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Chimneys and Physician Stent-Graft Modifications: A Chaotic Process or a Glimpse of the Future?

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Keywords

aortic arch, chimney graft, physician-made fenestration, physician-modified stent-graft, stent, surgeon-modified stent-graft, thoracic endovascular aortic repair, thoracic stent-graft

The endovascular revolution was initiated in 1953 when Seldinger published his pioneering work describing a novel technique for percutaneous insertion of a catheter in the cardiovascular system.¹ This revolution reached the aortic arch more than 10 years ago, but currently, total endovascular options for treating acute aortic syndrome are very sparse. Global experience with custom-manufactured devices is limited to small series, and the time for manufacturing makes this approach unsuitable in the emergent setting.² Off-the-shelf branched devices [Valiant Mona LSA (Medtronic, Santa Rosa, CA, USA), GORE TBE single branched thoracic stent-graft (Gore Medical, Flagstaff, AZ, USA)] consist of a main stent-graft and a single branch stent-graft designed to maintain patency of only one of the supra-aortic trunks. Furthermore, these devices are not available in every country.³

Emergent techniques employing chimney grafts and on-site physician-constructed fenestrations using off-the-shelf, tubular thoracic stent-grafts are then the only available option. The frequency of reports citing the use of physician-modified thoracic stent-grafts is increasing.⁴ In the February 2020 issue of the *JEVT*, Zhang et al⁵ confirmed that these techniques are suitable options for treating the aortic arch, with excellent outcomes in a large cohort study. However, in their study, the authors reported that the chimney technique was associated with a higher incidence of type I endoleak compared with the fenestration technique due to the gutter that arises from inadequate sealing between the parallel grafts. They also showed strong evidence of a higher rate of supra-aortic branch occlusion that could limit extension of the chimney technique beyond the left subclavian artery.

Homemade fenestrated stent-grafts appear to be a particularly attractive option, but the diversity of patterns devised (single, double, triple, and small or large fenestrations) may be confusing. Device fenestration techniques would benefit from better standardization of the technique

to pave the way for a broader utilization of physician stent-graft modifications.⁶ These endovascular approaches to the aortic arch may appear to be a chaotic process at present, but from this chaos will probably emerge the device of the future.

Declaration of Conflicting Interests

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