Galectin-3, Carotid Plaque Vulnerability, and Potential Effects of Statin Therapy

Objectives: Galectin-3, a member of galectinins, a family of β-galactoside-specific lectins, has been reported to propagate vascular inflammation. The role of galectin-3 in carotid atherosclerosis is controversial. The aim of this study was to investigate the relationship of galectin-3 with plaque vulnerability in patients with high grade carotid stenosis.

Methods: This was a cross sectional study of patients undergoing carotid endarterectomy (CEA). Carotid plaques obtained from 78 consecutive patients (40 symptomatic [SG], 38 asymptomatic [AG]) undergoing CEA were histologically analyzed for galectin-3, macrophages (CD68) and laminin. Pre-operatively the biochemical profile and plaque echogenicity (gray-scale median, GSM) score were determined.

Results: There were no significant differences in clinical and demographic parameters between SG and AG (p > 0.05). The SG had a lower GSM score (44.21 ± 18.24 vs. 68.79 ± 28.79, p < 0.001) and a smaller positive stented area for galectin-3 (4.89 ± 1.60% vs. 12.01 ± 5.91%, p < 0.001) and laminin (0.88 ± 0.71% vs. 3.46 ± 2.12%, p < 0.001) than the AG. On the other hand, intra-plaque macrophage content was increased in SG (p < 0.001). For the whole cohort, symptomatic status was independently associated with lower galectin-3 intra-plaque concentration (OR = 0.750, p < 0.001). Notably, patients on long term statin treatment had elevated galectin-3 and lowered macrophage intra-plaque concentrations compared with those on short term treatment (p < 0.05).

Conclusions: A low galectin-3 intra-plaque concentration seems to correlate with clinically and ultrasonically defined unstable human carotid plaques. Long term statin treatment may induce increase of intra-plaque galectin-3 concentration mediating plaque stabilization.

Mid-Term Results of EVAR in Severe Proximal Aneurysm Neck Angulation

Objective: To determine if mid-term outcome following endovascular aneurysm repair (EVAR) with the Endurant Stent Graft (Medtronic, Santa Rosa, CA, USA) is influenced by severe proximal neck angulation.

Methods: A retrospective case–control study was performed using data from a prospective multicenter database. All measurements were obtained using dedicated reconstruction software and center-lumen line reconstruction. Patients with neck length >15 mm, infrarenal angle (>5°), and/or suprarenal angle (≥)60°, or neck length >10 mm with β ≥60°, and/or ≥45° were compared with a matched control group. Primary endpoint was primary clinical success. Secondary endpoints were freedom from rupture, type 1A endoleak, stent fractures, freedom from neck-related reinterventions, and aneurysm-related adverse events. Morphological neck variation over time was also assessed.

Results: Forty-five patients were included in the study group and were compared with a matched control group with 65 patients. Median follow-up time was 49.5 months (range 30.5–58.4). The 4-year primary clinical success estimates were 83% and 80% for the angulated and nonangulated groups (p = 0.42). Proximal neck angulation did not affect primary clinical success in a multivariate model (hazard ratio 1.56, 95% confidence interval 0.55–4.41). Groups did not differ significantly in regard to freedom from rupture (p = 0.79), freedom from type 1A endoleak (p = 0.79), freedom from neck-related adverse events (p = 0.68), and neck-related reinterventions (p = 0.68). Neck angle reduction was more pronounced in patients with severe proximal neck angulation (mean δθ = 15.6°, mean δβ = 30.6°) than in the control group (mean δθ = 0.39°, mean δβ = 5.9°) (p < 0.001).

Conclusion: Mid-term outcome following EVAR with the Endurant Stent Graft were not influenced by severe proximal neck angulation in our population. Despite the conformity of the device, moderate aortic neck remodeling was identified in the group of patients with angulated neck anatomy on the first computed tomography scan after implantation with no important further remodeling afterwards. No device integrity failures were encountered.

Abdominal Aortic Aneurysm Diameters: A Study on the Discrepancy between Inner to Inner and Outer to Outer Measurements

Introduction: The NHS Abdominal Aortic Aneurysm Screening Programme (NAAASP) uses the inner to inner (ITI) wall diameter in sizing aortic dimensions when screening with ultrasound. It is recognised that ITI measurements are smaller than outer-to-outer (OTO) measurements, and the primary aim was to calculate the absolute difference in AP ITI and OTO measurements across varying aortic diameters. The secondary aim was to estimate the potential number of patients lost from the screening programme.

Methods: Since April 2012, patients outside the screening programme that undergo ultrasound of abdominal aortas have their ITI and OTO measurements recorded. These measurements were compared retrospectively and analysed for variability at threshold sizes of AAAs.

Results: From May 2012 to October 2013, 452 abdominal aortic ultrasound scans recorded both ITI and OTO measurements. The majority (81%) were performed on men with the mean age of 78 years. The mean difference between ITI and OTO measurements was 4.21 mm (p < 0.001). There was no difference between the genders. Thresholds were created for analysis between different ITI and OTO aortic diameters; these were <3 cm, 3.1–4 cm, 4.1–5 cm, and >5 cm. There was no significant difference between the means at each threshold size for ITI diameter (p = 0.758). In the first 2 years from April 2012, 15,447 men underwent screening. Of these, 177 (1.14%) had sub-threshold ITI aortic diameters between 2.6 cm and 2.9 cm. This would upscale to 5,316 men nationally.

Conclusion: We have demonstrated a consistent and significant 4 mm difference between ITI and OTO diameters in live scanning. Lowering the threshold for entry into a surveillance AAA to an ITI diameter of 26 mm rather than the current 30 mm is advocated. An alternative cost-effective way to rescreen this small sub-group at 5 or 7 years.

Variability of Origin of Splanchnic and Renal Vessels From the Thoracoabdominal Aorta

Objective: To analyze the variability of origin of the celiac trunc (CT), the superior mesenteric artery (SMA), the right renal artery (RRA), and the left renal artery (LRA) in terms of mutual distances, angle from the sagittal aortic axis (clock position), and ostial diameters on computed tomography angiographies (CTAs) in three groups of patients.

Methods: One hundred and fifty CTAs of 50 patients with a non-dilated thoracoabdominal aorta (group A), 50 with thoracoabdominal aneurysm (B), and 50 with infrarenal aneurysm (C) were reviewed. The measurements performed on CTAs, as well as the patients’ age, sex, and body surface area, were analyzed. p values < 0.05 were considered statistically significant.

Results: The clock position of the CT and the SMA, the diameters of all vessels, and the distance of the CT–SMA followed a Gaussian distribution. In contrast, the clock position of the renal vessels did not follow a normal distribution, and nor did the distances of the SMA–RRA, SMA–LRA, RRA–LRA or the distances between the renal arteries and the aortic bifurcation. The same values did not differ significantly among the three groups, with the exception of the distances between the renal
arteries and the aortic bifurcation, significantly greater in group C. The clock position of the LRA and the distances of the SMA—LRA, SMA—RRA, RRA—LRA and between both renal arteries and the aortic bifurcation showed a significant correlation with the increase of aortic diameter.

Conclusion: The anatomic variability of the origin of both the CT and the SMA in terms of clock position and mutual distances followed a Gaussian distribution, regardless of group. The same applies to the ostial diameters of renal and visceral vessels. In contrast, the origin of the renal vessels had a statistically significant heterogeneity that seemed to be correlated with the increase of aortic diameter in the mesenteric and renal aortic region.

Beneficial Effects of Pre-operative Exercise Therapy in Patients with an Abdominal Aortic Aneurysm: A Systematic Review

Objective/background: The impact of post-operative complications in abdominal aortic aneurysm (AAA) surgery is substantial, and increases with age and concomitant co-morbidities. This systematic review focuses on the possible effects of pre-operative exercise therapy (PET) in patients with AAA on post-operative complications, aerobic capacity, physical fitness, and recovery.

Methods: A systematic search on PET prior to AAA surgery was conducted. The methodological quality of the included studies was rated using the Physiotherapy Evidence Database scale. The agreement between the reviewers was assessed with Cohen’s kappa.

Results: Five studies were included, with a methodological quality ranging from moderate to good. Cohen’s kappa was 0.79. Three studies focused on patients with an AAA (without indication for surgical repair) with physical fitness as the outcome measure. One study focused on PET in patients awaiting AAA surgery and one study focused on the effects of PET on post-operative complications, length of stay, and recovery.

Conclusion: PET has beneficial effects on various physical fitness variables of patients with an AAA. Whether this leads to less complications or faster recovery remains unclear. In view of the large impact of post-operative complications, it is valuable to explore the possible benefits of a PET program in AAA surgery.

Second Toe Systolic Pressure Measurements are Valid Substitutes for First Toe Systolic Pressure Measurements in Diabetic Patients: A Prospective Study

Objective: Toe systolic pressure is a component of the standard vascular and diabetic foot assessment. Until now, clinicians have measured only first toe pressure given a lack of evidence for measurements of the other toes. In diabetic patients, first toe measurements are often not possible because of ulceration or amputation. It was hypothesized that the adjacent second toe systolic pressure measurements would be interchangeable with those of the first toe.

Methods: A prospective study was performed on 100 participants with diabetes mellitus. Duplicate systolic toe pressures were measured in the first toe and adjacent second toe using the Systoe Automated Toe Pressure System, Systoe Photoplethysmograph Sensor Cuff, and occlusion cuffs measuring 120 °C225 mm for the first toe and 90 °C15 mm for the second toe. Correlation analysis was followed by Ordinary Least Products regression to detect and distinguish fixed and proportional bias between the two toe measurements. The acceptable limits of interchangeable results were defined as 5–10 mmHg.

Results: Correlation coefficient r = 0.908; p < 0.001. Eighty-two percent of the variations in the second toe measurements were accounted for by knowing the first toe measurements and vice versa. Ordinary Least Products regression showed no fixed or proportional bias between the two methods of measurement: second toe systolic pressure = (−0.579) + (1.038) * first toe systolic pressure. Repeatability analysis showed a 0.5% variation between duplicate measurements.

Conclusions: This is the first study which demonstrates that second toe systolic pressures are interchangeable with those of the first toe. Second toe pressures can be used in diabetic patients whose first toe pressures cannot be assessed.