Images in Anesthesia

Diastolic rotational flow in the aortic arch

FIGURE A) A still image captures the rotational flow in the aortic arch (short axis) across from the left subclavian artery. B) Velocity vector map (calculated using particle image velocimetry) quantifying the rotational flow and the co-existing complex eddies.

WHILE the presence of rotational blood flow in the distal aortic arch is expected based upon modelling of the arch and has been demonstrated during cardiopulmonary bypass,¹ the utility of echocardiography to characterize these flows has been the subject of debate.² A 76-yr-old male successfully underwent endovascular exclusion of his descending thoracic aortic aneurysm. Transesophageal echocardiographic interrogation of the stent with colour Doppler did not reveal any clinically significant endoleaks and a completion echocontrast aortogram confirmed the absence of an endoleak. Clockwise rotational flow during diastole was demonstrated in the short axis view of the aortic arch at the level of the left subclavian artery (Figure, panels A and B; and video, available as Additional Material at: www.cja-cja.org). The long axis view demonstrated a similar, less well-developed rotational flow, with the flow reversal (retrograde flow) occurring along the posterior wall. Rotational

flow, or even vortices, in the human aortic arch are expected as a consequence of the vessel's shape and branching pattern. The existence of vortices has been difficult to prove, though recent magnetic resonance images have suggested longitudinal helical flow down the normal aorta with the development of vortices in the presence of even minor abnormalities.³ These images confirm that under some conditions rotational flow exists and can be visualized and quantified with transesophageal echocardiography and echocontrast. As there were no equivalent images prior to the stent deployment, we cannot exclude the possibility that this phenomenon is a consequence of the hemodynamic changes induced by the stent.

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