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

Jean-Baptiste Ricco, MD, PhD, Editor-in-Chief, and A. Ross Naylor, MBChB, MD, FRCS, Senior Editor

Status of the Circle of Willis and Intolerance to Carotid Cross-clamping During Carotid Endarterectomy

Montisci R, Sanfilippo R, Bura R, Branca C, Piga M, Saba L, et al. Eur J Vasc Endovasc Surg 2013;45:in press.

Purpose: During carotid endarterectomy (CEA), an intolerance to the cross-clamping (CC) can occur. The purpose of this study was to evaluate whether preoperative magnetic resonance angiography (MRA) can predict CC intolerance.

Material and methods: Seventy-one patients (57 males, 14 females, mean age 71.8 years, age range 46-86 years) underwent 71 CEA procedures under local anaesthesia. Before CEA, patients underwent an MRA of the Circle of Willis (CoW) and were then classified into three groups: group A consisted of patients with a complete CoW, group B included patients with one agenesia/obstruction in the CoW and group C comprised patients with two or more agenesiae/obstructions in the CoW. The association between the number of anatomical variants in the CoW, corrected for the status of the contralateral carotid artery, and the onset of CC intolerance was evaluated.

Results: The prevalence of intolerance to CC was 15.5% (11/71). The Fisher test and logistic regression analysis showed a statistically significant association between the intolerance to CC and two or more agenesiae/obstructions in the CoW (p value $<$ .00001 and $p <$ .001, respectively). No neurological complications were observed.

Conclusion: The results of our study showed that two or more agenesiae/obstructions of the CoW identified by MRA were associated with a high risk of intolerance to CC during CEA.

Features of Unstable Carotid Plaque During and After the Hyperacute Period Following TIA/Stroke

Salem MK, Sayers RD, Bown MJ, West K, Moore D, Robinson TG, Naylor AR, et al. Eur J Vasc Endovasc Surg 2013;45:in press.

Background: The aim was to test the hypothesis that histologically unstable carotid plaque features were more prevalent in patients undergoing carotid endarterectomy (CEA) in the acute period after onset of symptoms and that the plaque would assume more stable histological characteristics as the delay from the most recent event increased.

Methods: Seven histological features of plaque instability (haemorrhage, large lipid core, chronic plaque inflammation, chronic cap inflammation, marked vascularity, cap rupture and many foam cells) were independently quantified and then correlated with recency of symptoms in patients undergoing CEA.

Results: In patients undergoing CEA $\leq$14 days of their last event, 87/119 (73%) exhibited $\geq$5/7 unstable histological plaque features, compared with 22/40 (55%) of patients undergoing delayed surgery ($p =$ .048). As expected, there was a sustained decline in the prevalence of unstable plaque features in 61 patients undergoing surgery between days 7-28. However, there was then a marked increase in the prevalence of plaque haemorrhage (59% up to 65%), large lipid core (41% up to 78%), chronic plaque inflammation (71% up to 91%), cap rupture (35% up to 39%), many foam cells (24% up to 43%) and marked vascularity (71% up to 91%) in 23 patients undergoing CEA after 29 days had elapsed.

Conclusion: Patients undergoing surgery $\leq$14 days had a significantly higher overall burden of high risk plaque features compared with those undergoing delayed CEA. However, the secondary upsurge across a range of unstable plaque features in patients undergoing CEA after $\geq$29 days had elapsed suggests that the relationship between recency of symptoms and plaque histology is more complex than had been anticipated in previous studies.

A Multicentre Observational Study of the Outcomes of Screening Detected Sub-aneurysmal Aortic Dilatation

Wild JB, Stather PW, Biancari F, Choke EC, Earnshaw JJ, Grant SW, Hafez H, Holdsworth R, Juvonen T, Lindholt J, McCollum C, Parvin S, Sayers RD, Bown MJ On behalf of the Sub-aneurysmal Aortic Dilatation Study Group,, et al. Eur J Vasc Endovasc Surg 2013;45:in press.

Objectives: Currently most abdominal aortic aneurysm screening programmes discharge patients with aortic diameter of less than 30 mm. However, sub-aneurysmal aortic dilatation (25 mm-29 mm) does not represent a normal aortic diameter. This observational study aimed to determine the outcomes of patients with screening detected sub aneurysmal aortic dilatation.

Design and methods: Individual patient data was obtained from 8 screening programmes that had performed long term follow up of patients with sub aneurysmal aortic dilatation. Outcome measures recorded were the progression to true aneurysmal dilatation (aortic diameter 30 mm or greater), progression to size threshold for surgical intervention (55 mm) and aneurysm rupture.

Results: Aortic measurements for 1696 men and women (median age 66 years at initial scan) with sub-aneurysmal aortae were obtained, median period of follow up was 4.0 years (range 0.1-19.0 years). Following Kaplan Meier and life table analysis 67.7% of patients with 5 complete years of surveillance reached an aortic diameter of 30 mm or greater however 0.9% had an aortic diameter of 54 mm. A total of 26.2% of patients with 10 complete years of follow up had an AAA of greater that 54 mm.

Conclusion: Patients with sub-aneurysmal aortic dilatation are likely to progress and develop an AAA, although few will rupture or require surgical intervention.

Carotid Atherosclerosis and Relation to Growth of Infrarenal Aortic Diameter and Follow-up Diameter: The Tromsø Study

Johnsen SH, Forsdahl SH, Solberg S, Singh K, Jacobsen BK, et al. Eur J Vasc Endovasc Surg 2013;45:in press.

Objectives: This research aims to study how carotid atherosclerosis is related to growth of infrarenal aortic diameter and aneurysmal formation.

Design: Population-based follow-up study.

Materials and methods: At baseline, ultrasound examination of the carotid artery and the abdominal aorta was performed in 4241 persons from a general population with no evidence of abdominal aortic aneurysm (AAA). The burden of atherosclerosis was assessed as carotid total plaque area (TPA). After a mean follow-up of 6.3 years, a new ultrasound examination was performed and measurements of the aortic diameter and carotid TPA were repeated. The effects on aortic diameter progression, follow-up diameter and risk for AAA were assessed in multiple linear and logistic regression models according to carotid TPA, adjusted for known risk factors.

Results: When analysing AAA as a dichotomous variable, a borderline association between atherosclerosis and AAA could be demonstrated. When modelling aortic diameter as a continuous variable, a 1-SD increase in 5 years' carotid plaque area (ΔTPA) was associated with a 0.12-mm growth in infrarenal aortic diameter (standard error (SE) 0.04) and a 0.20-mm wider aorta at follow-up (SE 0.06). No independent relation was seen for baseline atherosclerosis.

Conclusions: Carotid plaque progression was positively related to growth in infrarenal aortic diameter and aortic diameter at follow-up. Whether this co-variation between plaque growth and aortic diameter growth is causally related or independent events is still an open question.

Free-living Physical Activity as a Novel Outcome Measure in Patients with Intermittent Claudication

Clarke CL, Holdsworth RJ, Ryan CG, Granat MH, et al. Eur J Vasc Endovasc Surg 2013;45:in press.

Objective: To develop a method of event-based analysis that quantifies the fragmented nature of walking bouts in individuals with intermittent claudication [IC] and compare outcomes with age and gender-matched healthy controls.

Design: Cross-sectional.

Materials: The activPAL™ physical activity monitor.

Methods: 7-day physical activity patterns were compared between individuals with IC ($n = 30$) and controls matched for age and gender ($n = 30$). The ratio of the number of walking events to upright events