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INVITED COMMENTARY – INFRARENAL AORTIC NECK ANGULATION FALLS SHORT AS A SOLE PROGNOSTIC FACTOR FOR EVAR OUTCOMES

Refers to: Qayyum H, Hansrani V, Antoniou GA. Prognostic role of severe infrarenal aortic neck angulation in endovascular aneurysm repair. Eur J Vasc Endovasc Surg. 2021; 62:409–21.

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Qayyum and colleagues performed a meta-analysis on studies comparing outcomes of endovascular aneurysm repair (EVAR) in patients with and without severe infrarenal aortic angulation. Although higher type 1a endoleak and re-intervention rates were demonstrated in patients with severe infrarenal angulation, no increased mortality, aneurysm related mortality or rupture rates were found.[1] They concluded that severe infrarenal angulation may not be associated with an adverse midterm prognosis following EVAR as previously thought.

The prognostic value of infrarenal aortic angulation seems limited for several reasons. First, reliability and uniformity of infrarenal angulation measurement varies in the included studies. During the past decade it has been common practice to measure supra- and infrarenal angulation on computed tomography scans over centre luminal line reconstructions. By using this so called flow direction angulation method, the maximum angulation is determined at the crossing of two lines, which leads to a triangular oversimplification of the aortic anatomy. In particular, tortuous aortic segments may be ignored. Aortic curvature was suggested as a better predictor for both intra-operative and late type 1a endoleak and migration, and calculation of aortic curvature offers a more precise estimation of the true aortic trajectory.[2,3] Second, to define a hostile neck the singular use of angulation is insufficient. Presence of a combination of other factors, such as neck length, diameter, presence of thrombus, and conical shape, can contribute to a hostile neck.[4] Third, more important than individual aortic neck characteristics may be the maximum obtainable infrarenal sealing zone. A severely angulated but long infrarenal neck can still result in an adequate sealing zone while a straight but very short neck might lead to insufficient apposition between endograft and infrarenal aortic wall. Wang and colleagues showed that short inner curve seal zone predicts complications in highly angulated necks post-EVAR.[5]

Quayyum et al. demonstrated increased type 1a endoleak and re-intervention rates in patients with severely angulated necks. This is an important finding especially because robust long term data are lacking, and these complication rates do not plateau with increasing follow up. Therefore, infrarenal angulation should not be abandoned completely as a prognostic factor for EVAR outcome. However, we have to go back to the drawing board

regarding the pre-EVAR risk calculations for complicated outcomes. Infrarenal angulation should be seen in the combination of several anatomical parameters that need to be evaluated to determine adequacy of the infrarenal sealing zone between endograft and aortic wall. This sealing zone is not only dependent on aortic morphology but also on endograft characteristics and the amount of oversizing. During the coming years, more sophisticated three dimensional methods, such as virtual stenting and aortic statistical shape analysis, may improve pre-operative evaluation of infrarenal aortic sealing zones and lead to more precise prognostic information on long term EVAR performance. Moreover, early post-EVAR determination of the achieved apposition between endograft and infrarenal aortic wall should be the standard, as it shows how accurate endograft sealing is.[6] In our opinion, these measurements are more important for analysing EVAR outcomes than the pre-EVAR infrarenal angulation.

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