

The Degree of Question Mark of Aorta Can Predict the Thrombosis Rate in the False Lumen of a Type-B Aortic Dissection After TEVAR

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Abstract: Objective: Thoracic endovascular aortic repair (TEVAR) of type B aortic dissection (AD) is to initiate the thrombosis in the false lumen to eventually result in aortic remodeling. We aim to find out whether the false lumen (FL) thrombosis rate after TEVAR can be predicted accurately by an index that expresses the degree of aortic arch angulation. **Method:** Three-dimensional aortic arch geometry of 39 type B AD patients (mean age: 48 years) after TEVAR were reconstructed from post-operative CT images. For the first time, the question mark which takes into account the curvature of both aortic arch and the descending aorta was introduced to indicate the aortic arch morphology. The degree of question mark and the angles of aortic arch defined by previous literatures were measured. Moreover, hemodynamics for ADs with different question mark degree were numerically computed using different models. **Result:** No correlation between the aortic arch angles defined by previous researchers and the rate of thrombosis. However, the degree of question mark has negatively correlation with FL thrombosis ($r=-.7394$; $p<.001$). In addition, regions of recirculating flow and low wall shear stress (WSS) in the FLs decreased with the increase of the degree of question mark of the aorta. **Conclusion:** The degree of question mark proposed in this paper is a good description of the aortic arch geometry after TEVAR in patients with aortic B-type dissection. It is negatively correlated with postoperative FL thrombosis, the higher the question mark degree was, the less likely it was to form a complete thrombus.

Keywords: Aortic dissection, morphology, aortic arch, thrombosis in false lumen, TEVAR.

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