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VS7.

Video Presentation

Complex Carotid Reconstruction: Left Subclavian to Carotid Bypass with Branched Grafts to the Left Vertebral and Carotid Arteries

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Background: Background: Complex cerebrovascular lesions require careful operative planning. We present a case of a 59 year-old male with a history of recent transient ischemic attack and right subclavian steal symptoms. Carotid duplex and CT angiography showed an aberrant left vertebral artery with critical origin stenosis, left common carotid artery (CCA) critical origin stenosis, and an occluded innominate artery extending to the right CCA bulb. This presented multiple therapeutic options including antegrade or retrograde endovascular stenting of the left CCA, with or without femoral to axillary bypass on the right to protect cerebral perfusion. We chose an alternate strategy made available by the normal left subclavian: a left subclavian to right carotid bypass, with branched grafts to the left CCA and left vertebral. No complications occurred. Follow up angiography demonstrated full-patency of the grafts and the patient has been without symptoms for greater than one year.

Technical Description: Technical Description: We begin with an outline of the anatomy and the options. We then present the operation, first with a left transverse supraclavicular incision through which the phrenic nerve is preserved and the left CCA, subclavian, and vertebral arteries are circumferentially controlled. Next, through a separate incision we expose and control the right carotid vessels. We then create a retroesophageal tunnel through which we pass a ringed 6 mm graft between the two incisions. Two short 6 mm branches are then sewn into place on the left side of the graft. These are occluded with hemoclips and we proceed with the left subclavian and right carotid anastomoses. Once antegrade right carotid flow is instituted, we then perform anastomoses of the graft branches to the left CCA and vertebral arteries, without interrupting flow to the right carotid. The hemoclips are then removed to restore flow through the left CCA and vertebral arteries. Pulsatile flow is confirmed and the wounds are closed.

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SS27.

The Risk of Carotid Artery Stenting Compared with Carotid Endarterectomy Is Greatest in Patients Treated within Seven Days of Symptoms

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Objectives: Among patients with symptomatic carotid stenosis, carotid artery stenting (CAS) is associated with a higher risk of peri-procedural stroke or death than carotid endarterectomy (CEA). Uncertainty remains whether the balance of risks changes with time since the most recent ischemic event.

Methods: We investigated the association of time since the qualifying event (0-7 days, 8-14 days, and > 14 days after the qualifying event) with the risk of stroke or death within 30 days after CAS or CEA in a pooled analysis of data from individual patients randomised in the Endarterectomy vs Angioplasty in patients with Symptomatic Severe Carotid Stenosis trial (EVA-3S), the Stent-Protected Angioplasty versus Carotid Endarterectomy trial (SPACE), and the International Carotid Stenting Study (ICSS).

Results: Timing information was available for 2839 patients. In the first 30 days after intervention, any stroke or death occurred significantly more often in the CAS group (110 [7.7%] of 1434) compared to the CEA group (54 [3.8%] of 1405, crude risk ratio 2.0 [95% CI 1.5-2.7]. The timing of the intervention modified the treatment benefit: early treated CEA patients.

Conclusions: The increase in risk of CAS compared with CEA appears greatest in patients treated within 7 days of symptoms. This effect is also apparent independent of age.

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SS28.

The Size of Juxtaluminal Black Area in Ultrasonic Images of Asymptomatic Carotid Plaques Predicts the Occurrence of Stroke

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Objectives: It has been suggested that a juxtaluminal black (hypochoic) area (JBA) in ultrasonic images of asymptomatic carotid artery plaques is associated with a lipid core close to the lumen or a thrombus on the plaque surface. The aim of our study was to test the hypothesis that

the presence and size of JBA predicts future ipsilateral ischemic stroke.

Methods: JBA was defined as an area of pixels with gray scale value <25 adjacent to the lumen without a visible echogenic cap, after image normalization. The size of a JBA was measured in the carotid plaque images of 1121 patients with asymptomatic carotid stenosis 50-99% in relation to the bulb (ACSRS study), followed-up for up to 8 years.

Results: JBA had a linear association with future stroke rate. The area under the ROC curve was 0.816. Using Kaplan Meier curves, the mean annual stroke rate was 0.4% in 706 patients with JBA <4 mm²; it was 1.4% in 171 patients with JBA 4-8 mm², 3.2% in 46 patients with JBA 8-10 mm² and 5% in 198 patients with JBA >10 mm² (*P* <.001). In a Cox model with ipsilateral ischemic events (AF, TIA or stroke) as the dependent variable, JBA (<4, 4-8, >8) was still significant after adjusting for other plaque features known to be associated with increased risk (stenosis, GSM, presence of discrete white areas without acoustic shadowing (DWA) indicating neovascularization, plaque area and history of contralateral TIA or stroke. Plaque area and gray scale median (GSM) were not significant. Using the significant variables (stenosis, DWA, JBA and history of contralateral TIA or stroke), this model predicted the annual risk of stroke (range 0.5-10.0%). The average annual stroke risk was <1% in 734 patients, 1-1.9% in 94, 2-3.9% in 134, 4-5.9% in 125 and 6-10% in 34.

Conclusions: The size of JBA is linearly related to the risk of stroke and can be used in risk stratification models. These findings need to be confirmed in future prospective studies or in the medical arm of randomized controlled studies in the presence of optimal medical therapy.

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SS29.

The Hemodynamic Impact of Balloon Angioplasty in Multiple Sclerosis Patients with Chronic Cerebrospinal Venous Insufficiency

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Objectives: Recently an association has been made between Multiple Sclerosis (MS) and Chronic Cerebrospinal Venous Insufficiency (CCSVI) characterized by stenosis and reflux of the principal extracranial venous drainage including the Internal Jugular veins (IJV) and the Azygous veins (AZV). This is the first angiographic study to quantitatively analyze the impact of percutaneous balloon angioplasty (PTA) on flow dynamics across these lesions.

Methods: 50 IJV from MS patients with CCSVI and 12 IJV from healthy volunteers underwent detailed angiographic evaluation. Technical components of all venograms were standardized. Quantitative analysis included the contrast time of flight (TOF) from the mid IJV to the superior vena cava, and the primary venous emptying time (PVET), quantified as >50% of venous emptying, from the IJV. The TOF and PVET were recorded in patients with CCSVI prior and subsequent to balloon angioplasty, as well in normal healthy subjects. All data was prospectively collected, and statistical analysis was performed using two-tailed Student's test.

Results: Of the 50 CCSVI-MS patients with IJV stenosis >70% and reflux underwent balloon angioplasty, technical success defined as <20% residual IJV stenosis was achieved in 78% (44/50). The Table describes the pre and post angioplasty TOF and PVET in patients with CCSVI, as well as in healthy non-MS patients without any treatment. CCSVI patients were noted to have a significant improvement in both the TOF and PVET following balloon angioplasty that paralleled healthy non-MS subjects.

Conclusions: Results of this prospective pilot study suggest an association between MS and CCSVI, which results in abnormally elevated TOF and PEVT through the IJV. Furthermore, balloon angioplasty these lesions improves the hemodynamic parameters that are comparable to healthy non-MS patients.

Table.

	MS patients with CCSVI				Healthy Non-MS		P value
	Pre-angioplasty		Post-angioplasty		No treatment		
	TOF	PVET	TOF	PEVT	TOF	PEVT	
Mean time (sec.)	5.28	12.45	2.45	6.44	2.33	6.10	<.001
St. dev.	2.52	10.0	0.79	2.05	0.42	0.58	

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RR1: Rapid Paced Paper Session I

RR1.

Safety of Carotid Stenting (CAS) Is Based on the Center Experience More than on the Individual Performance

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