

Selected Abstracts from the July Issue of the European Journal of Vascular and Endovascular Surgery

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Perioperative Cardiac Damage in Vascular Surgery Patients

Flu W.-J., Schouten O., van Kuijk J.-P., Poldermans D. Eur J Vasc Endovasc Surg 2010;40:1–8.

Background: Patients undergoing vascular surgery are at increased risk for developing cardiac complications. Majority of patients with perioperative myocardial damage are asymptomatic. Our objective is to review the available literature addressing the prevalence and prognostic implications of perioperative myocardial damage in vascular surgery patients.

Methods: An Internet-based literature search was performed using MEDLINE to identify all published reports on perioperative myocardial damage in vascular surgery patients. Only those studies published from 2000 to 2010 evaluating myocardial damage using troponin I or T, with or without symptoms of angina pectoris were included.

Results: Thirteen studies evaluating the prevalence of perioperative myocardial ischaemia or infarction were included in the study. The incidence of perioperative myocardial ischaemia ranged from 14% to 47% and the incidence of perioperative myocardial infarction ranged from 1% to 26%. In addition, 10 studies evaluating the prognostic value of perioperative myocardial ischaemia towards postoperative mortality or the occurrence of major adverse cardiac events were included. In the retrieved studies, hazard ratios varied from 1.9 to 9.0.

Conclusion: The high prevalence and asymptomatic nature of perioperative myocardial damage, combined with a substantial influence on postoperative mortality of vascular surgery patients, underline the importance of early detection and adequate management of perioperative myocardial damage.

This article provides an extended overview regarding the prevalence and prognostic value of perioperative myocardial ischaemia and infarction in vascular surgery patients. In addition, treatment options to reduce the risk of perioperative myocardial damage are provided based on the current available literature.

Changing Profiles of Diagnostic and Treatment Options in Subclavian Artery Aneurysms

Vierhout B.P., Zeebregts C.J., van den Dungen J.J.A.M., Reijnen M.M.P.J. Eur J Vasc Endovasc Surg 2010;40:27–34.

Background: Subclavian artery aneurysms (SAAs) are rare and may cause life- and limb-threatening complications. Therapeutic options greatly differ as do access alternatives. The aim of the study was to assess its clinical presentation, diagnostics and therapeutic options as reported in the literature.

Method: A literature search was performed of the Medline, Cochrane and EMBASE databases. All articles, published until September 2009, describing treatment of an SAA were included.

Results: A total of 191 reports, of which 126 met the inclusion criteria, were identified and were published from June 1915 until September 2009. Of these, 394 SAAs were described in 381 patients, with a mean age of 52 ± 16 years. The median diameter was 40 mm (range: 10–180 mm). The aetiology appeared to change in time towards more exogenous causes. Fifty-one percent of the SAAs presented with a pulsating mass, shoulder pain and/or non-specific chest pain. Embolisation, rupture and thrombosis were present in 16%, 9% and 6% of patients, respectively, and their incidence was related to the anatomical localisation of the SAA. Open surgery and endovascular repair had a complication rate of 26% and 28%, respectively ($p = 0.49$). Cardiopulmonary complications were restricted to open repair. Mortality rates for open and endovascular techniques were similar (5%). The mortality rates for conventional elective and emergency procedures were 3% and 13%, respectively, and for endovascular repair 4% and 8%, respectively.

Conclusion: The profiles of diagnostic and treatment options of SAAs are changing. Although guidelines considering timing of intervention may not be conducted from available literature, intervention appears to be indicated, especially in distal SAAs, due to the risk of thrombo-embolic complications. Endovascular repair and hybrid procedures appear to be the preferred treatment modalities, due to a lower rate of cardiopulmonary complications.

Percutaneous Endovascular Treatment of Innominate Artery Lesions: A Single-centre Experience on 77 lesions

Paukovits T.M., Lukács L., Bérczi V., Hirschberg K., Nemes B., Hüttl K. Eur J Vasc Endovasc Surg 2010;40:35–43.

Purpose: To assess primary success and safety of percutaneous transluminal angioplasty and/or stenting of innominate artery lesions and to compare its 30-day stroke/mortality level with the literature data.

Methods: A total of 72 patients (77 stenoses, five recurrent, 58 symptomatic and 39 female) with seven innominate vessel occlusions, nine subocclusive lesions and 61 significant ($>60\%$) stenoses of innominate artery treated between 2000 and 2009 were retrospectively reviewed. With the exception of seven, all procedures were performed using a transfemoral approach. A stent was implanted in 49 (63.6%) cases. Follow-up included neurological examination, carotid duplex scan and office/telephone interview.

Results: Primary technical success was 93.5% (72/77). There was neither periprocedural (<48 h) death, nor major neurological complication. Minor periprocedural neurological complications consisted of 2/72 (2.6%) ipsilateral TIAs. Access site complications included 4 (5.2%) access site bleedings. Follow-up was achieved in 65/72 (90.3%) of all patients and 68 (88.3%) of all procedures for a mean of 42.3 months and revealed neither major neurological complication, nor additional TIA.

The cumulative primary patency rate was 100% at 12 months, $98 \pm 1.6\%$ at 24 months, and $69.9 \pm 8.5\%$ at 96 months. The cumulative secondary patency rate was 100% at 12 and at 24 months, and $81.5 \pm 7.7\%$ at 96 months. Log-rank test showed no significant difference ($p = 0.79$) in primary cumulative patencies between PTA alone ($n = 28$) or PTA/stent ($n = 49$).

Conclusion: Transfemoral PTA with or without stent appears to be a safe treatment option for innominate artery lesions.

Predicting Patient-Specific Expansion of Abdominal Aortic Aneurysms

Helderman F., Manoch I.J., Breuwer M., Kose U., Boersma H., van Sambeek M.R.H.M., Pattynama P.M.T., Schouten O., Poldermans D., Wisselink W., van der Steen A.F.W., Krams R. Eur J Vasc Endovasc Surg 2010;40:47–53.

Objective: Local anatomy and the patient's risk profile independently affect the expansion rate of an abdominal aortic aneurysm. We describe a hybrid method that combines finite element modelling and statistical methods to predict patient-specific aneurysm expansion.

Methods: The 3-D geometry of the aneurysm was imaged with computed tomography. We used finite element methods to calculate wall stress and aneurysm expansion. Expansion rate was adjusted by risk factors obtained from a database of 80 patients. Aneurysm diameters predicted with and without the risk profiles were compared with diameters measured with ultrasound for 11 patients.

Results: For this specific group of patients, local anatomy contributed 62% and the risk profile 38% to the aneurysmal expansion rate. Predictions with risk profiles resulted in smaller root mean square errors than predictions without risk profiles (2.9 vs. 4.0 mm, $p < 0.01$).

Conclusions: This hybrid approach predicted aneurysmal expansion for a period of 30 months with high accuracy.

Early Results After Treatment of Open Abdomen After Aortic Surgery With Mesh Traction and Vacuum-Assisted Wound Closure

Seternes A., Myhre H.O., Dahl T. Eur J Vasc Endovasc Surg 2010;40:60–64.

Objectives: This study aimed to describe the use of vacuum-assisted wound closure (VAWC) and mesh traction to repair an open abdomen after aortic surgery.

Design: Prospective clinical study.

Material and methods: From October 2006 to April 2009, nine consecutive patients were treated; seven of the patients received laparotomy following abdominal compartment syndrome (ACS), while two wounds were left open initially. The indication for laparotomy was intra-abdominal pressure (IAP) > 20 mmHg or abdominal perfusion pressure (APP) < 60 mmHg and development of organ failure. V.A.C. therapy (KCI, San Antonio, TX, USA) was initiated with the laparotomy, and supplemented with a

fascial mesh after 2 days. The wound was then closed stepwise with mesh traction and VAWC.

Results: All wounds could be closed following a median interval of 10.5 (range: 6–19) days after laparostomy. A median of four (range: 2–7) dressing changes were performed. One patient died on the seventh postoperative day. Two other patients died 38 and 50 days after final closure, respectively. Left colonic necrosis was seen in two patients while incisional hernia was observed in two patients. Mean follow-up duration was 17 (range: 2–36) months.

Conclusion: VAWC with mesh traction was successful in terms of early delayed primary closure and is a useful tool in the treatment of open abdomen after aortic surgery.

The Influence of Socio-economic Deprivation on Rates of Major Lower Limb Amputation Secondary to Peripheral Arterial Disease

Ferguson H.J.M., Nightingale P., Pathak R., Jayatunga A.P. *Eur J Vasc Endovasc Surg* 2010;40:76–80.

Objectives: To investigate a hypothesised link between socio-economic deprivation and rates of major lower limb amputation within the catchment of a district general hospital in the United Kingdom.

Design: An analysis of a demographic database collated using patients identified by the OPCS codes for lower limb amputations.

Materials: All patients undergoing a lower limb amputation as a result of peripheral vascular disease, as identified by ICD-10 code, between January 2003 and January 2009 were included in the study.

Methods: A case-control study was undertaken, comparing the Index of Multiple Deprivation 2007 (IMD) scores of major lower limb amputees, to those of the catchment population. Multivariate analysis was not undertaken.

Results: A total of 327 patients underwent 445 lower limb amputations during the 6-year period. A comparative plot of cumulative frequency of IMD score in the catchment and amputation groups indicates greater numbers of major amputations in more deprived postcodes ($P = 0.004$). The catchment population was further divided into population-matched deprivation quintiles. A significant increase in the number of amputations occurred in the two most deprived quintiles (OR (95%CI) = 1.654 (1.121–2.440), $P = 0.011$).

Conclusions: This study indicates a positive association between increasing social deprivation and rates of lower limb amputation. If the most deprived quintiles are combined, this increase in amputation rates is approximately 65%. This inequity should be further investigated, and consideration given to targeted care within areas of greater social deprivation.

Salvage Treatment for Venous Aneurysm Complicating Vascular Access Arteriovenous Fistula: Use of an Exoprosthesis to Reinforce the Vein after Aneurysmorrhaphy

Berard X., Brizzi V., Mayeux S., Sassoust G., Biscay D., Ducasse E., Bordenave L., Corpataux J.M., Midy D. *Eur J Vasc Endovasc Surg* 2010; 40:100–106.

Objectives: We report a new salvage technique for treating venous aneurysms (VAs) complicating vascular access arteriovenous fistula (AVF) using externally reinforced venous aneurysmorrhaphy.

Design: A retrospective study over a 20-month period from a single centre.

Patients: Patients presenting to the vascular surgery department, Bordeaux University Hospital for revision of a vascular access AVF were included.

Methods: Reinforced venous aneurysmorrhaphy consisted in removal of redundant vessel wall followed by reinforcement using an external prosthetic graft. Patency, diameter and flow were assessed by duplex ultrasound at 1, 6 and 12 months after salvage.

Results: Thirty-eight eligible patients were identified. Five were excluded because VA was associated with central vein stenosis; the remaining 33 underwent salvage. Indications were rapidly expanding or painful VA in seven cases; VA with frequent bleeding or damaged overlying skin in eight; VA in close relation to a stenosis in two; and VA associated with high-flow rate in 16. Cannulation was attempted after 30 days. Mean follow-up time was 12 S.D. 5 months (range: 4–22). Two repaired AVFs failed. Primary 1-year patency was 93%. No aneurysm or infection occurred. Reduction of high flow was successful in 12 of 16 patients. The remaining four required re-operation.

Conclusions: Reinforced venous aneurysmorrhaphy is effective in controlling venous dilation and achieving patency. Reduction of high-flow rates was not always achieved. Further study is needed to evaluate long-term efficacy of this treatment.

Long-term Results after Transfemoral Venous Thrombectomy for Iliofemoral Deep Venous Thrombosis

Lindow C., Mumme A., Ascitto G., Strohmam B., Hummel T., Geier B. *Eur J Vasc Endovasc Surg* 2010;40:134–138.

Objective: In patients presenting with extensive venous thrombosis affecting the pelvic veins, transfemoral venous thrombectomy has been suggested as an effective treatment in selected patients. We present our experience of this technique as well as its long-term results.

Patients and methods: Between January 1998 and January 2008, a total of 83 patients underwent transfemoral venous thrombectomy in our Department of Vascular Surgery. In 22 cases, this was combined with angioplasty and stenting of an iliac vein stenosis. Isolated intra-operative thrombolysis was performed in eight cases to treat deep venous thrombosis (DVT) affecting veins distal to the common femoral vein. All patients suffered from a DVT involving the pelvic veins. A DVT involving all venous segments from the pelvis to the calf was present in 63% of cases. Patients were followed up at 3 months, 6 months and yearly thereafter by clinical and duplex ultrasound examination.

Results: In all patients, the procedure was successful in achieving re-canalisation of the pelvic veins at the end of the operation. Perioperatively, there was no mortality and there was no case of clinically detected pulmonary embolism. Life-table analysis showed that, after a mean duration of 60 months following treatment, ~75% of the treated venous segments remained patent. Moderate post-thrombotic syndrome (PTS; clinical severity, etiology, anatomy and pathophysiology (CEAP) C2–C4) was present in 20% of cases; severe PTS (CEAP C5 and C6) did not occur in any of the treated patients.

Conclusions: It is safe and effective to treat extensive iliofemoral DVT using transfemoral venous thrombectomy and this prevents the development of severe PTS in the long term. The procedure is only feasible in a subset of patients with DVT, depending on the extent and the age of the thrombosis.