

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

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Jugular Venous Neurone Specific Enolase (NSE) Increases Following Carotid Endarterectomy Under General, but Not Local, Anaesthesia

Wijayaratne S.M., Collins M.A., Barth J.H., Gough M.J. *Eur J Vasc Endovasc Surg* 2009;38:262-266.

Introduction: Previous studies indicate that local (LA) rather than general anaesthesia (GA) for carotid endarterectomy (CEA) is associated with reflex hypertension and preservation of cerebral cytochrome oxidase after carotid clamping. The hypothesis that LA offers protection against ischaemic cerebral injury has been investigated by measuring ipsilateral jugular venous neurone specific enolase (NSE: neuronal glycolytic enzyme) and S-100B (glial cell protein) during and after CEA.

Methods: 27 patients with symptomatic carotid artery disease (70–99% stenosis) underwent CEA, 14 under LA and 13 under GA. Jugular venous blood samples were assayed for NSE and S-100B before carotid clamping and at 5 min before and 5 min, 2, 4, 6, 8, 12 and 24 h after clamp release.

Results: No neurological complications occurred. S-100B levels were low and did not increase from baseline in either group. Pre-clamp NSE levels were similar in both groups (LA: 17.6 (15.2–20.7) $\mu\text{g/l}$, GA: 21.5 (11.3–26.2) $\mu\text{g/l}$; $p = 0.37$) but increased significantly 2 h after clamp release in GA patients (LA: 25.5 (16.6–27.8) $\mu\text{g/l}$, GA: 48.2 (31.4–61.3) $\mu\text{g/l}$, $p = 0.05$) with a significant rise from baseline in GA patients ($p = 0.04$).

Conclusions: CEA performed under GA is associated with greater rises in jugular venous NSE, and hence cerebral injury, than CEA performed under LA.

The Endovascular Management of Penetrating Carotid Artery Injuries: Long-term Follow-up

du Toit D.F., Coolen D., Lambrechts A., de V. Odendaal J., Warren B.L. *Eur J Vasc Endovasc Surg* 2009;38:267-272.

Objectives: To review a single-centre experience with stent-graft treatment of penetrating carotid artery injuries and long-term follow-up.

Methods: All stable patients with carotid artery injuries presenting between August 1998 and February 2009 were considered for endovascular treatment. Patients were selected based on clinical and radiological criteria and data were prospectively collected. Follow-up was conducted clinically, angiographically and by telephonic contact. End-points were stroke, death and any other stent-graft-related complications.

Results: A total of 128 patients were treated, of whom only 19 were selected for endovascular management. The recorded technical success rate was 100%, with one early stroke and one non-stent-graft-related procedural death. A further four patients were lost to follow-up. The remaining 14 patients had a mean follow-up of nearly 4 years. No stent-graft-related late deaths, strokes or other complications were reported, although one instance of late stent-graft occlusion was documented.

Conclusion: Endovascular management of penetrating carotid artery injuries is safe and the long-term outcomes justify a more liberal application of this technique in selected patients.

The Importance of Anatomical Suitability and Fitness for the Outcome of Endovascular Repair of Ruptured Abdominal Aortic Aneurysms

Richards T., Goode S.D., Hinchliffe R., Altaf N., MacSweeney S., Braithwaite B. *Eur J Vasc Endovasc Surg* 2009;38:285-290.

Introduction: Endovascular repair of aortic aneurysm (EVAR) has a lower mortality than open repair. The aim of this study was to assess mortality from EVAR for emergency AAA repair and the impact of fitness for operation and adverse anatomy.

Methods: One-hundred and forty two patients who had EVAR for a ruptured AAA (80, REVAR) or a symptomatic AAA (62, SEVAR) between 1994 and 2007 in a single specialist endovascular centre were reviewed. Fitness for surgery was assessed by Hardman's index (age > 76, loss of consciousness, Hb < 9.0, Cr > 190, ischaemic ECG). CT scans were reviewed, compared with operative images and operation notes for adverse anatomy. Details of perioperative complications, and outcome were recorded.

Results: Overall mortality at 24-h, 30-days and one year were, respectively: 17%, 36%, 50% for REVAR and 5%, 8%, 23% for SEVAR. Overall

adverse anatomy increased 30-day mortality. Hardman's index of three or more increased mortality HR = 2.59 (1.24–5.41), $p = 0.01$. On Cox regression Univariate analysis increasing Hardman's index score and adverse anatomy increased the overall mortality over time. In multivariate Cox regression analysis (controlled for the Hardman's index) adverse anatomy was associated with significant increase in graft related mortality.

Conclusion: The use of EVAR is feasible in patients who present with a ruptured or acutely symptomatic AAA. Care must be taken not to extend anatomical or clinical guidelines.

A Comparison of the Mid-term Results Following the use of Bifurcated and Aorto-uni-iliac Devices in the Treatment of Abdominal Aortic Aneurysms

Jean-Baptiste E., Batt M., Azzouli R., Koussa M., Hassen-Khodja R., Haulon S. *Eur J Vasc Endovasc Surg* 2009;38:298-304.

Purpose: To compare the mid-term results following the use of bifurcated (ABIS) and aorto-uniiliac (AUIS) endovascular devices in the treatment of abdominal aortic aneurysms (AAA) in a population of patients deemed to be at high risk for open surgery.

Material and methods: Over a 4 year period (January 2003 to December 2007), 447 underwent elective endovascular aneurysm repair (EVAR) using ZENITH[®] stent-grafts. Group I comprised patients treated using the AUIS ($n = 124$), and group II those receiving ABIS ($n = 323$). Outcome measures included the assisted technical success rate, perioperative mortality, major complications, freedom from reintervention, and primary and secondary patencies. Factors associated with mid-term clinical failures were determined using univariate and multivariate analyses.

Results: The assisted primary technical success rate was 94% and 99% in groups I and II respectively ($p = .002$). Major perioperative complications occurred in 13 group I patients (10%) vs. 12 group II patients (4%) ($p = .005$). The 30-day mortality rate was 3.2% vs. 1.5% ($p = 0.2$). TASC C and D iliac lesions significantly increased the risk of major perioperative complications (35% vs. 3%; OR = 14.94; 95% CI: 5.75 to 38.78; $p < .0001$). During the follow-up period (median 24 months), secondary procedures were required in 11% and 5% of group I and group II patients respectively ($p = .01$). Freedom from reintervention at 12, 24 and 36 months was 98%, 90%, and 85% in group I vs. 96%, 92%, and 92% in group II ($P < 0.005$). The primary and secondary patency rates at 3 years were 92% vs. 98% ($p = .003$) and 97% vs. 99% ($p = .04$) for groups I and II respectively. In group I, the Crossover Femoro-Femoral Bypass (CFFB) was responsible for 3 major complications (2.4%) which occurred at 7, 12 and 57 months of follow-up. However, the use of AUIS with CFFB did not independently increase the risk of major complications during follow-up (HR = 0.108; 95% CI: 0.007 to 1.637; $p = .11$, Cox proportion model). In both univariate and multivariate analysis, concomitant iliac arterial occlusive disease (IAOD) was the only significant predictor of clinical failure in study population as a whole (OR = 3.996; 95% CI: 1.996 to 7.921; $p < .0001$).

Conclusion: This study demonstrates that ABIS is associated with better results than AUIS in the management of patients with AAA. Iliac artery occlusive disease was more frequently diagnosed in the AUIS group and this was significantly associated with a higher risk of complications, while the crossover graft itself was not. Nevertheless, the outcomes for both groups are encouraging in this high risk population.

Prevalence of Symptomatic and Asymptomatic Peripheral Arterial Disease and the Value of the Ankle-brachial Index to Stratify Cardiovascular Risk

Ramos R., Quesada M., Solanas P., Subirana I., Sala J., Vila J., Masía R., Cerezo C., Elosua R., Grau M., Cerdón F., Juvinyà D., Fitó M., Isabel Covas M., Clarà A., Àngel Muñoz M., Marrugat J., on behalf of the REGICOR Investigators. *Eur J Vasc Endovasc Surg* 2009;38:305-311.

Objectives: To determine the prevalence of ankle-brachial index (ABI) < 0.9 and symptomatic peripheral arterial disease (PAD), association with cardiovascular risk factors (CVRF), and impact of adding ABI measurement to coronary heart disease (CHD) risk screening.

Design: Population-based cross-sectional survey of 6262 participants aged 35–79 in Girona, Spain.

Methods: Standardized measurements (CVRF, ABI, 10-year CHD risk) and history of intermittent claudication (IC), CHD, and stroke were

recorded. ABI < 0.9 was considered equivalent to moderate-to-high CHD risk ($\geq 10\%$).

Results: ABI < 0.9 prevalence was 4.5%. Only 0.62% presented low ABI and IC. Age, current smoker, cardiovascular disease, and uncontrolled hypertension independently associated with ABI < 0.9 in both sexes; IC was also associated in men and diabetes in women. Among participants 35–74 free of cardiovascular disease, 6.1% showed moderate-to-high 10-year CHD risk; adding ABI measurement yielded 8.7%. Conversely, the risk function identified 16.8% of these participants as having 10-year CHD risk > 10%. In participants 75–79 free of cardiovascular disease, the prevalence of ABI < 0.9 (i.e., CHD risk $\geq 10\%$) was 11.9%.

Conclusions: ABI < 0.9 is relatively frequent in those 35–79, particularly over 74. However, IC and CHD risk $\geq 10\%$ indicators are often missing. Adding ABI measurement to CHD-risk screening better identifies moderate-to-high cardiovascular risk patients.

Subintimal Angioplasty: Meta-analytical Evidence of Clinical Utility

Bown M.J., Bolia A., Sutton A.J. *Eur J Vasc Endovasc Surg* 2009;38:323-337.

Objectives: The aim of this study was to determine accurate estimates of the success rate of subintimal angioplasty in terms of ability to recanalise occluded vessels, patency over time and limb salvage rates.

Design: A meta-analysis of published literature.

Materials: All studies reporting unique patient data published in English language between 1989 and 2008.

Methods: Separate meta-analyses were performed for immediate technical success, 12-month patency rates and 12-month limb salvage rates. Longer-term outcomes were analyzed in separate meta-analyses. Meta-regression was applied to determine whether any of these outcomes had improved over time.

Results: Pooled estimates for technical success, primary patency at 12 months and limb salvage at 12 months were 85.7% (95% confidence interval: 83.3%–87.7%, 2810 limbs), 55.8% (95% confidence interval: 47.9%–63.4%, 1342 limbs), and 89.3% (95% confidence interval: 85.5%–92.2%, 2810 limbs), respectively. Regression analysis demonstrated no significant change in outcomes over time. There was some evidence of publication bias, however, after adjusting for this there was little change in the pooled outcome estimates.

Conclusions: This study demonstrates that the outcomes for subintimal angioplasty are good and that this method should be considered as an alternative to surgical bypass.

A 15-Year Experience with Combined Vascular Reconstruction and Free Flap Transfer for Limb-Salvage

Randon C., Jacobs B., De Ryck F., Van Landuyt K., Vermassen F. *Eur J Vasc Endovasc Surg* 2009;38:338-345.

Objectives: To evaluate the results and complications of combined simultaneous arterial re-vascularisation and free flap transfer in patients with critical limb ischaemia and large soft-tissue defects that would otherwise have required major amputation.

Design: Retrospective analysis of all combined procedures performed between 1993 and 2007 with regard to complications and outcome.

Materials and methods: Seventy-eight procedures were performed in 76 patients with a mean age of 60 years (range: 18–80 years). The majority had diabetes (70.5%). Follow-up was obtained from hospital charts and telephone contacts with patients or GPs.

Results: The limb-salvage rate was 93% after 1 year, 80% after 3 years and 71% after 5 years. Perioperative complications occurred in 50% of the patients; six out of 78 (7.7%) arterial reconstructions and 13 out of 78 (16.7%) flaps had to be revised during the early postoperative period. However, most flaps could be saved by a secondary procedure resulting in an early failure (amputation) rate of 6%.

In-hospital mortality was 3.8%. End-stage renal disease was the only factor predicting limb loss. In total, 65% of the patients survived and were able to walk on their reconstructed limb at 1-year follow-up. Combined survival and limb-salvage rates were 85%, 66% and 51% after 1, 3 and 5 years.

Conclusions: Combined arterial re-vascularisation and free flap transfer can be performed safely with acceptable morbidity and mortality and should be considered for every mobile patient with large soft-tissue deficit (>10 cm²) without end-stage renal disease prior to major amputation.

Lower-extremity Arteriovenous Access for Haemodialysis: A Systematic Review

Antoniu G.A., Lazarides M.K., Georgiadis G.S., Sfyroeras G.S., Nikolopoulos E.S., Giannoukas A.D. *Eur J Vasc Endovasc Surg* 2009;38:365-372.

Background: The lower extremity is increasingly used as an access site in end-stage renal disease patients. However, reports present conflicting results, creating confusion regarding the feasibility and outcomes. Our objective is to review the available literature and analyse the patency rates and complications of various types of lower-extremity arteriovenous access.

Methods: An Internet-based literature search was performed using MEDLINE to identify all published reports on lower-extremity vascular access. The analysis involved studies comprising at least 10 arteriovenous accesses with both inflow and outflow vessels in the lower extremity, and reporting on patency rates and access-related complications. The weighted mean patency rates were calculated, and the chi-square (χ^2) test was used to evaluate the differences in the complication rates in the subgroups of patients identified.

Results: Three main types of lower-extremity vascular access were identified: the upper thigh prosthetic, the mid-thigh prosthetic and the femoral vein transposition arteriovenous access. There are limited data on saphenous vein loop grafts, which report poor results. The weighted mean primary patency rates at 12 months were 48%, 43% and 83%, respectively. The weighted mean secondary patency rates at 12 months were 69%, 67% and 93%, respectively. Access loss as a result of infection was more common in upper thigh and mid-thigh grafts than femoral vein transposition arteriovenous access (18.40%, 18.33% vs. 1.61%; $P < 0.05$). Ischaemic complications rates were higher in autologous than prosthetic arteriovenous access (20.97% vs. 7.18%, $P < 0.05$).

Conclusions: Lower-extremity vascular access has acceptable results in terms of patency, with femoral vein transposition having better patency rates than femoral grafts. Autologous access is associated with less infective complications, however, at the expense of increased ischaemic complications rates. Further research with randomised trials is required to assess the outcomes of lower-extremity vascular access.