years old male, with history of hypertension and diabetes mellitus type 2 was referred to the Diabetic Foot Multidisciplinary Unit:

Foot ulcer in the second toe with bone exposure;  
Palpable femoral, popliteal and posterior tibial pulses

Diagnostic: **Neuropathic diabetic foot**

#### ER (2 months after initial evaluation):

Exuberant inflammatory signs peri-ulcer and cellulitis of the leg under oral antibiotic; Palpable femoral, popliteal pulses and posterior tibial pulse

Doppler evaluation revealed low amplitude monophasic distal fluxes

### POST PROCEDURE

Incompressible posterior tibial, anterior tibial and peroneal arteries

Biphasic fluxes in the posterior tibial and pedal arteries

Surgical debridement, toe amputation and plantar abscess drainage

### CONCLUSION

A clinical examination of a diabetic foot should be performed periodically.<sup>(2)</sup> Pulse palpation is the cornerstone of vascular examination and clinically significant arterial disease can be ruled out only if both dorsalis pedis and posterior tibial pulses are palpable, as patients present themselves with very distal and complex disease.<sup>(2)</sup> In diabetes, the presence of pulses does not always correlate with the absence of ischemia.<sup>(4)</sup> Non-invasive vascular studies include ankle pressure and ankle-brachial systolic pressure index (ABI), which may be falsely elevated in diabetic patients. Alternatives include toe pressure measurement, toe-brachial systolic pressure index (TBI) and transcutaneous oxygen pressure. Detailed visualization of infrapopliteal arteries, including the arteries of the foot, may be necessary for a complete evaluation. DSA is the gold standard for imaging investigation of peripheral arterial disease but it is an invasive procedure. Besides the underfilling of contrast in the distal vessels may erroneously suggest they are occluded, if selective catheterization is not performed.<sup>(4)</sup> The choice of revascularization methods depends on comorbidities, severity and extension of the arterial lesions. Endovascular treatment is more and more considered as a first choice – “endovascular first” treatment.<sup>(3)</sup>

(1) Global report on diabetes. World Health Organization; (2) Chapter V: Diabetic Foot. European Journal of Vascular and Endovascular Surgery (2011) 42(S2), S60-S74; (3) 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with ESVS; (4) R. W. Browning et al. (2015). Diagnosis and assessment of peripheral arterial disease in the diabetic foot. 10.1111/dme.12749

## **FEMOROPOLITEAL BYPASS SURGERY: ANTICOAGULATION THERAPY PLUS CLOPIDOGREL VS DUAL ANTIPLATELET THERAPY**

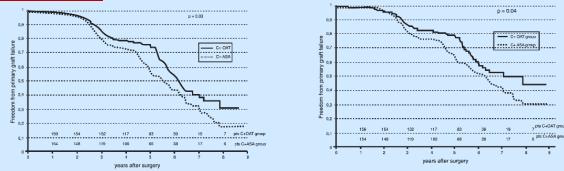
Ana Luísa Pinto, João Rocha Neves

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### **INTRODUCTION**

Patients who underwent femoropopliteal bypass surgery remain at significant risk of graft failure(1). Although antithrombotic therapy is of paramount importance in these patients, the effect of oral anticoagulation therapy (OAT) on outcomes remains unresolved(2). The present work aims to evaluate the impact of OAT plus clopidogrel vs dual antiplatelet therapy on peripheral vascular and systemic cardiovascular outcomes in patients undergoing this type of surgery.

### **RESULTS**



A clinical research study has shown that the graft patency rate and the freedom from severe peripheral arterial ischemia was significantly higher in C+OAT, clopidogrel plus oral anticoagulation therapy, when compared to C+ASA, clopidogrel plus Acetylsalicylic acid therapy ( $P = .026$  and  $.044$ , respectively).

	C +OAT(n = 181)	C +ASA(n = 187)	P value
No of patients % (patient-year)	(95% CI)	(95% CI)	
Bleeding	20.462 (0.09-0.87)	21.259 (2.33-3.00)	.06
Life-threatening/requiring hospitalization and/or amputation	15.176 (1.52-2.24)	15.162 (1.17-2.07)	.7
Not requiring hospitalization and/or amputation	21.285 (2.87-3.45)	21.157 (0.95-1.18)	.03

The same clinical study has shown that the linearized incidence of minor bleeding complications was significantly higher in C + OAT group than in C + ASA group (2.85% patient-years vs 1.37% patient-years;  $P = .03$ ) (3).

### **CONCLUSION**

In patients who have undergone femoropopliteal vascular surgery, combination therapy with clopidogrel plus anticoagulation therapy is more effective than dual antiplatelet therapy when it comes to increasing graft patency and reducing severe peripheral ischemia. These improvements are obtained at the expenses of an increase in the rate of minor anticoagulation-related complications (3).

### **BIBLIOGRAPHY**

- 1) L.P. Jensen, M. Lepäntalo, J.E. Fossdal, O.C. Røder, B.S. Jensen, M.S. Madsen, et al. **Dacron or PTFE for above-knee femoropopliteal bypass: A multicenter randomized trial**; *Eur J Vasc Endovasc Surg*, 33 (2007), pp. 44-49
- 2) R.S. Bruckental, H. Koenig, G. Armstrong, G. Collier, S. Sharpen, B.L. Johnson, et al. **The relative importance of graft surveillance and warfarin therapy in infrarenal prosthetic bypass failure**; *J Vasc Surg*, 46 (2007), pp. 1160-1166
- 3) M. Monaco, L. Tommaso, G. Pinna, S. Lillo, V. Schiavone, et al. **Combination therapy with warfarin plus clopidogrel improves outcomes in femoropopliteal bypass surgery patients**; *J Vasc Surg*, 56 (2012), pp. 96-105

## VASCULAR MANIFESTATIONS OF ANTIPHOSPHOLIPID SYNDROME

Ana Maria Meireles, Marina Dias-Neto

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Antiphospholipid syndrome (APS) is a systemic autoimmune disease characterized by thrombotic events in arterial and venous territories, gestational morbidity and the persistent presence of antiphospholipid antibodies. APS is relatively frequent in the clinical practice of the vascular surgeon and typically presents with stigmas of thrombotic disease.[1]

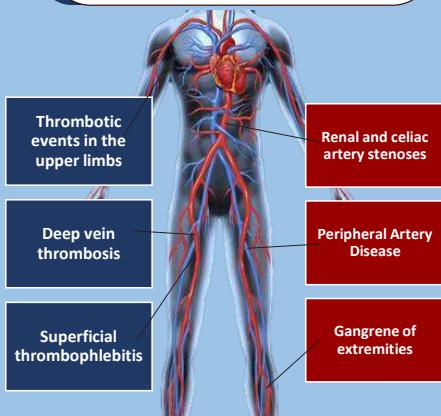


FIGURE 1 – Vascular manifestations of APS of the venous (left - blue) and arterial (right - red) territories.

### Conclusion

APS may lead to multiple major thrombotic manifestations. Therefore, this diagnosis should be considered by the clinician, so that it is performed the optimal treatment, consequently improving the overall prognosis of the disease.

### Methods

Relevant articles for the topic were selected after researching in *PubMed* with the terms "antiphospholipid syndrome", "thrombophilia" and "vasculopathy". Articles referenced in other papers were also included.

### Results

The most common manifestation of APS is **deep vein thrombosis** of the lower limb (prevalence 39%). This may or may not have predisposing factors, and is sometimes associated with pulmonary embolization. **Superficial thrombophlebitis** is also common (12%). On the other hand, **thrombotic events in the upper limbs** are rare. It was reported a prevalence of 1.8% of subclavian thrombosis and 0.9% of jugular vein thrombosis. [2] In the arterial territory, the most common events are strokes and TIA. APS is associated with accelerated atherosclerotic disease. [3] In this way, **peripheral artery disease** is common, including changes in ABI and arterial thrombosis (4%) sometimes with gangrene of the extremities. [2, 4, 5] Less frequently APS is associated with **renal artery stenosis** and **stenosis or even celiac trunk occlusion**. [6]

- 1.Siddique, S., et al., Vascular Manifestations in Antiphospholipid Syndrome (APS): Is APS a Thrombophilia or a Vasculopathy? CRR, 2017.
- 2.Cervera, R., et al., Antiphospholipid syndrome: clinical and immunologic manifestations and patterns of disease expression in a cohort of 1,000 patients.AR, 2002.
- 3.Gavier, B., F. Vazquez, and E. Gandara, Antiphospholipid antibodies and lower extremity peripheral arterial disease (meta-analysis) Vasa, 2016.
- 4.Baron, M., et al., Prevalence of an abnormal ankle-brachial index in patients with primary antiphospholipid syndrome: preliminary data. ARDS, 2005.
- 5.Soo Hoo, A.J., et al., Critical Limb Ischemia Secondary to Antiphospholipid Syndrome in a Pediatric Patient: Case Report and Review. AVB, 2017.
- 6.Christodoulou, C., S. Sangle, and D.P. D'Cruz, Vasculopathy and arterial stenotic lesions in the antiphospholipid syndrome. Rheumatology, 2007

## OPEN SURGERY VS TOTAL ENDOVASCULAR REPAIR OF THE AORTIC ARCH USING FENESTRATED ENDOGRAFTS: WHAT WE KNOW?

Ana Marisa Cunha<sup>1</sup>, José Pedro Pinto

<sup>1</sup>Oporto University Medical School student

anamarisa\_c@hotmail.com

Regente da Unidade de Angiologia e Cirurgia Vascular: Prof. Doutor Armando Mansilha

**Introduction:** The gold standard for aortic arch repair remain open surgical repair. However, it is still associated with significant mortality and morbidity<sup>1</sup>. Total endovascular replacement of the arch using fenestrated grafts have emerged as a novel and less invasive alternative for unfit patients in specialized centers<sup>2</sup>. Only a few studies have been conducted so far using total endovascular repair of the aortic arch with fenestrated grafts<sup>2</sup> and whether this technique is superior to open surgical repair is still unclear<sup>1</sup>.  
**Aim:** The present work aim to compare short term outcomes between total endovascular and open repair for the treatment of aortic arch aneurysms.

**Methods:** PubMed databases were searched to find contemporary and relevant data on "aortic arch aneurysm", "open surgical repair" and "fenestrated endografts for arch repair".

### Results

Table1: Early results for the patients undergoing open surgery vs endovascular treatment.

	Open surgery n=133	Endovasc ular repair n= 66	P value
Postoperative hospital stay, days <sup>a</sup>	17(14-26)	11 (10-15)	<0.001
Acute kidney injury, n (%)	23(17)	6(9)	0.14
Stroke, n (%)	14(11)	2(3)	0.09
In-hospital deaths, n (%)	3(2)	3(5)	0.4

<sup>a</sup>Median (25<sup>th</sup> to 75<sup>th</sup> percentile). Source: Hori et al, 2017

**Discussion/Conclusion:** No differences were found in the in-hospital deaths. The open surgery group had better mid-term survival and freedom from reintervention rates. Early data show that endovascular aortic arch repair provide promising results. Still most of this results come with highly experienced centers. Additional long-term studies with real-world data are necessary to attest these findings.

### References

- Hori D, Okada H, Yamamoto T et al. Early and mid-term outcomes of endovascular and open surgery for a dissected aortic arch aneurysm. Interactive cardiovascular and thoracic Surgery 2017;24:e94-e98.
- Azuma T, Yokoi Y, Yamazaki K. The next generation of fenestrated endografts: results of a clinical trial to support and expanded indication for aortic arch aneurysm treatment. European Journal of cardio-Thoracic Surgery 2013;44:e156-e163.

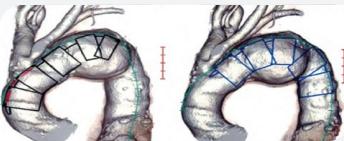


Fig.1 - Preoperative three dimensional measurements and engraft planning. Source: Azuma, 2015.



Fig.2- Preoperative and postoperative CTA of a patient treated with a fenestrated graft. Source: Tsilimparis et al, 2016.

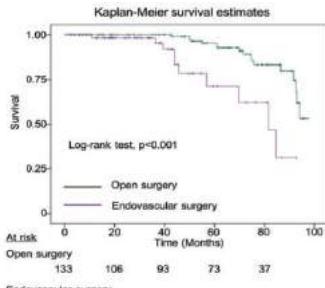


Fig.2- Kaplan-Meier survival curve and log-rank test for all-cause mortality. Source: Hori et al, 2017

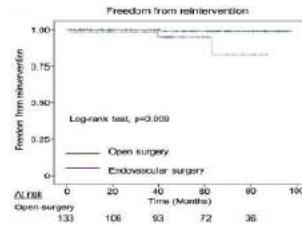


Fig.3- Kaplan-Meier curve and log-rank test for reintervention. Source: Hori et al, 2017

Ana Raquel Gonçalves, Joel Sousa

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

**BACKGROUND**

Pelvic congestion syndrome (PCS) is an **under-diagnosed** disorder due to pelvic venous insufficiency.

- PCS is defined as a **chronic pelvic pain often associated with perineal, vulvar or lower extremity varices**<sup>1,2,3</sup>.

- Usually affects multiparous women of reproductive age<sup>1,3</sup>.

- The most common symptom is **noncyclic lower abdominal or pelvic pain** which is exacerbated by prolonged standing, coitus, menstruation and pregnancy. The physical examination may reveal **hemorrhoids and varicose** that extend to the medial thigh and long saphenous territory<sup>1</sup>.

- PCS has a prevalence of **15%** in fertile women in the US. Up to 10% of general population have ovarian varices and **60%** of them will develop PCS<sup>2</sup>.



Fig.1. Vulvar (a) and lower extremity varices (b).

**PATHOPHYSIOLOGY OF PCS**

PCS might be primary due reflux through incompetent valves in the ovarian and pelvic veins (the major defect in PCS<sup>3,4</sup>) or secondary to compression:

- **Nutcracker Syndrome** (mesoaoortal compression of the left renal vein);

- **May-Thurner Syndrome** (the left common iliac vein is compressed by the right iliac artery)<sup>4</sup>.

The **goldstandard diagnostic method** is the venography, but it shouldnt be used as the primary imaging but rather reserved for patients who necessitate intervention.

**REFERENCES:** <sup>1</sup>Marlene T et al ,2015; <sup>2</sup> Chiara Borghi et.al ,2016; <sup>3</sup> Darcy Phillips et al ,2014; <sup>4</sup> Osman Mahmoud et al.,2016; <sup>5</sup>Janette D. Durham ,2013; <sup>6</sup>S R Butros et al. ,2013.



Fig.2. Retrograde flow in Fig.3. May-Thurner a dilated LOV with left Syndrome parametrial varices

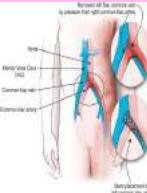


Fig.3. May-Thurner Syndrome



Fig.4. Nutcracker Syndrome

**TREATMENT OPTIONS**

Treatment is usually endovascular with 99% reported technical sucess<sup>3</sup>.

- **Transcatheter ovarian vein embolization** with several embolic agents like sclerosant foam, coils, glue and Amplatzer drugs is the goldstandard treatment for PCS due to ovarian and pelvic venous incompetence. Sclerotherapy of hypogastric veins can be used adjunctively.

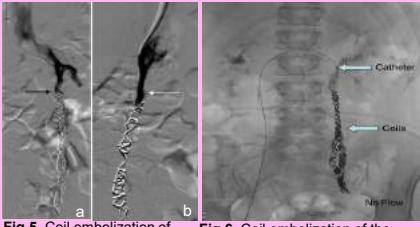


Fig.5. Coil embolization of the left (a) and right (b) gonadal veins

Fig.6. Coil embolization of the left gonadal vein

- **Endovascular stenting** of the obstructed vein has been emerging as the primary treatment of obstructive syndromes like NS and MTS<sup>4,6</sup>. Self-expanding stents are most commonly used. Long term anticoagulation and compression stockings are required to prevent deep venous thrombosis and stent occlusion.

**THE MAIN HIGHLIGHTS**

- PCS can cause lower abdominal/pelvic pain and vulvar or lower extremity varices. Most of the patients are young fertile women.
- The treatment of PCS is mainly endovascular.

## Introduction

*Tromboangiitis obliterans* (TAO), or *Buerger Disease*, is a vasculitis unrelated to atherosclerotic disease that predominantly affects the distal vasculature (small and medium-sized arteries and veins) of the extremities. It commonly presents in smokers as a devastating disease with a dismal prognosis, frequently requiring amputation. Although the treatment options have been somewhat limited, primarily restricted to smoking cessation and, when the limb viability was lost, amputation, new therapies have shown promise.

## Objectives and Methods

Bibliographic review to access results of experimental therapies for *Buerger's Disease*.

Authors	N	Potential•treatment	Results
Bozkurt et al.	158	Intravenous•iloprost	Complete healing rate without pain or major amputation of 60.23% at 24 weeks
DeHaro et al.	13	Oral•bosentan	Clinical improvement was observed in 12 of the 13 patients, even those who continued to smoke. Only 2 of the 13 extremities were amputated.
Patwa and Krishnan	60	Iliarov's Technique—follow-up<63 months	Immediate results were promising except two amputations. Good to excellent early and late results in 56 and 48 patients, respectively.
Fabregat et al.	3	Spinal•cord•stimulation	Improvement in pain control allied to improved perfusion in the limbs in the initial stages of the disease.
Lee et al.	67	Autologous•bone•marrow•transplant—follow-up<5 years	The 1, 3 and 5-year amputation-free rates were 91.9%, 88.5% and 84.6% for all the limbs, respectively, and 83.9%, 77.5% and 70.4% for the critical limb ischemic limbs.
Guo et al.	59*	Autologous•bone•marrow-derived•mononuclear•cells—follow-up>10 years	Treatment significantly improved amputation-free survival, ulcer healing, and pain, although there is no difference in ankle-brachial index compared to treatment with aspirin alone.
Mohammad-Hadi et al.	13	Percutaneous•transluminal•angioplasty—mean follow-up•19.4±13.4 months	Percutaneous transluminal angioplasty can be considered as a technically feasible and potentially effective treatment for patients with and critical limb ischemia, as well as a last resort for limb salvage when other options have failed. However, reintervention may be required, especially in patients who continue smoking.
Tang et al.	30	Endovascular•radiofrequency•ablation	Occlusion of femoral artery was improved after surgery. Moreover, there was no recurrence of TAO at 2 years of follow-up. The pain score was significantly decreased after surgery. The values of ankle brachial index at postoperation, 2 weeks after surgery, and 2 years after surgery were all significantly higher than the preoperative ankle brachial index.
Wan et al.	64	Autologous•peripheral•blood•stem•cell•transplantation	Five patients suffered from necrosis below the middle of the leg 4 weeks after transplantation and received amputation. The remaining 59 patients (75 affected limbs), pain and cold sensation of the affected limbs were improved with varying extent 3 months after transplantation; there were statistically significant differences in pain score and cold sensation score of the affected limbs before and after treatment. Claudication distance, ABI, TOPO2 and skin temperature were also significantly improved. New collateral vessels were formed in the affected limbs.

Research has provided a new therapeutic armamentarium to the once relentless *Buerger Disease*. Regarding medical therapy, one can use IV prostaglandins in the acute setting and bosentan as maintenance treatment, as these two options have demonstrated satisfactory results. The surgical options presented have also demonstrated optimal outcomes, not only in pain control, but also in tissue perfusion. Bone marrow transplantation is the most active area in buerguer disease treatment. Although these therapies are appellative, real world clinical practise results are lacking. Further studies are still required to establish the role of these treatments in *Buerger's disease*.

## References

- Vijayakumar A, Tiwari R, Kumar Prathawary V. Thromboangiitis Obliterans (*Buerger's Disease*)—Current Practice. International Journal of Inflammation. 2013;2013:1-9.
- Jiménez-Gállo D, Alberdi-Sanz M, Cárdenas C, Arjona-Aguilar C, Blanco-Sánchez G, Rodríguez-Matos M, Llunes-Barrios M. Treatment of thromboangiitis obliterans (*Buerger's disease*) with high-potency vasodilators. Dermatol Ther. 2015;28(2):113-123.
- Bozkurt A, Cengiz K, Arslan C, Mine D, Onur S, Deniz D et al. A Stable PGE<sub>1</sub> Analogue (Iloprost) in the Treatment of Buerger's Disease: A Prospective Analysis of 150 Patients. ATC. 2013;2013:1-10.
- De Haro J, Acín F, Beda S, Varela C, Esparral L. Treatment of thromboangiitis obliterans (*Buerger's disease*) with bosentan. BMC Cardiovasc Disord. 2012;12(1):5.
- De Haro J, Beda F, Acín F. An open-label study on long-term outcomes of bosentan for treating ulcers in thromboangiitis obliterans (*Buerger's disease*). International Journal of Cardiology. 2014;177(2):529-531.
- Patwa J, Krishnan A. Buerger Disease: A Retrospective Review of 100 Cases. Indian Journal of Surgery. 2010;73(1):40-47.
- Fabregat A, Martínez-Vidal V, Asensi J, De Andrés J, López D. Spinal Cord Stimulation for the Treatment of Buerger Disease: The Clinical Experience of Palma. 2011;27(9):819-823.
- Lee K, Kang E, Kim A, Kim M, Do Y, Park K et al. Stem Cell Therapy in Patients with Thromboangiitis Obliterans: Assessment of the Long-Term Clinical Outcome and Analysis of the Prognostic Factors. Int J Stem Cells. 2014;2(2):101-106.
- Guo J, Guo S, Tong Z, Dardik A, Gu Y. Autologous bone marrow-derived mononuclear cell therapy in Chinese patients with critical limb ischemia due to thromboangiitis obliterans: 10-year results. Stem Cell Res Ther. 2018;9(1):43.
- Modaduguji MS, Hafezi S. Endovascular Treatment of Thromboangiitis Obliterans (*Buerger's Disease*). Vasc Endovascular Surg. 2018;52(2):124-130.
- Tang J, Gan S, Zheng M, Jiang Y, Feng Y, Mao J. Efficacy of Endovascular Radiofrequency Ablation for Thromboangiitis Obliterans (*Buerger's Disease*). Ann Vasc Surg. 2017;42:78-83.

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## THE POSTTHROMBOTIC SYNDROME: RISK FACTORS AND PREVENTION

Ana Sofia Araújo, Dra. Marina Neto  
Prof. Doutor Armando Mansilha

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

### BACKGROUND

- Deep Venous Thrombosis (DVT) refers to the formation of blood clots in ≥1 deep veins, usually of the lower or upper extremities and affects 1 to 3 of 1000 people in the general population annually.
- Postthrombotic syndrome (PTS), the most common long-term complication of DVT, occurs in a limb previously affected by DVT.
- PTS is a syndrome with a spectrum of symptoms and signs of chronic venous insufficiency, which vary from patient to patient and affects 20% to 50% of patients with DVT.
- Symptoms can range from minor leg swelling at the end of the day to severe complications such as chronic debilitating lower-limb pain, intractable edema, and leg ulceration, which may require intensive nursing and medical care.

### PURPOSE

This work has the purpose to clarify why some people with DVT develops PTS and other not.

### RISK FACTORS AT THE TIME OF DIAGNOSIS

#### Patient Characteristics

- Elevated body mass index and obesity
- Older age
- There is no consistent association with sex
- PTS after pregnancy-associated DVT: age >33 years at the time of index pregnancy and daily smoking

#### DVT Characteristics

- The extent – SIZE (extensive thrombosis) and LOCATION (common femoral or iliac vein or iliac vein in conjunction with other veins)
- Greater symptoms severity
- PTS after pregnancy-related DVT - proximal thrombosis

Kahn SR, Comerota AJ, Cushman M, Evans NS, Ginsberg JS, Goldenberg NA, et al. The postthrombotic syndrome: evidence-based prevention, diagnosis, and treatment strategies: a scientific statement from the American Heart Association. Circulation. 2014;130(18):1636-61.

### RISK FACTORS DURING TREATMENT AND FOLLOW-UP

- Recurrent ipsilateral DVT
- Residual thrombosis after treatment
- Subtherapeutic anticoagulation

### RECOMMENDATIONS TO PREVENT PTS

- Thromboprophylaxis in patients at significant risk for DVT (Class I; Level of Evidence C).
- Anticoagulation: appropriate intensity and duration. With vitamin K antagonist - frequent, regular INR monitoring to avoid subtherapeutic INRs (Class I; Level of Evidence B).
- The effectiveness of elastic compression stockings for PTS prevention is uncertain, but it is reasonable to reduce symptomatic swelling in patients with proximal DVT (Class IIb; Level of Evidence A).
- Catheter-directed thrombolysis and pharmacomechanical catheter-directed thrombolysis considered, in experienced centres, may be considered in patients with acute (<14 days) symptomatic, extensive proximal DVT who have good functional capacity, ≥1-year life expectancy, and low expected bleeding risk (Class IIb; Level of Evidence B).

### CONCLUSIONS

Further research on predictors of PTS is needed, including the development and validation of PTS risk prediction models and weight reduction may have a role in preventing PTS and has not been studied.

These days, endovascular techniques are not for all patients and it always has to be considered with bleeding risk.

## Branched versus fenestrated endografts in thoracoabdominal endovascular aneurysm repair

André Ferreira; Joel Sousa

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Thoracoabdominal aorta aneurysms (TAAAs) are relatively uncommon, accounting for only 3% of diagnosed aneurysms<sup>1</sup>. TAAAs are classifiable in 5 categories according to Crawford classification (Fig. 1).

Endovascular treatment is now the standard of care. Treatment options include branched and fenestrated endografts, although anatomic suitability should be considered for each technique<sup>2</sup>.

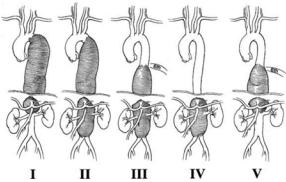
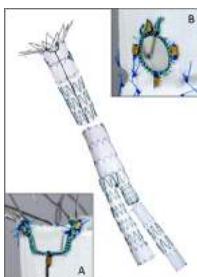


Fig. 1 – Modified Crawford classification<sup>4</sup>



**Fenestrated endograft**

are devices incorporating windows in the fabric to maintain perfusion to branch vessels<sup>4</sup>.



Fig. 2 and 3–

Fenestrated graft<sup>4,5</sup>



Fig. 4 and 5–

Branched graft<sup>4,5</sup>

**Branched endografts**  
are devices incorporating branches matching visceral and renal vessels to maintain perfusion to branch vessels<sup>4</sup>.



	Fenestrated graft	Branched graft
<b>Suitability</b>	<ul style="list-style-type: none"> <li>• short-neck aneurysms</li> <li>• juxtaparenal aneurysms</li> <li>• para-anastomotic aneurysms</li> </ul>	<ul style="list-style-type: none"> <li>• “off-the-shelf” devices available</li> <li>• larger aneurysm sacs</li> <li>• branches arising from the aneurysm</li> <li>• more overlap between the aortic stent graft and the covered stent branch</li> </ul>
<b>Pitfalls</b>	<ul style="list-style-type: none"> <li>• not suitable for pararenal or TAAAs</li> <li>• 8-week waiting period for customization</li> <li>• more prone to component separation</li> </ul>	<ul style="list-style-type: none"> <li>• added bulk secondary to the branches</li> <li>• higher risk of branch occlusion</li> <li>• need of additional aortic coverage</li> </ul>

Table – Fenestrated versus branched grafts comparison<sup>4,5</sup>

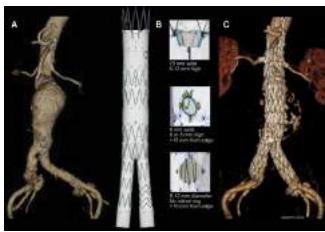


Fig. 3 – Fenestrated graft CT scan<sup>6</sup>



Fig. 5 – Branched graft CT scan<sup>2</sup>

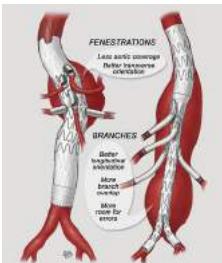


Fig. 4 – Fenestrated vs branched graft<sup>3</sup>

### Conclusion

Both fenestrated and branched grafts are suited to repair endovascular aneurysms. The anatomic specificity of aneurysm determines the best option for each case.

### References

- Stein et al, Springer Milan 2011:25-32;
- Clough et al, Eur J Vasc Endovasc Surg 2012, 43:262-7;
- Oderich et al J Thorac Cardiovasc Surg 2017 153:S32-S41;
- Fort et al J Cardiothorac Vasc Anesth 2017, 31:1440-59;
- Monahan et al Semin Vasc Surg 2009, 22:132-9.
- Oderich et al. J Vasc Surg 2014, 60:1420-8.

## POSTTHROMBOTIC SYNDROME INTERVENTIVE TREATMENT:

changing the paradigm

Andréia Lima<sup>1</sup>, Nuno Henriques Coelho<sup>2</sup>

<sup>1</sup>aluna do 5º ano do MIM da FMUP, <sup>2</sup>Serviço de Angiologia e Cirurgia Vascular do CHVNGE  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Postthrombotic syndrome (PTS) is a frequent chronic complication of deep venous thrombosis (DVT) which can be present in **20 to 50%**. As such, it has an important burden on both patients and healthcare system [1].

PTS is diagnosed primarily on clinical grounds manifesting as a spectrum of symptoms and signs of chronic venous insufficiency, ranging from minor leg swelling to a more severe presentation such as intractable pain and edema, or even leg ulceration [1].

### Methods: clinical review of two clinical cases of PTS and literature review

#### Results:

2 patients with severe PTS (Villalta Score > 14 pts), submitted to recanalization, venoplasty and stenting of left iliac vein

- Good technical and clinical result
- Symptoms improved in both patients (Villalta score < 5pts after 1 month)
- Recommended early ambulation and anticoagulation



### Discussion:

With the introduction of minimally invasive interventions like venoplasty and stenting, the paradigm has changed [3].

Looking back, endovascular treatment was performed with stents developed for arterial system. So as there were no dedicated venous stents available, stent-related complications like in-stent restenosis, kinking, and tapering were more frequent. To overcome this problem, dedicated venous stents were developed with adapted features[3]. Several studies using these stents have demonstrated **high technical success** (94% to 96%), with **low complication rates** (<1% for bleeding, pulmonary embolism, and mortality) and **favorable patency rates**. Moreover, most patients experience complete resolution of symptoms after the procedure

Standard conservative treatment with compression stockings was the mainstay approach [2].

However, endovascular procedures to treat patients with PTS have shown potential to decrease PTS morbidity [2]. A relevant example is the recanalization of chronic cavoiliacofemoral obstruction, the segment which is associated with the highest venous pressures and PTS morbidity [1].

(69% to 82% for pain, 64% to 68% for edema, and 71% to 81% for ulcer healing). [3, 4, 5].

Choosing the right postprocedural antithrombotic therapy is also crucial for success. The lack of consensus on this issue is well known, since several studies report a great variety of antithrombotic drugs and regimens of treatment. One study tried to reach a consensus by means of a electronic survey to different physicians. In the context of PTS they attained a 1/3 of respondents choosing anticoagulation with VKA, with a > 19% recommending anticoagulation with NOAC. Also, consensus was reached (67%) regarding the use of LMWH during the initial treatment (2–6 wk). [6] Additionally, early ambulation and compression therapy should be recommended as part of functional recovery[7].

In conclusion, endovascular recanalization and stenting it's an expanding field in the approach to PTS combining both **safety** and **effectiveness** contrary to the poor results of conservative treatment – a changing paradigm

- [1] Kahn SR et al. The Postthrombotic Syndrome: Evidence-Based Prevention, Diagnosis, and Treatment Strategies. *Circulation* 2014; 130:1636-1681.  
 [2] Abu Al Ahsan N et al. Role of Venous Stenting for Iliofemoral and Vein Cava Venous Occlusion. *Surgical Clinics* 2018; Volume 98, Issue 2: 361-371.  
 [3] Valente, T.M.A.J., Dogoni, Sust, H.A. Writing Committee, et al. Endovascular Treatment of Chronic Venous Disease. *Journal of Vascular Surgery* 2018; 67(3): 613-623.  
 [4] Razavi, MK.; Jaff, MR.; Miller, LE. Safety and Effectiveness of Stent Placement for Iliofemoral Venous Occlusion. *Circulation: Cardiovascular Interventions* 2015; 8(6):672-677.  
 [5] Stuck AK, et al. Endovascular Intervention of post-thrombotic and non-thrombotic iliofemoral venous occlusion with a self-expanding nitinol stent. *Angiology* 2016; 67(1): 1-7.  
 [6] Meissner, A.; Thaler, A.; Joseph, Shulman, J.; Deeb, AH. Anticoagulation Therapy Following Venous Stenting: Intermediate Depth Considerations. *Eur J Vasc Endovasc Surg* 2015; 49(5): 577-583.  
 [7] Jafarai H, Schreiber K, Barbat ME, et al. Interventional treatment of postthrombotic syndrome. *Gefäßchirurgie*. 2016;21(Suppl 3):77-84.

## POST-THROMBOTIC SYNDROME: THE BENEFITS OF ILIAC VEIN STENTING

ANITA SANTOS, RICARDO CASTRO FERREIRA

Regente da Unidade de Angiologia e Cirurgia Vascular - PROF. DOUTOR ARMANDO MANSILHA

### INTRODUCTION

Post-thrombotic syndrome (PTS) occurs in about 20-50% of patients with an episode of deep vein thrombosis (DVT) of lower extremities, even if appropriate anticoagulant treatment is provided. The involvement of iliac veins in DVT establishes a risk three times higher of PTS development, so it will only be discussed iliac PTS in this poster. The affected limb usually has reduced venous outflow and residual venous volume ejected with calf muscle contraction. Pathophysiology is mostly based on the role of venous hypertension, caused by prolonged residual venous obstruction and incompetent venous valves. Treatment can be based on lifestyle interventions, compressive therapy and surgical treatment (endovascular or open surgery). Nowadays, the preferred therapy is endovascular treatment.

### RESULTS

**TABLE 1: Advantages of iliac vein stenting in PTS**

Less invasive
Minimal complication rate
High rate of technical success
Significant symptomatic relief (pain, swelling)
Healing of venous ulcers
Amelioration of limb claudication
Outflow fraction normalization
Increase on calf muscle pump function
Adequate patency
During the procedure: - Direct evaluation of the obstruction's severity - Disruption of intravenous synechiae

#### TREATMENT OF PTS

##### Lifestyle interventions :

- Include weight loss, smoking cessation and exercise therapy;
- Can be applied, but are not proven to improve PTS outcome.

##### Compressive therapy:

- Is useful in management of PTS associated venous leg ulcers;
- In other PTS patients, its use is confined to symptomatic control.

##### Surgical bypass reconstruction:

- Widely used before the development of endovascular treatment;
- Is more invasive and has a greater number of complications.

##### Endovascular implantation of stents:

- Involves percutaneous access, a much less invasive option;
- Has a wide number of benefits, represented in table 1.

Endovascular treatment achieves the removal of chronic iliac vein obstructions, which will help with pain and swelling relief and also aid with ulcer healing in PTS patients. The endovascular approach is also advantageous during the procedure, since the diagnostic venography enables direct observation of the venous obstruction's degree and also the disruption of intravenous synechiae. It shows great potential on improving the quality of life of these patients. Endovascular recanalization is apparently superior to the conventional surgical treatment and has recently become the preferred treatment option and gradually replaced open surgery in venous obstructive diseases, like PTS.

### CONCLUSIONS

At the moment, endovascular treatment for PTS is the best option, since it produces significant symptom relief with great improvement on specific parameters. It is also a safe and effective option, given its satisfactory complication profile and minimally invasive approach, which reveals a good success rate.

#### REFERENCES:

- Mussa, F. F., et al. (2007). Iliac Vein Stenting for Chronic Venous Insufficiency. *Texas Heart Institute Journal*, 34(1), 60–66.
- Schleimer, K., et al. (2016). The Treatment of Post-Thrombotic Syndrome: The Role of Endovascular Recanalization in Chronic Iliac Vein Obstruction. *Deutsches Arzteblatt International*, 113(50), 863–870.
- Ruilua, W., et al. (2017). Technique and Clinical Outcomes of Combined Stent Placement for Postthrombotic Chronic Total Occlusions of the Iliofemoral Veins. *Journal of Vascular and Interventional Radiology*, 28(3), 373–379.
- Vedantham, S. (2017). Knowns and Unknowns in Managing Postthrombotic Syndrome. *Seminars in Interventional Radiology*, 34(01), 68–72.
- Rollo, J. C., et al. (2017). Contemporary outcomes of elective iliofemoral and infrarenal venous intervention for post-thrombotic chronic venous occlusive disease. *Journal of Vascular Surgery: Venous and Lymphatic Disorders*, 5(6), 789–799.
- Delis, K. T., et al. (2007). Successful Iliac Vein and Inferior Vena Cava Stenting Ameliorates Venous Claudication and Improves Venous Outflow, Calf Muscle Pump Function, and Clinical Status in Post-Thrombotic Syndrome. *Annals of Surgery*, 245(1), 130–139.

## MYCOTIC AORTIC ANEURYSMS

### CONVENTIONAL SURGICAL TREATMENT OR ENDOVASCULAR TREATMENT?

ANTÓNIO DELMAR, DR. JOSÉ PEDRO PINTO

REGENTE DA UNIDADE DE ANGIOLOGIA E CIRURGIA VASCULAR: PROFESSOR DOUTOR ARMANDO MANSILHA

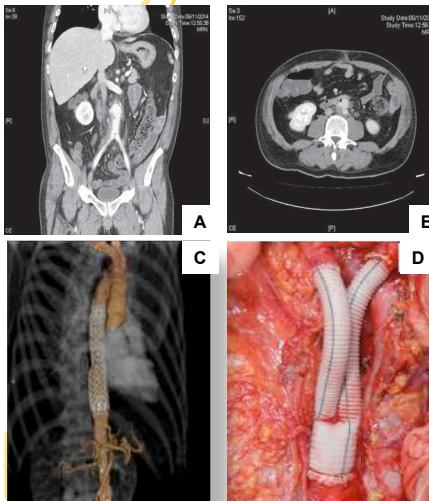


Figure (A) Angio-CT with deflected image of saccular morphology, with irregular contours, that coexist with a mass of non-peritoneal, non-capturing parts. (B) Angio-CT (transverse section) where a peritoneal gas bubble is seen and an enterogastrostic fistula. (C) Three-dimensional reconstruction after endovascular repair of a ruptured mycotic aneurysm in the descending thoracic aorta. (D) Anatomical reconstruction using rifampicin-soaked Dacron graft.

#### INTRODUCTION

Mycotic abdominal aortic aneurysms (MAAA) is a rare but life-threatening disease, with an incidence of about 0.65% to 2% of all aortic aneurysms in Western countries.<sup>1</sup> When not surgically treated, the reported hospital mortality ranges from 36% to 82% due to persistence of infection and subsequent aneurysm rupture. Over the last decade, EVAR became the preferred method for AAA treatment. However, EVAR's efficacy on mycotic aneurysms and how it compares to open surgery remain scarcely described.<sup>2</sup>

#### Methods

MEDLINE databases were searched to identify publications comparing EVAR to open surgery to MAAA treatment.

#### RESULTS/DISCUSSION

In a retrospective study involving 16 European centers, EVAR for treatment of MAAA was performed in 123 patients. Survival at 30 days was 91% and there was 19% of fatal infection-related complications. Survival at 5 years was 55%, with significant worse outcomes for non-Salmonella-positive blood cultures.<sup>3</sup>

Regarding open surgery, a retrospective review was performed at Mayo Clinic including patients submitted to aortic grafting for MAAA between 1976 and 2000 (N=43). Survival at 1 and 5 years was 82% and 50%, respectively. Freedom from late graft-related complications at 1 year and 5 years of 90% and 92% respectively.<sup>5</sup>

#### CONCLUSIONS

EVAR of MAA is an acceptable alternative treatment of MAA, with similar survival rates compared to open surgery. However, persistent infection after endovascular treatment does occur and is often fatal.<sup>4</sup> EVAR could be considered a palliative option or a bridge to later elective open repair in patients with non-Salmonella-positive blood cultures.<sup>3</sup> Still, more studies are needed to assure satisfactory results among patients with a non-Salmonella-positive blood culture.

#### REFERENCES

- (1) - Reddy DJ, Shepard AD, Evans JR, Wright DJ, Smith RF, Ernst CB. Management of infected aortiliac aneurysms. Arch Surg. 1991;126:873-8; discussion 878.
- (2) - Yu SY, Lee CH, Hsieh HC, Chou AH, Ko PJ. Treatment of primary infected aortic aneurysm without aortic resection. J Vasc Surg. 2012;55:933-50.
- (3) - Sorelius K, Mani K, Björck M. Endovascular treatment of mycotic aortic aneurysms: a European multicenter study. Circulation. 2014;130(24):236-42.
- (4) - Lu M, Luo C-Y, Chan Y-S, Chen S-S, Wang C-C, N-H, Chi P-C, L-H, Wu C-C. Long-term Outcome of Endovascular Treatment for Mycotic Aortic Aneurysm. European Journal of Vascular and Endovascular Surgery. 2017, Pages 464-471.
- (5) - Gustavo S. Oderich MD<sup>a</sup>, Jean M. Panneton MD<sup>a</sup>, Thomas C. Bower MD<sup>a</sup>. Infected aortic aneurysms: Aggressive presentation, complicated early outcome, but durable results. Journal of Vascular Surgery. 2001;34(5):900-908.

António Tomás, João Rocha Neves

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

#### Introduction

During Carotid Endarterectomy (CEA) a shunt may be placed to prevent ischemia of brain tissue due to the clamping of the artery. However, the controversy remains about the risk factors to consider on shunting patients (selectively or not) or not to shunt, and the possible outcomes of these decision.

#### Objectives and Methods

Bibliographic review to access comparisons of risk factors and outcomes in shunted, selectively shunted and no shunted patients who underwent CEA.

Authors	Population and Methods	Results
Marrocco-Trischitta, Melissano et al. 2006	251 patients with bilateral carotid stenosis of ≥ 70% subjected to staged bilateral CEA	Patients submitted to contralateral CEA ≤ 30 days had a higher risk of requiring carotid shunting comparing to those who underwent contralateral CEA between 31 and 60, and ≥ 61 days. The latter also showed lower risk comparing to those undergone surgery between 31 and 60 days. (P=0.023, univariate analysis).
Wisman, Nolthenius et al. 2011	851 patients undergone CEA with a selective shunting protocol based and perioperative transcranial Doppler and electroencephalogram. 156 shunted patients were included in the study	Longer need for shunt-to-shunt time (NST) was correlated to a higher risk of 30-day stroke/ death rate (P=0.004)
Sandmann, Kolvenbach et al. 1993	In 503 patients with indication to CEA, the use of Javid shunt was prospectively randomized.	Patients shunted did not show a significantly increase in perioperative neurologic deficit (4,2%) comparing to those who were not shunted
Tan, Garcia-Toca et al. 2009	242 patients underwent CEA with selective shunt placement for significative EEG findings	Moderate ipsilateral carotid artery stenosis had lower risk for shunting compared to severe stenosis (P=0.003), as well as the degree of contralateral carotid artery stenosis (P=0.003)
Ballotta, Saladini et al. 2010	Prospectively gathered information of 1914 procedures in 1696 patients (218 of them were staged bilateral CEAs)	The following factors predicted the need for shunting: symptomatic presentation (P=0.012); prior stroke (P<0.001); contralateral carotid occlusion (P=0.019); and moderate ipsilateral carotid disease (P=0.033)
Kretz, Abello et al. 2014	With a prospective database, a group of 88 patients (S) shunted due to intolerance of clamping was compared to a control group of 1135 patients (C).	Comparing to C, patients in group S presented the following factors: increased age (P<0.001); systemic arterial hypertension (P=0.016); occlusion of contralateral carotid artery (P<0.001)
Hans and Catanesu 2015	59 patients underwent CEA ≤ 8 weeks of a stroke (group A). Another group of 1036 patients underwent CEA with other indications (group B)	The requirement of shunt placement was similar in groups A and B (P=0.47)
Halsey 1992	1495 CEAs from 11 centers were monitored with transcranial Doppler to determine severity of ischemia during carotid artery clamping.	In cases of persisting ischemia, the risk of stroke was lower in shunted patients (P≤0.0001). In the case of no ischemia, the risk of stroke was higher in shunted patients (P≤0.001)
Chongruksut, Vaniyapong et al. 2014	Review of six randomised and quasi randomised trials of routine shunting versus no shunting or selective one.	No significant difference was found in terms of rate of all stroke, ipsilateral stroke or death up to 30 days after procedure comparing shunting to no shunting or selective shunting (P=0.32)

#### Discussion

Although there is evidence that certain risk factors (contralateral CEA ≤ 30 days, severe ipsilateral carotid artery stenosis, prior stroke, contralateral carotid occlusion and systemic hypertension) predicted the need for shunting during surgery, and therefore might be considered criteria for CEA with planned shunting, we lack information in terms of meta-analysis, systematic reviews and comparable randomized clinical trials. In fact, in the literature there are few studies comparable regarding this issue. Also, there is no evidence that shunting has better outcomes overall than selective shunting or no shunting.

More studies are needed to access this question correctly.

#### References

- Ballotta, E., et al. (2010). "Predictors of electroencephalographic changes needing shunting during carotid endarterectomy." *Ann Vasc Surg* 24(8): 1045-1052.
- Chongruksut, W., et al. (2014). "Routine or selective carotid artery shunting for carotid endarterectomy (and different methods of monitoring in selective shunting)." *Cochrane Database of Systematic Reviews*(6).
- Halsey, J. H., Jr. (1992). "Risks and benefits of shunting in carotid endarterectomy. The International Transcranial Doppler Collaborators." *Stroke* 23(11): 1583-1587.
- Hans, S. S. and I. Catanesu (2015). "Selective shunting for carotid endarterectomy in patients with recent stroke." *J Vasc Surg* 61(4): 915-919.
- Kretz, B., et al. (2014). "Risk index for predicting shunt in carotid endarterectomy." *Ann Vasc Surg* 28(5): 1204-1212.
- Marrocco-Trischitta, M. M., et al. (2006). "Increased incidence of cerebral clamping ischemia during early contralateral carotid endarterectomy." *Journal of Vascular Surgery* 43(6): 1155-1161.
- Sandmann, W., et al. (1993). "Risks and benefits of shunting in carotid endarterectomy." *Stroke* 24(7): 1098-1099.
- Tan, T. W., et al. (2009). "Predictors of shunt during carotid endarterectomy with routine electroencephalography monitoring." *J Vasc Surg* 49(6): 1374-1378.
- Wisman, P. P., et al. (2011). "Longer time interval between carotid cross-clamping and shunting is associated with increased 30-day stroke and death rate." *Vasc Endovascular Surg* 45(4): 335-339.

# REPAIR OF JUXTARENAL AORTIC ANEURISMS

Beatriz Campos Mota; Ricardo Ferreira; Faculdade de Medicina da Universidade do Porto  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

17-19  
May  
PORTUGAL  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## INTRODUCTION

Juxtarenal aortic aneurysms (JAA) account for approximately 15% of abdominal aortic aneurysms (AAA), being aneurisms that do not involve, but are close to the origin of, the renal arteries.

Nowadays Endovascular aneurysm repair (EVAR) has become the method of choice for AAA repair in a wide number of patients.

Fenestrated endovascular aneurysm repair (F-EVAR) and chimney endovascular aneurysm repair (CH-EVAR) were developed, allowing more flexibility for EVAR use.

The fundamental goal of F-EVAR and CH-EVAR is to extend the sealed area and maintain flow to a branch vessel with or without the use of a stent-graft.



(a) Juxtarenal aortic aneurysms (JAA).



(b) Treatment of JAA with FEVAR.

Endografts provide access to renal or other visceral vessels through openings that accommodate deployment of branch vessel stents, improving the proximal seal zone by incorporating the renal and other visceral arteries.

## F-EVAR

Stent grafts placed into branch vessels, allowing extension of the proximal seal zone. EVAR device is then deployed and balloons are used to mold the different components together.

	FEVAR	CH-EVAR
perioperative morbidity and mortality rates	✓	✓
Circumvents anatomic limitations to traditional EVAR	✓	✓
Avoids large volume hemodynamic shifts	✓	✓
Radiation and contrast exposures	✗	✗
Provide immediate treatment in acute cases		✓
Incidence of endoleaks	Low	High
risk of kidney dysfunction	Low	High
Insufficient long-term data	✗	✓

## CONCLUSIONS

F-EVAR and CH-EVAR techniques are both effective treatment for JAAs patients. The fenestrated technique was considered the priority treatment for JAAs, whereas CH-EVAR is frequently performed in patients with more complex anatomy and urgent cases.

Although the early and mid-term outcomes are satisfactory, the long-term durability of these techniques requires further assessment.

Although higher late mortality rates, open surgery has similar outcomes when compared to EVAR techniques.

## REFERENCES

1. Rao R, Lane TRA, Franklin II, Davies AH. Open repair versus fenestrated endovascular aneurysm repair of juxtarenal aneurysms. *J Vasc Surg*. 2015;61(1):242-255.e5. doi:10.1016/j.jvs.2014.08.068
2. Ryłski B, Czerny M, Stokłapka M, Russe M, Sieg M, Beyersdorf F. Fenestrated and Branched Aortic Grafts. *Dtsch Ärztebl Int*. 2015;112(48):816-822. doi:10.3238/arztebl.2015.0818
3. Health Quality Ontario. Fenestrated endovascular grafts for the repair of juxtarenal aortic aneurysms: an evidence-based analysis. *Our Health Technol Assess Ser*. 2009;9(4):1-51. <http://www.ncbi.nlm.nih.gov/pmc/articles/23074534>. Accessed April 21, 2018.
4. Li Y, Hu Z, Bai C, et al. Fenestrated and Chimney Technique for Juxtarenal Aortic Aneurysms: A Systematic Review and Pooled Data Analysis. *Sci Rep*. 2016;6(1):20497. doi:10.1038/srep20497.
5. Jongkind Y, Yeung KK, Akkersdijk GJM, et al. Juxtarenal aortic aneurysm repair. *J Vasc Surg*. 2010;52(3):760-767. doi:10.1016/j.jvs.2010.01.049.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## CASE REPORT OF A NEW TECHNIQUE FOR TREATMENT OF POSTCATHETERIZATION RADIAL ARTERY PSEUDOANEURYSM

Beatriz Carmo, Tiago Soares

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Radial artery pseudoaneurysm (RAP) is a rare complication of transradial access, but its prevalence may increase due to the growing popularity of transradial interventions. Ultrasound-guided techniques, such as compression or percutaneous thrombin injection, have largely replaced the surgical approach in the treatment of this complication.

### Case

68-year-old male that underwent cardiac catheterization was readmitted 1 month later with RAP proximal to the previous radial puncture site. (Fig.1) Since percutaneous coronary intervention (PCI) was needed, a combined strategy of PCI of the right coronary artery (RCA) and repair of the RAP was planned. After successful puncture of radial artery (RA) distal to RAP, a small vessel dilator (5F) was inserted into RA lumen and retrograde angiography was performed. RAP was visualized and after advancing a 0.014" Prowater guidewire, a 21cm 6F hydrophilic introducer sheath was placed covering the neck of RAP, isolating the aneurysm sac from the blood circulation. (Fig. 2) PCI of RCA was performed through the 6F sheath. Unfractionated heparin was administered at the beginning of the procedure. The sheath was left in RA lumen after completion of PCI for 8 hr and was attached to a pressurized heparinized saline flush using a standard arterial line setup, with 500 units/hour of heparin administered via the sheath. Additional light mechanical compression was applied using an external compression bandage dressing. Follow-up (2-month) revealed persistent closure of RAP and good patency of RA

### Conclusion

This new technique using ipsilateral RA catheterization with long introducer sheath placement and light mechanical compression may improve safety and efficacy of RAP treatment when comparing to current used methods.

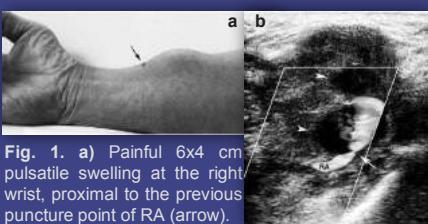


Fig. 1. a) Painful 6x4 cm pulsatile swelling at the right wrist, proximal to the previous puncture point of RA (arrow).

b) Duplex ultrasonography: dual chamber (arrowheads) pseudoaneurysm of radial artery (RA) partially filled with thrombus and narrow neck connection (arrow) with RA lumen (patent).



Fig. 2. a) Retrograde angiography after distal puncture (arrow). Note significant deviation of anatomic course and stenosis of radial artery at the site of RAP compression b) Location of long 6F sheath (tip shown by arrow) in RA until its ostium Connection point between RAP sac and main artery covered by Sheath body. Faint opacification of RAP sac indicated by arrowheads. c) restoration of arterial lumen and absence of pseudoaneurysm sac filling

REFERENCES: [1] Babunashvili AM, Pancholy SB, Kartashov DS. New technique for treatment of postcatheterization radial artery pseudoaneurysm. Catheter Cardiovasc Interv. 2017;89(3):393-398. [2] Collins N, Wainstein R, Ward M, et al. Pseudoaneurysm after transradial cardiac catheterization: case series and review of the literature. Catheter Cardiovasc Interv. 2012;80(2):283-7. [3] Din JN, Murphy A, Chu K, et al. Radial artery pseudoaneurysms after transradial cardiac catheterisation. Vasa. 2016;45(3):229-32.

## ANTITHROMBOTIC THERAPY FOR VTE DISEASE: WHAT'S NEW

Beatriz Ferro<sup>1\*</sup>, João Rocha Neves, MD 1

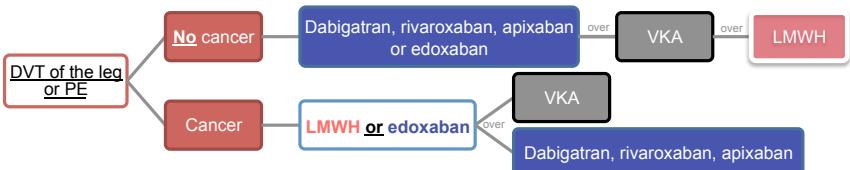
Head of Angiology and Vascular Surgery Course - Armando Mansilha, MD, PhD

<sup>1</sup> Department of Surgery and Physiology, Faculty of Medicine, University of Porto  
\* mimed12158@med.up.pt

### Introduction

- Anticoagulant therapy is the cornerstone for the treatment of venous thromboembolism (VTE) and should be initiated immediately after clinical suspicion. The primary objective of anticoagulation is the prevention of further thrombosis and of early and late complications <sup>1,2</sup>;
- A substantial amount of new evidence relating to the treatment of VTE has been published, particularly in relation the use of non-vitamin K oral anticoagulants (NOACs), addressing new developments and ongoing controversies in the treatment of VTE <sup>3</sup>.

### Choice of Long-Term (First 3 Months) Anticoagulant <sup>3,4</sup>



### Extended Treatment of VTE to Prevent Recurrent VTE <sup>3,5</sup>

Unprovoked proximal DVT or PE \*

Rivaroxaban

Rivaroxaban 10 mg  
(or aspirin)

vs no aspirin

\* Lifelong anticoagulation

### Whether to Anticoagulate Subsegmental PE <sup>3</sup>

Subsegmental PE (no involvement of more proximal pulmonary arteries) and no proximal DVT in the legs

Low risk for recurrent VTE

High risk for recurrent VTE  
(eg.: positive d-dimer, no reversible provoking factor for DVT, active cancer,...)

Clinical surveillance

Anticoagulation

### Management of Recurrent VTE on Anticoagulant Therapy <sup>3</sup>

VKA therapy (in the therapeutic range) **or** dabigatran, rivaroxaban, apixaban or edoxaban (believed to be compliant)

Recurrent VTE on:

switch to  
Long-term LMWH  
(believed to be compliant)

increase the dose of LMWH by about ¼ to ½

VTE = venous thromboembolism; DVT = deep vein thrombosis; PE = pulmonary embolism; LMWH = low-molecular-weight heparin; VKA = vitamin K antagonist

#### References:

1. Kearon, Clive, and Elie A. Akl. "Duration of anticoagulant therapy for deep vein thrombosis and pulmonary embolism." *Blood* 123.12 (2014): 1794-1801.
2. Di Nisio, Marcello, Nick van Es, and Harry R. Büller. "Deep vein thrombosis and pulmonary embolism." *The Lancet* 388.10063 (2016): 3060-3073.
3. Kearon, Clive, et al. "Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report." *Chest* 149.2 (2016): 315-352.
4. Raskob, Gary E., et al. "Edoxaban for the treatment of cancer-associated venous thromboembolism." *New England Journal of Medicine* (2017).
5. Weitz, Jeffrey I., et al. "Rivaroxaban or aspirin for extended treatment of venous thromboembolism." *New England Journal of Medicine* 376.13 (2017): 1211-1222.

## CONCOMITANT CORONARY AND PERIPHERAL ARTERIAL DISEASE – TWO SIDES OF THE SAME COIN

**Beatrix Braga; Rita Augusto**  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### ► Introduction

Peripheral Arterial Disease (PAD) is one of the complications of atherosclerotic disease, affecting about 10-25% of patients over 55 years. It is usually asymptomatic and shares several risk factors with arterial coronary disease. According to literature, the estimated prevalence of PAD in patients with Coronary Artery Disease (CAD) is about 20%.

The aim of this study was to investigate the prevalence of PAD in patients with CAD admitted to CHVNG/E during 2 weeks.

### ► Methods

The authors observed all patients admitted with Acute Coronary Syndrome (ACS) and performed clinical history and physical arterial examination.

### ► Results

The sample included 19 patients with an average age of 70.3 years old: 63,2% male (table 1). PAD prevalence in the scrutinized population was 36,8% (graphic 1) – 17,6% symptomatic and 82,4% asymptomatic. According to previous records, only 5,3% of these patients had the diagnosis of PAD. Medium value of ABI measured was 0,92 (0,4-1,92). There were no significant statistical associations between the cardiovascular risk factors and the presence of PAD. (Table 1).

Graphic 1

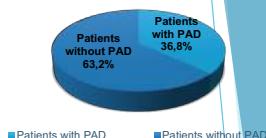


Table 1

Data	n (%)	p value
Age (years)	70,9	
Sex (male)	12 (63,2%)	0,65
Diabetes Mellitus	7 (36,8%)	0,32
Smoking	6 (31,6%)	0,21
		0,58
Hypertension	15 (78,9%)	
		0,67
CKD	7 (36,8%)	
Dyslipidemia	10 (52,6%)	0,17
Previous known IC	4 /21,1%)	0,58
Heart failure	2 (10,5%)	0,25
PAD known	1 (5,3%)	0,18

### ► Conclusion

PAD prevalence in the sample analyzed was 36,8% ( 82,4% asymptomatic vs 17,6% symptomatic). Due to the high prevalence recorded, this study reinforces the importance of the complete arterial physical examination in a patient admitted with ACS, to minimize the possible future consequences in a patient with high risk for vascular events.

Sarangi S, Srikant B, Rao DV, Joshi L, Usha G. Correlation between peripheral arterial disease and coronary artery disease using ankle brachial index-a study in Indian population. *Indian Heart Journal*. 2012;64(1):265-10.1016/S0019-4832(12)60002-9.

## VASCULAR TRAUMA: Mechanisms and pathophysiology

### Mechanisms:

There are three main types of vascular trauma: penetrating (bullets, knives or iatrogenic factors), blunt (direct arterial impact, bone fragments due to bone fractures or articular hyperextension) and complex (variable combinations of the penetrating and blunt traumas, normally seen in explosions and car accidents).

The consequences of such trauma in the vasculature are the main focus of the vascular repair. These traumas may induce complete or partial transection of the arteries/veins, contusion and/or thrombosis, laceration and dissection of the vascular structures.

More frequently which type of trauma is associated with a typical scenario. The penetrating wounds usually prologue an active bleeding or a pseudo aneurism; blunt traumas induce dissection of the vase or luminal thrombosis; and complex traumas are prompt to induce distal embolization.

### Conclusion:

The emergent management of severe trauma with vascular compromise poses a difficult decision for the surgeon and the patients. Decision making in this context remains a challenge despite advances in orthopedic and microvascular techniques, being imperative to produce more definitive guidelines for such purpose.

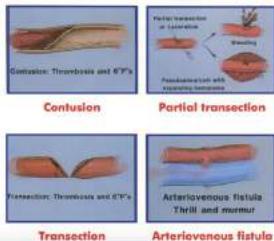


Figure 1 – Mechanisms of vascular trauma

### Pathophysiology:

Upon trauma the first step of vascular response is the platelet activation and local coagulation and hemostasis. When this mechanisms aren't enough to contain the lesion vasoconstrictor responses are activated and artery spasm occur, such as smooth muscle contraction and increasing of the noradrenergic levels. Finally, the neurovascular response starts and the activation of the nociceptor receptors induces muscular contraction and once again arterial spasm.

This type of physiologic response to trauma suffers slight differences depending on the type of lesion. For penetrating wounds, the three physiological responses are diminished and the hemorrhage is difficult to control. Nevertheless, the risk for thrombosis is decreased and the area of lesion is normally minor. Blunt trauma normally associates with better hemostatic response and with significant vaso and neuromotor responses, lesser hemorrhage but bigger risk for thrombosis. Complex traumas are the most difficult to predict due to the combination of factors.; associating with arterial and venous hemorrhage and have a reserved prognosis.



Figure 2 – Penetrating trauma



Figure 3 – Blunt trauma



Figure 4 – Complex trauma



Figure 6 – Vascular suture



Figure 4 – Vascular stent

### References:

- Behdad S, Rafiei MH, Taheri H, Behdad S, Mohammadzadeh M, Kiani G, et al. Evaluation of Mangled Extremity Severity Score (MESS) as a predictor of lower limb amputation in children with trauma. Eur J Pediatr Surg. 2012;22(6):465-9.  
Baghdanian AH, Armetta AS, Baghdanian AA, Lebedis CA, Anderson SW, Soto JA. CT of Major Vascular Injury in Blunt Abdominopelvic Trauma. Radiographics. 2016;36(3):872-90.  
Klingelhofer E, Berger H, Kersting S, Ludwig S, Weiss N, Schonleben F, et al. Predictive factors for better bypass patency and limb salvage after prosthetic above-knee bypass reconstruction. J Vasc Surg. 2016;64(2):380-8 e1.

# A SYSTEMATIC REVIEW OF VENOUS ANEURYSMS BY ANATOMIC LOCATION

Bruno Barreira; Tiago Soares;  
Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha



## Introduction

Venous aneurysms are uncommon vascular abnormalities that may be identified anywhere in the body. Historically, they were often misdiagnosed as soft tissue lesions, but with the advent of readily available noninvasive imaging, they can now be easily identified. However, recommendations for management of these lesions are still not well defined.

## Objectives

Our aim was to review the presentation of venous aneurysms, available imaging modalities for defining them, and management.

## Methods

The English-language literature before March 2017 was reviewed, and only reports of primary venous aneurysms of the deep veins were included.

Reports were subdivided on the basis of the location of the venous aneurysm, and reports containing sample imaging studies were referenced from Elsevier publications.

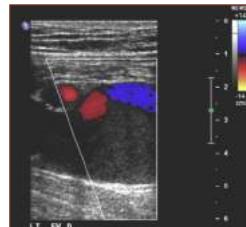


Fig 1. Superficial femoral vein aneurysm demonstrated on venous duplex ultrasound.

## Results

**Manifestations:**  
Head and neck, upper extremity, and thoracic venous aneurysms are often asymptomatic and have low risk of venous thromboembolism. Intra-abdominal venous aneurysms are often associated with vague abdominal pain and have a higher risk of rupture or bleeding. Venous aneurysms of the lower extremity deep veins are most likely to be manifested by venous thromboembolic events, with approximately 25% to 50% of popliteal vein aneurysms presenting with pulmonary embolism.

**Diagnosis:**  
Diagnosis can be made by duplex ultrasound, computed tomography venography, magnetic resonance venography, or invasive venography.

**Management:**  
Management is largely determined by location and the potential morbidity and mortality.



Fig 2. Popliteal vein aneurysm demonstrated on ascending venography.

## Results (2)

**Management (2):**  
Aneurysms of the head and neck, thorax and upper extremities have a low risk of thromboembolic events and rupture, and so are managed with observation and serial imaging over time. In contrast, intra-abdominal and lower extremity venous aneurysms are associated with life-threatening complications and should be surgically repaired when identified. Namely, in patients with venous aneurysms of the lower limbs, anticoagulation alone is insufficient to prevent pulmonary emboli. As such, open surgical repair with tangential aneurysmectomy with lateral venorrhaphy is usually performed.



Fig 3. Superior mesenteric vein aneurysm demonstrated on computed tomography venography.

## Conclusions

Venous aneurysms are rare vascular malformations that occur throughout the body. Depending on the location, these can be asymptomatic or carry a significant risk of venous thromboembolism or rupture. As such, management is made according to the location. When indicated, the standard of care remains open repair.

1. Katherine A. Teter, Thomas M. Maldonado, Mark A. Adelman. A systematic review of venous aneurysms by anatomic location. *Journal of Vascular Surgery: Venous and Lymphatic Disorders*, Volume 6, Issue 3, May 2018, Pages 408-413, ISSN 2213-333X, <https://doi.org/10.1016/j.jvsv.2017.11.010>.

Fig 1. From Teter KA, Schuman PM, Maldonado TM, et al. Endovascular stent-assisted coil embolization for a symptomatic femoral vein aneurysm. *J Vasc Surg* 2008;48:1032-6. Reprinted with permission from Elsevier.

Fig 2. From Vela RB, Dailey F, Barber G. Popliteal venous aneurysm. *J Vasc Surg* 2005;41:1360. Reprinted with permission from Elsevier.

Fig 3 From Starck A, Bento J, Lima R. Massive superior mesenteric vein aneurysm with portal vein thrombosis. *Clin Imaging* 2015;39:908-10. Reprinted with permission from Elsevier.



## Introduction

The ankle-brachial index (ABI) has played an important role as a screening procedure for peripheral artery disease (PAD), based on the ratio between ankle and arm systolic pressures, which can be attributed to atherosclerosis in the lower limb (early manifestation of PAD). It is noninvasive, inexpensive and a fast procedure. However, ABI is associated with limitations, often inflated by medial arterial calcification that produces a high percentage of false-negative screening tests results for arterial disease.

### Studies that provide a solid foundation for holding reservations about the validity of the ABI

#### **Study 1: Ix et al. (2012)**

Vascular calcification in relation to ABIs is often referred to primarily in the context of producing ABIs  $>1.30$ . However, this study demonstrated that a high percentage (86%) of their sample who had MAC, had ABIs  $\leq 1.30$ .

	Has MAC	Does not have MAC	Totals
ABI $>1.30$	14	1	15
ABI $\leq 1.30$	83	87	170
Totals	97	88	185

Figure 1. Ankle-brachial indices (ABIs) of people detected by X-ray as having MAC. All people had diabetes.

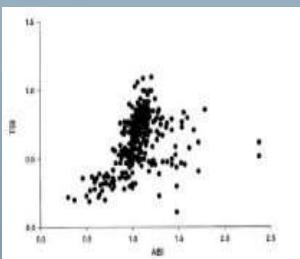


Figure 2. Scatterplot of ABIs and toe-brachial indices (TBIs) for people who have diabetes.

#### **Study 2: Brooks et al. (2001)**

ABIs and TBIs corresponded with each other only in low ranges. Many of the ABIs in the normal range (0.90-1.30) comprise an almost-vertical set of data points such that approximately half of the TBIs fall below the TBI cutpoint of 0.75 → many of the ABIs were falsely inflated and masked the presence of ischemia in the lower extremity that the TBI was more capable of detecting. ABIs falling immediately below 0.90 correspond to TBIs falling well below 0.75 → ABIs downplay the severity of pedal ischemia.

#### **Study 3: Tehan, Bray and Chuter (2015)**

The mean ABI of people who have diabetes is noticeably higher than is the mean ABI of people who don't have diabetes (both above the lower cutpoint) but the mean TBIs for those two groups of people are almost identical (both below the lower cutpoint). For people who have diabetes, the ABI might be susceptible to artifactual inflation, possibly as a result of MAC, but less so the TBI.

	DM Group	No DM Group	Comparison
Total Participants N	73	46	
Mean ABI (%)	1.16 (0.24)	1.08 (0.22)	1.67 ( $p=0.09$ )
Mean TBI (%)	0.70 (0.23)	0.87 (0.24)	0.67 ( $p=0.51$ )
PAD n (%)	36 (49)	19 (41)	

Figure 3. Mean ABI, Mean TBI and PAD% of participants of study 3.

## Conclusion

Vessel calcification isn't limited to people whose ABIs are exceptionally high. Many ABIs that fall within the normal range appear to mask the presence of arterial occlusive disease in the periphery, and ABIs that fall below normal can fail to reveal the extent of disease. Misleading ABIs appear to be produced among people who do and don't have diabetes but more so in people who do. Calcification is less likely to occur in the toes than in the ankles, so TBIs appear to be capable of providing a more accurate indication of the extent of peripheral occlusion and a pedal ischemia than do ABIs.

17-19  
May

Lisbon Conference  
on Endovascular and  
Arterial Diseases

PORTO  
VASCULAR  
CONFERENCE  
2018

## INTERNAL ILIAC ARTERY PRESERVATION STRATEGIES IN THE ENDOVASCULAR TREATMENT OF AORTOILIAC ANEURYSMS

Carolina Robalo, Joel Sousa.



Regente da Unidade de Angiologia e

Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

- Common iliac aneurysms are present in up to 40% of AAAs and frequently impair distal landing zones for endovascular aneurysm repair.
- Inappropriate landing zones, in association with further aneurysmal degeneration of the iliac arteries after EVAR, can lead to endoleak or stent-graft migration, and therefore increase the risk of rupture.
- Several techniques have been developed in order to overcome these issues. Although long-term outcomes of Hypogastric Exclusion are favorable, up to 50% of patients develop complications due to pelvic ischemia.
- We review current hypogastric preservation strategies used in the endovascular treatment of aortoiliac aneurysms.

### CONCLUSION

Correct patient selection is crucial when determining the appropriate technique and should consider anatomic criteria, life-expectancy, physical and sexual activity. Procedure complexity and cost should also be accounted for.

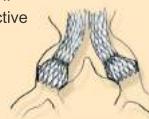
### BELL-BOTTOM

It employs flared limb devices in order to adequately obtain seal in the CIA. Although apparently effective in the short-term, long-term durability is questionable with reported type 1b endoleak rates varying from 3,4-7,8% and high re-intervention rates reported of up to 27,4%.

#### INDICATIONS

Patients with CIA diameter ≤24mm with:

- Lower Life Expectancy and/or less active patients
- Absence of significant thrombus in the CIA/IIA
- Iliac Branch has previously failed



### ILIAC BRANCHES

These bifurcated grafts that allow hypogastric artery preservation through a bridged stent-graft may be used in larger aneurysms. They have better long-term outcomes, with high patency rates varying from 74% to 100% and freedom from re-intervention of 81,4% to 92,9% in follow-ups of up to 10 years. Nonetheless, its widespread application is limited by complex anatomies and increased costs.

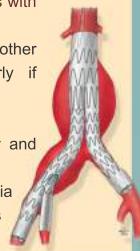
#### INDICATIONS

Gold-standard treatment option in patients with CIA diameter >30mm.

Also indicated for smaller CIAs as long as other anatomic features are met and particularly if concomitant AAA is present.

Should be especially considered in:

- Higher life expectancy and/or younger and more active patients.
- Higher risk of symptomatic pelvic ischemia
- Thoraco-abdominal endovascular repairs
- Contralateral iliac occlusion



### PARALLEL GRAFTS

Effective option for hostile anatomies unsuitable for other techniques. Short-term patency rates from 84,2% to 93,8%. Endoleak due to gutter development remains the biggest limitation for its long-term durability and solid evidence regarding its application is still lacking.

#### INDICATIONS

- Emergency situations
- Higher complexity anatomies unsuitable for other techniques



## NEW APPROACHES TO NO-OPTION CRITICAL LIMB ISCHEMIA

Catarina Francisco, Marina Dias-Neto

Regente da Unidade de Angiologia e Cirurgia Vascular: Prof. Doutor Armando Mansilha

### Introduction and Objectives

Critical limb ischemia (CLI) is a syndrome characterized by ischemia rest pain, non-healing ulcers and tissue loss. It is an increasingly common problem in elderly individuals and is associated with >30% 1-year amputation rates and >20% 1-year mortality rates<sup>1</sup>.

Surgical or endovascular revascularization is currently available for limb salvage in CLI. However, there are challenging situations in which conventional revascularization techniques still fail and culminate in major amputation. This is termed no-option CLI. Absence of distal target vessels, severe calcification, heavy plaque burden and advanced disease with occlusion of the pedal arteries used for distal bypass or angioplasty targets (the "desert foot") represent an end-stage pathology and may lead to no-option CLI<sup>2</sup>.

Thus, further treatment strategies must be developed to revascularize ischemic limbs and ameliorate clinical outcomes.

### Methods

PubMed electronic database was used as the main source for extracting papers for further review and analysis of therapeutic options for patients with unreconstructable critical limb ischemia.

### Results

#### Prostanoids

Prostanoids have been proposed as a therapeutic alternative for patients with CLI. Their vasodilatory, antithrombotic and anti-inflammatory effects might increase blood supply to the limb with occluded arteries<sup>3</sup>. However, the current data suggest that prostanoids have no effect on the incidence of amputations when compared against placebo. Furthermore, evidence show a greater incidence of adverse effects with the use of prostanoids, namely headache, nausea, vomiting diarrhoea, flushing and hypotension<sup>3</sup>.

Some studies suggest benneficial effects of prostanoids in the reduction of rest-pain and promotion of ulcer healing when compared with placebo<sup>3</sup>.

#### Cell therapy

Cell based therapy is a novel and promising alternative for CLI treatment. Stem cells have been established to act by enhancing angiogenesis, forming new blood vessels, providing trophic support via cytokine release, modulating inflammation and reducing infection<sup>4</sup>.

Angiogenic cell-based drug approach may prevent the death of cells via inhibiting insult-activated pathologic steps and induction biochemical pathways that induce survival<sup>4</sup>.

Exogenous cell transplantation stimulates endogenous repair via angiogenesis and offers the complementary advantage of generating an unlimited number of cells and control over fate, cell number, timing and site of infusion<sup>1,4</sup>. Although pre-clinical and clinical trials support the potential benefits of cell transplantation in CLI, higher quality randomized clinical trials should be performed to ensure the safety of these techniques before we move on to clinical practice<sup>4</sup>.

### Discussion and Conclusion

- The balance between benefits and harms associated with the use of prostanoids in no-option CLI is uncertain and careful assessment of therapeutic alternatives should be considered<sup>3</sup>.
- While preliminar results support the beneficial role of cell transplantation in CLI, well-organized studies are required to ensure the safety and efficacy of progenitor cell therapy prior to widespread this strategy<sup>1,4</sup>.
- Although the initial results of PDVA are promising, they need to be tested in larger studies to validate its clinical impact in no-option CLI<sup>2,5</sup>.

### References

- [1] Wang, X., et al. Combination of autologous transplantation of G-CSF-mobilized peripheral blood mononuclear cells and Panax notoginseng saponins in the treatment of unreconstructable critical limb ischemia. *Ann Vasc Surg*, 2015; 26(5).
- [2] Kuehl, V., et al. "Prelim Outcomes From a Pilot Study of Percutaneous Deep Vein Arterialization for No-Option Critical Limb Ischemia." *J Endovasc Ther*, 2017, 24(5), p. 619-626.
- [3] Kuehl, V., et al. "Prelim Outcomes From a Pilot Study of Percutaneous Deep Vein Arterialization for No-Option Critical Limb Ischemia." *J Endovasc Ther*, 2017, 24(5), p. 619-626.
- [4] Van Dyke, E.J., et al. [2010] Oxidative/reactive stresses trigger type 1 diabetes: preventable in susceptible individuals in human disease. *Annals of the New York Academy of Sciences*, 1201, p. 138-45.
- [5] Mamidi, M.K., et al. "Cell therapy in critical limb ischemia: current developments and future progress." *Cytotherapy*, 2012, 14(8), p. 902-16.
- [6] Subser, J. [2016] "A New Arterialization in Dialysis Patients With No-Option Critical Limb Ischemia and Posterior Tibial Artery Occlusion: A Technique for Limb Salvage in a Challenging Patient Subser, J. *Endovasc Ther*, 2016, 25(1), p. 127-132.

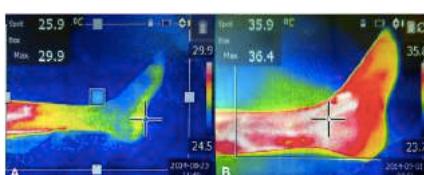


Fig. 1. Improvement in thermography before (A) and after (B) percutaneous deep vein arterialization. Cool areas are blue and warm areas are red<sup>2</sup>.

# CUSTOM-MADE SCALLOPED THORACIC ENDOGRAFTS IN HOSTILE AORTIC ANATOMIES

Catarina Henriques, Joel Sousa

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

17-19  
May

U PORTO  
FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO  
VASCULAR  
CONGRESS

## Introduction

- ❖ TEVAR is an established treatment option for thoracic aortic disease in both the acute and elective setting.<sup>1</sup>
- ❖ The feasibility of TEVAR is determined by several anatomic factors, particularly **landing zones**.
- ❖ Adequate proximal and distal landing zones of healthy aorta (at least 1,5-2cm) are mandatory to prevent stent graft migration and to reduce the risk of endoleak.<sup>2</sup>
- ❖ Nonetheless, hostile anatomies are common, and either proximal or distal short landing zones are frequent, so TEVAR may interfere with ostium of LSA, LCCA or brachiocephalic trunk.<sup>3,4</sup>
- ❖ Some alternative techniques were developed:<sup>5</sup>
  - Hybrid arch repair with supra aortic debranching
  - Chimneys
  - Fenestrations
  - Branches
- ❖ **Custom-made scalloped stentgrafts are less invasive treatment option for thoracic aneurysms with short landing zones.**

## Custom-made scalloped stentgraft

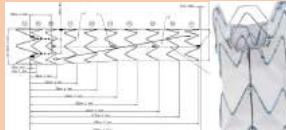
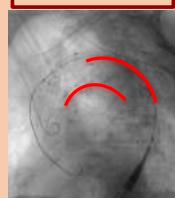
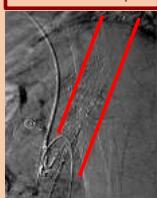


Fig1 - Schematic showing and real image of a scalloped endograft.

### Proximal scallop



### Distal scallop

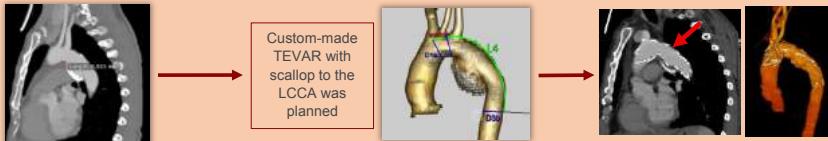


Increases the proximal landing zone in the inner curvature of the arch without compromising supra aortic trunk patency, thereby reinforcing proximal sealing at its weakest point.<sup>5</sup>

Enhances distal sealing and fixation, without the need of any adjunct procedure to increase landing zone. In some cases diaphragmatic crura can be an external wrap to help endograft fixation over time.

Scallops can be placed either proximally or distally, depending on the landing zone to improve:

- Short proximal landing zone with interference in ostium of the LSCA



- Short proximal landing zone of thoracic aortic aneurysm with bovine trunk



In the endovascular era, custom-made scalloped stent-graft technique appears to be a relatively simple, accessible, reproducible and safe endovascular alternative to other available surgical techniques to preserve aortic branch flow in TEVAR cases with hostile thoracic aortic anatomies.

[1] Henriquez, L.G., et al., Expert consensus document on the treatment of descending thoracic aortic disease using endovascular stent-grafts. Ann Thorac Surg. 2008; 85(5 Suppl): p. 54-61. [2] Alankar, A., et al., Endovascular treatment of thoracic aortic aneurysms with a short proximal landing zone using scalloped endografts. J Vasc Surg. 2014; 59(3 Pt 2): 549-556. [3] Van der Velde, C., et al., Reaching the 2nd branchial ring by branched thoracic stent-grafts for short landing zones. J Endovasc Ther. 2017; 34(4): p. 97-108. [4] Deeb, R., et al., Risk factors for perioperative stroke during thoracic endovascular aortic repair (TEVAR). J Endovasc Ther. 2007; 34(1): p. 54-57. [5] Aburada, I., et al., Proximal scallop in thoracic endovascular aortic aneurysm repair.

## POST-EVAR TYPE II ENDOLEAKS WITH SAC EXPANSION

Catarina Vale, Joel Sousa. Faculdade de Medicina da Universidade do Porto  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

- Abdominal aortic aneurysms affect 4-7% of the population above 65 years old, mostly males<sup>1</sup>;
- The rupture mortality is as high as 90%;
- Treatment includes open surgery and endovascular aneurysm repair (EVAR);
- One of the most frequent post-EVAR complication is type II endoleak<sup>2</sup>, where blood flows from one (IIa) or more (IIb) visceral or lumbar vessels into the aneurysmal sac<sup>3</sup>.

### RUPTURE OF ANEURYSMAL SAC

- Rupture can occur in type II endoleaks with or without sac expansion<sup>7</sup>;
- It is unclear whether sac expansion increases rupture risk, with some studies showing that type II endoleaks with sac expansion have no influence on rupture rate after EVAR<sup>4,5</sup>, while others found an association with sac expansion<sup>4,10,11</sup>, reintervention<sup>4, 10, 11</sup> and late aneurysm rupture<sup>4,11</sup>.

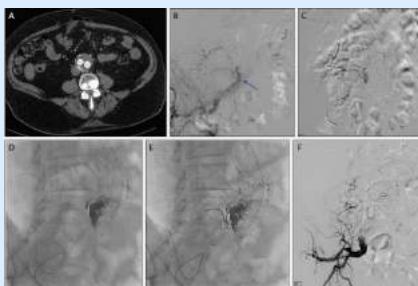


Fig. 1: A patient with a type II endoleak via a right lumbar artery (A) and enlarging aortic sac. Angiogram showing a pigtail catheter in the right limb of a bifurcated endograft demonstrates an endoleak being fed by a lumbar artery (arrow) (B). A catheter was placed into the right hypogastric artery, and angiography via a microcatheter placed into the culprit lumbar artery through the iliolumbar collateral better delineates the endoleak (C). Onyx was administered through the microcatheter (D). Further embolization was carried out until there was complete filling of the endoleak sac, as well as the feeding artery, with embolic agent (E). Final angiogram after embolization shows no further endoleak (F). Adapted from Gandhi et al.<sup>5</sup>

### TREATMENT OF TYPE II ENDOLEAKS

- Most type II endoleaks tend to resolve spontaneously, especially type IIa<sup>4,5</sup>.
- Type II endoleaks without sac expansion should be treated conservatively.
- Treatment of type II endoleaks with sac expansion is controversial<sup>4</sup>; with some authors recommending a conservative approach, and others advocating for early intervention.
- Despite the lack of sufficient evidence, sac expansion is currently the best marker available for risk of rupture and guides the indication for intervention<sup>8</sup>.

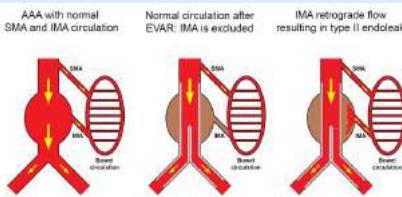


Fig. 2: A) Abdominal Aortic Aneurysm (AAA) B) Blood circulation after a typical EVAR C) Type II endoleak: collateral vessels provide retrograde blood flow to the inferior mesenteric artery (IMA), bringing blood inside the aneurysm sac. Adapted from x et al.<sup>12</sup>

### LIMITATIONS

The low rate of complications and the large number of patients required to conduct well-designed trials make it very difficult to obtain level-one evidence and to fully understand the natural history of type II endoleaks<sup>6</sup>.

### CONCLUSION

There is contradictory evidence concerning the role of sac expansion in post-EVAR rupture. Thus, it is not clear whether type II endoleaks with sac expansion should be treated conservatively or with early intervention.

REFERENCES: 1. K. Kurcsics, J.S. Matsuura, et al. Current status of medical treatment for abdominal aortic aneurysm. *Circ J.* 77 (2013), pp. 2860-2866. 2. F.J. Schlosser, B.E. Marin, Endoleaks after endovascular abdominal aortic aneurysm repair: what one needs to know. *Curr Opin Cardiol.* 27 (2012), pp. 898-903. 3. J. Oliveira-Perito, S. Sampath, et al. Risk Factors for aneurysm sac enlargement post-endovascular aneurysm repair: Revision of Literature. *Angiologia e Cirurgia Vascular.* 11 (2015), pp. 171-176. 4. L. Larzon T, Fujita S. Type II endoleak: a problem to be solved? *J Cardiovasc Surg (Torino)* 2014;55:109-118. 5. R.T. Gandhi, Y. Bryce, et al. Management of Type II Endoleaks: Available options for the treatment of the type of endoleak after EVAR. *Endovasc Today* (2016). 6. Brophy A, Sagu G, GK, et al. Type II endoleaks: challenges and solutions. *Vasc Health Risk Manag.* 2016 Mar 2:125-134. 7. JD. Wiss N, Gammie J, et al. Effect of anticoagulation on angiographic detection of endoleaks after EVAR. *J Vasc Surg.* 2014;59:103-107. 8. Kumar L, Cowled P, et al. Type II Endoleak after Endovascular Aneurysm Repair: Incidence, Clinical History and Treatment Outcomes. *Ann Vasc Surg.* 2017 Oct;44:94-102. 9. J. Vainio, R. V. Pereira, et al. Impact of type-II endoleak on aneurysm sac in a single center. *Angiol Cr Vasc* vol.13 no.2 Lisboa jun. 2017. 11. Jones J, Atkins M, et al. Persistent type 2 endoleak after endovascular repair of abdominal aortic aneurysm is associated with adverse late outcomes. *J Vasc Surg.* 2007;46:1-3. 12. G. Caruana, D. Giambelluca, et al. Evaluation of EVAR complications: a practical radiological approach. *European Congress of Radiology* (2017)

## OUTCOMES AFTER EARLY AND DELAYED CAROTID ENDARTERECTOMY IN PATIENTS WITH SYMPTOMATIC CAROTID ARTERY STENOSIS

Silva, Cátia; Pinto, José

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### INTRODUCTION

**Stroke** represents one of the most serious causes of mortality and morbidity in the United States and throughout the world. About one third of all strokes are related to carotid occlusive disease.(1)

**Carotid endarterectomy** is a surgical procedure to remove the endothelium and atherosclerotic plaque from inside the carotid artery wall.(2)

The Society for Vascular Surgery guidelines recommend **carotid endarterectomy** as the first-line treatment for most symptomatic patients with **carotid stenosis** of 50% to 99%.(3) Most of the guidelines recommended CEA as soon as possible or within 2 weeks of symptoms.(4)

### RESULTS

**Table 1: The 30-day outcome** of early ( $\leq 14$  days after onset of symptoms) versus delayed ( $>14$  days after onset of symptoms) carotid endarterectomy.

	Annambhota et al., 2012(5)	Charmoille et al., 2015(6)	Huang et al., 2017(4)
Death	0% vs 1.6%	5.1% vs 10.6%	0% vs 1%
Stroke	1.4% vs 1.6%	5.1% vs 12.9%	7.1% vs 0.6%
Cardiac complication	0% vs 0.8%	0% vs 3.5%	3.5% vs 6.1%

#### Long-term outcomes

- In terms of composite stroke and death, survival, and ipsilateral ischemic stroke were similar between patients undergoing CEA within 14 days and after 14 days after neurologic events.(4)
- During the 10-year follow-up period, there was no difference in the rate of either mortality or stroke by early vs delayed CEA.(5)
- Survival rates after 1, 2, and 3 years were similar in the 2 groups.(7)

### CONCLUSIONS

There is no difference in 30-day and long-term primary outcomes of stroke, cardiac complications and death with early vs delayed treatment.

Further studies are needed to eliminate bias factors from the comparison between early and late endarterectomy, such as adequate stratification of stroke severity and other comorbidities.

### REFERENCES

- Bhindi EOSS. Carotid Artery Stenosis. 2017.
- Orrupin S, Reikerasom K. Carotid endarterectomy for symptomatic carotid stenosis. The Cochrane Library. 2017.
- Ricotta JJ, AbuRahma A, Ascher E, Eskandari M, Faris P, Lai BK. Updated Society for Vascular Surgery guidelines for management of extracranial carotid disease: executive summary. Journal of vascular surgery. 2011;54(3):832-6.
- Huang Y, Głowiczki P, Duncan AA, Kalra M, Oderich GS, DeMartino RR, et al. Outcomes after early and delayed carotid endarterectomy in patients with symptomatic carotid artery stenosis. Journal of vascular surgery. 2018;67(4):1110-9.
- Annambhota S, Park MS, Keldahl ML, Morasch MD, Rodriguez HE, Pearce WH, et al. Early versus delayed carotid endarterectomy in symptomatic patients. Journal of vascular surgery. 2013;56(5):1161-7.
- Charmoille E, Bizez V, Laroche S, Sescaus G, Rouillet S, Ducasse E, et al. Thirty-day outcome of delayed versus early management of symptomatic carotid stenosis. Annals of vascular surgery. 2015;29(5):977-84.
- Ballotta E, Da Giau G, Baracchini C, Abbuzzese E, Saladini M, Meneghetti G. Early versus delayed carotid endarterectomy after a nondisabling ischemic stroke: a prospective randomized study. Surgery. 2002;131(3):287-93.

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## Quality of Life after therapy for varicose veins

Clara Casanova Vasco, José Oliveira-Pinto

Prof. Doutor Armando Mansilha, Regente da Unidade de Angiologia e Cirurgia Vascular

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

### INTRODUCTION

Varicose veins have a substantial impact on a patient's health-related quality of life (1).



Over the last decade, minimally invasive techniques such as laser therapy and foam sclerotherapy have become increasingly used alternatives to conventional surgery for the treatment of this condition. These treatments are short-term effective and result in significant clinical improvement. (2)

Nevertheless, patient-reported quality of life remains uncertain.

### METHODS

A review was undertaken to identify studies that reported generic and disease-specific patient-reported quality of life in patients with varicose veins. Literature searches were conducted in MEDLINE databases up to March 2017.



### RESULTS

15 randomized clinical trials were found comparing different techniques.

Sclerotherapy has a failure ablation rate of 18.0% at 6 weeks and 32.4% at 6 months, which is significantly higher than surgery (4.7% at 6 weeks and 8.1% at 6 months) and laser treatment (2.0% at 6 weeks and 6.4% at 6 months). Furthermore, patients treated with foam treatment had worse outcomes on a measure of disease-specific quality of life at 6 months than those who underwent surgery (-1.7 [-3.0 to -0.5]) (3).



Laser treatment is also favored over foam in regard to generic quality of life (1.5 [0.0 to 3.1]). The improvement in quality of life in the laser group did not differ significantly from that in the surgery group (0.6 [-0.9 to 2.2]).



### DISCUSSION

In conclusion, sclerotherapy is associated with more complications, worse patient-reported quality of life and lower efficacy compared to laser or conventional surgery. No clinically significant differences in quality of life was found between surgery and laser treatment.

### REFERENCES

- 1 - Biemans AAM, e. a. (2013). Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg*, 58, 727-734.
- 2 - Callam, M. (1994). Epidemiology of varicose veins. *Br J Surg*, 81: 167-173.
- 3 - Julie Brittenden, e. a. (2014). A randomized trial comparing treatments for varicose veins. *N Engl J Med*, 371: 1218-1227.



Diana Cardoso, José Pedro Pinto MD

Regente da Unidade de Angiologia e Cirurgia Vascular;  
Prof. Doutor Armando Mansilha

## Introduction

Endovascular aneurysm repair (EVAR) is a minimally invasive technique to repair abdominal aortic aneurysms (AAAs). However, it is not devoid of risks, with endoleaks being the most common complications. Unlike Type I and III endoleaks which, due to the high risk of aneurysm rupture, should be treated, Type II endoleak is the subject of great discussion and there is constant debate about its clinical importance.

This review pretends to clarify the right management of type II endoleak after EVAR.

## Methods

A literature review was conducted assessing type II endoleaks following EVAR. Two case reports were included in addition to other available studies on the topic.

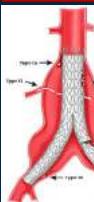
## References

- Morales JF, Greenberg RX, Lu Q, et al. Management of Endoleaks Following Endovascular Aneurysm Repair. *J Endovasc Ther*. 2008;15(3):631-638.
- Armenakas MR, Tsilimigras DD, Karayannidis K, et al. Type II endoleak after endoleak repair without surgical intervention. *Vascular*. 2015;33(1):201-204.
- Acayraci L, Jaber B, Wonglaj J. Rupture of the infrarenal abdominal aortic aneurysm (AAA) following an endovascular aneurysm repair (EVAR) due to an endoleak. *Eur Heart J*. 2013;34(27):2123-2124.
- Argirov ED, Chesar RA, Makaroun MS. Type II endoleaks. *J Vasc Surg*. 2014;59(5):1339-1343.
- Argirov A, Saigal GK, Brown MJ, Stavros RD, Siford DA. Type II endoleaks: Characteristics and outcomes. *Vasc Health Risk Manag*. 2016;12:53-63.
- Lai W, Zhou J, Li Z, et al. Endovascular repair of abdominal aortic aneurysms in the Veterans Affairs Open Versus Endovascular Repair (OVER) Trial of Abdominal Aortic Aneurysms. In: *Journal of Vascular Surgery*. Vol 62. 2015;133A-134A.



# POST-IMPLANT RUPTURE DUE TO TYPE II ENDOLEAK – DOES IT REALLY HAPPEN?

## Endoleaks



Type I endoleak is due to a defected seal at the proximal or distal attachment sites.

Type II endoleaks are caused by retrograde flow through collateral vessels, such as the inferior mesenteric artery, or patent lumbar branches, into the aneurysm sac.

Type III endoleaks are gaps, defects, or separations in the stent-graft material.

Type IV endoleaks represent porous graft walls leading to exudation of plasma components across the wall of the endograft.

## Type II Endoleak

Type II endoleak is the most commonly reported endoleak and a correlation between its incidence and the number of patient aortic branches prior to the performance of EVAR was established. It accounts for more than 50 percent of all endoleaks. They can be classified as: Early (first 30 days post-EVAR); Persistent (present for more than 6 month); Late (occur after 1 year of EVAR).

## Exposition of Two Case Reports

### Case One

A 77-year-old man with numerous comorbidities, such as end-stage renal failure, hypertension, myocardial infarction, among many others, was referred by the incidental finding of an AAA, measuring 5.5 cm. EVAR was performed and at 6 weeks, computed tomography (CT) did not evidence any endoleaks or displacement of the patient's endograft. Aneurysmal sac measured 6.2 cm. Subsequent CT scans, at 3 and 4 months, showed growth in aneurysm size (6.6 cm) and type II endoleak from the lumbar arteries. Ultrasound scans showed a static sac size (6.6 cm). At 30 months, surveillance CT found a 7.4 cm aneurysmal sac and a persistent type II endoleak. After an unsuccessful attempt at embolisation with coils, CT scans at 35, 40 and 45 months showed a ongoing increase in the sac size as 7.8 cm, 8 cm and 8.2 cm, respectively. A cardiological evaluation discarded the possibility of open repair. At 52 months, the patient developed a severe back ache. An urgent CT showed ruptured AAA sac with free intra-abdominal fluid and retroperitoneal haematooma. The patient was taken promptly to theatre, where he was operated and made a satisfactory recovery.

### Discussion

- Type II endoleak is predominantly benign. In 5.5% to 24% of patients, as the aforementioned, aneurysm sac enlargement occurs, which can increase pressure and can cause rupture. However, aneurysm rupture due to an isolated type II endoleak is very rare (<1 percent of all endoleaks) and its spontaneous resolution is common.  
- This patient presented a persistent type II endoleak and an increase in aneurysmal sac size. Intervention criteria vary across the literature, being the most common a persistent type II endoleak or an associated sac expansion >0.5 cm. If this criteria are not met, a conservative approach is suitable. In this patient, the decision to not intervene was not easy, but was considered clinically justified, as most deaths in the open repair, are related to the perioperative cardiac events and pre-existing renal disease.



An endoleak related to the right limb of the stent graft.

### Case Two

A 92-year-old woman, hypertensive, with chronic cardiac failure (CCC), chronic atrial fibrillation and AAA, presented with lower back pain associated nausea. Four years prior, she had undergone an EVAR for a 5.5 cm AAA. Her follow-up scans, 3 years after EVAR, evidenced persistent type II endoleak, despite a continuous reduction in the diameter of the aneurysmal sac (up to 5.0 cm). At the emergency department, 4 years post-EVAR, TC showed a substantially larger aneurysm sac (8.0 cm) with a persistent type II endoleak with adjacent posterior aneurysm rupture. Given her age and comorbidities, intervention was discarded and the patient was informed of her poor prognosis. The day after presentation, to everyone's surprise, the patient was and was discharged. There were no other signs or signals of ulterior deterioration of her aneurysmal rupture. She passed away 6 months later due to her CCC.

### Discussion

- Endoleak type II induces low pressurization of the aneurysmal sac, as the backfilling pressures of the inferior mesenteric and lumbar arteries are low. Consequently, these characteristics may have led her to a more favorable outcome in this patient. Unlike the primary rupture of an AAA, this low-pressurized rupture, has a slower bleed and is easier to tamponade.



CT shows a large AAA sac with posterior contrast flush consistent with type II endoleak, peritoneal stranding and large left retroperitoneal haematooma consistent with AAA rupture.

## Conclusions

- In general, endoleak type II is benign, seals spontaneously, induces low pressurization of the aneurysmal sac and has a rare association with rupture.
- A conservative approach, with lifelong follow-up, namely, regular CT scans, is appropriate if there is no sac expansion.
- Intervention is recommended if there is persistent type II endoleak or an associated sac expansion >0.5 cm.

# ABDOMINAL AORTIC ANEURYSMS (AAA): APPROACH TO GENDER DIFFERENCES



Dioogo Brandão da Costa<sup>1</sup>, Tiago Soares<sup>2</sup>

<sup>1</sup>Faculty of Medicine of the University of Porto, Porto, Portugal

<sup>2</sup>Vascular Surgery and Angiology Department, São João Hospital Center, Porto, Portugal

Head of the Angiology and Vascular Surgery Module - Prof. Doutor Armando Mansilha

## INTRODUCTION / BACKGROUND

The prevalence of AAA in persons' age over 65 years is 3–4 times higher in men than women<sup>2</sup>. Endovascular aortic repair (EVAR) has become the primary treatment method for AAA repair<sup>2,3</sup>. Females with rAAA tend to be underdiagnosed as well as undertreated, leading to worse prognoses<sup>9</sup>.

## OBJECTIVES

The goal of this review is to summarize what is currently known about the effect of gender on AAA presentation and outcomes and also to point out how can be designed a path to understand how to treat women<sup>2</sup>.

## PHYSIOPATHOLOGY

AAAs result from a degenerative process, characterized by structural deterioration of the aortic wall, mainly via matrix metalloproteinases (MMPs), having estrogens as protective and androgens presence as deleterious factors. Risk factors: are the same for women as for men, namely age, smoking, hypertension, and family history.<sup>2</sup>

## METHODS / MATERIALS

Review of the state of art related to the differences found in abdominal aneurysm in males vs females, based on several reviews and articles.

## SCREENING

There are no consensus on screening recommendations for women, leading to delayed diagnosis and repair. The SVS recommends screening women age 65 or older who have smoked or have a family history.<sup>2</sup>

## RESULTS

Women are generally spared from AAA formation by the immunomodulating effects of estrogen but once they develop, the natural history in women appears to be worse:

- Declines in AAA-related mortality have been more prominent for men than women<sup>2</sup>
- more likely to present at older age with rAAA
- 60% of women are not eligible for EVAR with use of conventional devices<sup>10</sup>
- 35% higher odds of mortality<sup>9</sup>
- faster rate of aneurysm growth and higher tendency to rupture at smaller diameter
- fourfold higher risk of rupture and threefold higher mortality following rupture<sup>7</sup>
- more procedural complications

Lower size threshold should be used for women in consideration of repair?

Considering repair for women at diameters of:

- 4.5–5.5 cm (2003 recommendations);
- 5.0–5.4 cm (updated 2009 SVS Practice Guidelines).

In-hospital, 30-day, and 1-year mortality rates were equivalent among men and women undergoing EVAR for intact aneurysms.<sup>1,2,4,6,9</sup>

## CONCLUSIONS

This work highlights the importance of future studies dedicated to understand the natural history, the ideal screening and threshold for repair of AAAs in female patients.

Devices used in women can not be same as the ones used in men because of gender-related anatomic differences. An improved selection of women for EVAR would likely lead to better results and lower the risk of arterial complications. In the future, newer devices hold promise in further reducing the gender gap in complication rates.

### References:

- Christie Clegg, MC, et al. Evolution of gender-related differences in outcomes from ten decades of endovascular aneurysm repair. *J Vasc Surg* 2015;61:843-52.
- C. Lo, Ruby and L. Schermerhorn, Marc. Abdominal aortic aneurysms in women. *J Vasc Surg* 2013; March ; 63(3): 839-844.
- 3.Schepis, M., et al. Women with abdominal aortic aneurysms: a case control study comparing open repair with endovascular repair. *J Vasc Surg* 2013 Oct;58(4):1091-105.
- 4.Peter Olcincik, MD et al. Clinical presentation, comorbidities, and age but not female gender predict survival after endovascular repair of abdominal aortic aneurysms. *J Vasc Surg* 2015 Apr;61(4):853-81.
- 5.Schepis, M., et al. Women with abdominal aortic aneurysms: a case control study comparing open repair with endovascular repair. *J Vasc Surg* 2013 Oct;58(4):1091-105.
- 6.Venkatesh G, Wolf MD et al. Gender differences in endovascular abdominal aortic aneurysm repair with the Aneurfix stent graft. *J Vasc Surg* 2003;38:86-8.
- 7.Sarah E. Dwyer, MD et al. Sex differences in mortality and morbidity following repair of intact abdominal aortic aneurysms. *J Vasc Surg* 2017;65:1066-13.
- 8.Ramsey, J., et al. Women with abdominal aortic aneurysms: a case control study comparing open repair with endovascular repair. *J Vasc Surg* 2011;54:931-7.
- 9.Mark Bundz et al. Persisting disparities between sexes in outcomes of ruptured abdominal aortic aneurysm hospitalizations. Springer Nature. (2017) 7:17994.
- 10.David Kuhns, MD, Zsuzsanna Krajacic, MD. Progress in Endovascular Aortic Repair for Women. *Texas Heart Institute Journal*, Oct 2017, Vol. 44, No. 5.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U. PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

# CREST: FLAWS AND CRITIQUE

## Introduction:

The Carotid Revascularization Endarterectomy versus Stenting Trial (CREST) supports the equivalence of carotid artery stenting (CAS) and carotid endarterectomy (CEA).

However, the subgroup analyses and detail data, seem not to support this equivalence.

Diogo Francisco Tomaz, Ricardo Fereira MD  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

**References** - Paraskevas KI, Mikhailev DP, Lapis CD, Veith FJ Critique of the Carotid Revascularization Endarterectomy versus Stenting Trial (CREST): Flaws in CREST and its Interpretation

## MIs in the 1<sup>ary</sup> end-point

The purpose of both CAS and CEA is to prevent strokes (and death), not MIs, being inappropriate to group them together with equal weight in a primary end point. The initial CREST report stated no difference in the primary 'end' point between the two groups.

The difference in MIs balanced the difference in strokes and produced the apparent equivalence in the overall primary 'end' point.

Also, MI definition was quite unusual (using the creatine kinase MB or troponin level) and patients undergoing CAS received considerably higher doses of anti-platelet treatment in the peri-procedural period compared with CEA patients. This may have accounted, in part, for the 50% lower periprocedural MI rates observed in the CAS compared with the CEA patients.

## Inclusion of asymptomatic patients

Is intriguing how the percentage of asymptomatic CAS patients in the final report got as high as 47.1% - the enrolment of asymptomatic individual started just after the first 3.5 years of study, when almost  $\frac{2}{3}$  of the CAS population had already been enrolled.

## CAS for asymptomatic carotid stenosis

According to the AHA/ASA guideline, CAS might be considered in selected asymptomatic patients, but its effectiveness compared with current BMT alone for these patients is not well established.

## Conclusions

The subgroup analyses showed that CAS was associated with higher stroke and death rates in symptomatic patients, females and patients >65 years compared with CEA.

**Thus, current data suggest that CEA and CAS are not equivalent for the management of symptomatic patients.**

Asymptomatic males <65 years of age are the only patients in whom similar stroke and death rates are present in both CAS and CEA. Even so, current best medical treatment (BMT) alone may be the treatment of choice for most asymptomatic patients.

## Contradictions in the initial CREST report and subgroup analyses

Various subgroup analyses showed:

- \* stroke and death rates in all patients (symptomatic and asymptomatic) were almost double for CAS;
- \* in females CAS was associated with clearly inferior outcomes;
- \* Patients >70 years treated with CAS were shown to have higher risk of events (if the MIs were not included, the inflection point for an equal stroke risk for CAS and CEA was at 64 years - 6 years younger than the primary 'end' point);

## TREATMENT OF RUPTURED ABDOMINAL AORTIC ANEURYSM: HOW GOOD IS EVAR?

Diogo Morais, Jacinta Campos. Contacts: vzero@riseup.net

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha



### Introduction

Despite advances in operative technique and perioperative management, ruptured Abdominal Aortic Aneurysm (rAAA) still has high rates of morbidity and mortality.

Endovascular aneurysm repair (EVAR) is an established approach to elective correction.

Observational and population-based studies aroused the possibility that this technique could potentially reduce perioperative morbidity and mortality compared with open repair (OR).

The aim of this study is to evaluate the four randomized controlled trials (RCTs) and the meta-analysis, comparing EVAR to OR in rAAA, taking in account the best evidence available to the date.

### Methods

A search in PubMed was achieved and four RCTs – Nottingham<sup>1</sup>, AJAX<sup>2</sup>, IMPROVE<sup>3</sup> and ECAR<sup>4</sup> trials- and one meta-analysis, done by Cochrane<sup>5</sup>, were collected.

The key outcomes that we want to highlight are both short term as well as mid/long term.

### Results

In effectiveness trials, patients with diagnosis of rAAA were allocated to the arm of OR or EVAR admitting that crossover was allowed.

In efficacy centered trials, patients suitable for both EVAR and OR were randomized for one of the intervention arms.



Regarding EVAR short term outcomes:

Mortality (30d or in-hospital)

- No statistically differences (OR=0.88 [0.66, 1.16]).

Major complications

- Only two trials categorized them as an outcome;
- Total net effect was an OR=0.72 [0.42, 1.23];
- Neither stroke, cardiac or renal complications, or reoperation were significantly different.

Regarding EVAR mid/long term outcomes :

6 months

- AJAX and ECAR did not show statistically meaningful differences in mortality.

1 year

- IMPROVE showed no survival benefit (OR 0.85 [0.62, 1.17]);
- Similar reoperation rates;
- Favorable trends regarding (QOL), quality-adjusted-life-years (QALYs) and cost effectiveness toward EVAR.

3 years

- IMPROVE reported recently survival benefits at 3 year but by 7 years this effect faded away (OR 0.92 [0.75, 1.13]);
- Similar reoperation rates.
- Favorable trends in QALYs and cost effectiveness (CE) toward EVAR were solidified.

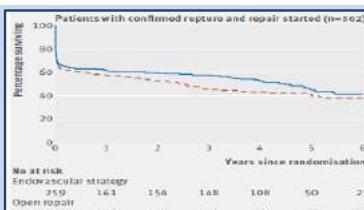


Fig1- IMPROVE results regarding long term survival.

Years	Endovascular strategy		Openorrhith		P value
	No. of patients	Mean (SD)	No. of patients	Mean (SD)	
1.5 years	214	1.71 (0.11)	237	1.61 (1.41)	0.314
3 years	176	1.14 (0.11)	237	0.97 (1.01)	0.668
5 years	176	0.80 (0.94)	237	0.94 (1.21)	0.28
6 years	176	0.76 (0.94)	237	0.82 (1.26)	0.656

Fig2 - IMPROVE results regarding long term gains in QALYs and CE.

### Conclusions

Although observational data showed a survival benefit, RCTs states that EVAR does not appear to produce survival benefits comparing to OR either short or mid/long term.

Nonetheless, EVAR is not associated to an increase in short term complications (30-day) neither higher reoperation rates (short and long term). Regarding the benefits, it appears to show early positive gains in QOL, QALYs and cost effectiveness.

### Bibliografia:

1. Mansilha A et al. A randomized trial of endovascular and open surgery for ruptured abdominal aortic aneurysm. European Journal of Vascular and Endovascular Surgery 2005;30(5): 506-10. doi:10.1016/j.ejvs.2005.03.010
2. Ramirez J et al. Endovascular repair versus open repair for ruptured abdominal aortic aneurysms: A meta-analysis. Journal of Vascular Surgery 2013;58(2): 248-55. doi:10.1016/j.jvs.2013.04.010
3. IMPROVE Trial Investigators. Powell JT et al. A randomized trial comparing endovascular repair with open repair for ruptured abdominal aortic aneurysms. New England Journal of Medicine 2014;370(24): 2291-300. doi:10.1056/NEJMoa1402775
4. ECAR Trial Investigators. Powell JT et al. A randomized trial comparing endovascular repair with open repair for ruptured abdominal aortic aneurysms. European Journal of Vascular and Endovascular Surgery 2015;50(3): 303-10. doi:10.1016/j.ejvs.2015.01.010
5. Cochrane Database of Systematic Reviews 2017, Issue 2. Art. No.: CD002051

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

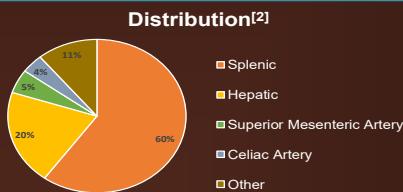
PORTO  
VASCULAR  
CONFERENCE  
2018

# **ENDOVASCULAR MANAGEMENT OF VISCERAL ARTERY ANEURYSMS**

Seabra D, Sousa J.  
Head of Angiology and Vascular Surgery - Prof. Doutor Armando Mansilha

## RARE BUT LIFE-THREATENING<sup>[1]</sup>

- Prevalence of 0.01-2%
  - Mortality from rupture ranges from 25-100%
  - Clinical symptoms and signs are frequently unspecific



### **General Guidelines for Intervention<sup>[3]</sup>**

- **True Aneurysm**
    - Symptomatic
    - Women of Childbearing age
    - Patients who may require a liver transplant
    - Nonatherosclerotic etiology
    - Interval growth >0.5 cm/y
    - Multiple hepatic VAA
    - >2 cm Hepatic, splenic, or celiac VAAs
    - Any size if rare
  - **Pseudoaneurysm**

## PARENT ARTERY SACRIFICE

"Sandwich Technique" (Fig. 1)<sup>4</sup>

Embolization of the aneurysmal artery, first distal and then proximal to the location of the aneurysm.  
Mostly used in splenic artery aneurysms.



Fig. 1

### PARENT ARTERY PRESERVATION<sup>[3]</sup>

## Covered Stents

Self-expanding covered stents are ideally placed in tortuous arteries (Fig.2), whereas balloon-expandable covered stents can be placed in straight proximal segments.



#### **Coil Packing Technique (Fig.3)**

Treatment of saccular aneurysms with narrow necks. Risk of distal embolization and organ infarction.

## **Stent-assisted Coiling Technique (Fig.4)**

**Technique** (Fig. 1).  
Also known as "Coil and Cage".  
Prevents distal coil migration. Mainly for aneurysms with wide necks.



Fig.4

**CONCLUSION:** Endovascular treatment of VAAs is technically attainable with excellent outcomes and reduced morbidity and mortality. The choice of technique relies on the need to preserve the parent artery, the morphology of the aneurysm, and the tortuosity of the native artery.<sup>[3]</sup>

1 Repenenti JF, Etezadi V, Gandhi RT, et al. Endovascular Treatment of Visceral and Renal Artery Aneurysms. *JVIR*. 2011;22(9):1246-53.

1. Benenati JF, Etezadi V, Gandini RT, et al. Endovascular Treatment of Visceral and Renal Arterial Aneurysms. *Journal of Vascular and Interventional Radiology*. 2017;28(10):197-204.

2. Hendriks JM, Raaij ST, Rill MJ, et al. Visceral aneurysm: Old paradigms, new insights? Best Practice & Research Clinical Gastroenterology. 2017;31(1):97-104.

2.1. Henkens JM, Baij GSJ, Rijnwoerd HJW, et al. Visceral arteriomyolysis: Old paradigms, new insights? Best Practice & Research Clinical Gastroenterology 2017;30(1).

4. Wei G, Xiao-Ping L, Xin J, et al. The endovascular management of splenic artery aneurysms and pseudoaneurysms. *Vascular*, Vol. 19 No. 5, pp. 257–261, 2011.

## DOUBLE LAYER MESH STENTS IN CAROTID ARTERY STENTING

**Campos, E.; Sousa, J.**

Regent of the Angiology and Vascular Surgery Unit -  
Armando Mansilha, PhD



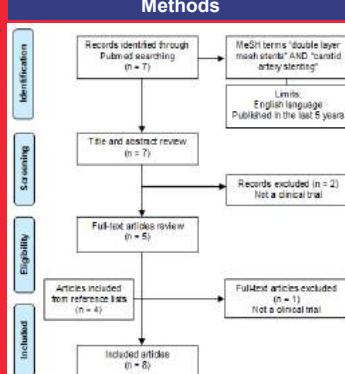
### Objectives

Review clinical trials with CAS using double mesh stents to assess its safety and effectiveness in the treatment of carotid artery stenosis.

### Introduction

The CREST trial suggested a higher risk of ipsilateral strokes after CAS compared to CEA by 30 days, as a result of plaque protrusion until the stent is endothelialized. (1) For this reason, it became necessary refine the carotid stent design. New dual-layer stents have been introduced since into clinical practice (2).

### Methods



### Results

Authors	n	Ages	Patients		Procedural Results		Clinical Outcomes B (in-hospital and 30-day follow-up)		
			SCS	ACS	TS	PC	%S	R/T	CE/MI
Machnik, R. et al. <small>2017 [3] Roadrunner</small>	40	67.8 ±7.9 yrs	100%	0%	100%	1 minor stroke after common CA intubation with a guiding catheter	82.9±9.1% to 19.3±7.3%	0%	1 transient ischemic attack
Nerla, R. et al. <small>2016 [3] Roadrunner</small>	150	B 74±8 yrs	29%	71%	100%	0%	B to 12.4±4.7%	0%	0%
Musialek, P. et al. <small>2016 [3] Clear</small>	101	51-86 yrs	54.4%	45.6%	99.1%	0%	83±9% to 6.7±5%	0%	0.9% (1 SCS patient had a minor ipsilateral stroke 24–48 h after CAS)
Bosiers, M. et al. <small>2016 [3] Roadrunner</small>	100	73.44 ±9.55 yrs	31%	69%	100%	0%	85.30±8.02% to 5.21±7.40%	0%	2.1% (1 patient had MI followed by death and 1 patient had a stroke)
Castagno, C. et al. <small>2016 [3] Roadrunner</small>	4	73-82 yrs	0%	100%	100%	1 case of transient bradycardia just after stent deployment	75-90% to n.d.	0%	0%
Schofer, J. et al. <small>2015 [3] Clear</small>	30	71.6±7.6 yrs	33.3%	66.7%	100%	0%	79.9 ±5.0% to 16.9±6.5%	n.d.	0% B
Kedev, S. et al. <small>2015 [3] Roadrunner</small>	10	66 yrs	70%	30%	100%	1 case of temporary vasospasm	n.d.	n.d.	0%
Hopf-Jensen, S. et al. <small>2015 [3] Roadrunner</small>	7	75 ±11.4 yrs	100%	0%	100%	0%	76±8.9% to n.d.	0%	0%

SCS – symptomatic carotid stenosis; ACS – asymptomatic carotid stenosis; TS – technical success; PC – procedural complications; %S – degree of carotid stenosis before and after procedure; R/T – restenosis or thrombosis; CE – cerebrovascular event; MI – myocardial infarction; CA – carotid artery; CAS – carotid artery stenting; n.d. – no data.

### Conclusion

- CAS using double mesh stents seems to be safe and effective and has presented minimal neurological complications periprocedural and at 30-day follow-up.
- Further studies involving larger patient populations and longer follow-up are needed.

### References

- [1] Machnik, R. et al. Mesh-covered (Roadrunner) stent as a new treatment modality for symptomatic or high-risk carotid stenosis. *Adv Interv Cardiol* 2017; 13, 2 (48): 130-134. [2] Nerla, R. et al. Carotid artery stenting with a new-generation self-expanding nitinol stent: the Roadrunner trial. *J Endovasc Ther* 2017; 24: 101-107. [3] Castagno, C. et al. A novel paradigm in carotid revascularization: prospective evaluation of all-comer percutaneous carotid revascularization in symptomatic individuals using a carotid artery stent system (CLEAR). *Minerva Cardioangiol* 2016; 64: e68-70. [4] Bosiers, M. et al. The CLEAR-RD study evaluation of a new dual-layer mesh-covered stent system for the carotid artery. *Eur Heart J* 2016; 37: e571-6. [5] Castagno, C. et al. Preoperative and Postoperative Evaluation of New Double Layer Mesh-Covered Carotid Stent System. *Am J Cardiol* 2016; 117: 1228-1234. [6] Schofer, J. et al. A prospective, multicenter study of a novel mesh-covered carotid stent: The CLEARNET Trial. *JACC Cardiovasc Interv* 2016; 9: 1229-34. [7] Kedev, S. et al. Safety of Slinger 18F Transradial Approach Carotid Stent System. *Am J Cardiol* 2016; 117: 1235-40. [8] Hopf-Jensen, S. et al. Initial Clinical Experience With the Micromesh Roadrunner Carotid Artery Stent for the Treatment of Patients With Symptomatic Carotid Artery Disease. *Journal of Endovascular Therapy* 2015; Vol. 22(2) 220-225.

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO

FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO



## EXTRACRANIAL CAROTID-ARTERY DISEASE – OUR DAILY PRACTICE

Emanuel Matias, Dr.<sup>a</sup> Jacinta Campos

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

Stroke is the leading cause of death and disability among Portuguese adults and carotid-artery disease is responsible for up to 20% of the cases. Carotid endarterectomy (CEA) has been established as the standard treatment for severe symptomatic carotid-artery stenosis. Carotid artery stenting (CAS) has provided a less-invasive alternative in recent years, but it is unclear whether it is as safe, making the therapeutic strategy of choosing between CEA and CAS still controversial.

### AIMS

The aim of this study was to evaluate clinical characteristics and outcome differences between patients submitted to endovascular and surgical treatment for carotid-artery disease.

### METHODS

An observational retrospective study was conducted including patients submitted to CEA or CAS between January 2015 and December 2015 at Centro Hospitalar Vila Nova de Gaia. The main variables evaluated were age, gender, cardiovascular risk factors, previous neurologic events, severity of stenosis, presence of symptoms at admission, type of symptoms and associated endovascular treatment. In-hospital outcomes were evaluated in symptomatic patients (time to treatment, time to discharge, full neurologic recovery, neurologic events *de novo*, medical complications, need of reintervention and mortality). Student t-test and Fisher's exact test were used and a  $p < 0.05$  was set as significant.

### RESULTS

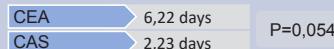
Fifty-one patients were included in this study; their **baseline characteristics** are presented in the following tables.

	CEA (n=38)	CAS (n=13)	<i>p</i> value
Age (years)	72,26	61,85	0,007
Male sex (%)	89,5	92,3	0,767
Hypertension (%)	73,7	61,5	0,487
Dyslipidemia (%)	57,9	46,2	0,463
Diabetes (%)	36,8	30,8	0,750
Smoking (%)	47,4	15,4	0,041
Coronary-artery disease (%)	26,3	15,4	0,706
Previous neurologic events (%)	39,5	30,8	0,743

	CEA (n=38)	CAS (n=13)	<i>p</i> value
Severity of stenosis			
50-69% (%)	0	7,7	
≥70% (%)	100	92,3	
Neurologic event at admission (%)	23,7	100	0,000
Transient ischemic attack (%)	31,8	30,8	0,899
Hemispheric stroke (%)	66,7	69,2	0,899
Associated endovascular treatment (%)	0	53,8	

### In-hospital outcomes of symptomatic patients:

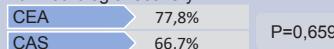
Mean time to treatment after admission



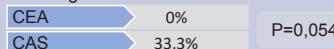
Mean time to discharge after intervention



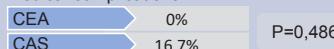
Full neurologic recovery



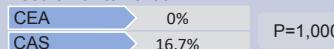
Neurologic events *de novo*



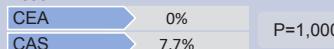
Medical complications



Need of reintervention



Death



### CONCLUSION

All CEA were performed by vascular surgeons and all CAS procedures were performed by neuroradiologists. CAS seems to be associated with worse in-hospital outcomes. However, the time to treatment after admission was higher in patients submitted to CEA. Despite these results, none of these outcomes were significantly different between both groups.

Mac, J.L., Chatelet, G., Beyens, B. (2006) Endarterectomy versus stenting in patients with symptomatic severe carotid stenosis. *The New England journal of medicine*.

Rosenfield, K., Matsuura, J.S., Chaturvedi, S. (2018) Randomized Trial of Stent versus Surgery for Asymptomatic Carotid Stenosis. *The New England journal of medicine*.

Zhang, L., Zhao, Z., Ouyang, Y. (2015) Systematic Review and Meta-Analysis of Carotid Artery Stenting Versus Endarterectomy for Carotid Stenosis: A Chronological and Worldwide Study. *Medicine*.

Programa Nacional para as Doenças Cerebrovasculares 2017. Direção-Geral da Saúde.

UPPER EXTREMITY DEEP VEIN THROMBOSIS: SYMPTOMS,  
DIAGNOSIS, AND TREATMENT

Fernando Barbosa Peixoto; Rita Augusto

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

**Introduction**

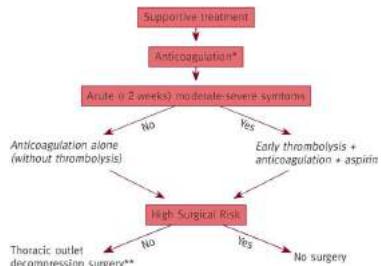
UEDVT is defined as thrombosis of the deep venous system of the upper extremities (subclavian, axillary, brachial, ulnar, and radial veins). Annual incidence for UEDVT is 1/100000 - 2/100000 and accounts for 1-4% of all deep vein thrombosis.[1]

**Clinical Manifestations**

Acute UEDVT usually presents with arm pain and swelling. Other symptoms may include superior vena cava syndrome, cyanosis of the hand and fingers, low fever and signs of superficial vein thrombosis. Pulmonary embolism may occur in 4-10% of cases. Post-DVT syndrome is present in up to 50% of patients and is much more common in primary UEDTV patients.[1]

**Primary UEDTV**

Primary UEDTV (Paget-Schroetter syndrome) is due to anatomic abnormalities and accounts for 20% of all cases. It is caused by compression of the veins that pass through the thoracic outlet therefore it is also called venous thoracic outlet syndrome. This compression can be congenital (e.g. accessory rib, abnormal scalene tendon insertion, supernumerary muscle and tendons) or acquired (e.g. bone fracture, subclavian muscle hypertrophy). Median age of diagnosis is in the early thirties and the male to female ratio is 2:1. [2]

**Figure 2 – Treatment for primary UEDTV**

\* 3-6 months

\*\* Should be offered shortly following thrombolysis

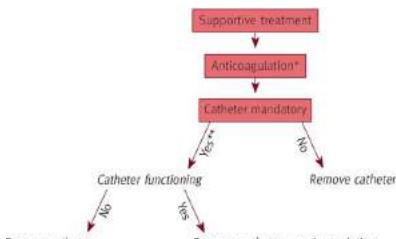
**References**

[1] Mustafa, J., et al. (2018). "Upper Extremity Deep Vein Thrombosis: Symptoms, Diagnosis, and Treatment." *Isr Med Assoc J* 1(20): 53-57.

[2] Illig KA, Doyle AJ. A comprehensive review of Paget-Schroetter syndrome. *J Vasc Surg* 2010; 51 (6): 1538-47.

**Figure 1 – Patient with UEDVT on the left arm.****Secondary UEDTV**

Accounts for 80% of all cases and is mostly caused by intravenous catheters, pacemakers, malignancy or thrombophilia. As such, most patients are much older than those with primary UEDTV. [2]

**Figure 3 – Treatment for secondary UEDTV**

\*3 months

\*\*maintain if mandatory and functioning along with anticoagulation treatment

**Conclusion**

UEDVT is a potentially severe event, therefore, an early diagnosis and treatment is key to an improved outcome in these patients.

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## THE IMPACT OF STATINS ON PERIPHERAL ARTERY DISEASE OUTCOMES

Filipa Adan e Silva<sup>1</sup>; Nuno Henriques Coelho<sup>2</sup>

<sup>1</sup> aluna do MIM da FMUP, <sup>2</sup> Serviço de Angiologia e Cirurgia Vascular Centro Hospitalar de Vila Nova de Gaia/Espinho

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

U.PORTO

FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

### INTRODUCTION

Peripheral Artery Disease (PAD) is highly prevalent worldwide, with a major impact in the quality of life and mortality and having an atherosclerotic basis (1).

Although treatment approach of PAD with statins is recommended, there are still lots of patients with PAD that are not prescribed with them because statin dose guidelines are based on Coronary Artery Disease (CAD) (2). In fact, it is more likely to be prescribed with statins if the patient has concomitant CAD (3).

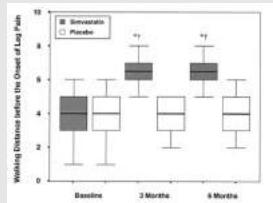


### METHODS

A review was undertaken to find and categorized studies that report the association of statin use in PAD patients and the outcomes of pain-free walking distance and amputation. The search was carried out in Medline until April 2018.

### RESULTS

Mondillo et al compared the effects of simvastatin in improving pain-free walking distance with placebo, showing significant increases.



Arya et al analyzed the association of statin treatment with the risk of amputation and mortality. Furthermore, they compared the impact of high or low-to-moderate dose statins on this outcome.

**Table 2.** Cox Proportional Hazards Model Results for Effect of Statin Intensity on Mortality and Amputations Comparing High-Intensity Statin Use and Low-to-Moderate-Intensity Statin Use With an Active Comparator Group (Use of Antiplatelet Medication But No Statin) in Incident PAD, N=800

	Mortality	Amputation
Unadjusted model <sup>a</sup>		
Antiplatelet only, no statin <sup>b</sup>	Ref.	Ref.
Low-to-moderate-intensity statin	0.95 (0.90-0.99)	0.79 (0.75-0.83)
High-intensity statin	0.82 (0.79-0.85)	0.84 (0.78-0.90)
Adjusted model 1 <sup>c</sup>		
Antiplatelet only, no statin <sup>b</sup>	Ref.	Ref.
Low-to-moderate-intensity statin	0.83 (0.81-0.85)	0.76 (0.72-0.80)
High-intensity statin	0.70 (0.67-0.73)	0.61 (0.56-0.66)
Adjusted model 2 <sup>d</sup>		
Antiplatelet only, no statin <sup>b</sup>	Ref.	Ref.
Low-to-moderate-intensity statin	0.83 (0.81-0.86)	0.81 (0.75-0.86)
High-intensity statin	0.70 (0.67-0.73)	0.67 (0.61-0.74)

<sup>a</sup> P value for high versus low-moderate statin use is <0.001 in unadjusted adjusted model 1, and fully adjusted model 2. PAD indicates peripheral artery disease.

<sup>b</sup>Model includes subjects taking amputation 30 because it is part of American College of Cardiology/American Heart Association 2013 lipid guidelines.

<sup>c</sup>Model 1 adjusted for age at cohort entry, PAD diagnosis year, race, sex, education, income, smoking, alcohol, systolic blood pressure, diastolic blood pressure, congestive heart failure, chronic obstructive pulmonary disease, atrial fibrillation, cardiovascular depression, chronic kidney disease, and end-stage renal disease, antiplatelet medications, clopidogrel, PBO, statin (not specified) in claudication as well as pain on claudication (angina), and serum creatinine.

<sup>d</sup>Model 2 adjusted for age at cohort entry, PAD diagnosis year, race, sex, education, income, smoking, alcohol, systolic blood pressure, diastolic blood pressure, congestive heart failure, chronic obstructive pulmonary disease, atrial fibrillation, cardiovascular depression, chronic kidney disease, and end-stage renal disease, antiplatelet medications, clopidogrel, PBO, statin (not specified) in claudication as well as pain on claudication (angina), and serum creatinine.

### CONCLUSION

In conclusion, there is a benefit on including statins in the treatment approach of patients with PAD, related with the improving shown in pain-free walking distance and the lower risk of amputation. High intensity statins (atorvastatin 40-80 mg and rosuvastatin 20-40 mg) have a higher effect on reducing the negative outcomes.

### REFERENCES

1. Arya, S. et al Association of Statin Dose With Amputation and Survival in Patients With Peripheral Artery Disease. Circulation. 2018;137:1435–1446.
2. 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults. Journal of the American College of Cardiology. Vol. 63, No. 25, 2014
3. Mondillo, S. et al Effects of Simvastatin on Walking Performance and Symptoms of Intermittent Claudication in Hypercholesterolemic Patients With Peripheral Vascular Disease. April 1, 2003 The American Journal Of Medicine Volume 114
4. Momsen AH, et al. Drug therapy for improving walking distance in intermittent claudication: a systematic review and meta-analysis of robust randomised controlled studies. Eur J Vasc Endovasc Surg. 2009;38:463–474

# ENDOVASCULAR ANEURYSM REPAIR: *CURRENT STATUS ON DEVICE SPECIFICATIONS AND OUTCOMES*

Filipa Cordeiro, José Oliveira-Pinto

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

## Introduction

Since its first introduction in 1991, endovascular aneurysm repair (EVAR) became the preferred modality for abdominal aortic aneurysms (AAA) repair. Several devices have been launched over the years addressing progressively more complex anatomies. The aim of this review is to provide an update on current endografts and compare their performance.

## Evidence Synthesis

Currently, there are six CE and FDA approved devices: Zenith®, AFX®, C3 EXCLUDER®, Endurant® II, Ovation® and Aorfix™; while six more have only the CE mark: Anaconda™, E-vita ABDOMINAL XT®, E-tegra®, Incraft®, TREOVANCE® and Altura™. Instructions for Use (IFU) are described in Table 1.

## Conclusion

New-generation endografts perform better than the older ones, especially in challenging anatomies. However, no randomized controlled trials exist comparing different contemporary stent grafts, making conclusions difficult to accomplish. Long-term follow-up reviews are required to assertively take assumptions about different stent grafts performance.

Device	Neck length (mm)	Neck diameter (mm)	Neck angulation (%)	Distal fixation length (mm)	Iliac diameter (mm)
Zenith (Cook Medical)	≥15	18-32	Infrarenal ≤60; suprarenal ≤45	≥10	7.5-20
AFX (Endologix)	≥15	18-32	≤60	≥15	10-23
C3 Excluder (Gore)	≥15	19-32	≤60	≥10	8-25
Endurant II (Medtronic)	≥10	19-32	≤ 60 if neck ≥ 10 mm; ≤ 45 if neck < 10mm	≥15	8-25
Ovation (Trivascular)	-	16-30 at 13 mm IR*	≤ 60 if neck ≥ 10 mm; ≤ 45 if neck < 10mm	≥10	8-20
Aorfix (Lombard Medical)	≥15	19-33	≤ 90	≥15	9-19
Anaconda (Vascutek)	≥15	16-31	≤90	≥20	8.5-21
E-vita ABDOMINAL XT (Jotec)	≥15	19-29	≤60	≥15	11-23
E-tegra (Jotec)	≥15	19-32	≤75	≥15	8-25
Incraft (Cordis)	≥15	17-31	≤60	≥10	7-22
Treovance (Bolton Medical)	≥10	17-32 with neck length ≥10; 16-30 with neck length ≥15	IRIS 60 if neck length 10-14 mm; 60-75 if neck length ≥15 mm	≥10 with diameter 8-13 ≥15 with diameter 14-20	8-13 if iliac length ≥10; 14-20 if iliac length ≥15
Altura (Lombard Medical)	≥15	18-28	≤60	≥15	8-18

## References

- Bastos Gonçalves, F., V. Rouwet Ellen, R. Metz, J. M. Hendriks, M. Vrancken Peeters, B. E. Muhs, and H. J. Verhagen. 2010. 'Device-specific outcomes after endovascular abdominal aortic aneurysm repair', *J Cardiovasc Surg (Torino)*, 51: 515-31. Bryce, Y., P. Rogoff, D. Romanelli, and R. Reichle. 2015. 'Endovascular repair of abdominal aortic aneurysms: vascular anatomy, device selection, procedure, and procedure-specific complications', *Radiographics*, 35: 593-615. Michael Marin, Christine Chung, Daniel Fremed, Daniel Han, Peter Farries. 2016. 'Update on the use of abdominal and thoracic endografts for treating aortic aneurysms', *Expert Review of Medical Devices*. Oliveira-Pinto J, Oliveira N, Bastos-Gonçalves F, Hoeks S, Van Rijn MJ, Ten Raa S. 2017. 'Long term results of outside "instructions for use" EVAR', *The Journal of Cardiovascular Surgery*. Schortsanitis, N., E. Georgakarakos, C. Argyriou, K. Ktenidis, and G. S. Georgiadis. 2017. 'A critical appraisal of endovascular stent-grafts in the management of abdominal aortic aneurysms', *Radial Med*, 122: 309-18.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## QUALITY-OF-LIFE SCALES IN CHRONIC VENOUS DISEASE

Filipa Martins

Jacinta Campos

Regent of the Unit of Angiology and Vascular Surgery Armando Mansilha MD, PhD

### INTRODUCTION

Chronic venous disease (CVD) has a very high prevalence, which can reach 56% in male and 73% in female. It affects a large amount of the population, with a very large spectrum of disease severity, ranging from telangiectasias to venous ulcer. The symptomatology also varies widely among patients. Depending on the patient, the disease has a different impact on their quality of life (QoL). Therefore, it is crucial for the physician to be able to assess its impact on the patient's QoL, in order to better apply and customize the therapy. For that purpose, disease-specific questionnaires have been developed for CVD.

### OBJECTIVE AND METHODS

To compare disease-specific QoL assessment instruments for CVD: Chronic Venous Insufficiency Questionnaire (CIVIQ), Venous Insufficiency Epidemiological and Economic Study (VEINES) and the Aberdeen Varicose Vein Questionnaire (AVVQ), making a review of literature

### RESULTS

Despite being predictive of the impact of CVD on QoL, the CEAP serves for clinician grade and following up the disease. The general questionnaires of QoL assessment, like SF-36, despite already very validated, fail to specific details of CVD. Specific questionnaires have been developed for CVD, but since none has yet been found to suit all patients, a summary of their characteristics is given below to facilitate the selection of the questionnaire to apply.

### CONCLUSIONS

The impact of CVD on the patient's QoL has been increasingly valued. However, there is still no specific questionnaire that meets all the criteria. It should be a customized choice, with CIVIQ and VEINES showing great value.

#### References:

- Robertson C, Fowkes FG. Epidemiology of chronic venous disease. Phlebology 2005
- Laroche R, Reboul-Marty J, Henry B. Construction and validation of a quality of life questionnaire in chronic lower limb venous insufficiency(CIVIQ). Qual Life Res 1996
- Caterinelli F, Nieman F, Witters C. An overview of the most commonly used venous quality of life and clinical outcome measurements. J Vasc Surg: Venous and Lym Dis 2015
- Vasquez MA, Munschauer CE. Venous Clinical Severity Score and quality-of-life assessment tools: application to vein practice. Phlebology 2009



### CIVIQ

- Easy to implement in clinical practice
- Complete and representative set of items
- Meet standard criteria for validity, reliability and responsiveness
- C0 to C4 patients
- Not the best instrument to evaluate disease only with cosmetic impact
- Reflects the physical better than the mental aspect of varicose veins



### VEINES

- Whole spectrum of disease
- Easy to apply: <10 min
- Meet standard criteria for acceptability, reliability, validity, and responsiveness
- Lack of anatomic confirmation of CVD, validated only with clinical diagnosis
- Less disease specificity = less response to change

### AVVQ

- Easy to implement in clinical practice
- Multiple items for symptoms evaluation
- Reliability and validity, most in the physical health domains
- Not specific symptoms, influenced by comorbidity
- Only 4 items evaluate nonphysical effects, doesn't fully assess the psychosocial impact
- Less responsiveness

# Post-Thrombotic Syndrome

Filipe Sousa<sup>1</sup>, Marina Dias-Neto<sup>1</sup>, Armando Mansilha<sup>1,2</sup>

<sup>1</sup>Serviço de Angiologia e Cirurgia Vascular, Centro Hospitalar de São João, Porto, Portugal

<sup>2</sup>Regente da Unidade de Angiologia e Cirurgia Vascular



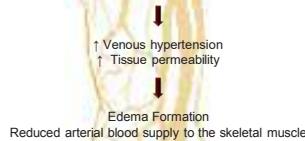
## Definition & Epidemiology

The Post-Thrombotic Syndrome (PTS) is a venous disorder that develops from long-term effects from a previous Deep Vein Thrombosis (DVT). It is a burdensome and potentially debilitating condition for which patients frequently seek medical help. The annual incidence of venous thromboembolism is estimated at 1/1000 persons per year. Within 2 years of DVT diagnosis, 20-50% of these patients develop PTS and 5-10% develop severe PTS, including venous ulcers.

## Pathophysiology

There are 3 proposed pathophysiologic pathways from development of acute DVT to PTS as a chronic disease:

- Direct damage to venous valves by the thrombus formation
- Indirect damage to venous valves through inflammatory mediators: Intercellular Adhesion Molecule-1 and IL-6
- Venous outflow obstruction due to the thrombotic burden



## Clinical diagnosis

The **Villalta scale** has been adopted by the International Society on Thrombosis and Haemostasis as a standard to diagnose and grade the severity of PTS in clinical studies.

Symptoms	Clinical Signs
Pain	Edema
Cramps	Skin induration
Heaviness	Hypopigmentation
Pain	Redness
Paraesthesia	Pruritus during calf compression
	Venous ectasia
Each symptom/sign rated as 0 (absent), 1 (mild), 2 (moderate) or 3 (severe)	
Scoring	
0 to 4	No PTS
5 to 14	Mild/moderate PTS
> 15 or presence of ulcers	Severe PTS

## Risk factors

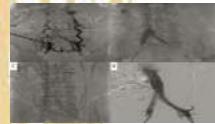
Apparent at the time of DVT diagnosis	Related to the treatment of acute DVT	Apparent during follow-up after DVT
DVT location: Risk of PTS is higher after proximal (iliac or femoral vein) than distal (calf) DVT	Quality of oral anticoagulation - subtherapeutic INR (> 50 % time during the first 3 months of treatment with VKA)	Ipsilateral DVT recurrence
Previous ipsilateral DVT	Chances of ipsilateral DVT: LMWH vs VKA – a meta-analysis suggested that the use of LMWH for prophylaxis to treat DVT might lead to less risk of PTS than treatment with LMWH for 5 to 7 days followed by VKA	Persistent venous symptoms and signs 1 month after acute DVT
Body Mass Index (BMI) > 30 and older age		Residual thrombosis on ultrasound
Preexisting primary venous insufficiency		Persistent elevation of D-dimers

## Treatment

- To reduce the edema and improve PTS symptoms, 20-30 mmHg Elastic Compression Stockings can be used. Use a stronger pressure if necessary (30-40 or 40-50 mmHg);
- In moderate or severe PTS consider a trial of intermittent pneumatic compression units;
- Prescription of a supervised exercise training program with aerobic components for patients who tolerate it;
- Until availability of new data, do **NOT** use venoactive drugs to treat PTS such as Ruthosides, Defibrotide or Hidrosmarin;
- Venous ulcer management – compression therapy, skin care and topical dressings;
- Provide patient support and ongoing follow-up;
- Certain patients with severe/refractory PTS may benefit from surgical or endovascular procedures such as venous valve repair, venous bypass or venous stent to decrease the post-thrombotic manifestations,

Clinical case of a 50-year-old male with chronic thrombosis of the infrarenal IVC and bilateral common and external iliac veins.

Jeffrey J. Farrell et al., 2016



## Conclusion & Research needs in PTS

Prevention and management of the PTS can be a complex task requiring a multidisciplinary team. Optimal prevention and treatment strategies are hampered by the lack of understanding of the pathophysiology.

There are several studies needed concerning:

- The relative effects and cost-effectiveness of extended LMWH and direct oral anticoagulants on the risk of PTS
- The effectiveness, safety and cost-effectiveness of pharmacomechanical catheter-directed lysis to treat DVT as a means to prevent PTS
- The effectiveness and safety of venoactive drugs to treat PTS
- The safety and long-term effectiveness of endovascular and surgical procedures to treat severe PTS

## References

- Pikovsky O, Rabinovich A. "Prevention and treatment of the post-thrombotic syndrome." *Thromb Res.* 2017.  
Kahn SR. "The post-thrombotic syndrome." *Hematology Am Soc Hematol Educ Program.* 2016(1):413-8.  
Farrell JJ, Sutter C, Tavsi S, Patel I. "Incidence and interventions for post-thrombotic syndrome." *Cardiovasc Diagn Ther.* 2016;6(6):623-31.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## PELVIC VENOUS REFLUX AS A CAUSE OF RECURRENT VARICOSE VEINS IN MALE AND FEMALE PATIENTS

Gonçalo da Fonseca, Tiago Soares

Regente da Unidade Curricular de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### INTRODUCTION

Varicose veins are found in about one third of adults and recurrence rates after surgical treatment are extremely high. One of the causes for such failure is Pelvic Venous Reflux (PVR).

PVR is found to be a cause of leg varicose

veins in around 17% of women and around one in 30 males with lower limb varicose veins have associated PVR.



Image 1 – Clinical presentation of a male patient with a leg varicose vein of the upper thigh.

In a subgroup of patients which had given birth and had not undergone hysterectomy, PVR was found to be a cause of 33.3% of recurring varicose veins, representing the second most common cause. The modal pattern was identified as bilateral ovarian and internal iliac vein incompetence and reflux in the right internal iliac vein alone. Concerning the 8 male patients, all were found to exhibit some pattern of venous reflux in their truncal pelvic veins. 23 out of a total 32 pelvic veins were identified as being incompetent and the most common pattern of PVR identified was left testicular with bilateral internal iliac incompetence.

Cause of recurrence	No. of legs (N = 154)	%
Neovascular tissue	86	55.8
Incompetent perforating veins	54	35.1
Missed or de novo reflux	49	31.8
Pelvic venous reflux	43	27.9
Inadequate operation	21	13.6
Previously untreated veins	10	6.5

Table 1 – Causes of recurrence in female patients.

**DISCUSSION/CONCLUSION** Considering the above mentioned results, TVS examination of the pelvic veins has been proposed for the investigation of PVR in women presenting with symptomatic leg varicose veins with documented reflux entering the leg vein from the pelvis. PVR has also been associated with leg varicose veins in males as there appears to be a cohort of patients with varicose veins in whom PVR significantly contributes towards their lower limb venous reflux. Thus, it has been suggested that to completely treat the leg varicose veins and reduce recurrence, treatment of PVR may be regarded as part of the superficial varicose vein treatment.

**METHODS** In a retrospective study, female patients with recurrent varicose veins were examined using venous duplex ultrasound scan (DUS) and those who were found to have venous reflux emerging from the pelvis were given transvaginal duplex ultrasound scan (TVS) to identify the source of the reflux. In another study, male patients with recurrent varicose veins were examined using DUS in order to identify the venous reflux pattern and source. All patients received treatment with embolization procedures and subsequent leg vein treatment.

**RESULTS** A total 154 legs from 97 female patients showed recurrent varicose veins and PVR was found to be causing it in almost 28% of the times.

### BIBLIOGRAPHY

- Whiteley AM, Taylor DC, Dos Santos SJ, Whiteley MS. Pelvic venous reflux is a major contributory cause of recurrent varicose veins in more than a quarter of women. *J Vasc Surg Venous Lymphat Disord*. 2014;2(4):411-5.
- Dabbs EB, Dos Santos SJ, Shiangoli I, Holdstock JM, Beckett D, Whiteley MS. Pelvic venous reflux in males with varicose veins and recurrent varicose veins. *Phlebology*. 2017;28:355517728667.

## POST-CAROTID ENDARTERECTOMY RESTENOSES

MANUEL GUILHERME MARTINS LOUREIRO, JOÃO ROCHA NEVES. FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO  
REGENTE DA UNIDADE DE ANGIOLOGIA E CIRURGIA VASCULAR: PROF. DOUTOR ARMANDO MANSILHA

### INTRODUCTION

- Depending on the technique used, carotid restenosis(CR) occurrence can vary between 10% to 30%<sup>1</sup>
- Pathophysiology is in dependency of elapsed time between CEA and the of concurrency of restenosis<sup>2,3</sup>
  - ✓ Early recurrence (within 2 to 3 years) is due to intimal hyperplasia;
  - ✓ Late recurrence is associated with progressive atherosclerotic lesions.
- Inflammation plays a key role on atherosclerotic development and inflammation markers are lowered by statins and some antiplatelet therapy<sup>4</sup>

### RISK FACTORS<sup>1</sup>

- Age inferior to 65;
- Smokers;
- Women;
- Elevated creatinine;
- Elevated serum cholesterol

### PREDICTION OF CR AFTER CEA

Tanaskovic et al. investigated the role of inflammatory markers in the occurrence of CR after CEA, concluding that the main predictors of early CR are:

- Elevated C reactive protein before CEA;
- Elevated fibrinogen 48 hours after CEA;
- Not taking aspirin.

Medical therapy algorithms were presented in accordance to risk stratification after applying a Fisher equation (see figures 1 and 2).<sup>4</sup>

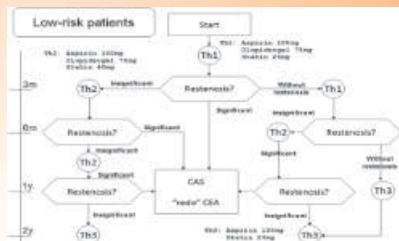


Figure 2. Therapeutic algorithm to prevent carotid restenosis (CR) after carotid endarterectomy (CEA) in low-risk patients. CAS, Carotid artery stenosis; Th, therapy<sup>4</sup>

### REINTERVENTION

The criteria for treating carotid restenosis are not consensual and this procedure is rarely preformed. Although, reintervention should be made if:<sup>2</sup>

- Neurologic symptoms referable to carotid;
- Carotid restenosis superior to 80%.

The option between reoperating using CEA or carotid arterial stenting is also not consensual. In fact, no significant differences in the perioperative (30-day) rates for mortality, stroke, or transient ischemic attack were found when comparing redo CEA with CAS performed for restenosis.<sup>5</sup>

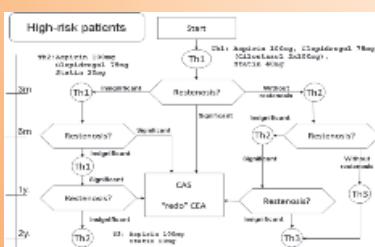


Figure 1. Therapeutic algorithm to prevent carotid restenosis (CR) after carotid endarterectomy (CEA) in high-risk patients. CAS, Carotid artery stenosis; Th, therapy.<sup>4</sup>

REFERENCES [1] Bonati, L. H., et al. (2009). "Long-term risk of carotid restenosis in patients randomly assigned to endovascular treatment or endarterectomy in the Carotid and Vertebral Artery Transluminal Angioplasty Study (CANTATA): long-term follow-up of a randomised trial." *Lancet Neurol* 8(10): 908-917. [2] Farman, R. (2017). "Complications of carotid endarterectomy: Update." [3] Tanaskovic, S., et al. (2011). "Inflammation as a marker for the prediction of intimal thickening following carotid endarterectomy-evidence from clinical studies." *Angiology* 62(7): 535-542. [4] Tanaskovic, S., et al. (2016). "Scoring system to predict early carotid restenosis after eversion endarterectomy by analysis of inflammatory markers." *J Vasc Surg* 63(4): 1168-1173. [5] Repeated carotid endarterectomy versus carotid artery stenting for patients with carotid restenosis after carotid endarterectomy: Systematic review and meta-analysis. *Surgery* 157(6): 1168-1173.

## PREDICTORS OF LONG-TERM MORTALITY FOLLOWING ELECTIVE ENDOVASCULAR REPAIR OF ABDOMINAL AORTIC ANEURYSMS

**Guilherme Marques-Rios, José Oliveira-Pinto, Armando Mansilha**  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

## INTRODUCTION

Endovascular aneurysm repair (EVAR) became the preferred modality for abdominal aortic aneurysms (AAA) repair due to its minimally invasive nature and short-term benefits. Still, reinterventions remain the Achilles heel of EVAR, carrying a significant financial burden for healthcare services. In a system with limited resources the choice of the correct treatment, specially the decision not to treat plays a key role. The predictors of late mortality following EVAR may have an important part in aiding the physician to choose the correct method of treatment and specially when to treat. Consequently, it is paramount to identify critical risk factors for late mortality after EVAR in order to understand the real benefit of EVAR. Some easily identifiable factors such as age, aneurysm size and the presence of co-morbid diseases, which determine suitability to surgery, are already taken into consideration in the decision-making process. Regardless, most of the clinical and demographic predictors remain scarcely described on the long-term. The aim of this review is to highlight the recent findings regarding the most important and clinical relevant determinants of late mortality after elective EVAR correction.

## EVIDENCE ACQUISITION

A literature search was performed to select studies investigating the long-term predictors of mortality following elective EVAR. The MEDLINE databases were searched between January 2007 and August 2017 using the key words "Abdominal Aortic Aneurysm", "Long Term Mortality", "Risk Factors" and "Endovascular Aneurysm Repair". The search was conducted on August 2017 and only published data were included. Studies were included if they met the following criteria: randomized clinical trials and retrospective or prospective studies, in English language and included patients after elective EVAR with at least 5 years of mean/median follow-up published between January 2007 and August 2017. Case series which reported ruptured aneurysm repair and non-infrarenal aneurysm were not considered. After relevant titles were identified, all the abstracts were read, and eligible studies were retrieved. The outcome considered was the all-cause mortality. These were divided in several categories: age; gender; aneurysm anatomy; potentially important cardiovascular, pulmonary and renal co-morbidities; and Diabetes Mellitus. Definition of heart failure, renal impairment or renal failure and Diabetes Mellitus were established according to the included articles.

Twelve studies were included describing more than 82306 patients, exploring at least one predictor of long-term mortality (Table I).

## EVIDENCE SYNTHESIS

	Kroonen et al. (n=1390)	Huang et al. (n=893)	Piasecki et al. (n=138)	Le et al. (n=562)	De Bruin et al. (n=173)	Oberender et al. (n=304)	Olivere et al. (n=408)	Eggers et al. (n=77350)	Oberender et al. (n=304)	Mutlu et al. (n=273)	Han et al. (n=156)	Hildebrand et al. (n=42)
Age	1.8 (1.6-2.0)	1.50 (1.27- 2.78)	1.69 (0.96- 1.12)	1.05 (1.04)	3.34 (2.24- 5.64)	1.55 (1.04-2.31)	1.05 (1.03- 1.08)	-	-	-	-	-
Gender	NF	1.4 (1.3- 1.9)*	-	NF	NF	NF	NF	1.07 (1.01- 1.12)	-	-	-	-
Smoking Habits	NF	-	-	1.51 (1.19- 2.00)	3.750 (1.9- 2.52)	-	-	-	NF	-	-	-
Arteriosclerotic Disease	NF	1.06 (1.02- 1.18)	-	-	NF	-	1.64 (1.13- 2.38)	-	-	NS *	NF	-
Heart Failure	1.6 (1.3-2.0)	-	7.34 (3.24- 16.61)	-	-	-	-	-	NF	-	-	-
Atherosclerotic Heart Disease	NF	-	-	-	-	-	-	-	1.6 (1.3-2.0) §	-	-	-
Peripheral Vascular Disease	1.9 (1.3-3.8)	-	-	-	-	-	-	-	NF	-	-	-
Oral Hypertension	NF	-	-	-	1.55 (1.20- 1.80)	-	-	-	-	-	-	-
Hypertension	NF	-	-	-	NF	-	-	-	NF	-	-	-
Diabetes Mellitus	NF	-	-	-	NF	-	-	-	NF	-	-	6.83 (4.49- 27.1)
COPD	2.5 (1.2-3.8)	-	-	-	NF	2.06 (1.24-3.42)	-	-	-	-	-	-
CRP	1.9 (1.5-2.5)	-	-	-	5.05 (1.59- 6.85)	NF	1.55 (1.02-2.24) 2.75	1.93 (1.85- 2.75)	-	-	-	-

[View all posts by admin](#) | [View all posts in category](#)

The literature remains scarce in studies covering longer follow-up periods, especially greater than 5 years. This review, identified several clinical and anatomic risk factors for mortality after EVAR. While more evidence with longer follow-up is needed to draw definitive conclusions, our results suggest that an effort must be made by the physician to identify critical risk factors pre EVAR, not only to proceed to a judicious choice of candidates who really benefit from the procedure but

<sup>10</sup> Also to optimize clinical treatment in order to maximize survival.

## THE BURDEN OF POST-THROMBOTIC SYNDROME

### IN A LONG-TERM RETROSPECTIVE COHORT

INÉS ANDRADE, MARINA DIAS-NETO. FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO  
REGENTE DA UNIDADE DE ANGIOLOGIA E CIRURGIA VASCULAR: PROF. DOUTOR ARMANDO MANSILHA

#### Background

The incidence of Post-Thrombotic Syndrome (PTS) is not described in the Portuguese population. The main objective of this study is to determine the cumulative incidence and severity of PTS after a first episode of Deep Venous Thrombosis (DVT).

#### Methods

This is an observational, unicentric, retrospective cohort of patients who had a first episode of DVT in the lower limb, documented with Duplex ultrasound (n=101).

#### Results

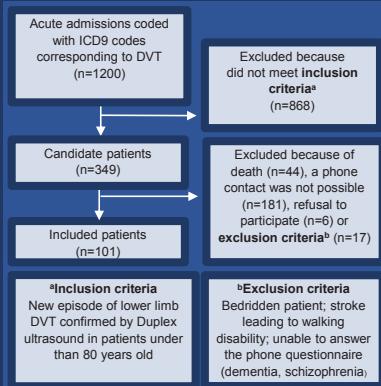


Figure 2. Classification of post-thrombotic syndrome in 101 patients.

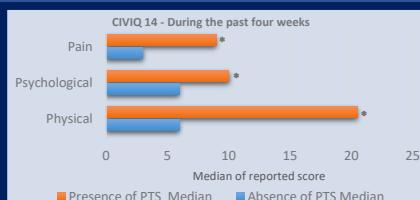
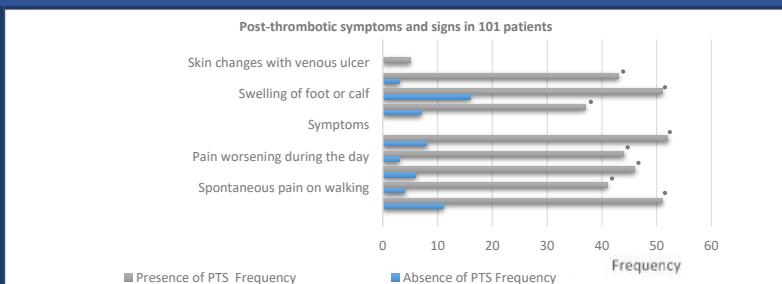


Figure 1. Flow of patients in the study.



#### CONCLUSION

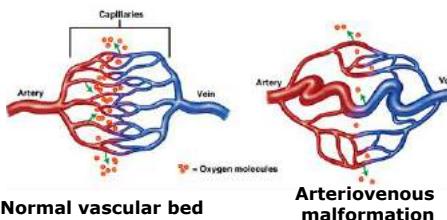
This is a unique report, of substantial duration, on the incidence of PTS from a nationally representative cohort of patients. A high incidence of PTS was shown, correlating with worse adjusted CIVIQ 14 scores. Large studies of prospective nature could provide more definitive evidence.

Reference: Kahn SR et al. Circulation. 2014;130(18):1636-61.

## ARTERIOVENOUS MALFORMATIONS

Inês Carqueja, Joel Sousa  
Regente da Unidade de Angiologia e Cirurgia Vascular –  
Prof. Doutor Armando Mansilha

**Arteriovenous malformations** (AVMs) are fast-flow congenital anomalies that occur due to errors in vasculogenesis. In these lesions, a connection composed of primitive blood vessels exists between feeding arteries and draining veins.



The normal capillary bed is either partially or completely absent. They can occur anywhere in the body, but are more common in the head and neck. The connection may be direct, originating an **arteriovenous fistula**, or composed of several abnormal channels, forming an **arteriovenous nidus**.

### Clinical presentation

Warm, pink-red cutaneous stain with palpable bruit or thrill.

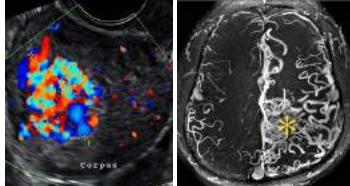
Pain, hyperemia, tissue overgrowth, bleeding, ulceration and gangrene. Congestive heart failure (uncommon).



[inhttps://www.phlebology.org/congenital-arteriovenous-malformations-what-are-the-perspectives/](https://www.phlebology.org/congenital-arteriovenous-malformations-what-are-the-perspectives/)

### Diagnosis

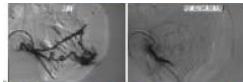
- Clinical history and physical examination.
- Colour Doppler ultrasound
- MRI
- Contrast-enhanced CT
- Angiography.



[inhttps://www.phlebology.org/congenital-arteriovenous-malformations-what-are-the-perspectives/](https://www.phlebology.org/congenital-arteriovenous-malformations-what-are-the-perspectives/)

### Treatment

Treatment indications should consider the lesion's location, risk of complications, impact on quality of life and symptom control. Surgical resection of the AVMs and embolosclerotherapy are currently the main treatment options.



[inhttps://doctorlib.info/surgery/plastic/21.html](https://doctorlib.info/surgery/plastic/21.html)

## RUPTURE OF AN INFECTIVE AORTIC ANEURYSM – A CASE REPORT AND LITERATURE REVIEW

Inês Carvalho, Andreia Coelho.

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

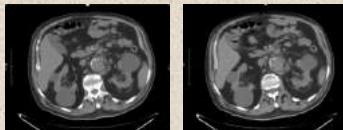
- Abdominal aortic aneurysm (AAA) is an entity with high mortality when treated in rupture, affecting 2 to 4% of 65-year old males.
- Etiologically, they are classified as inflammatory and infective (mycotic), the latter being less common.
- Infective aneurysms are more frequently pseudo aneurysms involving only adventitia and account for 0.7%–2.6% of AAAs.
- Staphylococcus aureus* (45%), enteric derived bacteria, commonly *Salmonella* (30%–40%), and streptococci (10%) are the most common culprits.
- The aim of this study was to present a case-report of a ruptured justarrenal infective aortic aneurysm treated with open surgery.

### METHODS

- Gathering of patient's clinical data and literature review using Medline database.

### RESULTS: CASE-REPORT

- 80 year-old male patient;
- Previous medical history of arterial hypertension, diabetes and chronic respiratory disease; Recent history of *Salmonella* gastroenteritis admitted in the ER in septic shock.
- Followed by the Vascular Surgery Dep. for aortic and iliac aneurysms with no indication for invasive treatment;
- Admitted in the ER:** CT revealed rupture of a *De novo* aneurysmal formation of the infrarenal aorta; Unsuitable anatomy for EVAR (no suitable proximal neck);



- OR:** An early attempt to perform in-situ bypass was frustrated by aortic friability and impossibility to perform a vascular anastomosis; Creation of an aortic stump and subsequent extra-anatomic bypass (axilobifemoral) was decided.
- Started antibiotic therapy with vancomycin and ceftriaxone.
- Histopathological study discovered fibroadipose tissue with intense polymorphic infiltration with supuration areas.
- Positive biopsy culture studies for *Salmonella* group B.
- Episode of ventricular fibrillation at 96 hours post procedure - ultimately passed away.

### DISCUSSION

- Infection of the aorta usually results from septic embolization to the *vasa vasorum*, hematogenous seeding of an existing aneurysm, or extension from a contiguous site of infection.
- Mycotic aneurysm are more aggressive than atherosclerotic aneurysms justifying elective treatment irrespective of aneurysm diameter.
- Treatment options in rupture include in-situ reconstruction with rifampicin-bonded prosthetic grafts, extra-anatomic reconstruction and EVAR.
- EVAR is a good first choice of treatment when feasible.
- Choice of treatment has to be made in a case-by-case approach.

#### • References:

1. Tae-wonKwon et. Al.; *Ruptured Abdominal Aortic Aneurysms due to Salmonella, not of typhi Species*. Annals of Vascular, volume 17, Issue 4, July 2003.
2. R.E. Clough et Al.; *Is Endovascular Repair of Mycotic Aortic Aneurysms a Durable Treatment Option?* European Journal of Vascular and Endovascular Surgery, Volume 37, Issue 4, April 2009.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

## PERCUTANEOUS ACCESS AS THE BEST FOR ENDOVASCULAR ANEURYSM REPAIR

Inês Lopo, José Pedro Pinto  
Regente da Unidade de Angiologia e Cirurgia Vascular –  
Prof. Doutor Armando Mansilha

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

**INTRODUCTION** Endovascular aortic aneurysm repair (EVAR) has become the preferred modality for abdominal aortic aneurysm (AAA) repair [1]. Femoral artery access may be either performed surgically or percutaneously [2,3]. Despite less invasiveness of percutaneous approach, comparative data on access complications between these two techniques lacks. This work aims to provide comparative results regarding access complications between surgical and percutaneous approach.

**METHODS** Pubmed databases were searched aiming to find comparative studies comparing access complications between surgical and percutaneous access for EVAR.



IMAGE 1 Access for EVAR A) pEVAR B) cEVAR

**RESULTS** 4 studies were found. Wound complications were 1.0% for pEVAR vs 2.1% for cEVAR ( $P=0.02$ )<sup>[1]</sup> and conversion to open repair was 0.4% for pEVAR vs 0.5% for cEVAR ( $P=0.56$ )<sup>[1]</sup>. It was observed a trend towards greater loss in cEVAR (2.8 vs. 1.4 mg/dl,  $P=0.171$ )<sup>[4]</sup> and ipsilateral time to hemostasis was also higher with cEVAR (23 vs 9.8min,  $P=0.002$ ) than with pEVAR<sup>[5]</sup>. Operative time was shorter for pEVAR (86.7 vs 107.8 min,  $P<0.05$ ) as well as was median length of hospital stay (1 vs 2 days,  $P<0.01$ )<sup>[1,2]</sup>.

Prescribed analgesics for groin pain were significantly lower in pEVAR (12% vs 34%,  $P=0.039$ )<sup>[5]</sup>.

**CONCLUSIONS** Percutaneous femoral access has been progressively adopted. Compared to surgical access less wound complications are reported. Surgical time and length of hospital stay are also shorter with pEVAR<sup>[1,2,6]</sup>. If performed by experienced operators percutaneous access might be considered the preferred modality for femoral access.

### REFERENCES

- [1] Buck DB, Kaithaus EG, Soden PA, Ultee KH, van Herwaarden JA, Moll FL, Schermerhorn ML. Percutaneous versus femoral cutdown access for endovascular aneurysm repair. 2015; 62(1): 16-21.
- [2] Torsello GB, Kasperek B, Klenk E, Tessarak J, Osada N, Torsello GF. Endovascular suture versus cutdown for endovascular aneurysm repair: a prospective randomized pilot study. Journal of vascular surgery. 2003; 38(1):78-82.
- [3] Howell M, Villareal R, Kriger Z. Percutaneous access and closure of femoral artery access sites associated with endoluminal repair of abdominal aortic aneurysms. Journal of endovascular therapy : an official journal of the International Society of Endovascular Specialists. 2001; 8(1):68-74.
- [4] Vieira MM, Ferreira AS, Neves JR, Paz Dias P, Teixeira JP. Percutaneous access for Evar: Case-control study. Angiologia e Cirurgia Vascular. 2016;12(4):252-8.
- [5] Nelson PR, Krager Z, Kannan N, Rao V, Bianchi C, Hashemi H, et al. A multicenter, randomized, controlled trial of totally percutaneous access versus open femoral exposure for endovascular aortic aneurysm repair (the PEVAR trial). J Vasc Surg. 2014 May;59(5):181-93.
- [6] Souza J, Braga D, Barreto P, Ferreira J, Lopes JA, Mansilha A. Percutaneous Endovascular Aortic Repair with Local Anesthesia - One Day Surgery. 2016; 29(6):381-388.

IMAGES adapted from:

<https://www.google.es/imgres?imgurl=https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig2/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig3/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig4/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig5/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig6/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig7/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig8/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig9/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig10/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig11/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig12/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig13/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig14/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig15/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig16/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig17/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig18/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig19/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig20/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig21/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig22/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig23/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig24/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig25/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig26/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig27/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig28/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig29/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig30/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig31/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig32/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig33/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig34/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig35/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig36/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig37/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig38/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig39/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig40/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig41/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig42/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig43/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig44/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig45/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig46/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig47/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig48/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig49/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig50/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig51/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig52/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig53/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig54/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig55/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig56/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig57/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig58/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig59/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig60/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig61/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig62/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig63/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig64/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig65/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig66/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig67/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig68/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig69/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig70/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig71/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig72/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig73/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig74/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig75/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig76/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig77/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig78/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig79/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig80/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig81/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig82/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig83/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig84/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig85/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig86/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig87/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig88/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig89/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig90/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig91/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig92/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig93/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig94/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig95/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig96/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig97/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig98/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig99/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig100/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig101/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig102/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig103/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig104/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig105/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig106/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig107/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig108/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig109/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig110/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig111/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig112/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig113/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig114/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig115/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig116/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig117/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig118/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig119/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig120/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig121/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig122/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig123/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig124/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig125/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig126/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig127/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig128/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig129/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig130/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig131/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig132/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig133/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig134/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig135/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig136/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig137/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig138/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig139/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig140/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig141/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig142/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig143/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig144/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig145/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig146/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig147/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig148/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig149/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig150/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig151/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig152/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig153/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig154/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig155/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig156/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig157/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig158/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig159/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig160/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig161/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig162/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig163/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig164/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig165/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig166/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig167/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig168/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig169/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig170/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig171/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig172/> &<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242240/figure/Fig173/> &

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## RISK FACTORS FOR VENOUS IN-STENT THROMBOSIS

Inês Pais Cunha, Marina Dias-Neto

Regente da Unidade de Cirurgia e Angiologia Vascular: Prof. Doutor Armando Mansilha

### BACKGROUND

Venous obstruction results from different causes, including extrinsic compression secondary to malignancies or anatomic variants like May-Thurner syndrome; and acute or chronic deep venous thrombosis (DVT). Symptoms depend on the cause of obstruction; acute DVT often presents as a sudden pain and swelling in the lower extremity; post-thrombotic or long-standing compressive syndromes commonly result in chronic pain, edema, and, in advanced cases, ulceration [1]. Venous stenting has been proven to be a safe and effective approach to venous obstructive lesions with high technical success rates [2][3]. Nonetheless, avoiding early thrombosis and maintaining stent patency remains a challenge [1].

### RESULTS



### CONCLUSIONS

Several factors have been thought to have an association with in-stent thrombosis. In recent studies, **number of stents and lesions length** [4] as well as **stent inflow** [5] have been reported to be significantly associated with stent occlusion. In fact, impaired stent inflow will alter flow and pressure within the stent tract, making it prone for thrombosis. Therefore, measures such as **mobilization, compression stockings and pneumatic compression can prevent complications**. Furthermore, **coagulability states and severity of the underlying thrombotic disease** may also have a role in this complication. [5] Therefore, **anticoagulants** are a key part of the treatment to prevent hypercoagulation, being recommended in patients with **long segment occlusions, underlying thrombophilia, suprarenal occlusions and previous long-term anticoagulation, and impaired inflow suggested by venography**, [6] To sum up, these patients should be carefully followed after the stenting procedure to prevent in-stent thrombosis.

### REFERENCES

1. Razavi MK, Jaff MR, Miller LE. Safety and Effectiveness of Stent Placement for Iliofemoral Venous Outflow Obstruction: Systematic Review and Meta-Analysis. *Circ Cardiovasc Interv* 2015; 8 (10):e002772.
2. Matsuda A, Yamada N, Ogihara Y, Tsuji A, Ota S, Ishikura K, et al. Early and Long-Term Outcomes of Venous Stent Implantation for Iliac Venous Stenosis After Catheter-Directed Thrombolysis for Acute Deep Vein Thrombosis. *Circulation Journal* 2014; 78 (5):1234-1239.
3. Hartung O. Results of stenting for postthrombotic venous obstructive lesions. *Perspectives in vascular surgery and endovascular therapy* 2011; 23 (4):255-260.
4. Neglén P, Hollis KC, Olivier J, Raju S. Stenting of the venous outflow in chronic venous disease: long-term stent-related outcome, clinical, and hemodynamic result. *J Vasc Surg*. 2007;46:979–990. doi: 10.1016/j.jvs.2007.06.046.
5. de Wolf M, Arnoldussen C, Grommes J, Hsien SG, Nelemans PJ, de Hann MW, de Graaf R, Wittens CH. Minimally invasive treatment of chronic iliofemoral venous occlusive disease. *J Vasc Surg: Venous and Lym Dis* 2013;1:146–153.
6. Raju S and Neglén P. Percutaneous recanalization of total occlusions of the iliac vein. *J Vasc Surg* 2009; 50: 360–8.

# INTRAVASCULAR ULTRASOUND VS CENTERLINE COMPUTED TOMOGRAPHY

determination of aortic diameters during thoracic endovascular aortic repair

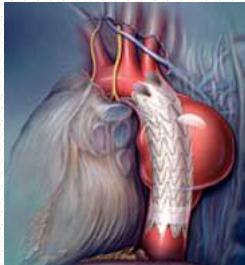


Fig.1



Fig.2

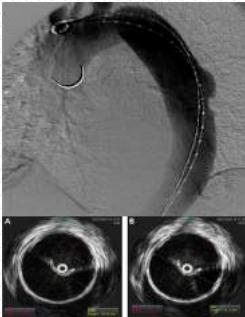


Fig.3

## INTRODUCTION

Accurate sizing of stent grafts during thoracic endovascular repair (TEVAR) is critical for a successful outcome [1]. The current standard for stent graft sizing is a preoperative three-dimensional reconstruction of computed tomography angiography (CTA) [2]. However, this technique is predicated on an idealized straightened aorta and does not account for the dynamic changes in the aortic diameter with the patients' hemodynamic status [3]. Intravascular ultrasound (IVUS) offers real-time cross-sectional imaging of the aorta, providing an adjunctive method for aortic diameter determination at the time of TEVAR [4].

Fig.1 - Thoracic endovascular aortic repair (TEVAR).

## METHODS

Diameter measurements were performed in nontraumatic aortic images obtained at 1-cm intervals from the left subclavian origin to 20 cm distally [1]. The average values of major and minor axes diameters from both modalities were calculated at each location for comparison [1].

Fig.2 - Three-dimensional curved multiplanar reformat of CTA images.

Fig.3 - Manual stepwise pullback of the intravascular ultrasound (IVUS) probe along the descending aorta in 1-cm intervals. Diameter measurements in major (red) and minor (yellow) axes during the (A) maximum systolic phase and (B) the minimum diastolic phase.

## RESULTS

Compared with CT, IVUS resulted in larger aortic diameters, with the mean difference of  $3.09 \text{ mm} \pm 4.56 \text{ mm}$ . When stratified by the aortic position, a high degree of agreement was observed at the base of the left subclavian (position 0), with a mean difference of  $2.69 \text{ mm} \pm 4 \text{ mm}$ . The agreement was the lowest at the angulated aortic segments (2 cm to 7 cm distal to the subclavian origin) with a mean difference up to  $7.96 \text{ mm} \pm 8.27 \text{ mm}$ . [1]

## CONCLUSION

Significantly different aortic diameter measurements provided by the two imaging modalities is likely reflected by intravascular hypovolemia and resuscitation in the interval between initial imaging and repair [4]. Caution must be taken when sizing a stent graft using CTA alone, particularly in the acute angulations of the thoracic aorta, as it may result in undersizing of the endograft [1]. Thus, preoperative CTA should be complemented with IVUS to accurately determine the correct stent size implementation.

### References

- [1] Comparison of intravascular ultrasound- and centerline computed tomography-determined aortic diameters during thoracic endovascular aortic repair. Han, Soligo M. et al. Journal of Vascular Surgery, Volume 65, Issue 4, 1128-1134.e1-e11.
- Filinger, M. Imaging of the thoracic and thoracoabdominal aorta. Semin Vasc Surg. 2009; 20: 247-263.
- Mahr BE, Veenker KJ, van Prehn J, Stone MK, Bartels LM, Pringle M, et al. Dynamic cine-CT angiography for the evaluation of the thoracic aorta: insight in dynamic changes with implications for thoracic endograft treatment. Eur J Vasc Endovasc Surg. 2006;32:S32-6.
- Wallace G, Starnes BW, Hatzikakou T, Sobri M, Singh N, Tran N. Intravascular ultrasound is a critical tool for accurate endograft sizing in the management of blunt thoracic aortic injury. J Vasc Surg. 2015;61:430-5.

Jiele Li; Dr. José Pedro Pinto; Prof. Doutor Armando Mansilha

# USE OF HYPERBARIC OXYGENATION FOR PREVENTION OF DIABETIC FOOT AMPUTATION

Joana Silva, Ricardo Castro Ferreira

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha



## INTRODUCTION

In order to accelerate the cure of Diabetic Foot Ulcers (DFUs), numerous complementary therapies have been used, including Hyperbaric Oxygen Therapy (HOT). HOT requires 30–60 daily sessions of oxygen under pressure in a hyperbaric chamber, which involves more visits to the hospital and increased costs to the patient, comparatively to conventional treatment.<sup>1</sup>

HOT has presented good results in DFU treatment. However, its use remains controversial. The aim of this review is to evaluate the role of HOT in the prevention of diabetic foot amputations.

## METHODS

We performed a search on the database PubMed, using a query with the Mesh Terms "hyperbaric oxygenation", "diabetic foot" and "amputation". We limited our search to studies published in the last five years, obtaining forty-one publications. After selection by title, we obtained ten studies. After verifying their availability, we ended with seven studies. We included four after an integral reading.

## RESULTS

Elraiayah *et al* made the more recent meta-analysis concerning this topic. Analyzing six RCTs, they found a reduced major amputation rate following HOT, comparing with conventional therapy (OR, 0.30; 95% CI, 0.10-0.89) (fig.1).<sup>2</sup>

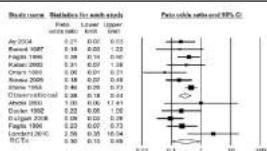


Fig. 1: Meta-analysis of major amputation rates by Elraiayah *et al*.<sup>2</sup>

## DISCUSSION

Fedorko *et al* did not use actual amputation rates, only indications.<sup>1</sup> Besides, follow-up time of 12 weeks might be too short.<sup>1</sup> Margolis *et al* also acknowledged study limitations and possible biases.<sup>4</sup>

Although HOT results were promising in the study conducted by Elraiayah *et al*, there are several limitations associated with the studies' methodologies and some heterogeneity among them.<sup>2</sup> In this regard, there is only low to moderate evidence concerning the adjunct HOT to prevent amputation.<sup>2</sup>

HOT should only be used as a complement after careful evaluation, since it does not show benefits in severe uncorrectable ischemia.<sup>2</sup> This and other adjunctive therapies may be studied with more rigor.

A previous observational studies' meta-analysis showed a significant difference in major amputation between HOT group and control group.<sup>3</sup> However, no significant difference was found when analyzing RCTs.<sup>3</sup>

A RCT performed by Fedorko *et al* showed no statistical difference between HOT group and sham group, when studying any type of amputation ( $P = 0.771$ ) or major amputation alone ( $P = 0.846$ ).<sup>1</sup> These results are consistent with the findings of Margolis *et al*, that suggest an increase in amputation rate among patients who received HOT, despite the numerous analytic approaches.<sup>4</sup>

<sup>1</sup>Fedorko L. *et al*. Hyperbaric Oxygen Therapy Does Not Reduce Indications for Amputation in Patients With Diabetes With Nonhealing Ulcers of the Lower Limb: A Prospective, Double-Blind, Randomized Controlled Clinical Trial. *Diabetes Care* 2016;39:392–399

<sup>2</sup>Elraiayah T. *et al*. A systematic review and meta-analysis of adjunctive therapies in diabetic foot ulcers. *J Vasc Surg*. 2016 Feb;63(2 Suppl):46S-58S.

<sup>3</sup>Reilly E. *et al*. Hyperbaric oxygen therapy for diabetic ulcers: Systematic review and meta-analysis. *International Journal of Technology Assessment in Health Care*, 29:3 (2013), 269–281.

<sup>4</sup>Margolis DJ *et al*. Lack of effectiveness of hyperbaric oxygen therapy for the treatment of diabetic foot ulcer and the prevention of amputation: a cohort study. *Diabetes Care* 2013;36:1961–1966

## CALCIFICATION OF AORTIC ANEURYSMS IS ASSOCIATED WITH MORTALITY AND MORBIDITY

João Maia<sup>1</sup>, Nuno Coelho<sup>2</sup>

1. Mestrado integrado em Medicina da FMUP, 2. Serviço de Angiologia e Cirurgia Vascular do Centro Hospitalar Vila nova de Gaia/Espírito Santo

Regente da Unidade de Angiologia e Cirurgia Vascular

Prof. Doutor Armando Mansilha

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

### Introduction

- Coronary artery calcification (CAC) can be quantified using the Agatston score, an independent predictor of future coronary events.<sup>1</sup>
- Calcification occurs in response to chronic inflammation, a key process in the development of aortic aneurysm and atherosclerotic disease.<sup>1,2</sup>
- A strong correlation between aortic aneurysmal calcification (AAC) and atherosclerosis has already been recognised.<sup>1</sup> Yet evidence suggests that calcification occurs differently within differing arterial beds.<sup>3</sup>
- In the same way as it relates to occlusive arterial disease, can the AAC score, like the Agatston score, be used in a clinical context to predict outcomes in aortic aneurysmal disease?

### Aims

- Determine whether AAC score could predict mortality and morbidity in aortic aneurysms.

### Methods

- Literature revision on calcification of the abdominal aorta and the associated outcomes.

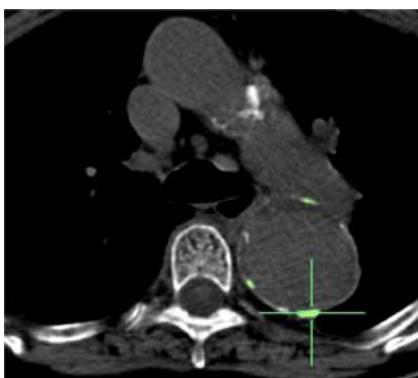


Figure 1. Calculation of calcium score using OsiriX.<sup>4</sup>

### Further Information

For more information, please contact João Maia at:  
joao.a.maia@gmail.com

### Results

- The presence of AAC uniformly increases the risk of subsequent CV events or CV related death in the general population.<sup>1</sup>
- Measurements of the calcification of both the aneurysmal thoracic and the infrarenal abdominal aorta, using the OsiriX software (Figure 1), is predictive of all cause mortality.<sup>4</sup>
- The burden of aortic calcification is an accurate predictor of poor patient outcome. It is a clinically relevant measure, as all patients being considered for intervention will undergo CT evaluation.<sup>4</sup>

### Discussion

- As previously shown with CAC, integration of AAC in risk models for asymptomatic subjects may have the potential for risk reclassification and therefore influence primary prevention strategies.<sup>5</sup> Since patients with aneurysmal disease reaching threshold for treatment and undergoing treatment/surveillance are followed with CT scans, this tool wouldn't call for any other exam and it can easily and rapidly be used, without extra costs.<sup>3</sup>
- The sample size of the studies published at the moment are small<sup>1,3</sup> and some of them are biased, since they don't all take into account every known calcification factor, like chronic renal disease.<sup>3</sup>
- There is a need for studies that would include a larger number of patients and it would also be useful to investigate the link between aneurysmal calcium score and coronary artery calcium score.
- The clinical decisions in this type of pathology are based in multiple variables, turning it into a complex and multifactorial process. Therefore, the analysis of the calcium score could be useful as a prognostic marker and can possibly be taken into account when it comes to taking clinical decisions.

### Conclusion

- As the CAC scoring has its significance on risk stratification in cardiac patients, the AAC score may as well have an emerging importance in patients with aneurysmal disease.

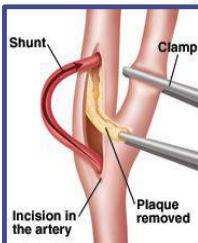
### References

- Bastos Gonçalves F, Voude MT, Hoeks SE, Chervos MA, Bierema EE, Stolker RJ, et al. Calcification of the abdominal aorta as an independent predictor of cardiovascular events: a meta-analysis. *Heart* 2012;98:986-94.
- Doherty TM, Fitzpatrick LA, Inoue D, Qiao JH, Flaherty MC, Detrano RC, et al. Molecular, endocrine, and genetic mechanisms of atherosclerosis in abdominal aortic aneurysms. *J Am Coll Cardiol* 2012;59:1712-22.
- Alison MA, Ihs S, Wesson CL, Morgan C, Iv AlWright CM, et al. Calcified atherosclerosis in different vascular beds and the risk of mortality. *Arterioscler Thromb Vasc Biol* 2012;32:1450-6.
- Chowdhury, Mohammed M, et al. "Calcification of Thoracic and Abdominal Aneurysms is Associated with Mortality and Morbidity." *Journal of Vascular Surgery* 67.2 (2018): 678.
- Budoff MJ, Achrekar SS, Blumenthal RD, et al. Assessment of coronary artery disease by cardiac computed tomographic angiography: statement by the American Heart Association Committee on Cardiovascular Imaging and Intervention, Council on Cardiovascular Radiology and Intervention, and Committee on Cardiac Imaging/Council on Clinical Cardiology. *Circulation* 2006;114:1761-97.

## CAROTID ENDARTERECTOMY: WHICH SHUNTING STRATEGY IS THE BEST?

JOÃO SANTOS FARIA, JOÃO ROCHA NEVES

Regente da Unidade de Angiologia e Cirurgia Vascular - PROF. DOUTOR ARMANDO MANSILHA



### INTRODUCTION

Carotid Endarterectomy (CEA) is a surgery to remove the narrowing of the carotid artery thus reducing stroke risk. The surgery itself comes with a 5-10% risk of stroke. Using a shunt can reduce the length of time that the blood flow is interrupted<sup>1</sup>. This strategy, which may reduce the risk of perioperative stroke, could also result in arterial embolization or dissection, therefore increasing stroke risk<sup>2</sup>. CEA practice, including the use of shunt and monitoring techniques, are often surgeon-dependent<sup>3</sup>. There are three possible approaches: routine shunting, selective shunting or no shunting. This work aims to offer a review of the current evidence regarding these strategies.

### RESULTS

Studies targeting the best approach have been inconclusive in demonstrating any difference in important clinical outcomes, namely lower overall rates of perioperative stroke or other morbidity<sup>2</sup>. A systematic review comparing routine shunting versus no shunting found no significant difference between strategies in terms of rate of all stroke, ipsilateral stroke or death up to 30 days after surgery. However, a potential clinical benefit from routine shunting could not be excluded due to the low quality of data. The same review found no difference between the risk of ipsilateral stroke in participants selected for shunting with different monitoring methods<sup>1</sup>.

Although routine shunting is preferred by some surgeons to avoid the need of intraoperative neurological monitoring, it is recognized that shunting is unnecessary in approximately 90% of patients, therefore exposing the patients to potential arterial embolization or dissection<sup>2</sup>. The advantages of routine shunting may include the familiarity of the surgeon with the technique and the assurance of a proper cerebral flow without the need for neurological monitoring<sup>2</sup>.

In patients with recent stroke, Hans, et al. found no significant difference between selective shunting and routine shunting regarding postoperative mortality<sup>4</sup>.

A 2018 retrospective analysis compared shunting strategies and found, in a risk-adjusted analysis, that the rate of stroke and death during CEA were independent of the surgeon's approach to shunting or choice of cerebral monitoring technique (table 1). Given the clinical equivalence of these approaches, these authors suggest a need to evaluate the relative cost of these techniques<sup>3</sup>.

Table 1 – Adapted from Wiske et al.<sup>3</sup>. Multivariate logistic regression comparing each group with the routine shunting group.

	Selective shunt (n=12489)		Never Shunt (n=1740)	
	aOR	P	aOR	P
Death	0.825	0.45	0.656	0.49
New Neurological Event	1.025	0.81	0.811	0.37
New ipsilateral stroke	1.148	0.38	0.954	0.89
Reperfusion Injury	1.304	0.47	2.632	0.07

**References:** [1] Chongrusut W, Vanijapong T, RerkasemK. Routine or selective carotid artery shunting for carotid endarterectomy (and different methods of monitoring in selective shunting). Cochrane Database of Systematic Reviews 2014; Issue 6. Art. No.: CD00190; [2] Fairman, RM, et al. Carotid Endarterectomy. UpToDate. 2018. Available in: <https://www.uptodate.com/contents/carotid-endarterectomy>. Retrieved in 20/04/2018; [3] Wiske, C, et al. Comparing the efficacy of shunting approaches and cerebral monitoring during carotid endarterectomy using a national database. Journal of Vascular Surgery. 2018; [4] Hans, SS, et al. Selective shunting for carotid endarterectomy in patients with recent stroke. Journal of Vascular Surgery. Volume 61, Number 4. 2015

### CONCLUSIONS

- Clinically important benefit from routine shunting cannot be excluded, although there is insufficient evidence from randomized controlled trials (RCT) to support it<sup>1</sup>.
- There is no evidence to favour the use of selective shunting and, in those who prefer that strategy, there is no evidence to support a form of monitoring technique<sup>2</sup>.
- Further large multicentre RCTs are needed to support either shunting strategy.

## THE PEDAL-PLANTAR LOOP: AN ALTERNATIVE APPROACH IN NEUROISCHEMIC DIABETIC FOOT

Borges J.; Augusto R.

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Diabetic Foot is one of the major complications of diabetes. Endovascular techniques have been revolutionizing the revascularization of neuroischemic diabetic foot patients, showing consistently high limb salvage rates. The pedo-plantar loop technique is an alternative approach when the anterograde recanalization is unsuccessful and the retrograde puncture is not recommended.

### Clinical Case

68 years old  
Male  
Diabetic



Left Lateral Plantar abscess involving the deep tissues

Femoral and popliteal pulses present, without distal pulses  
Hospitalization: surgical debridement of infected and necrotic tissues, IV antibiotic therapy and urgent revascularization

Hemodynamically significant stenoses in the anterior tibial artery (ATA), permeability of the dorsalis pedis artery, permeable peroneal artery, stenosis and occlusion of the posterior tibial artery (PTA) since its origin.



Angioplasty of ATA and peroneal artery lesions.  
Multiple unsuccessful attempts at anterograde recanalization of PTA. Medial plantar artery approach through ATA and dorsalis pedis artery via deep plantar perforating artery.

Retrograde recanalization of the medial and inferior 1/3 of the plantar artery of the PTA. Good final imaging and clinical results.



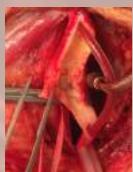
The patient was followed up at the Multidisciplinary Consultation of Diabetic Foot on CHVNG/E. Additionally he was submitted to oxygen hyperbaric therapy - with healing of the lesion 5 months after.

### Conclusions

The pedal-plantar loop approach for revascularization of neuroischemic diabetic foot patients appears to be a safe and effective alternative that expands revascularization options after the failure of the conventional endovascular anterograde approach, giving the possibility of salvaging a greater number of limbs.

## CAROTID ENDARTERECTOMY TO SHUNT OR NOT TO SHUNT

**JOÃO SARAIVA, JOÃO NEVES, FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO**  
Regente da Unidade de Angiologia e Cirurgia Vascular – PROF. DOUTOR ARMANDO MANSILHA



### INTRODUCTION

- Carotid Endarterectomy (CEA) is not an innocuous procedure and controversy exists regarding which shunting strategy to use to reduce CEA complications: 1) **routine shunting (RS)**, 2) **selective shunting (SS)**, or 3) **routine non-shunting (RNS)**.<sup>1</sup>

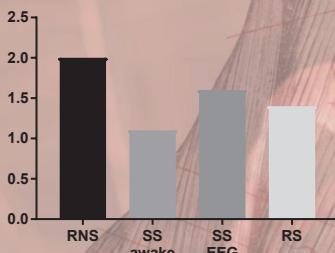
### ROUTINE SHUNTING<sup>2</sup>

Pros	Neuromonitoring not necessary Familiarity with the technique
Cons	Intimal flap formation and arterial dissection Acute occlusion Plaque emboli/Air embolism Difficult exposure of the distal end of a high plaque

### SELECTIVE SHUNTING

Shunt only if signs of cerebral ischemia, detected by:

- Neurological examination of awake patients (awake CEA)
- Electroencephalography (EEG)
- Transcranial Doppler (TCD)
- Carotid stump pressure
- Near-infrared spectroscopy<sup>3</sup>



**Figure 1** – Mean intraoperative stroke rates (%) by shunting strategy.<sup>4</sup>

### CONCLUSION

Routine shunting, selective shunting and routine non-shunting have all been associated with a low stroke rate.<sup>4</sup>

Selection of shunting strategy should be based on surgeon's personal preference.<sup>4</sup>

**REFERENCES** [1] Halsey JH, Jr. Risks and benefits of shunting in carotid endarterectomy. The International Transcranial Doppler Collaborators. *Stroke*. 1992;23(11):1583-7. [2] Hans SS, Catanescu I. Selective shunting for carotid endarterectomy in patients with recent stroke. *Journal of vascular surgery*. 2015;61(4):915-9. [3] Pennekamp GW, Immink RV, den Ruijter HM, Kappelle LJ, Bots ML, Buhre WF, et al. Near-infrared spectroscopy to indicate selective shunt use during carotid endarterectomy. *European journal of vascular and endovascular surgery : the official journal of the European Society for Vascular Surgery*. 2013;46(4):397-403. [4] Aburahma AF, Mousa YA, Stone PA. Shunting during carotid endarterectomy. *Journal of vascular surgery*. 2011;54(5):1502-10.

## To TEST OR NOT TO TEST (inherited thrombophilia mutations)?

Vision of Angiology and Vascular Surgeons

Joaquim Monteiro<sup>1</sup>; Nuno Henrique Coelho<sup>2</sup>

<sup>1</sup>Estudante do 5º ano do MIM da FMUP; <sup>2</sup>Serviço de Angiologia e Cirurgia Vascular do Centro Hospitalar de Vila Nova de Gaia/Espinho

Regente da Unidade de Angiologia e Cirurgia Vascular – Professor Doutor Armando Mansilha

### INTRODUCTION

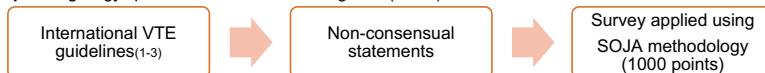
Thrombophilia are inherited and/or acquired conditions that predispose patients to venous or arterial thrombosis. As the etiology of venous thromboembolism (VTE) is multifactorial, the presence of a thrombophilic mutation is only one of the several factors that determine the risk. The usefulness of determining mutations for thrombophilia for prevention and therapeutic orientation of VTE is controversial. This leads to a lack of consensus on specific situations (unprovoked VTE and in direct family members of VTE/inherited thrombophilia patients) in the international guidelines. (1-3)

### AIM

Determine the most relevant criteria for the decision to test thrombophilia mutations in less consensual situations of VTE according to the perspective of Vascular Surgeons.

### MATERIAL AND METHODOLOGY

**Sample:** Angiology specialists and Vascular Surgeons (AsVS)

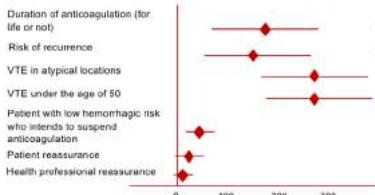


**Statistical Analysis:** Mean (95% confidence interval). Compare means with t student test ( $\alpha=0,05$ ). IBM SPSS® v25.

### RESULTS

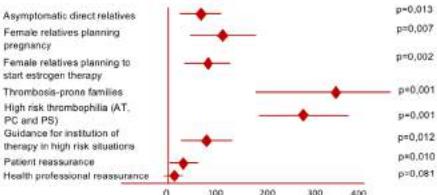
Two less consensual situations selected from the guidelines<sup>1,2,3</sup> were asked to 10 AsVS:

#### HEREDITARY THROMBOPHILIA SCREENING IN THE CONTEXT OF UNPROVOKED VTE



**Figure 1:** Mean and 95% confidence interval of AVS pontuation for hereditary screening in the context of unprovoked VTE; VTE- V venous thromboembolism

#### HEREDITARY THROMBOPHILIA SCREENING OF DIRECT RELATIVES OF VTE identified hereditary thrombophilia PATIENTS



**Figure 2:** Mean and 95% confidence interval of vascular surgeons pontuation for hereditary screening in the contexto of direct relatives of VTE patients or with hereditary thrombophilia; VTE- Venous thromboembolism; AT- Anti-thrombin; PC- C Protein; PS- S Protein

### CONCLUSION

In this survey, **atypical locations**, **VTE under 50 age** were the most relevant criteria that would make the surgeons to test thrombophilia mutations in the context of unprovoked VTE. On the other hand, in the context of direct relatives of VTE/identified hereditary thrombophilia patients, **thrombosis-prone families** and **high risk thrombophilia** were the most relevant criteria. There is a lack of consensus reflected by the large confidence interval obtained in our survey, in line with demonstrated in international guidelines. (1-3) Further studies are requested to obtain strong evidence to help clinicians to make a consensual decision for test thrombophilia mutations and prevent unnecessary costs or patients anxiety.

### REFERENCES

- 1-Stevens SM et al; Guidance for the evaluation and treatment of hereditary and acquired thrombophilia; J Thromb Thrombolysis (2016) 41: 154-164; 2- Howard LS, Hughes RJ. Thorax 2013;68:391–393; 3- Permod G,et al.; French Society of vascular medicine. J Mal Vasc 2009; 34: 156-203.

## IATROGENIC HEPATIC ARTERY PSEUDOANEURYSMS

José Miguel Azevedo<sup>1</sup>, Joel Sousa<sup>1,2</sup>

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha<sup>1,2</sup>

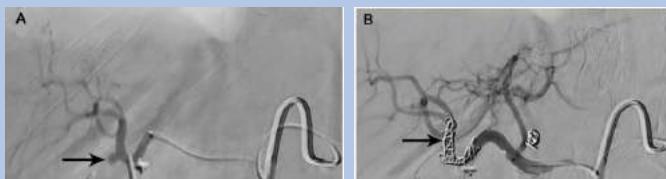
1 - Faculty of Medicine of the University of Porto 2 - Department of Angiology and Vascular Surgery, Hospital de S. João. Porto

### Introduction

- Visceral artery aneurysms (VAA) are a rare entity (0,01-0,2%) with splenic artery aneurysms comprising 50-75% and hepatic artery (HA) 20% of all VAA<sup>1</sup>.
- HA aneurysms' incidence has been increasing, reflecting both the widespread use of invasive medical procedures, as well as better imaging techniques after hepatic trauma<sup>2</sup>.
- 50% of HA aneurysms are iatrogenic<sup>3</sup>, and are mostly pseudoaneurysms (PsA), since they result from a breach of the inner-wall layers and not a distension of all three layers of the arterial wall<sup>4</sup>.

### Discussion

- Leakage of the injured artery forms a high-pressure cavity<sup>5</sup>, resulting in a PsA<sup>6</sup> rate of rupture of 76,3% (vs 3,1% in true aneurysms) with 100% mortality<sup>4</sup>.
- HA PsA develops in 4% (17% in children) of patients after traumatic liver injury (blunt and penetrating)<sup>6,7</sup>.
- The main cause of HA PsA is iatrogenic such as liver biopsy, transhepatic biliary drainage, pancreaticoduodenectomy, liver transplantation and laparoscopic cholecystectomy (LA)<sup>8,9</sup>.
- LA is the surgical procedure that report more cases of HA PsA<sup>9</sup>.
- Failure to deal with bile leak and secondary infection may result in PsA formation in 4,5% of the patients with bile duct injury, since bile cause damage to the vascular wall and therefore delay the healing of injured arteries<sup>10</sup>.



**Fig 1:** HA angiograms of a 70-year-old woman 2 weeks after a LA showing (A) focal outpouching from the right HA at the site of origin of the cystic artery (arrow) and (B) complete obliteration of the PsA (arrow) following coil embolisation<sup>11</sup>.

### Conclusion

Hepatobiliary procedures are very common, and a rare complication of a common procedure becomes clinically relevant. Most of the HA PsA are asymptomatic and due to its high risk for rupture, early detection and definitive treatment (Fig 1B) is fundamental to prevent deaths.

#### References

- 1- Huang YK, Hsieh HC, Tsai FC, Cheng SH. Visceral artery aneurysm: risk factor analysis and therapeutic option. *Eur J Vasc Endovasc Surg*. 2007;33:293-301.
- 2- Meissner LM, Shavelle CJ. Visceral artery aneurysm. *Surg Clin North Am*. 1997 Apr;77(2):425-42.
- 3- Julianov A. Hepatic artery aneurysm causing obstructive jaundice. Quantitative Imaging in Medicine and Surgery. 2014;4(4):294-295.
- 4- Pittlin M, Deppe B, Jungmann F, Kloeckner R, Scholten S, Wirth (2018). Hepatic artery aneurysms: Incidence, management, and outcome analysis in a tertiary care center over one decade
- 5- Keeling AN, McGrath FP, Lee AJ. Interventional radiology in the diagnosis, management, and follow-up of pseudoneurolymphoma. *Cardiovasc Interv Radiol*. 2009; 32 (1):2-18.
- 6- Odeberg J, Lindström L, Åberg B, Hultcrantz A. Hepatic artery aneurysms: a CT study. *Acta Radiologica*. 2004; 45 (1):17-21.
- 7-Durkin N. Post-traumatic liver and splenic pseudoneurolymphomas in children: Diagnosis, management, and follow-up screening using contrast enhanced ultrasound (CEUS). *J Pediatr Surg*. 2016;e6
- 8-Bayukkaya R, Aydin O, Erdogan C, Kaye E, Hakyemez B. Successful emergency endovascular treatment of iatrogenic giant hepatic artery pseudoneurolymphoma. *Ann Ital Chir*. 2014 Jul; 21:85.
- 9-Tessier DJ. Iatrogenic hepatic arteriovenous malformations: an unusual complication after hepatic, biliary, and pancreatic procedures. *Am J Gastroenterol*. 2003 Nov; 193(6):983.
- 10- Modestini MA, Battula N, Sathi S, et al. Pseudoaneurysm after laparoscopic cholecystectomy. *Hepatobiliary Pancreat Dis Int* 2007; 6(3): 254-255.
- 11-Normen O, Marinho. Hepatic or Cystic Artery Pseudoaneurysms - Following a Laparoscopic Cholecystectomy. *Sultan Qaboos Univ Med J*. 2017 May; 17(2): e135-e146.



## ABDOMINAL AORTIC ANEURYSM: WHY WE SHOULD BE DISCUSSING THE IMPLEMENTATION OF A SCREENING PROGRAM IN PORTUGAL?

José Rui Ribeiro, José Pedro Pinto

Regente da Unidade Curricular de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

**INTRODUCTION** Abdominal aortic aneurysm (AAA) represents a considerable health burden, having an estimated prevalence in adults over 50 years of age of 4-7% in men and 1% in women. [1,2] Despite mortality rates for intact aneurysm repair are less than 5% [3], ruptured AAA presents an overall mortality rate of 80-90% [4] (with mortality rates of 40-60% for those who survive till surgical repair [5]), making it the second most frequent cause of death from all emergency surgical conditions [6]. An analysis of Portugal mainland hospitals casuistry between the years 2000 and 2010 is in line with this data, showing that the survival rate of patients with ruptured AAA that comes alive to the hospital averages less than 50%. Nevertheless, in contrast to the epidemiological trend described on international literature, a reduction in the proportion of ruptured AAA repair vs. intact AAA repair was not observed in our country, a fact that might be related to the absence of an AAA screening program. [7] When equating AAA rupture's dismal prognosis with the fact that rupture, the most frequent complication of AAA, is not an exceedingly rare occurrence (adjusted incidence of 11 per 100 000 per year in some series [8]), one can hypothesize that the implementation of a systematic screening programme could lead to a reduction of AAA mortality in Portugal.

**DISCUSSION** AAA screening using ultrasonography is a practice already recommended by the main international vascular surgery societies for men over 65 years of age. [9, 10] A number of advantages are reproducibly associated with AAA screening and should work as a stimulus for a discussion on the implementation of AAA population screening program in a country like Portugal.

Firstly, AAA population screening has been associated with a 44% reduction in AAA related mortality [11] and a favourable impact on all-cause mortality [12] in men aged  $\geq 65$  years, an effect that seem to be attributable to a reduction on the incidence of AAA rupture [11]. In fact, a number of randomized controlled trials have established that a single abdominal ultrasound scan in elderly men decreases the risk of aneurysm rupture by almost 50% over the next 10 years. [13]

Secondly, despite the mortality risk associated with post-screening elective surgery, postoperative mortality after surgery for men with a screen-detected AAA is lower than in those with AAAs detected incidentally. [14] Overall, some authors estimate that, over 10 years, for every 10,000 men screened, 52 lives would be saved while risking six deaths after elective surgery. [13]

Thirdly, when compared with other screening programs, AAA screening seems to be highly efficient, with a number needed to be invited to screening (NNI) of 156 to save one all-cause death over 10 years [12], a number significantly lower than the NNI associated with screening programs already running in our country (i.e. breast, prostate and colorectal cancer screening). [15]

Fourthly, AAA screening has been demonstrated to be a cost-effective practice. [16] Moreover, this cost-effectiveness is predicted to be maintained for disease prevalence down to 1% [17], a relevant feature when considering that Portugal has an estimated AAA prevalence of 2.4% for men aged  $\geq 65$  years (data presented in "XII Congresso Anual da Sociedade Portuguesa de Angiologia e Cirurgia Vascular").

Lastly, in our country, the number of AAA treated in relation with the population is among the lowest in the literature, amounting a treatment rate five times inferior to that of other developed countries. Given that the criteria for AAA surgical repair are relatively consensual between the different countries, the implementation of an AAA screening program would allow us to understand whether this low AAA treatment rate is due to a low AAA prevalence in our country or if it translates a serious public health problem of underdiagnosis. [18]

**CONCLUSION** In the authors opinion, Portugal's epidemiological characteristics alongside the fact that ultrasonographic screening for AAA in risk populations fulfills all WHO criteria for screening [19] and gathers a solid body of evidence reiterating its benefits raise a civic imperative for the emergence of an evidence-based and systematic discussion on the implementation of AAA population screening, a practice that could bring academic, scientific and public health gains to our country.

### REFERENCES

- [1] Glagov S. Hemodynamics of arterial aneurysms in the United States. J Clin Epidemiol. 1998;48(11):1239-46.
- [2] Blanchard JF. Epidemiology of abdominal aortic aneurysms. Epidemiol Rev. 1992;17(2):207-21.
- [3] Akbari M, Gamiel M, Lederle GA, et al. Abdominal aortic aneurysm-related death: Primary endpoint analysis in comparison of open and endovascular repair. J Vasc Surg. 2002;36(2):297-304.
- [4] Monge M, Eskandari MK. Strategies for reduced abdominal aortic aneurysms. J Vasc Interv Radiol. 2000;15(6):544-505.
- [5] van der Velde M, Verhaeghe H, Verhaeghe M, et al. Long-term results of endovascular repair of abdominal aortic aneurysms: A systematic review and meta-analysis of short-term survival. Eur J Vasc Endovasc Surg. 2007;2014;47(6):693-402.
- [6] Stewar B, Khurana A, McCord C, Chene-Yelton N, Ursano S, Vega Rivero P, Mock C. Global disease burden of conditions requiring emergency surgery: A systematic review and meta-analysis. Br J Surg. 2014;101(1):e1-e22.
- [7] Lekakis J, Tsilimparis I, Kotsopoulos D, et al. Abdominal aortic aneurysm screening in Greece: A call for action. Eur J Vasc Endovasc Surg. 2011;42(1):11-16.
- [8] Reikia A, Szwed K, Ellingsen CL, Kravay JT, Vorwerk M. Epidemiology of ruptured abdominal aortic aneurysms in a well-defined Norwegian population with trends in incidence, intervention rate, and mortality. J Vasc Surg. 2015;61(5):1168-74.
- [9] Goldsmith RL, Jackson BM, et al. American Association for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. J Vasc Surg. 2018;June(1):12-27.
- [10] Chaikour EL, Demirci RL, Eskandari MK, Jackson BM, et al. The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. J Vasc Surg. 2013;57(5):1231-2.
- [11] Crawford PA, Lang RM. Screening for abdominal aortic aneurysm. Cochrane Database Syst Rev. 2007;16(2):CD002946.
- [12] Edwards R, Phillips T, Thompson M, et al. Screening for abdominal aortic aneurysm. Br Med J. 2013;347(7):1231-2.
- [13] Takagi H, Goto SN, Matsui M, Maruyama E, Umehara T. A further meta-analysis of population-based screening for abdominal aortic aneurysm. Revista Portuguesa de Medicina Geral e Familiar. 2014;30(5):305-14.
- [14] Mouloua M, Lederle GA, Glagov S, et al. Abdominal aortic aneurysm screening in the United States: A meta-analysis based on four year results from randomised controlled trial. BMJ. 2002;325:1135.
- [15] Spronk S, van Kammen BJ, Bell AP, et al. Cost-effectiveness of screening for abdominal aortic aneurysm in the Netherlands and Norway. Br J Surg. 2011;98:1546-55.
- [16] Cesarone MC, Saccoccia P, Giannuzzi P, Scaramella P, Agnelli G, Neri M, Ricci D, Piozzo F, Fracchia A, Orsi V, Serradelli M, Letta-Moretti A, Rizzoli A. Rastreio populacional de aneurisma da aorta abdominal em Portugal – o imperative da sua realização. Angiologia e Cirurgia Vascular. 2016;12(4):267-270.
- [17] Borgesca D, Björck M, Wachmann A. Abdominal aortic aneurysm and new WHO criteria for screening. Int Angiol. 2010;32:37-41.

## FENESTRATED VS PARALLEL-GRAFTS: WHO WINS THIS BATTLE?

Juliana Macedo, José Pedro Pinto

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

17-18 May  
PORTO  
FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO  
INTERNATIONAL VASCULAR CONFERENCE

**AIM:** The aim of this study is to compare fenestrated/branched and parallel graft techniques regarding incidence of proximal type 1 endoleaks and the subsequent need of a second intervention in TAAA repair.

**INTRODUCTION:** Thoracoabdominal aortic aneurysm (TAAA) represents a complex aortic disease. Prevalence rounds 3% in United States.<sup>1</sup> Open surgery remains the standard treatment for fit patients.<sup>2</sup> Fenestrated/branched and parallel stent-grafts are less invasive alternatives for TAAA repair in high-risk patients (Fig. 1, 2, 3).<sup>2</sup> Although, limited evidence comparing these two techniques is available.



Fig.1 – Fenestrated Stent-graft



Fig.2 – Parallel Stent-graft  
Fig.3 – Sandwich configuration

**METHODS:** Medlined databases were searched since 2010 regarding parallel ("sandwich") and fenestrated/branched stent-grafts for TAAA repair. Only trial studies with a minimum follow-up of 1 year were included.

**RESULTS:** 8 trial studies (5 for fenestrated/branched and 3 for parallel grafts) were selected and their results are shown in Tables 1 and 2.

With parallel graft technique, type 1a endoleaks ranged from **6.7-15.6%**. Incidence was related to a higher number of ch-grafts employed.<sup>3,4</sup> In one study, **9.3%** of the cases that required reinterventions was due to type 1a endoleaks. Overall, **50%** of all type 1a endoleaks required a second intervention and the other **50%** was solved intraoperatively during the first procedure.

In fenestrated/branched method no proximal type 1 endoleaks were reported. Reintervention rates ranged 2,25-18,18% and mainly involved supplementary renal stenting or type 3 endoleaks resolution.

N (cases/study)	Follow-up	Type 1a endoleaks	Reinterventions	Notes
89 TAAA (Guilherme, 2012)	17mo	0	(2) 2.2% (type 3 endoleak; supplementary renal stent)	48 purely fenestrated (95.5% from reintervention; 95.5% ± 3%/2y)
30 TAAA (Galliot, 2016)	15± 14mo	0	(2) 6.7% (supplementary renal stent)	9 purely fenestrated (95.5% from reintervention; 88%/2y)
31 TAAA (Budtz-Lilly, 2017)	25mo	0	Not specified for FEVAR/BEVAR	9 purely fenestrated
16 TAAA (Spear, 2016)	12mo	0	(2) 12.5% (type 1b endoleak; supplementary renal stent)	FEVAR preferred (number not reported)
44 TAAA (Baba, 2017)	27.3±18.6mo	0	(8) 18,18% (7 type 3 endoleak, 1 conversion)	30 purely fenestrated; 1 proximal (type 1b endoleak)

Table 1 – Results for fenestrated/branched stent-grafts.

N (cases/study)	Follow-up	Type 1a endoleaks	Reinterventions	Notes
5 TAAA (Lobat et al., 2010)	12mo	1 type 1a (subtypes not specified (20%, solved spontaneously))	0	Short number of patients (sandwich configuration)
15 TAAA (Lobat et al., 2012)	17mo	1 type 1a (8.7% solved intrasoperatorily >)	(5) 33.3% (2 colonic ischemia, 1 endoleak, 2 primary approach occlusion)	Sandwich configuration
32 TAAA (Schwartz et al., 2014)	19.7m	5 type 1a (15.6%)	(7) 21.8% (4 on patency, type 1a and III endoleak, instant stenosis/ thrombosis)	Sandwich configuration

Table 2 – Results for parallel stent-grafts.



Fig. 5 – CTA of type 1a endoleak with fenestrated stent-graft

**DISCUSSION/CONCLUSION:** Parallel graft technique results in more type 1a endoleaks than fenestrated/branched method in TAAA repair. Therefore, more reinterventions were performed due to this complication. Nevertheless, "sandwich" configuration is a suitable and feasible alternative for emergency<sup>5</sup> and complex aortic anatomy (tortuosity) cases.<sup>1,2</sup>

Still, for elective cases fenestrated grafts represents a better alternative as they result in less neck-related complications and subsequent reinterventions.<sup>3,5</sup>

Further studies with longer follow-up are still required to ascertain safety of these both techniques for TAAA repair.

**REFERENCES:** <sup>1</sup>Orr et al., 2014; <sup>2</sup>Kuo and Han, 2017; <sup>3</sup>Schwierz et al., 2014; <sup>4</sup>Moulakakis et al., 2012; <sup>5</sup>Lachat et al., 2010.

# 10 YEARS OF PERIPHERAL ARTERY DISEASE: A RETROSPECTIVE ANALYSIS

Lara Dias, Andreia Coelho

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha



17-19 May

FORUM SAVULET CONFERENCE

## Background

**Peripheral artery disease (PAD)** prevalence in Portugal is estimated in 5,9%<sup>1</sup>. PAD shares risk factors with other cardiovascular diseases, including smoking, hypertension and dyslipidemia, and is an independent marker of high risk of cardiovascular mortality.

**Ankle-brachial index of  $\leq 0.90$  or  $\geq 1.3$**  is diagnostic for PAD<sup>2</sup>.

The treatment of PAD includes cardiovascular risk factors control in all disease stages, especially in claudicants (Rutherford stage 2 and 3). Endovascular and open surgery are usually reserved for more advanced stages of PAD.

## Methods

A retrospective analysis of all patients observed in PAD consultations performed in Centro Hospitalar de Vila Nova de Gaia during 1 to 5 of January 2007 was conducted and their evolution was tracked until January 2017.

## Results

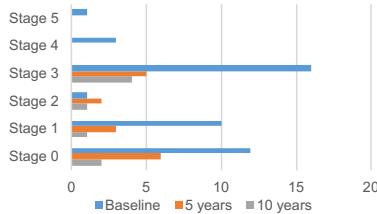
In the time frame considered, **43 patients** were observed. The mean age was  $66,7 \pm 10,4$  years and 93% of patients were male. The most common comorbidity observed was **ischemic heart disease** (34,5%), followed by cerebrovascular disease (11,6%). In 2007, 17 patients (60,5%) had claudication (Rutherford stage 2/3), 3 (7%) had ischemic rest pain (Rutherford stage 4) and 1 had an ulcer (Rutherford stage 5). After 10 years, 5 patients (62,5%) had claudication, and no patients had ischemic rest pain or ulcer. (Graph 1.)

There was an important loss of follow-up of 21 patients (48,8%) after 10 years.

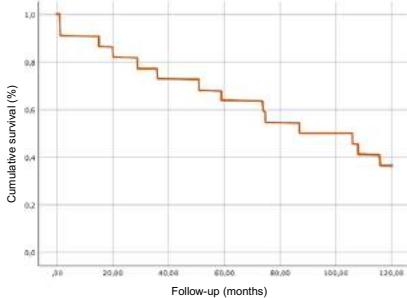
In terms of survival, **36,4% of patients were alive after 10 years**, and the mean survival was 79 months (6,6 years). (Graph 2.)

## Conclusion

The existence of a dedicated appointment allows the documentation of the progression of PAD over 10 years. To conclude, PAD has an **unfavorable prognosis**. Most patients present with severe claudication (Rutherford 3), and cardiovascular risk factors and comorbidities are frequent, increasing the overall risk of cardiovascular death.



Graph 1. Number of patients in each Rutherford stage at baseline, 5 and 10 years.



Graph 2. Cumulative survival, in percentage, in 10 years of follow-up

<sup>1</sup>Prevalence of Peripheral Arterial Disease in Portugal, José Daniel Menezes, José Fernandes e Fernandes, Carlos Santos de Carvalho, Joaquim Barbosa, Armando Mansilha, Angiologia e Cirurgia Vascular, Vol 5, Number 2, Jun 2009

<sup>2</sup>Aboyans, et al., 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS), European Journal of Vascular and Endovascular Surgery (2017)

## COMPARISON OF TWO FEMORAL VEIN INTERVENTIONS CONCOMITANT WITH ILOFEMORAL STENTING IN PATIENTS WITH POST THROMBOTIC SYNDROME

Luis Santos, Tiago Soares

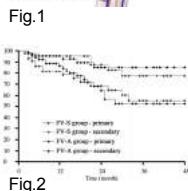
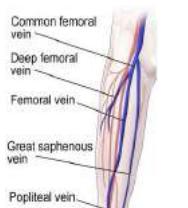
Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### Introduction

**Endovascular stenting** has become, over the more recent years, a first line modality of treatment for patients with severe **Post Thrombotic Syndrome (PTS)** [1]. This technique has been performed in the **iliofemoral segment** having achieved satisfying results [2][3]. In order for the stent to remain in good conditions and avoid occlusion, it is mandatory that it receives an **adequate inflow**, mainly from the **Femoral and Profunda** (Deep Femoral) veins [4]. In the study that is hereby analyzed, the aim was to compare two different approaches of treatment of the Femoral Vein in patients with PTS that were subject to iliofemoral stenting and that possess a patent Profunda Vein. The first approach consisted of **extending the iliofemoral stent into the femoral vein** below the junction of the profunda vein, whereas in the second approach the stents were deployed above the aforementioned junction while the Femoral Vein merely underwent **angioplasty**.

### Methods

This paper is based on a study conducted in a University Hospital in China by Kaichuang et al [5]. In said study, the researchers reviewed a database containing information regarding patients with severe PTS that underwent iliofemoral stenting between January 2012 and December 2015. The patients were separated into two groups: the **stenting group (FV-S)** and the **angioplasty group (FV-A)**. The clinical and stent outcomes were recorded and compared in the two groups.



### Results

There were 45 and 69 patients in the FV-S and the FV-A groups, respectively. The rate of **immediate failure** (within 30 days post-op) of the stented iliofemoral vein was **similar in both groups** but the **FV-S group** experienced a **lower rate of immediate failure in the femoral segments** (FV-S = 24%, FV-A = 70%). All treated femoral segments in both groups were occluded within 1 year, however. Figure 2 shows the **cumulative primary and secondary patency rates** of the iliofemoral stent in the two groups. **Clinically speaking**, there was an **improvement in the patients' conditions** (relief of pain and swelling and healing of ulcers) with **no significant differences** between the two groups.

### Discussion

It was demonstrated that iliofemoral stenting along with either femoral stenting or angioplasty in patients with PTS has an **acceptable short-term patency rate** and results in an **improvement in clinical symptoms**. There isn't, however, any significant upside in combining iliofemoral stenting with femoral stenting when compared with the angioplasty alone. Besides this, comparing these results with ones from other studies, we find that **concomitant femoral vein disobliteration in the present study doesn't significantly affect stent and clinical outcomes of patients with PTS that underwent iliofemoral stenting**. Therefore, such procedures cannot be recommended.

### References

- Bellmunt-Montoya, S. and Escrivano, J. (2016). Re: 'Editor's Choice—Management of Chronic Venous Disease: Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)'. *European Journal of Vascular and Endovascular Surgery*, 51(1), p.156.
- Raju, S. (2013). Best management options for chronic iliac vein stenosis and occlusion. *Journal of Vascular Surgery*, 57(4), pp.1163-1169.
- Kazaz, A., H. and Tripathi, R. (2015). Safety and effectiveness of Stent Placement for Iliofemoral Venous Outflow Obstruction. *Circulation: Cardiovascular Interventions*, 8(10), p.e002772.
- Vennera, H. and Tripathi, R. (2010). Iliofemoral endovenectomy in conjunction with iliac vein stenting to improve venous inflow in severe post-thrombotic obstruction. *Journal of Vascular Surgery: Venous and Lymphatic Disorders*, 5(1), pp.138-142.
- Ye, K., Shi, H., Yin, M., Qin, J., Yang, X., Liu, X., Jiang, M. and Lu, X. (2018). Treatment of Femoral Vein Obstruction Concomitant with Iliofemoral Stenting in Patients with Severe Post-thrombotic Syndrome. *European Journal of Vascular and Endovascular Surgery*, 55(2), pp.222-228.

# PENETRATING ATHEROSCLEROTIC ULCER OF THE THORACIC AORTA

17–19  
May

Latest Advances  
in Vascular and  
Aortic Diseases<sup>®</sup>

PORTO  
VASCULAR  
CONFERENCE  
2018



MAFALDA URBANO, JOEL SOUSA. FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO  
REGENTE DA UNIDADE DE ANGIOLOGIA E CIRURGIA VASCULAR: PROF. DOUTOR ARMANDO  
MANSILHA

## INTRODUCTION:

Penetrating atherosclerotic ulcer (PAU) is part of **acute aortic syndrome**. It is asymptomatic and its true incidence is unknown.<sup>2</sup>

It affects the elderly, who usually have comorbidities and a record of severe atherosclerosis, hypertension, and hyperlipidaemia, with lung and/or renal dysfunction or peripheral vascular disease<sup>1</sup>.

**Atherosclerotic plaques ulcerate** the internal elastic lamina into the aortic media, resulting in a PAU<sup>1</sup>

## RESULTS:

PAU is diagnosed on (CT) scan (frequently as an incidental finding<sup>2</sup>) as a contrast-filled, pouch-like protrusion of the aorta<sup>1</sup> (Figure 1)<sup>1</sup>. The aortic wall is calcified and the intima is thickened and cratered.<sup>3</sup>

When it ruptures, symptoms consists of: acute chest, retrosternal or interscapular pain.<sup>1</sup> (Figure 2)<sup>2</sup> Symptomatic and complicated PAUs require **urgent therapy**.<sup>3</sup>

TEVAR performed for PAUs has a high procedural success rate.<sup>3</sup> (figure 3)<sup>2</sup>

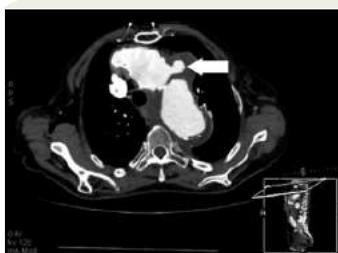


Figure 1. CT scan showing the ulcer of the ascending aorta.<sup>1</sup>

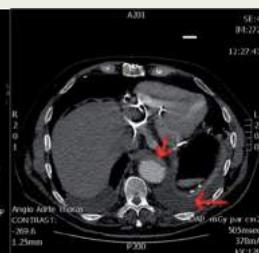


Figure 2. A leaking PAU with associated IMH and left pleural effusion.<sup>2</sup>



Figure 3. penetrating aortic ulcer successfully managed by TEVAR.

## CONCLUSION

Differentiation of PAU from other aortic diseases is difficult.<sup>1</sup>

Symptomatic and large (>20mm diameter and >10 mm depth) PAUs should be considered as rupture-prone lesions, justifying endovascular exclusion by a stent graft. TEVAR has been performed for PAUs with a high procedural success rate and satisfying midterm<sup>3</sup> outcome. Since critical cases of PAU cannot be identified on the basis of initial imaging findings, careful follow up is needed, particularly during the first month after onset.<sup>1</sup>

1. Nikolaos G., Et al., Penetrating Atherosclerotic Ulcer of the Thoracic Aorta: Diagnosis and Treatment., Hellenic J Cardiol 2010; **51**: 153-157.
- 2 . Patatas.K., et al., Penetrating atherosclerotic ulcer of the aorta: A continuing debate. Clinical Radiology 2013;**68**: 753-759.
3. Hassani.I. El, et al., Penetrating atherosclerosis aortic ulcer: a re-appraisal. Acta Chirurgica Belgica 2016;

# TUMORES DO CORPO CAROTÍDEO

Margarida Peixoto, Ivone Silva

## Introdução

Os tumores do corpo carotídeo constituem a forma mais comum de paragangliomas da região da cabeça e do pescoço, representando 65% dos mesmos.<sup>[1]</sup> Todavia, têm incidência inferior a 1 em 30000.<sup>[2]</sup> Estes tumores são mais frequente no sexo feminino, com uma idade média de diagnóstico por volta dos 45 anos.<sup>[3][1]</sup> Apresenta um curso indolente e geralmente benigno.<sup>[3]</sup> Contudo, pode progredir e comprimir estruturas neurovasculares adjacentes, sendo recomendada intervenção precoce.<sup>[4]</sup>

## Caso Clínico

Doente de sexo feminino, de 69 anos, com obesidade mórbida (IMC=40) e antecedentes de síndrome vertiginosa e doença cardíaca isquémica, medicada com AAS e mononitrato oral . No decurso do estudo das vertigens, foi diagnosticado um tumor do corpo carotídeo direito. Não apresentava sintomatologia sugestiva de tumor secretor e a pesquisa de metanefrinas urinárias encontrava-se negativa. A angioTAC revelou lesão abrangida pela bifurcação carotídea direita, Grau II de Shamblin com contornos bem definidos, captação intensa e heterogénea do contraste e dimensões 2,5x2,2 cm. Foi realizada excisão tumoral completa. O estudo anatomo-patológico confirmou o diagnóstico de parangangioma. No pós-operatório imediato, revela úlcera de exposição da córnea direita, sendo medicada com Anestocil, lubrificação e oclusão do olho direito. Quadro resolveu, sem complicações. Quatro dias depois, refere sensação de queimadura cervical, tratada com Neurobion e Lyrica. Atualmente, encontra-se assintomática.



## Discussão

Não obstante a evolução das técnicas imagiológicas, a ausência frequente de sintomatologia leva a um diagnóstico tardio da neoplasia do corpo carotídeo. Todavia, quando diagnosticado, o goldstandard terapêutico consiste na ressecção cirúrgica, podendo ocorrer uma incidência significativa de complicações neurovasculares e hemorragia intra-operatória.<sup>[5][6]</sup> Por sua vez, recorre-se à classificação de Shamblin para prever, parcialmente, o risco de complicações vasculares pós-operatórias. No grau I, existe pouca adesão tumoral à carótida, estando associado a pouca morbidade; no grau II, os vasos estão parcialmente circundados pelo tumor e, no grau III, o envolvimento dos vasos é completo, sendo usualmente necessária reconstrução vascular [7] Atualmente, existe controvérsia quanto à eficácia da embolização pré-operatória. Alguns defendem que esta facilita a dissecação e diminui o tamanho tumoral e das perdas hemáticas, enquanto outros alegam risco aumentado de acidente vascular cerebral por partículas embólicas.<sup>[8]</sup>

### Bibliografia

- Gelengci, A., & Duman, M. A. (2017). Carotid body tumor: presentation in a female patient. *International Journal of Surgery Case Reports*.
- Gelengci, A., & Duman, M. A. (2017). Bilateral carotid body tumor resection in a female patient. *Journal of Vascular Medicine*.
- Kaygusuz, I., Kaldar, T., Keles, E., Yalcin, S., & Yuksel, K. (2015). Carotid Body Tumor: The Journal of Craniofacial Surgery.
- Sarihi, A., Oz, K., Aydogan, E., Aydin, S., Altin, G., & de Eken, M. (2012). Carotid Body Tumors and Our Surgical Approaches. *Journal of Endocrinology and Head & Neck Surgery*.
- Zhong, J., & Li, X. (2015). Carotid Body Tumors: Clinical Features and Management. *Journal of Clinical Oncology*.
- Gazi, A., Sayed, A., Elshenawy, H., Fouad, F., & al. e. (s.d.). Carotid Body Tumors: A Review of 25 Years Experience in Diagnosis and Management of 56 Tumors. *Annals of Vascular Surgery*.
- Oferfeld, G., Brain, C., Parekhchand, S., & Mader, I. (2012). Head and neck paragangliomas: clinical and molecular genetic classification. *Clinics*.
- Lim, J., Kim, J., Kim, C., & L.S. (2010). Surgical Treatment of Carotid Paraganglioma: Outcomes and Complications According to the Shamblin Classification. *Clinical and Experimental Otorhinolaryngology*.

## PREVALENCE OF PERIPHERAL ARTERIAL DISEASE IN PATIENTS WITH CAROTID ARTERY STENOSIS

Maria Beatriz Ferraz; Dra. Rita Augusto;

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha.

### Introduction

Atherosclerosis is a systemic disease; the existence of atherosclerosis is determined by the combination of acquired and inherited risk factors.<sup>[1]</sup> Atherosclerotic plaques can gradually occlude vessel lumen, compromising blood flow and causing ischemic injury.

Peripheral arterial disease (PAD) and carotid artery stenosis (CAS) are both known to be specific manifestations of atherosclerosis<sup>[2]</sup>. The prevalence of PAD and CAS is 3-10% and 3% in Portugal, respectively<sup>[3]</sup>. We evaluated the population with CAS and investigated the prevalence of PAD in these patients.

### Methods

A retrospective institutional review of patients with carotid stenosis >50% that were followed at the CHVNG/E by Eco-Doppler during the year of 2017.

Eighty four patients (59 males and 25 females with a mean age of  $72,4 \pm 7,4$  years) out of 442 were submitted to a carotid duplex ultrasound that showed a stenosis >50% during the year of 2017. We evaluated demographics and co-morbidities data of these patients who were divided into two groups (>70% stenosis VS 50-70% stenosis). Statistical analysis was performed to determine the impact of different variables such as claudication, presence of distal pulse, ankle brachial index and co-morbidities.

Categorical variables are presented as frequencies and percentages. All reported P values are two-tailed, with P value of 0,05 indicating statistical significance. Statistical analysis was performed with the use of SPSS software, version 24.

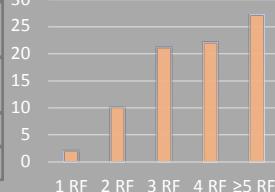
### Results

Data	n (%)
Hypertension	76 (90,5%)
Diabetes	48 (57,8%)
Dyslipidemia	70 (84,3%)
Smoking	47 (56%)
Obesity	14 (16,9%)
Cerebrovascular disease	25 (29,8%)
Coronary Disease	37 (44,6%)
Kidney Failure	7 (8,4%)
PAD	45 (53,6%)

Grade of intermittent claudication (n=45)



Number of patients with carotid stenosis by number of risk factors



Ankle brachial index in patients without distal pulse (n=52)

0,9 – 1,3	5 (9,6%)
0,4 – 0,9	41 (78,8%)
< 0,4	6 (11,5%)

Grade of carotid stenosis

unilateral	57,8%
bilateral	42,2%
50-70%	59 (35,1%)
70%	40 (23,8%)

### Conclusion

PAD is significant among patients with CAS (53,6%). In our study, we found that the female gender was the only variable significantly associated with the grade of stenosis ( $p < 0,05$ ) – women have a higher grade of stenosis. We found no statistically significant association between grade of stenosis and the prevalence of PAD, co-morbidities and symptoms.

1. Cottin, R. (2009). Pathologic Basis of Disease. Stanley L. Robbins, A.A. et al. (2017). “Prevalence of Significant Carotid Artery Stenosis in Patients with Significant Atherosclerotic Peripheral Arterial Disease.” Journal of Cardiovascular Diseases & Diagnosis.

2. Fernandes, J. F. e. (2017). RH ANGIOLOGIA E CRURGIÀ VASCULAR. R. Portugal. Portugal.

## ANEURISMA DA ARTÉRIA RENAL – O PAPEL DO AUTO-TRANSPLANTE

Maria Inês Sousa<sup>1</sup>, Ivone Silva<sup>2</sup>

<sup>1</sup>Instituto de Ciéncias Biomédicas Abel Salazar, <sup>2</sup>Professora Associada ICBAS

### INTRODUÇÃO

O aneurisma da artéria renal (AAR) constitui uma entidade rara, com uma prevalência de 0.1[1]-1.3%[2] em estudos angiográficos. Na sua maioria, estes aneurismas são assintomáticos e correspondem a achados incidentais.[2] A hipertensão é o sintoma mais comum,[3] ocorrendo as restantes manifestações predominantemente em contexto de rutura. De seguida, é descrito um caso clínico de uma doente com um AAR esquerdo, tratado com a técnica de auto-transplante ex vivo.

### CASO CLÍNICO

Mulher, 40 anos, com HTA renovascular pós-gravidez, medicada com AAS, ARA e diurético tiazídico. Foi submetida a embolização do AAR direito com coils e colocação de stent em AAR esquerdo.

O Angio-TAC das AR realizado depois mostrou patência do AAR esquerdo com 18x13,5mm ao nível da bifurcação, não recoberto pelo stent previamente implantado (Fig. 1).

As opções terapêuticas foram discutidas com a doente, tendo-se procedido a nefrectomia renal esquerda por via endoscópica, seguida de implantação renal na fossa ilíaca esquerda. O diagnóstico de AAR foi confirmado por estudo anatomo-patológico da peça operatória.

A intervenção cirúrgica e o pós-operatório decorreram sem intercorrências, com alta hospitalar ao sexto dia após a cirurgia e recomendações de manutenção da terapêutica domiciliária prévia, com AAS e anti-hipertensores. Ao décimo dia, fez controlo com eco-doppler abdominal, que revelou permeabilidade da artéria e veia renais, com fluxos arteriais e venosos de características normais. Até à data, a doente encontra-se normotensa e é seguida na Consulta Externa de Cirurgia Vascular.

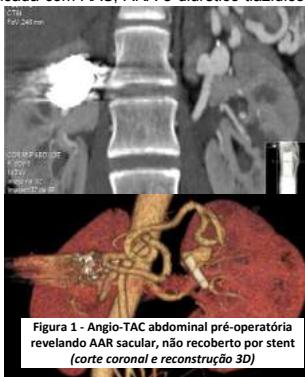


Figura 1 - Angio-TAC abdominal pré-operatório revelando AAR sacular, não recoberto por stent (corte coronal e reconstrução 3D)

### DISCUSSÃO

Em 19% dos casos, os AAR são bilaterais, e a bifurcação da AR é a sua localização mais comum.[4]

Admite-se a hipótese dos últimos estádios da gravidez predispor à formação de AAR; consequência de alterações hormonais e enzimáticas, associadas ao aumento da pressão intrabdominal.[5]

Devido à raridade dos AAR, não existe consenso quanto às indicações para tratamento invasivo, devendo a decisão de reparação ser individualizada.[6]

Todavia, como a principal indicação para tratamento é a prevenção de rutura, é habitual a reparação de aneurismas em indivíduos sintomáticos e em mulheres em idade fértil, devido ao risco aumentado de rutura. [7] O tamanho é um tema controverso, visto que alguns autores defendem a realização de intervenções para diâmetros >2cm, enquanto outros o encaram como um aspeto secundário. A par de outros fatores, a hipertensão renovascular costuma constituir uma indicação relativa.

Geralmente, a reparação ex vivo está reservada para os AAR com envolvimento intrarrenal ou hilar mais complexo, com segmentos arteriais distais inadequados para outras técnicas. A sua maior vantagem corresponde à possibilidade de realização de procedimentos de difícil execução.

Atualmente, a cirurgia aberta é considerada o gold standard para o tratamento, mas nos últimos anos a terapêutica endovascular tem-se assumido como uma alternativa valiosa, com redução da invasividade e das taxas de morbilidade e mortalidade.[6]

### BIBLIOGRAFIA

1. Tsalimpasis, N., et al. Endovascular vs open repair of renal artery aneurysms: outcomes of repair and long-term renal function. *J Am Coll Surg.* 2013; 217(2): p. 263-9.
2. Beroco, P.B., et al. Bilateral ex vivo repair and kidney autotransplantation for complex renal artery aneurysms: a case report and literature review. *Int J Urol.* 2014; 21(2): p. 219-21.
3. Goto, S., et al. Renal artery aneurysm and hypertension. *Am J Hypertens.* 2014; 27(1): p. 370-6.
4. Fraser, G.E. and H. Ponda. Spontaneous renal artery aneurysm rupture: an unusual cause of abdominal pain and syncope. *Emerg Med J.* 2009; 26(8): p. 619-20.
5. Henke, K.L., et al. Renal artery aneurysms: a review. *Am J Kidney Dis.* 2000; 35(1): p. 44-62; discussion 403-3.
6. Marone, E.M., et al. Is open repair still the gold standard in visceral artery aneurysm management? *Ann Vasc Surg.* 2011; 25(7): p. 936-46.
7. Yalcin, Y., et al. Endovascular management of iatrogenic renal artery aneurysm and arteriovenous fistula. *Saudi J Kidney Dis Transpl.* 2012; 23(4): p. 838-40.

## RESTENOSIS AFTER CAROTID ENDARTERECTOMY: WHAT IS THE BEST TREATMENT?

Maria João Quelhas; Marina Dias Neto, MD

Regent of the curricular unit of Angiology and Vascular Surgery - Armando Mansilha, MD, PhD

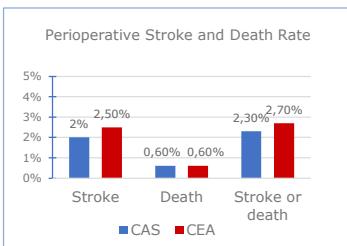
### Objective:

Restenosis after carotid endarterectomy (CEA) is associated with an increased risk of stroke and the management of this lesions poses a treatment challenge. Despite rate of restenosis at 2 years varies from 6% to 22% (depending essentially on the definition of restenosis), it is known that restenosis >70% (even in asymptomatic patients) have been related to an increased risk of ipsilateral stroke. The superiority of CEA vs carotid angioplasty and stenting (CAS) remains unclear, so we polled some literature evidence and compared outcomes after CAS and CEA.

### Methods:

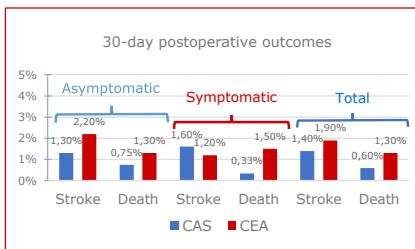
Two systematic review and meta-analysis and one population-based study (retrospective study) were studied to compare ipsilateral stroke rates and death.

### Results:



According to Fokkema et al, perioperative stroke or death did not differ between CAS and CEA (2,3% vs 2,7%, 95% CI: 0,4-1,8).

In addition, this meta-analysis did not show differences between symptomatic and asymptomatic patients, neither at restenosis during follow-up.



According to the population-based study from Arhuidese et al, mortality was significantly higher after CEA than CAS (1,3% vs 0,6%, P=0,04) and when stratified by preoperative symptoms, the difference between death rates was significantly higher for symptomatic patients that underwent CEA than CAS (1,5% vs 0,33%, P=0,04). At one-year outcomes, the multivariable Cox regression analysis showed higher mortality associated with CEA than with CAS (aHR: 2,17; 95% CI: 1,03-4,58; p=0,04).

The third article analysed showed that the presence of an untreated, asymptomatic restenosis >70% would be expected to be associated with 5% of late ipsilateral stroke at 37months. If all underwent re-intervention, a maximum of 4 or 5 ipsilateral strokes might be prevented at 47 months. So 95 of 100 undergoing CEA or CAS would ultimately undergo an unnecessary re-intervention.

### Conclusions:

The answer to our question remains unclear based on systematic review and meta-analysis but a population-based study showed higher mortality after CEA than CAS. On the other hand, the actual benefit from re-intervening seems to be small and would not prevent the majority of late ipsilateral strokes from occurring.

References:  
Arhuidese, L., Obeid, T., Nelim, B., Locham, S., Hicks, C. W., & Malas, M. B. (2017). Stenting versus endarterectomy after prior ipsilateral carotid endarterectomy. *Journal of Vascular Surgery*, 65(1), 1-11. <https://doi.org/10.1016/j.jvs.2016.07.111>

Fokkema, M. R., van der Velde, I. E. P., Ruijter, H. M. D., Greenwood, R. H. H., Schermers, M. L., Bots, M. L., ... De Borst, G. J. (2015). Stenting versus endarterectomy for restenosis following prior ipsilateral carotid endarterectomy: An individual patient data meta-analysis. *Annals of Surgery*, 261(1), 588-604. <https://doi.org/10.1093/annals/261.1.A0000000000000029>

Kumar, R., Batchelder, A., Sarazis, A., Abubahra, A. F., Rungab, P., Lat, B. K., ... Nayor, A. R. (2017). Restenosis after Carotid Interventions and its Relationship with Recurrent Ipsilateral Stroke: A Systematic Review and Meta-analysis. *Journal of Vascular Surgery*, 65(1), 1-11. <https://doi.org/10.1016/j.jvs.2016.07.111>

## ISQUEMIA MESENTÉRICA

Maria José Castro Soares<sup>1</sup>; Ivone Silva<sup>2</sup>

1- Estudante do 6º ano do MIM do ICBAS-UP; 2 – Professora Associada do ICBAS -CHUP

### INTRODUÇÃO

A Isquemia Mesentérica é uma patologia rara, representando menos de 1/1000 das hospitalizações. Caracteriza-se por dor abdominal intensa acompanhada de lactacidemia e leucocitose, com uma dissociação da intensidade dos sintomas com o quadro clínico. Está associada a elevadas taxas de morbi-mortalidade. O tratamento visa a restituição do normal fluxo sanguíneo e eventual necessidade de ressecção das áreas intestinais necrosadas.

### CASO CLÍNICO

#### Identificação

Sexo masculino, 58 anos, autônomo.

#### Antecedentes Pessoais

- Toxicodependente (heroína e cocaína);
- Tabagismo ativo (68 UMA);
- Infeção por HCV (seronegativo para HIV e HBV);
- Cardiomiotipatia dilatada com trombo no VE e depressão severa da FSVE.

#### História da Doença Atual

Recorre ao SU por quadro de dor abdominal intensa associada a anorexia com 3 dias de evolução. Durante a permanência no SU apresentou episódio de síncope.

Ao exame objetivo apenas sinais de desidratação grave.

Avaliado por Cirurgia Geral e Vascular, com indicação para tratamento conservador (fluidoterapia, analgesia e antibioterapia) e vigilância na UCIMC. Evoluiu posteriormente para quadro de choque hipovolêmico com necessidade de suporte vasopressor e agravamento dos sinais de irritação peritoneal.

#### Laparotomia exploradora.



Fig. 2 – Isquemia intestinal extensa

Sem indicação para colectomia. Instituídas medidas de conforto.

Confirmado o óbito 8h após a admissão.

### DISCUSSÃO

- A isquemia mesentérica aguda é uma emergência vascular com uma elevada taxa de morbi-mortalidade;
- A instalação súbita de sintomas é frequentemente já numa fase avançada da isquemia intestinal;
- O tratamento na fase aguda inclui fluidoterapia, antibioterapia e analgesia;
- A laparotomia exploradora está indicada **sempre** que a clínica for sugestiva de isquemia intestinal. O doseamento de D-dímeros ajuda no diagnóstico precoce;
- Em situações de necrose intestinal muito extensa a decisão de não revascularização pode estar justificada.



Fig. 1 – Angio TAC: êmbolo na Artéria mesentérica superior

#### Bibliografia

- Wiers, M. C. (2010). Acute mesenteric ischemia: diagnostic approach and surgical treatment. *Seminars in Vascular Surgery*, 23(1), 9–20. <https://doi.org/10.1053/j.semvasurg.2009.12.002>  
 Kirkkainen, J. M., & Acosta, S. (2017). Acute mesenteric ischemia (Part II) – Vascular and endovascular surgical approaches. *Best Practice & Research: Clinical Gastroenterology*, 31(1), 27–38. <https://doi.org/10.1016/j.bpg.2016.11.003>  
 Zhao, Y., Yin, H., Yao, C., Deng, J., Wang, M., Li, Z., & Chang, G. (2016). Management of Acute Mesenteric Ischemia. *Vascular and Endovascular Surgery*, 50(3), 183–192. <https://doi.org/10.1177/1538574416639151>

## Introduction

Unplanned readmission to hospital after recent discharge from a medical facility may be considered a surrogate of poor quality of healthcare provided during the index hospitalization and preventing it is a major target for limiting health care costs. Over past 15 years, endovascular abdominal aortic aneurysm (EVAR) has become the first line treatment for AAA2 and has become one of the most commonly performed vascular surgery operations.

The aim is to examine the readmission rates after EVAR and to determine the preoperative, intra-operative and post-operative factors associated with increased risk of hospital readmission.

## Methods

An electronic search was performed using the MEDLINE database from 2013 to 2018. The search included the terms "risk factors", "predictors", "readmission", "rehospitalization", "EVAR", "endovascular procedure", "endovascular repair", "abdominal aortic aneurysm", "aortic aneurysm" associated with the Boolean operators AND or OR.

The literature search identified 12 abstracts, of which 12 full texts were assessed for eligibility. Eight primary studies met the inclusion criteria for reporting predictors of readmission or aortic complications. The reference lists of articles obtained were also searched to identify further relevant citations.

## Results

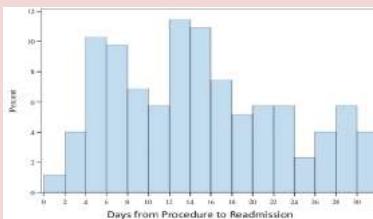
There are a few studies in the literature that focus on the policy-relevant outcome of 30-day readmission for AAA repair. According to Aziz et al.<sup>3</sup>, 30-day readmission after an elective EVAR is approximately 8% and roughly half of these readmissions occur within two weeks after discharge from hospital (Figure 1). This results are consistent with the rates presented by Chen et al.<sup>4</sup> (8.2%). By contrast, Greenblatt<sup>5</sup> and Vogel<sup>6</sup> found higher rates (13.3% and 11.6%, respectively). 30-day post-op readmission rates between EVAR and hypogastric artery embolization w/ EVAR were similar (7.9% vs 7.5%; P = .79).<sup>7</sup>

Among preoperative factors, patients with higher BMI, longer duration of time from hospital admission to operation and history of prior aortic surgery were associated with significantly higher risk of readmission.<sup>3</sup>

Other studies found a strong association in patients with diabetes, recent CHF event, chronic steroid use.

end-stage renal disease, female sex and older age.<sup>4,5,8,9,10,11,12</sup> Among intraoperative variables, high ASA class and attempted percutaneous access converted to open femoral access were associated with significantly high risk of readmission.<sup>3</sup> Moreover, Faizer et al.<sup>9</sup> found that especially those who developed infection during initial hospitalization are at a higher risk of readmission. Several postoperative factors were found to be associated with increased risk of readmission: UTIs, superficial and deep surgical site infections, unplanned return to the operating room, MI and DVT.<sup>3,4,8,9,10</sup>

The most common reason for readmission after EVAR was wound complication: more than 35% of patients with a wound complication were readmitted within 30 days.<sup>4,8,13</sup> Moreover, the strongest predictor of early readmission was the discharge destination (the odds of readmission for patients discharged to a skilled nursing facility were more than 2 times those for patients discharged home without nursing care<sup>5,10</sup>).



### **Conclusions**

Thirty-day readmission is common after AAA repair, and postoperative events are strong predictors of readmission. It was found that surgical site complications are a significant portion of the indications identified for readmission and this suggests that health care providers should aggressively target these patients to improve discharge advices, establish close surveillance while at home and arrange early reexamination, with the objective of lowering mortality and readmission after abdominal aortic surgery. As suggested by Brooke et al.<sup>14</sup> preventing readmissions for vascular surgery patients requires a planned strategy to identify at-risk patients, optimizing post-operative care and planning discharge from hospital after a careful review of all patient factors. Strategy to prevent a readmission begins long before the actual surgery.

## References

- beginning of the study period.

2. Dukay, S., K. Wilensky, C. Pachepsky, and J. G. Stiglitz. 2013. The effects of the sequester on health care spending after end-of-period repair of abdominal aortic aneurysms. *Journal of Health Politics, Policy and Law* 38(1): 159–177.

3. Chan, S. L., K. Wilensky, J. G. Stiglitz. 2013. Perceptions as risk factors for hospital readmission after end-of-period repair of abdominal aortic aneurysm – a qualitative study. *Journal of Health Politics, Policy and Law* 38(1): 197–220.

4. Chan, S. L., K. Wilensky, J. G. Stiglitz. 2013. Perceptions as risk factors for hospital readmission after end-of-period repair of abdominal aortic aneurysm. *Veterans Health Services Research and Development* 20(4):e350.

5. Wilensky, K., S. L. Chan, J. G. Stiglitz. 2013. Perceptions of consequences of hospital readmission after end-of-period repair of abdominal aortic aneurysm. *Veterans Health Services Research and Development* 20(4):e350.

6. Wilensky, K., S. L. Chan, J. G. Stiglitz. 2013. Perceptions of consequences of hospital readmission after end-of-period repair of abdominal aortic aneurysm. *Journal of Health Politics, Policy and Law* 38(1): 197–220.

7. Stiglitz, J. 2013. Impact of hospital readmission on long-term survival after end-of-period repair of abdominal aortic aneurysm. *Annals of Vascular Surgery* 24(2): 203–209.e1–e10. doi:10.1016/j.avsg.2012.10.012.

8. Polak, P., J. M. Pollock, D. H. Weisz, et al. 2013. Readmissions and discharge medications: metrics for the assessment of quality of care. *Critically Ill Patients* 20(3):49–44.

9. Wilensky, K., S. L. Chan, J. G. Stiglitz. 2013. Perceptions of consequences of hospital readmission after end-of-period repair of abdominal aortic aneurysm. *Veterans Health Services Research and Development* 20(4):e350.

**References**

17-19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## CAROTID ARTERY STENOSIS: WHAT ABOUT SCREENING?

### BACKGROUND

#### Epidemiology

In Europe, cerebrovascular stroke causes 1.1 million deaths annually. It is the commonest cause of acquired disability in adults, with more than half of stroke survivors being dependent on others for everyday activities.

#### Rationale for screening

Duplex Ultrasound

Latent phase and natural history understood	Reliable and acceptable screening test
Accepted treatment and agreed policy	Cost-effective intervention

Assuming that patients aged >80 years with asymptomatic stenosis do not benefit from CEA (carotid endarterectomy), the yield for finding patients with >70% stenosis through unselected screening of patients aged <80 years would be <2%, which is not enough to be cost-effective or clinically effective. However there is room for a selective screening addressing a population with specific risk factors.

#### Selective screening - independent predictors of a >50% CAS

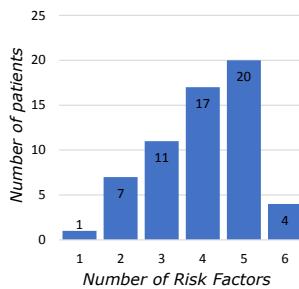
Peripheral arterial disease	Diabetes	Early onset atherosclerosis	Hypertension
Coronary Heart Disease	Aged > 65 years	Hyperlipidaemia	Tobacco smoking

### METHODS

All 60 patients submitted to carotid endarterectomy (CEA) for asymptomatic carotid artery stenosis in the past two years were retrospectively reviewed.

### RESULTS

Gender	Female	22 (37%)
	Male	38 (63%)
Age (mean +/- SD)		72 +/- 7,34
CV Risk Factors	Hypertension	57 (95%)
	Diabetes	24 (40%)
	Tobacco smoking	28 (47%)
	Hyperlipidaemia	46 (77%)
Affected territories	Ischaemic Heart Disease	29 (48%)
	Cerebrovascular stroke	19 (32%)
	Peripheral arterial disease	21 (35%)



### CONCLUSIONS

Selective screening is based in the knowledge of the systemic nature of atherosclerotic disease. In this study patients had a mean of 4 cardiovascular risk factors and 70% of them had other affected territories (mean of 1,08). This finding is in accordance with findings from literature. Every risk factor acts as selective criteria, with each being an independent predictor of carotid artery stenosis >50%.

REFERENCES: A.R. Naylor et al, Management of Atherosclerotic Carotid and Vertebral Artery Disease: 2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS), Eur J Vasc Endovasc Surg (2017): 1-79

Marta Alexandra Cerqueira Silva

Andreia Pires Coelho - IFE Angiologia e Cirurgia Vascular

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

## CONTRAST-ENHANCED ULTRASOUND AFTER ENDOVASCULAR AORTIC REPAIR (EVAR)

Marta Dias-Vaz, Ricardo Castro-Ferreira.  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha.

### Introduction

#### Endovascular repair of abdominal aortic aneurysms (EVAR)

EVAR is a minimally invasive and effective treatment method for patients with abdominal aortic aneurysms and suitable anatomy<sup>1</sup>.

After EVAR, patients need lifelong post-interventional imaging follow-up to rule out complications. Endoleaks, i. e., arterial blood flow between the stent prosthesis and the aneurysm sac, are the most common complication in the postoperative period<sup>2,3</sup>.

#### Computed Tomography Angiography (CTA)

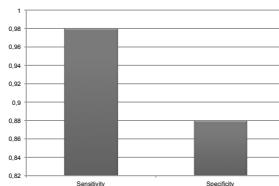
The current gold-standard in diagnostic imaging after EVAR is CTA. Recently, some of its limitations, such as cumulative ionizing radiation exposure and dependence on thyroid and renal function, have urged the need for new and valid alternatives<sup>4,5</sup>.

#### Contrast-Enhanced Ultrasound (CEUS)

Meanwhile, CEUS has emerged as a viable, fast and cost-effective imaging alternative for the follow-up and the detection of endoleaks after EVAR. Furthermore, CEUS is a non-ionizing radiation examination and enables realtime evaluation of blood flow with reasonably high spatial resolution for abdominal aortic imaging<sup>6,7</sup>.



**Figure 1:**  
Patient with endoleak after EVAR: native B-mode ultrasound does not show an indication of endoleak (above); CEUS shows an endoleak through a left-sided lumbar artery (below). Adapted from Rübenhauer et al<sup>8</sup>.



**Figure 2:** Bivariate meta-analysis: pool sensitivity 0.97 (95% CI: 0.90-0.99) and specificity 0.88 (95% CI: 0.78-0.94) of CEUS for detection of endoleaks following EVAR. Adapted from Mirza TA et al<sup>7</sup>.

### Results / Discussion

CEUS is a highly sensitive and sensible tool for detection of endoleaks, providing a valuable alternative to CTA as a first-line diagnostic tool for follow-up. However, the fact that it cannot always be used to assess graft migration or endograft kinking should be taken into account<sup>6,9</sup>.

If abnormalities such as endoleak development or an increase in aneurysm sac size are detected with CEUS, CTA followed by angiography should be performed for therapeutic purposes<sup>8</sup>.

### Conclusions

In summary, CEUS demonstrates an equal or even superior diagnostic performance compared to CTA. Considering the very high sensitivity and specificity of CEUS for detection of endoleaks, one plausible strategy would be to perform CEUS imaging post-EVAR as first line surveillance imaging modality combined with periodical routine CTA studies.

#### REFERENCES

- [1] Prinsen M, Verhoeven EL, Buff J et al. A randomized trial comparing conventional and endovascular repair of abdominal aortic aneurysms. *N Engl J Med* 2004; 351: 1697-1707.
- [2] White RA. Endograft surveillance: a priority for long-term device performance. *J Endovasc Ther* 2009; 7: 522-523.
- [3] White RA. Endograft surveillance: a priority for long-term device performance. *J Endovasc Ther* 2009; 7: 522-523.
- [4] Mirza TA, Karthikesalingam A, Jackson D et al. Duplex ultrasound and contrast-enhanced ultrasound versus computed tomography angiography for the detection of endoleaks after endovascular aortic repair (EVAR): a systematic review and bivariate meta-analysis. *European journal of vascular and endovascular surgery*. 2013; 46: 35-45.
- [5] White RA, White CJ, Lederle RA et al. Endovascular aortic repair: a critical review of the literature. *Crit Rev Diagn Imaging*. 2009; 26(11):52-6.
- [6] Rübenhauer M, Kretschmer L et al. CEUS: what is to role in abdominal aortic disease? *Med Ultrason* 2010; 17: 419-421.
- [7] Rübenhauer M, Kretschmer L et al. Contrast-Enhanced Ultrasound in the Follow-Up of Endoleaks after Endovascular Aortic Repair (EVAR). *Ultrashall Med* 2017 Jun;38(3):244-254.
- [8] Mirza TA, Karthikesalingam A, Jackson D et al. Duplex ultrasound and contrast-enhanced ultrasound versus computed tomography angiography for the detection of endoleaks after EVAR: systematic review and bivariate meta-analysis. *Eur J Vasc Endovasc Surg* 2010 Apr;39(4):418-28.

## SEXUAL DYSFUNCTION AFTER EVAR AND OPEN REPAIR OF ABDOMINAL AORTIC ANEURYSMS

Marta Henriques Costa; Jacinta Campos, MD

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

Surgical intervention in the treatment of abdominal aortic aneurysm (AAA) can affect sexual function, with an important impact in patient's life quality. The impairment after open repair (OR) has been mostly attributed to autonomic nerve injury and to the occlusion of the internal iliac artery and after EVAR only to the last. Despite this, it seems to exist a lack of information given to or understood by the patients regarding this potential side effect.

### AIM

The aim of this study is to investigate the preoperative information given about sexual function and to evaluate and characterize the sexual dysfunction of patients submitted to AAA repair.

### METHODS

An observational retrospective study including all male patients, with age < 80 years old, submitted to AAA repair during 2015 at Centro Hospitalar de Vila Nova de Gaia, was performed. Patients having previous sexual dysfunction and being impossible to reach a phone call were excluded. A questionnaire, Male Sexual Function 4-item (MSF-4), was applied by telephone contact to 19 patients. The instrument consists of the following questions: Interest in sex? Quality of erection? Achieving orgasm? Achieving ejaculation? Each question could be answered with the alternatives: very strong (0); strong (1); moderate (2); weak (3); very weak (4); or none (5). One question focusing on the preoperative information given were also added: Have you received any information about any potential change on the sexual function in connection with the surgical procedure? Paired sample t-test and simple unpaired t-test were used in the analysis. A *p* value lower than 0.05 was set as significant for both tests used.

### RESULTS

A total of 19 patients were included in this study with a 95% response rate. The average age of these patients was 65 years for the OR group (*n*=6) and 72 years for the EVAR group (*n*=12), (*p*=0,049). Most patients were hypertensive (78%) and smokers (67%).

Table II summarizes the results of the survey and they should be interpreted as follows: the higher the mean, the greater the loss of function perceived.

**Table I. Patients' age and risk factors with P values between groups**

	EVAR ( <i>n</i> =12)	Open Repair ( <i>n</i> =6)	P value
Mean age (years)	72	65	0,049
Pre-Op Information	1	2	0,018
Hypertension	10	4	0,569
Dislipidemia	5	5	0,152
Coronary Disease	4	0	0,245
Diabetes	4	0	0,245
Tobacco smoker	6	6	0,054

**Table II. Patients' reported interest in sex, quality of erection, and achievement of orgasm and ejaculation before and three years after surgery**

	EVAR ( <i>n</i> =12)		Open Repair ( <i>n</i> =6)		EVAR vs OR
	Mean ± SD	Two-tailed P value	Mean ± SD	Two-tailed P value	
Interest in sex (follow up – baseline)	1,000 ± 0,389	0,026	1,667 ± 0,615	0,042	0,355
Quality of erection (follow up – baseline)	0,833 ± 0,718	0,002	2,000 ± 0,683	0,033	0,051
Achieving orgasm (follow up – baseline)	0,917 ± 0,313	0,014	1,500 ± 0,619	0,060	0,222
Achieving ejaculation (follow up – baseline)	0,750 ± 0,279	0,021	2,000 ± 0,730	0,041	0,069
Total (follow up – baseline)	3,500 ± 0,802	0,001	7,167 ± 2,315	0,027	0,080

### DISCUSSION | CONCLUSION

The majority of patients (83%) reported that they did not receive preoperative information about potential implications of the procedure on sexual function, being that EVAR patients received significantly less information (*p*=0,018). Following the intervention, all the parameters tested were significantly decreased in both procedures, according with previous studies, predicting an important impact of this issue in patient's life quality. No significant differences were found between the two groups. These results should be interpreted with caution, because of the small number of patients interviewed and the retrospective nature of the study, but it shows the importance of the question, and raises awareness for the need to inform patients about this potential complication before the procedure. New studies on the matter addressing these limitations and also including women should be performed.

Peterson, M. Prospective follow-up of sexual function after elective repair of abdominal aortic aneurysms using open and endovascular techniques. Western Vascular Society, 2009  
Marquis, P. Reproducibility and Clinical and Concurrent Validity of the MSF-4. Value in health, 2001  
Rignier, P. Sexual Dysfunction after AAA surgical repair: Current Knowledge and Future Directions. Eur J Vasc Endovasc Surg, 2018

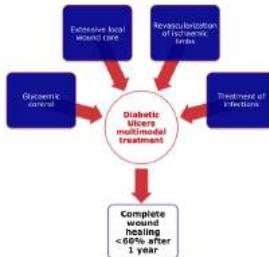
## HYPERBARIC OXYGEN FOR THE TREATMENT OF DIABETIC FOOT ULCERS

### Introduction

Hyperbaric oxygen therapy (HBOT) has been suggested as a valuable addition to conventional treatment and involves intermittent administration of 100% oxygen, usually in daily sessions of 90 minutes each, at pressures of 1.5-3.0 atmospheres absolute in an airtight cabin.

### Objective

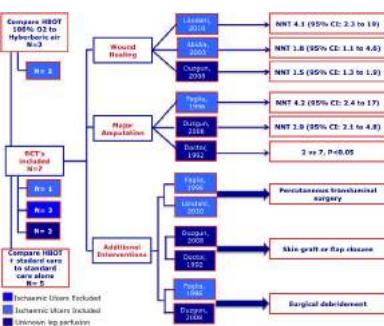
Review and assess the additional value of hyperbaric oxygen therapy (HBOT) in promoting the healing of diabetic foot ulcers and preventing amputation.



### Methods

We performed a Pubmed search reviewing the most recent clinical literature reporting the effectiveness of adjunctive HBOT regarding wound healing, amputations and additional interventions.

### Results



In the 7 randomized clinical trials (RCT's) reviewed, no increased rate in wound healing has been demonstrated in either 2 trials that excluded patients with ischaemic diabetic foot ulcer. 3 studies reported reduction in wound size. No effect on amputation rates was observed in 1 trial, which included ischaemic ulcers, and in both trials that only included patients with adequate peripheral blood circulation. Additional interventions were reported in 4 trials. 5 trials reported adverse events of HBOT and 2 trials reported no adverse events.

### Conclusion

Current evidence supports some effectiveness of HBOT in improving the healing of diabetic foot ulcer in patients with concomitant ischemia. However it's difficult to draw any definitive conclusion. On the published trials, populations, interventions and outcomes were heterogeneous making it difficult to pool data and compare results. Larger trials of higher quality are needed before implementation of HBOT in routine clinical practice in patients with diabetic foot ulcers can be justified.

- R.M. Stoekenbroek, et al. **Hyperbaric Oxygen for the Treatment of Diabetic Foot Ulcers: A Systematic Review**. Eur J Vasc Endovasc Surg. 2014 Jun; 47(6): 647.
- Health Quality Ontario. **Hyperbaric Oxygen Therapy for the Treatment of Diabetic Foot Ulcers: A Health Technology Assessment**. Ont Health Technol Assess Ser 2017; 17(5): 1–142.

# CAROTID ENDARTERECTOMY: PROGNOSIS

Nuno Sousa, Dr. João Rocha Neves.

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha.

## Introduction

Cerebrovascular accidents (CVAs) are, in 10-15% of the cases, caused by the deposition of atherosclerotic plaques in the internal carotid arteries. To prevent these ischemic strokes, carotid endarterectomy as a prophylactic operation has become commonly used. However, there are still controversies regarding the influence of some of the procedure's parameters over the morbidity, mortality and prognosis of these patients. (1, 2, 4)

## Parameters

### Loco-regional Anaesthesia

- (+) • Lower risk of cerebral ischemia (due to continuous evaluation of patient's neurological status).(2)
- (-) • Possible complications (intrathecal or intravascular injection; respiratory compromise related to phrenic nerve paralysis; systemic local anaesthetic toxicity (deep CPB); (2, 3)

### General Anaesthesia

- (-) • Higher risk of cerebral ischemia.(2)
- (-) • Higher tendency to use a carotid artery shunt.(2)

### Use of Patch

- (+) • More effective than primary closure in preventing: perioperative ischemic strokes and carotid thrombosis, and late restenosis.(1)
- (-) • May prolong operative and clamping time and may be unnecessary in certain patients.(1)

### Carotid Artery Shunt

- (+) • Higher cerebral protection.(2)
- (-) • Possible complications: Acute (3%): embolization of air or plaque, intimal tears and carotid dissection; Long term: restenosis.(2)

## Results

Study Name	Study Type	Parameters Evaluated	Results
Rerkasem K et al.(3)	Meta-analysis (10 RCTs, 4335 surgeries)	Loco-regional Vs General anaesthesia	No statistical difference between the two groups regarding risk of stroke, of myocardial infarction and death, during or soon after surgery.
Mannheim et al.(5)	RCT (422 surgeries)	Primary Closure	Restenosis ( $\geq 70\%$ ) at >3-months: 8.6% (n=14)
		Patch	Restenosis ( $\geq 70\%$ ) at >3-months: 2.2% (n=4)
Mendonça et al. (2014)(1)	RCT (125 surgeries)	Loco-regional anaesthesia	Perioperative mortality: 0.8% (n=1) Ischemic strokes: 1.6% (n=2) Myocardial Infarction: 1.6% (n=2)
		Patch	Restenosis ( $\geq 70\%$ ) at 32-months: 2.4% (n=3) Perioperative carotid thrombosis: 0% (n=0)

## Conclusions

- Although loco-regional and general anaesthesia didn't seem to differ regarding stroke and death risk, the possibility of monitoring the patient's neurological status during loco-regional anaesthesia makes it a comparatively safer technique.(2, 3)
  - As a result, surgeons who opt for general anaesthesia must routinely use a carotid artery shunt or a monitoring technique (e.g.: EEG) to evaluate the risk of an ischemic stroke.(1, 4)
- The use of a patch to close the internal carotid artery was proven to be more effective than primary closure in decreasing the risk of late restenosis.(5)
- Criteria for use of shunt is not straightforward, and may be based on clinical judgment and on the monitorization of cerebral perfusion or awake neurologic status. Moreover, it has not been proven to reduce morbidity and mortality.(1, 2)

1.Mendonça CT, Fortunato JA, Jr., Carvalho CA, Weingartner J, Filho OR, Rezende FF, et al. Carotid endarterectomy in awake patients: safety, tolerability and results. Rev Bras Cir Cardiovasc. 2014;29(4):574-80. 2.Tawfif QA, Ismaili MA, Ahmed MA. Prevention of intra-operative Cerebral Ischemia during Carotid Endarterectomy, Loco-regional versus General Anesthesia. Oman Med J. 2012;27(3):254-5. 3.Rerkasem K, Bond R, Rothwell PM. Local versus general anaesthesia for carotid endarterectomy. Cochrane Database Syst Rev. 2004;(2):CD000124. 4.Wright G, Naylor AR, Rico JB, de Borst GJ, Debus S, de Haro J, et al. Editor's Choice - Management of Atherosclerotic Carotid and Vertebro Artery Disease: 2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS). Eur J Vasc Endovasc Surg. 2018;55(1):3-81. 5.Mannheim D, Weller B, Bahadim E, Karmeli R. Carotid endarterectomy with a polyurethane patch versus primary closure: a prospective randomized study. J Vasc Surg. 2005;41(3):403-7; discussion 7-8.

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## TREATMENT OF TYPE II ENDOLEAKS FOLLOWING EVAR

Nuno Telo Preto Ramos; J. Oliveira Pinto, MD

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### Introduction

Endovascular aneurysm repair (EVAR) has emerged as the new standard of care in the management of the majority of infrarenal non-ruptured and ruptured Abdominal aortic aneurysms (AAA) [1]. However, re-intervention rates following EVAR are non-negligible, and as a result this has continued to affect the morbidity and cost-effectiveness of this management strategy. The majority of re-interventions following EVAR are related to peri-operative aortic aneurysm sac endoleaks. It is estimated that one in four patients who undergo EVAR has an endoleak of some kind.

Table 1

Overview of type II endoleaks:

Endoleak	Description
Type Ia	Blood flow is the aneurysm sac from the proximal and proximally
Type Ib	Blood flow in the aneurysm sac due to incomplete occlusion
Type IIa	Flow of the aneurysm sac due to retrograde flow from a single or multiple arterial branches
Type IIb	Flow of the aneurysm sac due to retrograde flow from multiple arterial branches
Type IIc	Blood flow in the aneurysm sac due to leakage around the stent graft
Type Id	Leaked fluid is seen in the peritoneal cavity
Type V	Aneurysm sac expansion with no evidence of coil embolization

Table 1- Types of endoleaks. [2] Type II endoleaks is more reserved, and its surveillance, management, and treatment strategies are variable.[2]

### Treatment of Type II Endoleaks

**Prophylactic embolization** of arterial branches and collaterals that may ultimately lead to a type II endoleak following EVAR. The most common example of this is pre-EVAR embolization of the internal iliac artery (fig 1). [3] Fabre et al. [4] demonstrated that prophylactic embolization in patients who are at high risk for developing a Type II endoleak, have resultant decrease of postoperative

endoleak rate, overall aneurysm sac size, and need for secondary procedures at 6 month follow-up.

**Secondary** post-EVAR interventions intentionally embolize the inflow and outflow of collateral arterial branches associated with the aortic aneurysm sac. Trans-lumbar intra-aortic sac liquid embolic agents [such as *N*-butyl cyanoacrylate (NBCA) glue or ethylene vinyl alcohol (Onyx, Micro Therapeutics)] are reported to have high success rates of >80% in embolizing target vessels, but require a unique kill set and a high level of operator expertise. CT guided trans-lumbar aortic aneurysm sac cannulation is heavily relied on with this technique.

Another method for the treatment is **trans-arterial coil embolization**, using detailed angiography collateral arterial networks may be selectively catheterized to facilitate advancement of varied coil sizes to vessels suspected of providing either inflow or outflow to the Type II endoleak, which is also a operator dependent technique.[5]

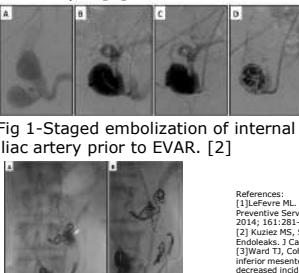


Fig 1-Staged embolization of internal iliac artery prior to EVAR. [2]

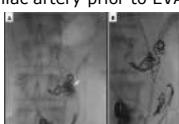


Fig 2- Trans-catheter coil embolization of the inferior mesenteric artery. [2]

Open and laparoscopic techniques may not completely resolve the endoleak.

Aneurysm sac rupture is rarely described to result from a persistent Type II endoleak, but in emergent situations, conversion to open AAA repair with graft explantation offers the most definitive method for repair.

Recently, emerging technology using endovascular aneurysm sealing (EVAS) demonstrated a significant decrease in post-operative Type II endoleak rate, and need for secondary interventions, like with The Endologix Nellix® EVAS. [5]

### Conclusion

Large number are benign in nature and spontaneously regress and/or resolve, but a subset can be hemodynamically significant requiring further surveillance and management.

- A three-phase CTA is a widely accepted method for detecting and diagnosing Type II endoleaks. (Percutaneous angiographic may be necessary);
- Emerging EVAS technology may provide a novel platform for AAA repair that may further dramatically decrease Type II endoleak rates.

#### References:

- [1]Leiberman HL, Force USPSTF. Screening for abdominal aortic aneurysm: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 2014;161:281-290. [PubMed: 24957320]
- [2]Kuziel MS, Sanchez LA, Zayed MA (2016) Abdominal aortic aneurysm: Type II Endoleak prevention with coil embolization during endovascular aneurysm repair: retrospective analysis of 200 cases. J Vasc Interv Radiol. 2016;27:295-301. [PubMed: 26902565]
- [3]Jward TJ, Cohen S, Fischer-Matthews AM, Kim E, Nowakowski PS, et al. Preoperative inferior mesenteric artery embolization before endovascular aneurysm repair: does it reduce the incidence of type II endoleak? J Vasc Surg. 2013;57:24-29.e1-24.e2. [PubMed: 23373897]
- [4]Fabre D, Fadel E, Brendt P, Handi S, Caro AG, et al. Type II endoleak prevention with coil embolization during endovascular aneurysm repair in high-risk patients. J Vasc Surg. 2013;57:24-29.e1-24.e2. [PubMed: 23373897]
- [5]Solis MM, Ayerdi J, Babcock GA, Parra JR, McLaughey RB, et al. Mechanism of failure in the treatment of type II endoleak with percutaneous coil embolization. Journal of Vascular Surgery. 2002; 36:485-491. [PubMed: 12218971]

## THE ROLE OF THROMBOLYSIS IN THE ACUTE TREATMENT OF DEEP VEIN THROMBOSIS

Paula Matias, Ricardo Castro Ferreira

Regente da Unidade Curricular de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### INTRODUCTION

Deep vein thrombosis (DVT) is a major health problem that can lead to venous thromboembolism (VTE), whose prevalence has increased 30% in the last years. Annually it is estimated, that in the European Union 1 million VTE events occur<sup>1</sup>. The post-thrombotic syndrome (PTS) is a frequent late complication of DVT that develops approximately within two years in half of the patients with a iliofemoral DVT, despite the use of adequate anticoagulation<sup>2</sup>. This syndrome causes swelling and chronic limb pain that can progress and cause leg ulcers, major disability and reduction in the quality of life<sup>3</sup>. Randomized controlled trials were done to understand if thrombolysis in the acute treatment of DVT could reduce the frequency of PTS and improve the patient outcome. Thrombolysis can be used systemically, by catheter-directed thrombolysis (CDT) or pharmacomechanical CDT.

### RESULTS

Catheter-directed thrombolysis is safer than systemic drugs because it allows the reduction of bleeding events due to the administration of the thrombolytic agent directly within the clot.<sup>4</sup> The **CaVeNT study**, a randomized controlled trial (RCT), found an absolute risk reduction of 14.4% in the frequency of PTS after a first time iliofemoral DVT in the group that used CDT in addition to anticoagulation and the number needed to treat was 7<sup>5</sup>. CDT restores the venous patency faster than anticoagulation<sup>7</sup>. However no difference were found regarding long-term quality of life<sup>5</sup>.

The **ATTRACT study**, was also an important RCT in this subject which concluded that pharmacomechanical CDT did not result in reduction of PTS frequency but decreased its severity, decreasing the level of leg pain and swelling in the month after acute treatment. Unfortunately it also leads to a higher number of major bleeding<sup>6</sup>.

### CONCLUSIONS

Iliofemoral DVT constitute a quarter of all DVT and carry a higher risk of embolic and post-thrombotic complications<sup>2</sup>.

The European Society of Cardiology recommends that adjuvant **CDT** may be considered in patients with **iliofemoral DVT with symptoms less than 14 days and life expectancy > 1 year** if performed in experienced centers<sup>4</sup>.

The American College of Chest Physicians recommends anticoagulation therapy alone over CDT for patients with acute proximal DVT of the leg.

The American Heart Association recommends CDT for first-line treatment of selected patients with **acute iliofemoral DVT (<21 days from the onset of symptoms), limb-threatening compromise, and/or rapid thrombus extension or symptomatic progression**<sup>7</sup>. All of this recommendations should be taken with caution because their level of evidence is low.

CDT in carefully selected patients could be a cost-effective adjunct to traditional anticoagulation mainly in **younger patients with acute iliofemoral DVT and long-life expectancy**. The main complication of CDT is bleeding, intracranial bleeding is rare (<1%) but could be fatal. There is no evidence that CDT increases the risk of pulmonary embolism<sup>7</sup>.

Pharmacomechanical CDT may reduce the risk of bleeding by lowering the dosage of thrombolytic. Furthermore, this technique could reduce treatment time and associated costs of therapy compared with CDT<sup>7</sup>.

Future studies are needed to a better understanding of which patients with DVT will have a benefit from CDT or pharmacomechanical CDT<sup>6</sup> instead of the classical treatment with anticoagulation alone.

(1) Mark J, Geerts MD et al. Endovascular Management of Deep Vein Thrombosis with Recombinant Thrombolytic. Final Report of the Prospective Multicenter PEARL Registry. *J Vasc Interv Radiol* 2015; 26(10):1323-1330.

(2) T Rayman FG et al. Iliofemoral Deep Vein Thrombosis. *Journal of the American College of Cardiology* 2010; 55(18):1873-1881.

(3) Vedantham S, Goldhaber SZ, Julian JA, et al., on behalf of the ATTRACT Trial Investigators. Pharmacomechanical Catheter-Directed Thrombolysis for Deep-Vein Thrombosis. *N Engl J Med* 2017; 377:2240-52.

(4) Mazzolini L, Aboyan V, Ageno W, et al. Diagnosis and management of acute deep vein thrombosis: a joint consensus document from the European society of cardiology working groups of aorta and peripheral vascular diseases and pulmonary hypertension. *Eur Heart J* 2016; 37:2240-52.

(5) Torné Ender et al. Long-term outcome after additional catheter-directed thrombolysis versus standard treatment for acute iliofemoral deep vein thrombosis (the CaVeNT study): a randomised controlled trial. *Lancet* 2012; 379: 31-38.

(6) Pavan Kavali, MD, Suresh Vedantham. What is the Best Treatment to Prevent Post-Thrombotic Syndrome? *Journal of the American College of Cardiology* 2018; 73(Suppl 3): S228-S237.

(7) Drew Fleck et al. Catheter-directed thrombolysis of deep vein thrombosis: literature review and practice considerations. *Cardiovasc Diagn Ther* 2017 Dec; 7(Suppl 3): S228-S237.

## CAROTID TREATMENT IN ADMINISTRATIVE DATABASES A COMPREHENSIVE REVIEW

### Introduction

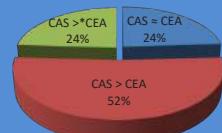
Since 2011, AHA/ASA guidelines consider Carotid artery stenting (CAS) as a therapeutic alternative to Carotid Endarterectomy (CEA) in patients with symptomatic carotid artery stenosis if the anticipated rate of perioperative stroke or mortality is less than 6 % and asymptomatic carotid artery stenosis when the rates are less than 3%. However, most randomised trials comparing CAS to CEA have reported higher rates of morbidity and mortality in the CAS groups. We aim to compare that rates in the real world.

21 contemporary (2008-2015) administrative dataset registries

### Results

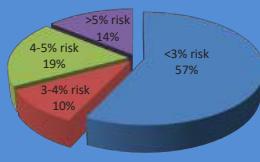
"Average risk for CEA" asymptomatic patients  
(21 registries)

#### Procedural stroke/death rates



\*a formal statistical comparison was not reported

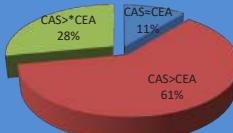
#### Procedural stroke/death rates after CAS



CEA risk>3% in only 1/21 registries – 5%

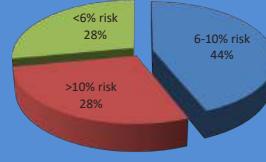
"Average risk for CEA" symptomatic patients  
(18 registries)

#### Procedural stroke/death rates



\*a formal statistical comparison was not reported

#### Procedural stroke/death rates after CAS



CEA risk>6% in 2/18 registries – 11%

"High risk for CEA" asymptomatic patients  
(3 registries)

- 1 CAS > CEA
- 1 CAS ≈ CEA
- 1 CAS >\* CEA

In 1/3 registries, risks after CAS and CEA exceeded 3%

"High risk for CEA" symptomatic patients  
(3 registries)

- 2 CAS > CEA
- 1 CAS >\* CEA

CAS risk >6% in all registries (7,9-14,4% risks)  
CEA risk >6% in 2/3 registries (1,5-7% risks)

### Conclusions

In most administrative dataset registries the procedural stroke/death rates are significantly higher with CAS, both in symptomatic and asymptomatic patients with "average risk for CEA". Moreover, most contemporary CAS registries showed stroke/death rates higher than AHA/ASA risk thresholds. Contributing to the increased risk following CAS might be the inappropriate case selection, low interventionist's experience and the

## EARLY AND LONG-TERM RESULTS OF ENDOVASCULAR STENTING AND AORTOFEMORAL GRAFTING FOR ILIAC OCCLUSIVE DISEASE

Martins P, Rocha-Neves J

Regente da Unidade de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### OBJECTIVE

The purpose of the present study is to compare early and long-term results of iliac artery stenting (IAS) and aortobifemoral (ABF) grafting in the management of patients with symptomatic iliac occlusive disease.

### INTRODUCTION

Percutaneous transluminal angioplasty and stenting became, in the past years, the initial approach in patients with iliac artery atherosclerotic lesions.

According to the guidelines on peripheral occlusive disease, described in the TransAtlantic Inter-Society Consensus (TASC) II, endovascular therapy is the treatment of choice for localized lesions (TASC type A) while reconstructive surgery is the preferred method of treatment for extensive disease (TASC type D)<sup>1</sup>. Patients with type B and C occlusive lesions can be managed by either stenting or surgery, depending on the patient's medical comorbidities<sup>1,2</sup>. However, the new type of stents and the rising experience levels among interventionists led to an extension of the indications to more complex iliac occlusive lesions<sup>2</sup>.

### METHODS

We searched the literature (PubMed) to identify publications on iliac artery stenting and aortobifemoral grafting in the management of patients with iliac lesions and chronic limb ischaemia.

### RESULTS

Six studies were included. In total, 941 patients were evaluated of which 541 underwent IAS and 400 underwent ABF bypass. Patients in the ABF group were younger (Table I) and more commonly had a history of nicotine abuse. Reported technical success was 100% in the ABF group and ranged from 92% to 100% in the IAS group. The average hospital stay in the ABF group was 7 days compared with 1 day in the IAS group. Perioperative mortality was reported in all included studies. In three studies, no 30-day mortality was found, whereas three studies reported a mortality rate ranging from 0% to 4% in the IAS group and from 1% to 7% in the ABF group. Patency results are presented in Table I. The primary prosthetic patency was significantly higher than the primary stent patency. The difference in secondary patency rates between the ABF groups and the IAS groups was not statistically significant.

TABLE I. Summary of data obtained from the included studies.

First author	Year	Procedure	N	Age, years, mean	Technique <sup>a</sup> , number	Length of stay, days, mean (SD)	Mortality (%)	30 d	PP (%)	SP (%)
Timuram	2005	IAS	156	61 <sup>b</sup>	76	NS	0	7 <sup>c</sup>	95 <sup>d</sup>	NS
		ABF	53	52 <sup>b</sup>	100	NS	0	8 <sup>e</sup>	NS	
Hans	2008	IAS	40	67	95	1(0.3)	0	6 <sup>f</sup>	89 <sup>g</sup>	
		ABF	32	59	100	7(7)	0	9 <sup>h</sup>	100 <sup>i</sup>	
Kashyap	2008	IAS	83	65	96	NS	4	7 <sup>j</sup>	95 <sup>k</sup>	
		ABF	86	63	100	NS	7	9 <sup>l</sup>	97 <sup>m</sup>	
Sachdeva <sup>n</sup>	2013	IAS	100	65	92	1(0.3)	0	7 <sup>o</sup>	77 <sup>p</sup>	95 <sup>r</sup>
		ABF	103	69	99	7(2.6)	0	9 <sup>q</sup>	94 <sup>s</sup>	99 <sup>t</sup>
Benitez	2016	IAS	54	68	100	1(0.4)	0	8 <sup>u</sup>	75 <sup>v</sup>	
		ABF	47	65	100	7(7)	0	5 <sup>w</sup>	87 <sup>x</sup>	
Dorigo	2017	IAS	128	66	99	NS	0	9 <sup>y</sup>	95 <sup>z</sup>	
		ABF	92	63	100	NS	1	9 <sup>aa</sup>	96 <sup>ab</sup>	

NS, not stated in the article.

<sup>a</sup>Only occlusions were included.

<sup>b</sup>Median age.

<sup>c</sup>Patency at 36 months.

<sup>d</sup>Patency at 48 months.

<sup>e</sup>Patency at 24 months.

<sup>f</sup>Patency at 24 months.

<sup>g</sup>Primary assisted patency.

### CONCLUSIONS

On the basis of the results, IAS is a suitable alternative treatment option with satisfactory primary patency, excellent secondary patency and shorter hospital length of stay when compared with ABF grafting. In some instances, if IAS is unsuccessful or not feasible, the option of ABF bypass is not precluded.

### REFERENCES

- Norgren L, Heit V, Dormandy JA, Nelson MR, Hiratzka LF. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *Eur J Vasc Endovasc Surg* 2007; 43 Suppl S: 55-69.
- Levin CD, Kashyap VS, Clair DG, et al. Endovascular management of iliac artery occlusions: extending treatment to TransAtlantic Inter-Society Consensus class C and D patients. *J Vasc Surg* 2006; 43: 32-9.
- Levin CD, Kashyap VS, Clair DG, et al. Endovascular management of iliac artery occlusions: treatment protocol for TASC (transatlantic inter-society consensus) type B and type C iliac lesions. *J Vasc Surg* 2003; 38: 272-278.
- Hans SS, DeSaunders D, Siddiqui R, and Khoury M. Results of endovascular therapy and aortofemoral grafting for TransAtlantic Inter-Society Consensus C and D iliac occlusive disease. *Surgery* 2008; 144: 583-588.
- Kashyap VS, et al. The management of severe iliac occlusive disease. Endovascular therapy rivals open reconstruction. *J Vasc Surg* 2008; 48: 1451-1457.
- Benitez R, Ghosh GH, et al. Results of iliac stenting and aortofemoral grafting for iliac artery occlusions. *J Vasc Surg* 2013; 57: 1030-1037.
- Benitez R, Kavalaliuskaite Z, Athanasiadis A, Kapous RS, Inciici D, Kinduris S. Comparison of results of endovascular stenting vs bypass for TransAtlantic Inter-Society (TASC II) type B, C and D iliac occlusive disease. *Archives of Medical Sciences (AMS)* 2018; 14(2): 353-359.
- Dorigo W, et al. A comparison between aortofemoral bypass and aortoliac kissing stents in patients with complex aortiliac obstructive disease. *J Vasc Surg* 2017; 65(1): 99-107.

**RARE COMPLICATIONS OF SURGICALLY OPERATED POPliteal ARTERY ANEURYSMS***Authors:* Rafaela Lopes, Jacinta Campos

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

**INTRODUCTION**

Popliteal artery aneurysms (PAA), despite being rare, account for 70–80% of all peripheral artery aneurysms. Approximately 40% of PAA are symptomatic and associated with an amputation risk of 30–40%.<sup>1</sup> PAA surgical repair by medial approach, with proximally and distally artery ligation as close to the sac as possible to promote aneurysm thrombosis, is associated to a risk of late expansion of the aneurysm sac, caused by a phenomenon similar to type II endoleak after EVAR for abdominal aortic aneurysm.<sup>2</sup> The authors report 4 cases of rare complications following surgical treatment of PAA by medial approach.

**CASE 1****Aneurismal sac rupture with the development of a false aneurysm**

79 years old male patient

- Elective surgical correction of PAA (40mm), by medial approach, in 2007: aneurysm exclusion and bypass with a prosthetic graft.

7 years later ...



Figure 1: Pulsatile mass in the right popliteal fossa



Figure 2: Posterior surgical approach

**Emergency surgery**

Posterior approach: hematoma drainage, ligation of collaterals and closure of the aneurismal sac.

**CASE 2****Aneurismal sac rupture with skin fistulization**

81 years old male patient

- Elective surgery correction of PAA, by medial approach, in 2001: aneurysm exclusion and extra-anatomic bypass with saphenous vein

11 years later ...



Figure 3: Sac rupture with skin fistulization



Figure 4: Posterior surgical approach

**References:**

1. Dawson, I., Sie, R.B., and van Bockel, J.H. Atherosclerotic popliteal aneurysm. Br J Surg. 1997; 84: 293–299
2. Cervin, A., Tjärnström, J., Ravn, H., Acosta, S., Hultgren, R., Welander, M. et al. Treatment of popliteal aneurysm by open and endovascular surgery: a contemporary study of 592 procedures in Sweden. Eur J Vasc Endovasc Surg. 2015; 50: 342–350

**Emergency surgery**

Posterior approach: hematoma drainage, ligation of collaterals and closure of the aneurismal sac.

**CASE 3****Aneurismal sac infection with skin fistulization**

54 years old male

- Urgent correction of thrombosed left PAA (35mm), by medial approach with aneurysm exclusion and bypass grafting with saphenous vein, in July 2009;
- Lower limb amputation below the knee, in October 2009

7 years later ...



Figure 5: Purulent drainage of supraarticular incision

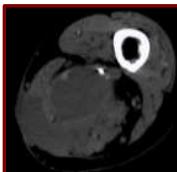


Figure 6: Angio-CT findings

**Emergency surgery:**

Medial approach: hematoma and purulent drainage. Negative pressure wound therapy.

**CASE 4****Aneurismal sac increase with neurological and venous compression symptoms**

60-year-old male patient

- Urgent correction of left PAA (45mm) with distal embolization by medial approach with aneurysm exclusion and bypass grafting with saphenous vein, in July 2009.

8 years later ...

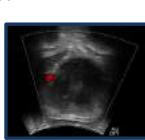
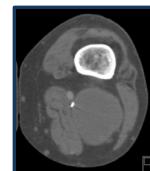


Figure 7: Imagiological study

**Emergency surgery:**

Posterior approach: hematoma drainage, ligation of collaterals and closure of the aneurismal sac.

**CONCLUSIONS**

Aneurysmal sac growth with symptoms is rare, particularly rupture with false aneurysm formation or skin fistulisation. All the presented cases were successfully treated, with no major complications reported and a mean duration of hospital stay of 9 days.

B

## CANCER AND VENOUS TROMBOEMBOLISM

Venous thromboembolism (VTE) is **4 to 6,5 times more frequent in cancer patients.**<sup>1</sup>  
Cancer has been suggested to be the most important risk factor in Pulmonary Embolism mortality.<sup>1</sup>  
The presence of VTE in cancer patients is associated with lower survival rate and worse prognosis.<sup>1</sup>

### RISK FACTORS<sup>1,2</sup>

Patient individualities	Tumour characteristics	Treatment	Biomarkers
<ul style="list-style-type: none"> <li>○ Acquired risk factors <ul style="list-style-type: none"> <li>○ &gt;65 years old</li> <li>○ Comorbidities</li> <li>○ Personal history of VTE</li> <li>○ Major surgery</li> <li>○ Immobilization</li> </ul> </li> <li>○ Inherited risk factors <ul style="list-style-type: none"> <li>○ Factor V Leiden</li> <li>○ Prothrombin G20210A</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Primary site <ul style="list-style-type: none"> <li>○ Higher risk in stomach, pancreas, lung, bladder kidney and hematologic cells</li> <li>○ Histology</li> <li>○ Stage</li> <li>○ Time since cancer diagnosis <ul style="list-style-type: none"> <li>○ More frequent 3-6 months following diagnosis</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Platinum based chemotherapies and anti-angiogenesis treatments</li> <li>○ Thalidomide</li> <li>○ Hormonal and radiation therapy</li> <li>○ Erythropoiesis-stimulating agents</li> <li>○ Blood transfusions</li> </ul>	<ul style="list-style-type: none"> <li>○ Haematologic count cells (elevated plaques and leucocysts and low haemoglobin levels)</li> <li>○ D-dimers (although valued as a VTE predictor it shouldn't be used for diagnosis)</li> <li>○ P-selectin</li> <li>○ Prothrombine fragments 1+2</li> </ul>

### TREATMENT AND MANAGEMENT OF VTE IN CANCER PATIENTS

#### ACUTE TREATMENT → Low molecular weight heparin (LMWH), in therapeutic doses<sup>1,3</sup>

Anticoagulation should be prolonged and reevaluated every 3-6 months in patients with the following conditions

- During systemic chemotherapy
- Presence of metastatic disease
- Progression or relapse disease
- Association of other protrombotic factors (for example catheter-related thrombosis)

Postpone LMWH for 24h prior major surgery.  
Prophylactic LMWH dose can be restarted at 12-24h after procedure

Therapeutic dose of LMWH should be withheld if plaque conts <20x10<sup>9</sup>/L or active bleeding is present

#### FINAL REMARKS<sup>1,3</sup>

Cease LMWH if remission is reached within 3-6 months

Risk-benefit should always be taken into consideration in continuing anticoagulation after the recommended period

Thromboprophylaxis in cancer patients is still debatable

Direct oral anticoagulants safety is still being regarded in cancer patients although, recent studies have showed a similar efficacy with lower risk for bleeding

#### References

1. Ay, C., Pabinger, I., & Cohen, A. T. Cancer-associated venous thromboembolism : Burden , mechanisms , and management. 219–230 (2017).
2. Kasper, D. et al. Harrison, Principles of Internal Medicine. 19<sup>th</sup> Ed. 2559 (2015).
3. Athale, U. Cancer and thrombosis. *Pediatr. Thromb. Disord.* 72–87 (2014). doi:10.1017/CBO9781139028882.007

Autores: Raquel Palhau e Marina Dias-Neto  
Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

# THORACIC AORTIC ANEURYSMS: RARE EVENTS OF A RARE DISEASE

Ricardo Teixeira, Rita Augusto.

Regente da Unidade de Angiologia e Cirurgia Vascular –  
Prof. Doutor Armando Mansilha.



U. PORTO

FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

17-19  
May

POST-EXEMPLAR  
CONFERENCE

**Introduction:** Thoracic aortic aneurysms (TAA) represent 2% to 5% of degenerative aneurysms and its lethal nature is of major importance. The annual incidence is reported to be 6 to 10 cases per 100,000 patients-year. The average age at the time of diagnosis is 49. The aneurysms occur in the root or the ascending aorta in 60% of cases, 10% in the arch, 40% in the descending aorta and 10% in the thoracoabdominal aorta.

**Acute Subdural Hematoma Following Thoracoabdominal Aortic Repair:** Spinal cord ischemia is a feared complication. Cerebrospinal fluid drainage is hypothesized to decrease the intrathecal pressure, causing an increase in medullary perfusion. Despite being a standard procedure in TAA repair, CSF fluid drainage has been associated with acute subdural hematoma due to the placement of lumbar drainage catheters, particularly when larger volumes are drained.

**Treatment:** When managing patients with TAA the first step is to control risk factors in order to avoid the progression rate of the aneurysm itself, thus reducing the probability of dissection or rupture. However, surgical repair is the classic therapy for thoracic aorta aneurysms. The timing for surgery is difficult to predict, but it is recommended for most patients to do surgery in the ascending aorta from 5.5 to 6 cm in diameter and 6 to 6.5 cm in the descending aorta. Surgery may be anticipated in rapidly expanding aneurysms, when there's regurgitation associated, and/or when the patients are symptomatic. 4.5 to 5 cm in diameter is the timing chosen in patients with Marfan Syndrome, family history of thoracic aortic aneurysm and Bicuspid aortic valve, since these factors are associated with increased risk of dissection and/or rupture at smaller aortic sizes.

Thoracic aortic aneurysm repair can happen either by open surgery repair or endovascular repair. Endovascular repair is not an option for ascending aortic aneurysms and is avoided in aortic arch aneurysms, however it can be recommended in high risk patients for open repair.

**Iatrogenic Intercostal Artery Aneurysm following Thoracoabdominal Aneurysm Repair:** Open surgery frequently requires the temporary occlusion of the intercostal arteries with a balloon. This can lead to the development of intercostal artery aneurysms, being a life threatening condition, since it may not give symptoms until rupture. There's very few reports of iatrogenic intercostal artery aneurysms so further studies are needed to comprehend more how common this complication is and if it is not underdiagnosed.

**Dysphagia due to thoracic aortic aneurysm:** Thoracic aortic aneurysm can be an incidental finding, due to compression of adjacent structures, or secondary to complications such as dissection or rupture. The most common symptom is pain, typically thoracic or epigastric, radiating to the neck. Compression may cause hoarseness, cough, stridor and superior vena cava obstruction. It has been reported that repairing the aneurysm and lowering its volume has improved the patients' complaints.

**Endovascular Repair of anatomic variants:** Anatomic variations are common and should be taken in account when handling TAA's. There are cases reported on aneurysms that occur on right sided aortic arches associated with an aberrant subclavian artery (both present in 0.05% of the population). Also, right sided aortic arch can present as a vascular ring around structures like the oesophagus and trachea causing compression. A patient with an aneurysm of the descending aorta, with right sided aortic arch and an aberrant left subclavian artery associated with a Kommerell's diverticulum has been described. The aneurysm was repaired by endovascular procedure. The origin of the aberrant left subclavian artery was covered by the graft, but blood supply had been reassured previously by an anastomosis from the left common carotid artery, thus showing another crucial aspect: how the placement of the graft affects vessels that have origin in the portion of the thoracic aorta that is repaired.

**Conclusion:** The thoracic aortic aneurysm is by itself a rare pathology, which can explain why there are still uncertainties about etiology, treatment, long-term outcomes and complications. However, some reported events can shed some light on the matter, and allow us to understand more on how to approach this pathology.

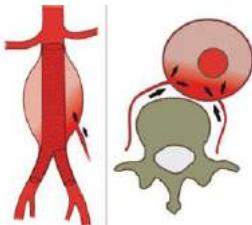
## TYPE II ENDOLEAKS AFTER EVAR FOR RUPTURED ABDOMINAL AORTIC ANEURYSM - ARE THEY DANGEROUS?

Rui Sampaio, José Pedro Pinto

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

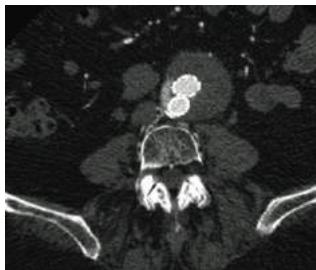
### Introduction

Type II endoleaks (T2EL) are common in patients who undergo endovascular aneurysm repair (EVAR) for ruptured abdominal aortic aneurysm (rAAA) and are known to cause sac expansion, but whether they lead to an increased risk of aneurysm rupture and need for re-intervention is unclear.



### Methods

Pubmed databases were searched for publications regarding the prognosis of type II endoleaks following EVAR for rAAA. We summarize reports from two studies.



### Results

One study reported a 29% rate of T2EL in 56 patients who underwent EVAR for rAAA, of which 43% sealed spontaneously, 36% underwent re-intervention and the remaining were monitored with surveillance computed tomography angiogram (CTA). No difference in overall mortality was reported between patients who developed T2EL and those who did not. No patient in the study experienced recurrent endoleak after re-intervention, sac expansion, delayed rupture, required graft explantation, or died of an aneurysm-related cause.

Another study comparing patients who underwent EVAR for rAAA or elective AAA repair reported a lower incidence of T2ELs (9.0 vs 20.2%) in these patients, which may be due to a lower incidence of overall type II endoleaks secondary to hemodynamic instability, death before endoleaks can develop, or a follow-up that is less strict than in patients undergoing EVAR as an elective procedure.

### Conclusion

**Data regarding patients treated with EVAR for rAAA who develop T2EL is limited but shows a relatively high chance of spontaneous sealing, which combined with similar outcomes when compared with patients without T2EL suggests patients should be carefully monitored through CTA and do not warrant aggressive treatment. Data from more patients needs to be collected and analysed to clarify the prognosis of T2ELs and need for re-intervention in such patients.**

Boniakowski A, De Martino R, Coleman D, Eliason J, Goodney P, Rectenwald J. The natural history of type II endoleaks after endovascular aneurysm repair for ruptured abdominal aortic aneurysm. Journal of Vascular Surgery. 2016;64(6):1645-1651.

Quinn A, Mehta M, Teymourli M, Keenan M, Paty P, Zhou Y et al. The incidence and fate of endoleaks vary between ruptured and elective endovascular abdominal aortic aneurysm repair. Journal of Vascular Surgery. 2017;65(6):1617-1624.

## USE OF THROMBOLYSIS IN ACUTE DEEP VEIN THROMBOSIS

Santos, Sara; Neves, João

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha

### INTRODUCTION

Deep vein thrombosis (DVT) is associated with important morbidity. The major short-term complication is pulmonary embolism and, in the long term, post-thrombotic syndrome, resulting from damage caused to the venous system. Patients may present consequently with poorer quality of life, specially if lesion occurs at iliofemoral and femoral level. The DVT core therapy is anticoagulation, in order to prevent embolism, post-thrombotic syndrome and recurrence, despite post-thrombotic syndrome can still occur in up to 50% of patients with proximal DVT. The aim was to investigate the clinical benefit of thrombolysis in the prevention of post-thrombotic syndrome.

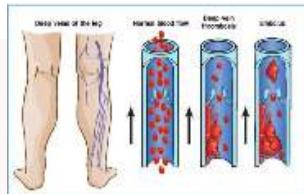


Figure 1. Deep Vein Thrombosis.  
From Michigan Vein Care Specialists.<sup>4</sup>

### RESULTS

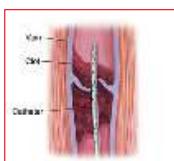


Figure 2. Catheter-directed thrombolysis.  
From Saint Luke's.<sup>5</sup>

In fact, thrombolysis is more effective in dissolving the clot than anticoagulation, resulting in better vein patency and maintained blood flow. This treatment is based on delivering the thrombolytic agent straight into the thrombus, with the use of catheters - catheter-directed thrombolysis (Figure 2). The systemic or loco-regional routes were abandoned, due to higher bleeding risk and lower efficiency.

By dissolving the clot more efficiently, thrombolysis can prevent further damage to the vein, preventing complications and resolving deep venous obstructions. In fact, post-thrombotic syndrome is less seen in patients treated with thrombolysis (15%), compared with anticoagulation alone.

All this comes with a trade off – haemorrhagic risk is higher, with subsequent more bleeding complications, but, according to CaVenT and ATTRACTstudy, they seem to be acceptable although with less benefit than initially thought. Thrombolysis could be used in selected patients.

### CONCLUSION

Use of thrombolysis in acute DVT is associated with a reduction in the risk of developing post-thrombotic syndrome; although significant changes in the Villalta score were found, no differences in the general quality of life were found in any trial.

**REFERENCES:** [1] Watson L, Broderick C, Armon MP. Thrombolysis for acute deep vein thrombosis. Cochrane Database of Systematic Reviews 2016, Issue 11. Art. No.: CD002783. DOI: 10.1002/14651858.CD002783.pub4 [2] Haig Y, Enden T, Grotta O, Klow NE, Slagsvold CE, Ghaniima W, et al. Post-thrombotic syndrome after catheter-directed thrombolysis for deep vein thrombosis (CaVenT): 5-year follow-up results of an open-label, randomised controlled trial. The Lancet Haematology. 2016;3(2):e64-71. [3] Enden T, Haig Y, Klow NE, Slagsvold CE, Sandvik L, Ghaniima W, et al. Long-term outcome after additional catheter-directed thrombolysis versus standard treatment for acute iliofemoral deep vein thrombosis (the CaVenT study): a randomised controlled trial. Lancet. 2012;379(9810):31-8. [4] Michigan Vein Care Specialists. What is DVT and why should you care? Available from <https://michiganveincare.com/deep-vein-thrombosis/> [last revised 14/11/2013; accessed on 06/04/2018]. [5] Saint Luke's. Peripheral Venous Thrombosis (Clot-Busting). Available from <https://www.saintlukeskc.org/health-library/peripheral-venous-thrombosis-clot-busting> [accessed on 02/04/2018].

17–19  
May

"Latest Advances  
on Venous and  
Arterial Diseases"

PORTO  
VASCULAR  
CONFERENCE  
2018

U.PORTO  
FMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

## OUTCOMES OF EVAR IN OCTAGENARIANS

Sara Teixeira, Marina Dias Neto

Regente da Unidade Curricular de Angiologia e Cirurgia Vascular – Prof. Doutor Armando Mansilha

### INTRODUCTION

Abdominal aortic aneurysm (AAA) is an age-related pathology whose rupture is associated with a very high mortality in the elderly<sup>1</sup>. This issue is of great importance since average life expectancy is rising, and those people aged 80 years or more that will need AAA repair, are increasing.<sup>2,3</sup> Although AAA repair can prevent its rupture and patient death, because age is an independent risk factor for perioperative death, people over 80 are often refused to surgery due to the considerable risk of an open repair.<sup>4</sup>

Nevertheless, patients > 80 currently undergo either open aneurysm repair (OAR) as endovascular aneurysm repair (EVAR). So, we need to search for robust data on the best medical procedures to treat this age group, which has its own specificities.

**Objective:** To compare the outcome of endovascular treatment of abdominal aortic aneurysms versus open repair in octogenarians.

### METHODS

A research was performed on PubMed which included systematic reviews and clinical trials published between 2007 and 2017. MeSH terms employed in the search: "EVAR"; "octogenarian"; "abdominal aortic aneurysm" and "open versus endovascular repair".

### RESULTS

F. Biancari et al. <sup>2</sup>	Postoperative mortality	Morbidity	Postoperative complications	Risk of re-intervention	30-day mortality after re-intervention
OAR/EVAR	8,6%/2,3%	higher/lower	higher/lower	4,9-6,9%/12%	-/9,6%
Henebiens et al. <sup>3</sup>	Pooled mortality				
OAR/EVAR	7,5%/4,6%				
Tan et al. <sup>5</sup>	Hospital resource use	30-day, in hospital and perioperative	Postoperative pulmonary complications	Costs	
OAR/EVAR	higher/lower	higher/lower	higher/lower	higher/lower	higher/lower
Timaran et al. <sup>6</sup>	Median hospital stay	Postoperative complications	30-day deaths	Survival at 20 months	Re-intervention at 20 months
CHEVAR	3,5 days	28%	none	75%	10%
Silveira, D. et al. <sup>7</sup>	30-day mortality	Early morbidity	Midterm re-intervention	Estimated survival	Freedom from re-intervention
fEVAR	2,9%	14,3%	12,1%	91,9% / 72,8%	94% / 91%

### CONCLUSION

EVAR procedure in patients aged 80 years or more is associated with significantly lower immediate postoperative mortality, morbidity, complications, hospital resource use, higher quality of life and acceptable survival rates. In this group of patients, some modified endovascular procedures had a successful applicability in challenging anatomies.<sup>1,2,6,7</sup>

However, there is a small number of patients undergoing procedures for different types of aneurysms.<sup>4-6</sup> Therefore, it is important to develop more studies with larger populations and with a longer follow-up period so that we can have more robust information on the outcomes and benefits of these interventions in octogenarians.

### REFERENCES

1. Hicks et al., *Journal of Surgical Research*, September 2017.
2. F. Biancari et al., *Eur J Vasc Endovasc Surg*, 2011.
3. Henebiens et al., *Journal of Vascular Surgery*, March 2008.
4. Locham et al., *Journal of Surgical Research*, July 2017.
5. Tan et al., *Journal of Vascular Surgery*, July 2017.
6. Timaran et al., *Journal of Vascular Surgery*, August 2017.
7. Silveira, D. et al., *Journal of Vascular Surgery*, April 2016.

# RECONSTRUCTIVE VASCULAR SURGERY AND THE EXTENT OF TISSUE DAMAGE DUE TO DIABETIC FOOT ULCERS RELATES TO RISK OF NEW ULCERATION IN PATIENTS WITH PAD

Sílvia Ferreira, Tiago Soares

Regente da Unidade de Angiologia e Cirurgia Vascular - Prof. Doutor Armando Mansilha



17-19  
May

PORTO  
VASCULAR  
CONFERENCE  
2018

## Introduction

Patients with Peripheral Artery Disease Develop Diabetic Foot Ulcers, that in some cases evolve to critical limb ischaemia, requiring urgent treatment with debridement and surgical revascularisation.

After treatment, some patients stay with their intact limb while others develop new ulcers over time. A history of a previous DFU is a strong risk factor for developing new ulcers, and indicating an increased risk of new amputation after healing from an initial ulcer.

## Aim

The aim was to study new ulcers in the same foot and their outcome, as well as survival rate in patients with diabetes and severe PAD after healing of a foot ulcer without major amputation irrespective of revascularisation.

## Results

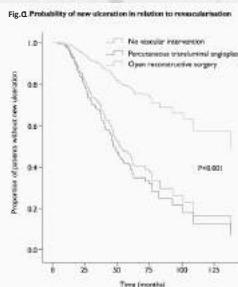


Fig.1 Probability of new ulceration in relation to revascularization

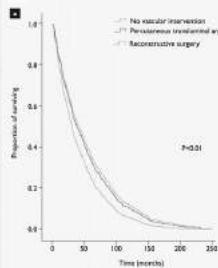


Fig.2 Survival of the patients in relation to (a) revascularization and (b) amputation

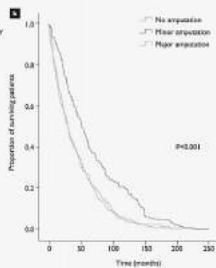


Fig. 1 - A maximum Wagner grade <3 reached for the previous foot ulcer ( $p=0.036$ , HR 0.71, 95% CI 0.52–0.98) and open reconstructive surgery ( $p\leq 0.001$ , HR 0.31, 95% CI 0.16–0.59), was associated with lower probability of development of new ulcers over time. Fig 2a - Invasive revascularisation, including both PTA and reconstructive surgery, was significantly associated with better survival probability.

Fig 3b - Patients who had minor amputation had better survival probability compared with those who had major amputation or no amputation.

## Conclusions

Patients with diabetes, severe PAD, and a previous foot ulcer are at high-risk of developing new ulcers on and undergoing amputation of the same foot after healing, indicating that continued follow-up is essential after initial healing of an ulcer. Both extent of tissue destruction caused by the previous ulcer and reconstructive vascular surgery affect the probability of developing a new ulceration.

Elgzyri T, Larsson J, Nyberg P, Thorne J, Eriksson KF, Apelqvist J. Reconstructive vascular surgery and the extent of tissue damage due to diabetic foot ulcers relates to risk of new ulceration in patients with PAD. Journal of wound care. 2015;24(12):590-2

## SÍNDROME DE MAY-THURNER

Tiago Chantre<sup>1</sup>  
Orientadora: Dra. Ivone Silva<sup>2</sup>

1 - Instituto de Ciências Biomédicas Abel Salazar – Universidade do Porto (ICBAS – UP)  
2 - Serviço de Cirurgia Vascular – Centro Hospitalar Universitário do Porto (CHUP)

## INTRODUÇÃO

Síndrome de Compresión Iliocalvaca (Demir et al., 2011). A SMT é mais comum entre mulheres ou de idade, especialmente multiparas. Os sintomas de apresentação típicos são dor e edema no membro inferior esquerdo (MIE), de inicio agudo ou progressivo (TVP) (Khalil et al., 2017). Os pacientes podem ainda apresentar sintomas de IVC sem resposta à dor da compressão ou membro de elevado dos membros. O número de doentes com diagnóstico de SMT é reduzido, porém a compressão venosa extrínseca descrição não é causa infrequente de anomalias venosas do MIE, que, em muitos casos, são consideradas como primárias por falta de diagnóstico etiológico (Khalil et al., 2017). Tal deve-se, pelo menos em parte, à substituição dos métodos invasivos de diagnóstico (como a fibrografia) pelos métodos não invasivos, que permitem estudar doenças venosas dos membros inferiores. Em casos de SMT, o diagnóstico deve ser idealmente feito antes de surgimento de complicações maiores como TVP, IVC por incompetência valvar ou úlceras de estase, para que o tratamento se possa dar atempadamente (Mousa e AbrhamRahim, 2013).

Caso-Clínico

Doente de sexo feminino 37 anos, sem história de TAVR, recorre a consulta de cirurgião vascular por edema com agravamento progressivo, claudicação venosa e sensação de MIE pés com 7 meses de evolução. O exame físico dos membros inferiores revelou pulsos distais presentes e ausência de trajetos varicosos, alterações cutâneas ou úlceras e edema perifônico. Com o auxílio da angiografia digital realizada com tomografia de fluxo sanguíneo, foi TAVR e TAPC (trombo-angioplastia percutânea) durante a anatomia compatível com SMT, com compressão da VICE entre a AICD e o corpo vertebral de LS, e não foi observada nenhuma massa péfigra (Figura 1 e 2). A flebografia comprovou a compressão da VICE, com defeito de preenchimento e redução de calibre (Figura 3a). A paciente foi submetida a tratamento endovenoso com anticoagulação e colagenase cisteinato (AE) Optimed Sinus Venous 15x80mm<sup>3</sup>. A Flebografia controlada com cateter e fluxo restabelecido da VICE (Figura 3b). O Pós-operatório ocorreu sem intercorrências. A paciente ficou medicada com rivaroxaban, a caminhada até completar durante 3 meses.

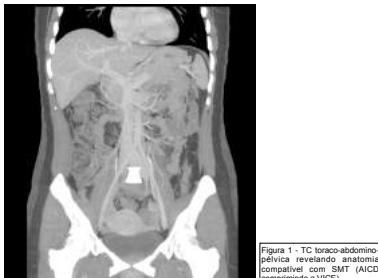


Figura 1 - TC toraco-abdomino-pélvica revelando anatomia compatível com SMT (AICD e engessado o VICE).

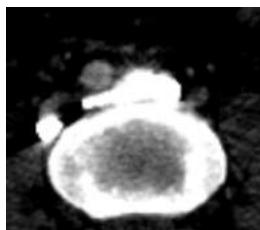


Figura 2 - TC axial com contraste, mostrando a compressão da VICE entre a AICD e o corpo vertebral de L5.

## Discussão

Uma história de edema persistente do MIE com ou sem TEP prévia númera muito entre as segunda e quinta décadas de vida, sem uma causa óbvia, é altamente suspeitiva de SMT (Euler et al., 2010; Yang e Lu, 2010). O risco aumenta com mulheres jovens ainda adolescentes, os diabéticos, prolongada gravidez, eletroforese, estigmas de tromboembolismo familiar, VTE prévia, e fatores de risco para trombose venosa crônica, (úlceras cutâneas recorrentes ou alterações na pigmentação da pele e do olho) e no MIE em associação com a evidência imangiográfica de compressão extrema da VCI (Wu et al., 2012). O Eco-Doppler venoso é um método não invasivo permitindo detectar a existência de TEP e avaliar a extensão da lesão, mas não pode confirmar a presença de SMT (Wu et al., 2012). No entanto, Wu et al., 2010. Através da E é possível definir os contornos anatomicos da VICE e a melhor estratégia terapêutica. Acrecentar ainda que com o afastamento progressivo do uso de fleboterapia e o aumento do recurso a técnicas não invasivas para confirmar a presença de TEP, muitos casos de SMT têm sido diagnosticados.

No entanto, em que a SMT é uma doença progressiva com complicações a longo prazo e aumento do risco de TEP recorrente, há evidência para que uma estratégia agressiva de alívio da compressão mecânica seja fortemente considerada (Raju, 2013). A extensão do stent é variável, cava pode ser feita sem aumentar o risco de embolia da veia ligeira, mas é permitido e recomendado (Kwiatkowski et al., 2017). Anos e o procedimento é a expectativa hincunatura, que a deplete angioplasty nos 3 meses.

BIBLIOGRAFIA

# ENVOLVIMENTO VASCULAR NA DOENÇA DE BEHÇET

Leonor Lemos<sup>1</sup>, Ivone Silva<sup>2</sup>

<sup>1</sup>Instituto de Ciéncias Biomédicas Abel Salazar – Universidade do Porto <sup>2</sup>Serviço de Cirurgia Vascular – Centro Hospitalar Universitário do Porto

## Introdução

A **Doença de Behçet (DB)** é uma vasculite multissistémica rara, de etiologia desconhecida. Caracteriza-se por episódios recorrentes de úlceras aftosas orais e genitais, lesões oculares e lesões cutâneas, podendo no entanto afetar praticamente qualquer órgão, em qualquer momento. O envolvimento vascular - "Vasculo-Behçet" atinge entre 5-40% dos doentes e pode afetar o sistema venoso, o arterial ou ambos.

## Caso Clínico



Homem de 66 anos, caucasiano, casado.

- ▶ Úlceras aftosas orais e genitais recorrentes e episódios de uveite durante a adolescência.
- ▶ **1986-** Nefropatia por IGA. IR desde 2000. Em diálise peritoneal.
- ▶ **Fev/1995- trombose venosa profunda ilio-femoral bilateral** s/ atingimento da cava. Inicia hipocoagulação com acenocumarol (mantém).
- ▶ **Set/1995- falso aneurisma** da artéria ilíaca externa esquerda. Operado e feita pontagem iliofemoral em terminal-terminal com a veia grande safena.
- ▶ **Diagnosticado c/ Doença de Behçet com positividade para HLA-B51. Medicado c/ lepicortinolo e colchicina.**
- ▶ **2000- falso aneurisma da anastomose femoral comum esquerda.** Aneurisectomia e pontagem ilio-femoral com prótese de Dacron.
- ▶ **2002- novo falso aneurisma** da artéria femoral esquerda. Nova aneurisectomia e pontagem cruzada ilíaca externa direita – femoral superficial esquerda com prótese de Dacron.
- ▶ **2004-** entrou em choque no SU com **falso aneurisma roto** da artéria femoral superficial esquerda. Foi feita pontagem entre a prótese ilio-femoral cruzada e artéria femoral superficial distal direita.
- ▶ Desde então estável, sem novas intercorrências do ponto de vista vascular.

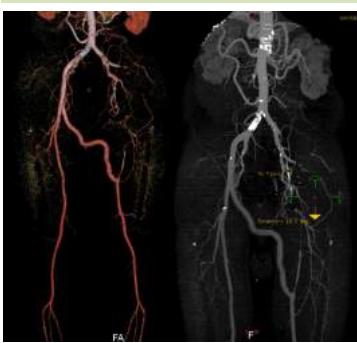


Fig. 1: Último controle com angioTc – 2018:  
 pontagem cruzada ilíaca externa direita – femoral superficial esquerda com prótese de Dacron + pontagem entre a prótese ilio-femoral cruzada e artéria femoral superficial distal direita.

## Discussão

- ✓ O envolvimento vascular na DB é um dos principais preditores de **morbilidade e mortalidade**.
- ✓ Tendencialmente, a trombose venosa dos membros inferiores é o fenómeno vascular que ocorre mais precocemente e é um **fator preditivo** para eventos vasculares futuros.
- ✓ O envolvimento vascular tem um carácter **recorrente**.
- ✓ As recidivas são mais frequentes nos segmentos previamente afetados ou em segmentos contíguos.
- ✓ Uma das principais complicações da arteriopatia aneurismática é o desenvolvimento de **falsos aneurismas recorrentes nos locais anastomóticos**. Os aneurismas devem ser corrigidos cirurgicamente.
- ✓ Para o tratamento da doença de Bechét estão recomendados **imunossupressores**.

## Bibliografia

- Iscan ZH, Vural KM, Bayazit M. Compelling nature of arterial manifestations in Behcet disease. Journal of Vascular Surgery.41(1):53-8  
 Alpagut U, Ugurluca M, Dayioglu E. Major arterial involvement and review of Behcet's disease. Ann Vasc Surg. 2007;21(2):232-9  
 Calamia KT, Schirmer M, Melikoglu M. Major vessel involvement in Behcet's disease: an update. Curr Opin Rheumatol. 2011;23(1):24-31  
 Seyahi E. Behcet's disease: How to diagnose and treat vascular involvement. Best Pract Res Clin Rheumatol. 2016;30(2):279-95.

# A comparison of major amputation rates and outcomes for Indigenous and non-Indigenous Australians in a major tertiary hospital.

Authors: Tejas P. Singh<sup>1,2</sup>, Samantha Peden<sup>1</sup>, Ammarah Tahir<sup>1</sup>, Vikram Iyer<sup>1,2</sup>, Ramesh Velu<sup>1</sup>, Joseph V. Moxon<sup>1</sup>, Yvonne Cadet-James<sup>3</sup>, Jonathan Golledge<sup>1,2</sup>.

1. Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, QLD, Australia.

2. Department of Vascular and Endovascular Surgery, The Townsville Hospital, Townsville QLD, Australia.

3. Indigenous Centre, James Cook University, Townsville, Queensland, Australia

## Introduction

- Indigenous Australians are at high risk of developing diabetes-related foot complications requiring major lower limb amputations.
- The aim of this study was to assess the incidence and outcome for Indigenous Australians and non-Indigenous Australians undergoing major amputations (MA) at the main tertiary hospital in North Queensland, Australia over a 16-year period.



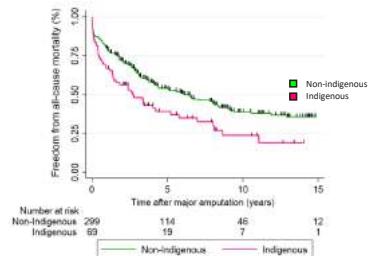
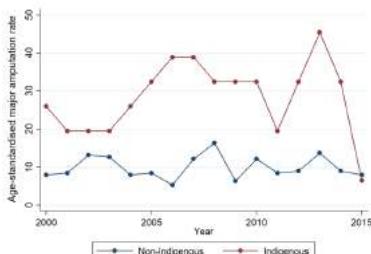
## Methods

- Retrospective study assessing all patients who underwent a MA at The Townsville Hospital between 2000 and 2015. Clinical characteristics were compared using Pearson's  $\chi^2$  test and Mann Whitney U test.
- MA rates (per 100,000) were calculated using the census data as the standard population.
- Kaplan Meier survival analysis and Cox proportional hazard analysis compared the incidence of all-cause mortality among both groups.



## Results

- A total of 374 MA occurred between 2000 and 2015. Seventy MA occurred in Indigenous Australians and 304 occurred in non-Indigenous Australians.
- Indigenous patients were younger ( $p<0.005$ ), more likely to be females ( $p=0.002$ ), have diabetes ( $p<0.005$ ), end-stage renal failure ( $p=0.003$ ), and were more likely to die during follow-up ( $p=0.028$ ).
- Overall, rates of MA in Indigenous and non-Indigenous patients with diabetes was 291.9 and 70.1 per 100,000 respectively. MA rates increased in Indigenous (~15%) and non-Indigenous patients (~50%) with diabetes between 2000–2007 and 2008–2015 ( $p=0.505$ ).
- Indigenous patients were at a ~2-fold greater risk of all-cause mortality ( $p=0.027$ ) compared to non-Indigenous patients. This association was lost in the multivariate analysis (HR 1.24 [0.82–1.89],  $p=0.314$ ).



## Conclusion

- The burden of MA has increased in North Queensland and is greater in Indigenous Australians.
- Indigenous people more frequently undergo MA.
- Indigenous people undergoing MA are at a high risk of subsequent mortality.
  - ↑ rates of associated co-morbidities such as end-stage renal failure.
- Action needed to reduce amputation rates in this population.

**QRCPVD**  
Queensland Research Centre for  
Peripheral Vascular Disease

**Ethics:** This study received local Human Research Ethics Committee approval from the Townsville Hospital (HREC/12/QTHS/202; HREC/13/QTHS/125, HREC/14/QTHS/203 & H6028). A 5-member Indigenous reference committee established for approval.

**Acknowledgements:** Jonathan Golledge holds a Practitioner Fellowship from the National Health and Medical Research Council, Australia (1117061) and a Senior Clinical Research Fellowship from the Office of Health and Medical Research. Joseph V Moxon holds an Advance Queensland Mid-Career Fellowship from the Queensland Government. Tejas P Singh holds a Junior Doctor Research Fellowship from the Queensland Government. This work was supported by a SERTA research grant from The Townsville Hospital (62701). The authors do not have any conflicts of interest to declare with regards to this work.

# Comparison of presenting characteristics and cardiovascular outcome between Indigenous and non-Indigenous patients with peripheral artery disease.

Authors: Tejas P. Singh<sup>1,2,3</sup>, Joseph V. Moxon<sup>1</sup>, Genevieve N. Healy<sup>3</sup>, Yvonne Cadet-James<sup>4</sup>, Jonathan Golledge<sup>1,2</sup>.

1. Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, QLD, Australia.  
2. Department of Vascular and Endovascular Surgery, The Townsville Hospital, Townsville QLD, Australia.  
3. Indigenous Centre, James Cook University, Townsville, Queensland, Australia



## Introduction

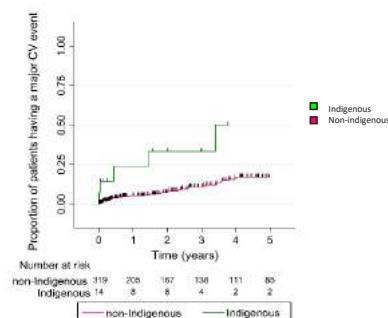
- The risk factors for Peripheral Artery Disease (PAD) are more common in Indigenous than non-Indigenous Australians, however the presentation and outcome of PAD in Indigenous Australians has not been previously investigated.
- The aim of this prospective cohort study was to compare the presenting characteristics and clinical outcome of Indigenous and non-Indigenous Australians with PAD.

## Methods

- PAD patients were prospectively recruited since 2003 from an outpatient vascular clinic in Townsville, Australia.
- Presenting symptoms and risk factors in Indigenous and non-Indigenous patients were compared using Pearson's  $\chi^2$  test and Mann Whitney U test.
- Kaplan Meier survival analysis and Cox proportional hazard analysis compared the incidence of myocardial infarction (MI), stroke or death (major cardiovascular events) among Indigenous and non-Indigenous patients.

## Results

- 401 PAD patients were recruited, of which 16 were Indigenous and 385 were non-Indigenous Australians.
- Indigenous Australians were younger at entry (median age 63.3 [54.7-67.8] vs 69.6 [63.3-75.4]), more commonly current smokers (56.3% vs 31.4%), and more frequently had insulin-treated diabetes (18.8% vs 5.2%).
- During a median follow-up of 2.5 years, five and 45 combined events (MI, stroke or death) were recorded amongst Indigenous and non-Indigenous Australians, respectively.
- Indigenous Australians were at a 4-fold greater risk of major cardiovascular events (adjusted hazard ratio 4.03 [95% confidence intervals 1.17-13.87],  $p=0.027$ ) compared to non-Indigenous Australians.



### Participant Characteristics

Characteristics	Indigenous (n=16)	Non-Indigenous (n=385)	p-value
Age (y)	63.3 (54.7-67.8)	69.6 (63.3-75.4)	<b>.005</b>
Sex (% Males)	10 (62.5%)	293 (76.1%)	0.215
Diabetes mellitus	7 (43.8%)	103 (26.8%)	0.135
Smoker	9 (56.3%)	121 (31.4%)	<b>.041</b>
Hypertension	15 (93.8%)	290 (75.3%)	0.091
IHD	10 (62.5%)	164 (42.6%)	0.116
Stroke	1 (6.3%)	38 (9.9%)	0.632
Frusemide	4 (25.0%)	28 (7.3%)	<b>.010</b>
ACEI	10 (62.5%)	152 (39.5%)	0.066
Insulin	3 (18.8%)	20 (5.2%)	<b>.022</b>
Statins	13 (81.3%)	273 (70.9%)	0.370

### Cox proportional hazard analyses

	Unadjusted HR (95%CI)	p-value	Adjusted HR (95%CI)	p-value
MI, stroke or death				
Non-Indigenous	1.00	-	1.00	-
Indigenous	3.59 (1.42-9.07)	0.007	3.12 (1.14-8.49)	<b>0.026 *</b>
	-	-	4.03 (1.17-13.84)	<b>0.027 **</b>
			4.72 (1.41-15.78)	<b>0.012 †</b>

\* Results are adjusted for hypertension, current smoking, diabetes, IHD, and age.

† Results are adjusted for hypertension, current smoking, diabetes, IHD, age, insulin and frusemide prescription.

\*\* Results are adjusted for hypertension, current smoking, diabetes, IHD, age, insulin, frusemide, ACE inhibitor, anti-platelet and critical limb ischemia.

## Conclusion

- These findings suggest that Indigenous Australians with PAD present at a younger age, have higher rates of smoking and insulin-treated diabetes, and poorer clinical outcomes compared to non-Indigenous Australians.



**Ethics:** This study received local Human Research Ethics Committee approval from the Townsville Hospital (HREC/12/QTHS/202; HREC/13/QTHS/125, HREC/14/QTHS/203 & H6028). A 5-member Indigenous reference committee established for approval  
**Acknowledgements:** Jonathan Golledge holds a Practitioner Fellowship from the National Health and Medical Research Council, Australia (1117061) and a Senior Clinical Research Fellowship from the Office of Health and Medical Research. Joseph V Moxon holds an Advance Queensland Mid-Career Fellowship from the Queensland Government. Tejas P Singh holds a Junior Doctor Research Fellowship from the Queensland Government. This work was supported by a SERTA research grant from The Townsville Hospital (62701). The authors do not have any conflicts of interest to declare with regards to this work.

## THE BURDEN OF POST-THROMBOTIC SYNDROME

### IN A LONG-TERM RETROSPECTIVE COHORT

Inês Andrade<sup>1</sup>, Marina Dias-Neto<sup>1,2</sup>, Armando Mansilha<sup>1,2</sup>.

<sup>1</sup> Faculty of Medicine, University of Porto, Portugal.

<sup>2</sup> Department of Angiology and Vascular Surgery, São João Hospital, Porto, Portugal

#### Background

The incidence of Post-Thrombotic Syndrome (PTS) is not described in the Portuguese population. The main objective of this study is to determine the cumulative incidence and severity of PTS after a first episode of Deep Venous Thrombosis (DVT).

#### Methods

This is an observational, unicentric, retrospective cohort of patients who had a first episode of DVT in the lower limb, documented with Duplex ultrasound (n=101).

#### Results

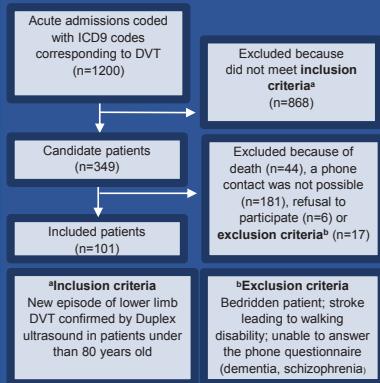


Figure 1. Flow of patients in the study.



Figure 2. Classification of post-thrombotic syndrome in 101 patients.

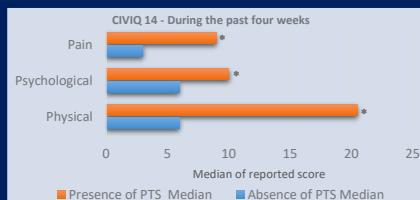


Figure 3. Chronic Venous Insufficiency Quality of Life Questionnaire (CIVIQ-14) score. \*p<0,001 versus absence of PTS; Dimension Pain (minimum score to maximum score)= 3 to 15; Dimension Physical (minimum score to maximum score)= 5 to 25; Dimension Psychological (minimum score to maximum score)= 6 to 30.

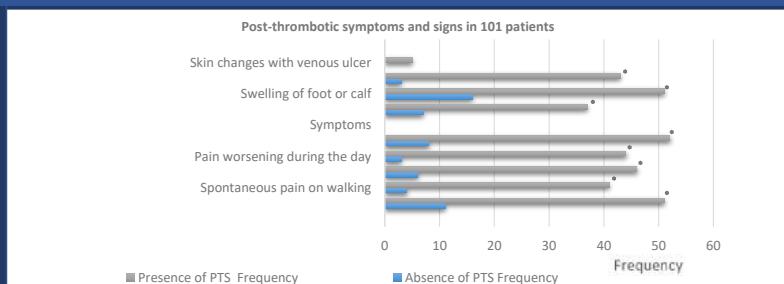


Figure 4. Post-thrombotic symptoms and signs in 101 patients. \* p < 0,001 versus absence of PTS.

#### CONCLUSION

This is a unique report, of substantial duration, on the incidence of PTS from a nationally representative cohort of patients. A high incidence of PTS was shown, correlating with worse adjusted CIVIQ scores. Large studies of prospective nature could provide more definitive evidence.

Reference: Kahn SR et al. Circulation. 2014;130(18):1636-61.



16–18  
May  
2019

**U.PORTO**  
FIMUP FACULDADE DE MEDICINA  
UNIVERSIDADE DO PORTO

[www.portovascularconference.com](http://www.portovascularconference.com)  
[cristina.freitas@portovascularconference.com](mailto:cristina.freitas@portovascularconference.com)  
+351 933 955 850

**PORTO  
VASCULAR  
CONFERENCE**