

SVT Archive Case Study - November 2002

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Retrograde external carotid and vertebral artery flow

Retrograde external carotid and vertebral artery flow with Brachiocephalic disease. The importance of combined use of spectral Doppler and colour flow in the identification of abnormal haemodynamics.

A 52 year old woman presented to the vascular laboratory at South Manchester University Hospital for pre operative assessment prior to coronary artery bypass graft with a recent history of transient ischaemic attack.

Bilateral colourflow duplex ultrasound was performed on the common carotid (CCA), internal carotid (ICA), external carotid (ECA), vertebral (VA) and subclavian arteries (SA).

On B-mode imaging, a widely patent right CCA, ICA, ECA and SA were noted with only minimal areas of intimal thickening (less than 40% stenosis). Doppler assessment of the right CCA and ICA demonstrated a low velocity, low resistance, spectral waveform which had venous characteristics. Colour flow and spectral Doppler confirmed retrograde flow in the right ECA and VA.

The origin of the CCA was identified and noted to be widely patent, as was the CCA/SA bifurcation. Spectral analysis of the mid SA revealed a monophasic waveform of reasonable velocity (122cm/s) and volume with significant spectral broadening. The waveform became progressively more damped, and velocities further reduced, as the Doppler cursor was moved proximally in the Subclavian artery until an unrecognisable waveform was obtained, indicative of a proximal occlusion or severe stenosis.

The Brachiocephalic artery could not be adequately viewed and therefore referral for diagnostic angiography was recommended.

The contralateral CCA, ICA and ECA waveforms were of normal velocity with orthograde flow with only minimal areas of intimal thickening noted (all less than 40% stenosis). The SA was widely patent with good biphasic waveform. The Vertebral artery although widely patent with orthograde flow exhibited increased flow velocities (133cm/s).

	Right			Left		
	CAA	ICA	ECA	CAA	ICA	ECA
Peak SYS (CM/A)	49	73	72	103	128	119
VA	Open and Retrograde			Open and Orthograde		
SA	Open and Retrograde			Open and Orthograde		

This suggests that the blood supply to the right hemisphere is completely isolated from the left hemisphere. The patient can only supply the right cerebral hemisphere and right arm via the right ICA and left VA respectively.

This explains the patient's presentation of classic TIA symptoms (left arm and leg weakness) and vertebrobasilar symptoms (dizziness and diplopia).

Diagnostic angiography confirmed a pinhole stenosis of the brachiocephalic artery which was stented with a good radiological result. Immediately after stenting orthograde flow was returned to the ipsilateral ECA and VA.

This case highlights the importance of colourflow duplex in the confirmation of abnormal circulatory haemodynamics secondary to severe disease. It also underlines the need for FULL colourflow and Doppler spectral analysis of ALL extracranial arteries for accurate diagnosis of disease.

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