Synchronous Cardiac and Carotid Revascularisation: The Devil is in the Detail
Naylor A.R. Eur J Vasc Endovasc Surg 2010;40:40

Background: Studies reporting outcomes following staged/synchronous carotid revascularisation prior to cardiac surgery have generally concluded that procedural strokes are reduced. However, virtually none have commented specifically on the risk of stroke in patients with bilateral carotid disease who undergo their cardiac procedure in the presence of an unoperated, contralateral stenosis. If carotid disease really was an important cause of peri-operative stroke, these patients should incur a much higher risk of stroke following their cardiac procedure.

Methods: A retrospective audit of prospectively acquired data in 132 consecutive patients undergoing synchronous carotid endarterectomy and cardiac surgery.

Results: Overall 30-day rates of mortality, ipsilateral stroke and any stroke were 5.3%, 1.5% and 3% respectively. The 30-day rate of death/stroke was 6.8%. In 51 patients with a prior history of stroke/TIA, the 30-day rate of death/stroke was 5.9%, compared with 7.4% in neurologically asymptomatic patients (p = 0.34). 57% had significant, bilateral disease. They went their combined procedure in the presence of a significant, non-operated (asymptomatic) contralateral stenosis (50–99% = 75, 60–69% = 34, 70–99% = 32). Only one patient (93–99% stenosis) suffered a post-operative stroke in the hemisphere ipsilateral to the non-operated, contralateral stenosis.

Conclusions: Patients undergoing synchronous procedures incurred a low rate of procedural stroke, perhaps justifying this many-vencnt approach. However, an alternative and more critical analysis suggested that the risk of procedural stroke in patients with significant (non-operated) contralateral asymptomatic carotid disease was extremely low. This challenges the assumption that asymptomatic carotid disease is an important cause of stroke during cardiac surgery.

An Update of the Role of Endovascular Repair in Blunt Carotid Artery Trauma

Blunt carotid injury (BCAI) is an increasingly recognised entity in trauma patients. Without a prompt diagnosis and a proper treatment, they can result in devastating consequences with cerebral ischaemia rate of 40–80% and mortality rate of 25–60%. Several applied screening protocols and continuously improving diagnostic modalities have been developed to identify patients with BCAI. The appropriate treatment of BCAI still remains controversial and strictly individualised. Besides anti-thrombotic/anti-coagulation therapy and surgical intervention, continuously evolving endovascular techniques emerge as an additional treatment option for patients with BCAI. We provide an update on blunt carotid trauma, emphasising the role of endovascular approaches.

Determinants of Radiation Exposure during EVAR
Badger S.A., Jones C., Boyd C.S., Soong C.V. Eur J Vasc Endovasc Surg 2010;40:40

Objectives: Endovascular aneurysm repair (EVAR) is an established method of aortic aneurysm repair, in favourable anatomical configurations. It does however expose patients to radiation. The study aim was to determine if the aneurysm neck morphology influencing radiation exposure.

Patients and methods: All elective and emergency EVAR patients were identified. Elective patients had a bifurcated stent graft deployed, while emergency patients were repaired with an aorto-uniliac stent-graft and fem-fem crossover bypass. Proximal and distal aortic neck diameters, neck length, neck angles and sac diameter were recorded, with the radiation dose, sac area and neck dynamics of the two groups were compared by using the t-test for unpaired data and multivariable logistic regression analyses were performed. Mean values are presented with the standard deviation.

Results: Included were 26 patients (19 Talent, 6 Excluder and 1 Lifepath). Stent graft migration of ≥5 mm occurred in 11 patients (group 1). The pulsatility of the AAA neck in these patients was compared with the pulsatility in 15 patients with no graft migration (group 2). There were no significant differences in aortic neck characteristics (angulation, length and diameter) or degree of stent graft oversizing between the two groups. At level A in group 1 versus group 2, the diameter increase during the cardiac cycle was 2.0 ± 0.3 versus 1.7 ± 0.3 mm and the aortic area increase was 49 ± 15 versus 38 ± 12 mm². At level B in group 1 versus group 2, the diameter increase per heartbeat was 1.8 ± 0.3 versus 1.6 ± 0.4 mm, and the area increase was 87 ± 10 versus 25 ± 15 mm². The heartbeat-dependent diameter and area changes at both levels were significantly higher in group 1 compared with group 2. The Multivariate regression analysis showed suprarenal aortic pulsatility was a significant predictor for stent graft migration after 3 years.

Conclusion: The preoperative heartbeat-dependent aortic neck pulsatility is significantly associated with stent graft migration after 3 years. The aortic pulsatility in patients with stent graft migration is significantly higher than the pulsatility in patients without stent graft migration.

A Computational Study of the Magnitude and Direction of Migration Forces in Patient-specific Abdominal Aortic Aneurysm Stent-Grafts
Molony D.S., Kavanagh E.G., Madhavan P., Walsh M.T., McGoughlin T.M. Eur J Vasc Endovasc Surg 2010;40:40

Objectives: Endovascular aneurysm repair for abdominal aortic aneurysm (AAA) is now a widely adopted treatment. Several complications remain to be fully resolved and perhaps the most significant of these is graft migration. Haemodynamic drag forces are believed to be partly responsible for migration of the device. The objective of this work was to investigate the drag forces in patient-specific AAA stent-grafts.

Methods: CT scan data was obtained from 10 post-operative AAA patients treated with stent-grafts. 3D models of the aneurysm, intraluminal thrombus and stent-graft were created. The drag forces were determined by fluid-structure interaction simulations. A worst case scenario was investigated by altering the aortic waveforms.

Results: The median resultant drag force was 5.46 N (range: 2.53–10.84). An increase in proximal neck angulation resulted in an increase in the resultant drag force (p = 0.009). The primary force vector was found to act in an anterior caudal direction for most patients. The worst case scenario simulation resulted in a greatest drag force of 16 N.