See Article page 13.

Commentary: How do you size a frozen elephant trunk?

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CENTRAL MESSAGE

The optimal sizing criteria for frozen elephant trunk procedures for aortic aneurysms are not well known. The surgeon should weigh the risk of endoleak versus aortic wall injury and paraplegia.

Kandola and colleagues[1] report their single-center experience with the frozen elephant trunk (FET) procedure for thoracic aortic aneurysms. They specifically look into patients who were intended to have single-stage procedures, presumably for aneurysms limited to the aortic arch and proximal descending thoracic aorta. They identified 36 patients over a period of 11 years (2008-2019). The endoleak or sac expansion rate during the follow-up period (mean of 2 years) was 36%, with the vast majority of cases being identified on the first postoperative scan. A careful review of preoperative and postoperative aortic measurements revealed that the vast majority of patients who had an endoleak/sac expansion had less than 10% FET oversizing and/or less than 30-mm distal seal zone. None of the patients who had more than 10% oversizing and more than 30-mm distal seal zone experienced endoleak/sac expansion. Based on this data, they recommended more than 10% oversizing and more than 30-mm seal zone for FET procedures performed for thoracic aortic aneurysms. Of note, their center's rate of paraplegia with FET was 1%, but none of the patients included was affected.

The findings are not surprising, given the known association between undersizing or insufficient seal zone and endoleak. However, this raises the question about the optimal sizing criteria for FET implantation for aneurysms. Data could be extrapolated from the thoracic endovascular aortic repair experience on the minimal recommended criteria for implantation (in general oversize >10% and seal zone >20 mm); however, we do not have a large registry of FET procedures for aortic aneurysms that addresses this question. In addition, as the authors allude to, some FET devices recommend more aggressive criteria (>15%-25% oversizing, >40-mm seal zone).

Oversizing is desired to prevent stent-migration and endoleak. However, aggressive oversizing is not without consequences. We know that aggressive oversizing is associated with the risk of distal aortic injury such as rupture and stent-induced new entry tears. Similarly, extensive aortic length coverage may improve the seal zone but at the cost of increased risk of paraplegia. In this sense, conservative oversizing followed by a staged thoracic endovascular aortic repair may represent a safer alternative. In addition, one should not expect the same sizing criteria to be applicable to all devices; different stent-grafts may have different mechanistic relationships to the aortic wall depending on the material used and the device's design.

Recently, certain hybrid FET devices were granted permission to the US market. This will likely result in an increased use of this technology for thoracic aortic aneurysms. It is imperative that aortic centers join efforts to report and analyze their outcomes,

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which would generate enough evidence to guide the sizing of FET. Until then, the sizing criteria proposed by the authors appear to be reasonable and safe.

Reference

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