

Endovascular Repair of the Ascending Aorta: Have We Reached the Moon?

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We have come a long way since Michael Dake introduced thoracic endovascular aortic repair (TEVAR) in 1994.¹ Today, TEVAR is approved and established for the treatment of patients with type B aortic dissection and traumatic aortic injury. We have now reached the last frontier in the evolution of endovascular aortic therapies, the ascending aorta.¹

Stent-grafting of the ascending aorta remains a formidable anatomical challenge. It is curved, of variable length from 40 to 130 mm, and is subject to both a high flow rate and significant systolic deformation due to cardiac motion. In type A aortic dissection, with a mean distance of 32 mm between the primary entry tear and the nearest coronary artery, proximal graft fixation is inevitably in close proximity to both the aortic valve and coronary ostia.^{2,3} Distally, if necessary, the landing zone must extend to the aortic arch to achieve adequate seal. Arch coverage necessitates either bypass of the supra-aortic vessels or branched and/or fenestrated stent-grafts.

In the August 2019 issue of the *J EVT*, Tsilimparis et al⁴ are to be congratulated on their pioneering work to treat complex ascending aorta disease. In reporting the largest series to date, they demonstrate not only the feasibility but also the safety and effectiveness of TEVAR in treating lesions of the ascending aorta. Nevertheless, it should be noted that these procedures are complex, and an experienced, multidisciplinary, and dedicated team is a necessity. Alternative access such as transapical, trans-subclavian, or transcarotid approaches may be required, and tips and tricks such as rapid pacing, guidewire exteriorization, or crossing the aortic valve with the guidewire are often useful.⁵

In addition, a detailed analysis should focus on three indications, namely the non-dissected ascending aorta, chronic type A dissection, and acute type A dissection. For lesions without dissection or chronic residual arch dissection, the majority of stent-grafts land proximally in

a prosthetic conduit. This effectively reduces the technical challenge to that of managing the distal landing zone. When the aortic arch is not involved and not dilated, the double fenestrated stent-graft is an interesting alternative to branched devices to reduce manipulation of the supra-aortic trunks.^{6,7}

With regard to type A dissection, it is important to distinguish acute from chronic dissection. In the weeks following the acute aortic injury, the medial layer of the flap will be stiffened by fibrosis, reducing the risk of proximal new entry tears following TEVAR. Many of the cases presented in the literature are in fact subacute or chronic type A dissections where extension of the dissection is often limited to the ascending aorta (DeBakey type II).^{8–10} Off-the-shelf dedicated tubular stent-grafts such as the Zenith Ascend are a step forward, but future type A devices will likely move beyond a short cylindrical design; they will cover the entire outer curve of the ascending aorta and deal with an aortic root most commonly dissected at least in the non-coronary sinus. In fact, there remains a long way before we reach the moon: combining TEVAR and transcatheter aortic valve intervention in a smooth and non-calcified aortic valve.¹¹ We need not only courage but also innovation and new dedicated devices.¹²

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