Air Bubbles are Released by Thoracic Endograft Deployment: a Possible Cause of Stroke During TEVAR. An experimental study.


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Abstract

Purpose
Embolic stroke is a dreaded complication of thoracic endovascular aortic repair (TEVAR). The prevailing theory about its cause is that particulate debris from atherosclerotic lesions in the aortic wall are dislodged by endovascular instruments and embolize to the brain. An alternative source of embolism might be air trapped in the endograft delivery system. The aim of this experimental study was to determine whether any air is released during deployment of a thoracic endograft.

Methods
In an experimental benchtop study, 8 thoracic endografts (five Medtronic Valiant Thoracic and three Gore TAG) were deployed in a water-filled transparent container drained from air. Endografts were prepared and deployed according to their instructions for use. Deployment was filmed with a high-resolution camera and the volume of air released was collected and measured in a calibrated syringe.

Results
Air was released from all the endografts examined. Air volumes ranged from 0.1 to 0.3 ml for Medtronic Valiant Thoracic and from < 0.025 to 0.04 ml for Gore TAG. Released air bubbles were clearly visible on films. The largest bubbles had a diameter of approximately 3 mm and came from the proximal end of the Medtronic Valiant device.

Conclusions
Air bubbles are released from thoracic endografts during deployment. This has not been demonstrated before. Air embolism may be an alternative cause of stroke during TEVAR.