

# New Technical Approach to Overcome Anatomical Challenges During Branched Endovascular Aortic Repair with off-the-Shelf Multibranched Stent-Grafts: Are We Sequentially and Progressively Scraping the Sky?

Commentary on “Sequential catheterization and progressive deployment of the Zenith tBranch™ device for branched endovascular aortic aneurysm repair”

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Received: 26 September 2020 / Accepted: 3 October 2020 / Published online: 1 November 2020

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Branched endovascular aortic repair (BEVAR), which nowadays represents the first-line option for treatment of thoracoabdominal aortic aneurysms (TAAA), is typically performed using patient-specific devices, whose time delay for manufacturing has limited their use to elective cases. Available endovascular alternatives to avoid such delay in urgent cases include off-the-shelf multibranched endografts, with significant clinical experience reported for the Zenith t-Branch device (Cook Medical, Bloomington, Ind) [1].

In their study, Malekpour et al. describe a novel technique of sequential catheterization and stenting amid progressive deployment (SCAPED) for the t-Branch device [2]. In brief, the t-Branch is deployed only enough to release the proximal target vessel (TV) cuff, with the remaining branches and the distal edge remaining constrained within the delivery sheath while the TV is selected and accessed. Once all TV are secured with a stiff guidewire, the endograft is fully deployed and the constraining wires are removed, while the procedure will continue in standard fashion. Use of the SCAPED approach in 18 consecutive patients (June 2016–April 2019) resulted in 100% technical success rate.

Use of the SCAPED technique can certainly be a valuable adjunct, particularly in challenging scenarios that would represent relative contraindications to use of the

Zenith t-Branch including small aortic lumen or unfavorable TV configuration. Indeed, this novel technique might result in reduced device (mal)rotation and increased (re)positioning freedom, thereby aiding to overcome some anatomical hazards such as narrow aortic diameter or presence of severe angulation/tortuosity/stenosis of the TV, by allowing more controlled release of the stent-graft and progressive “one-at-a-time” access to the TV.

A potential shortcoming of the SCAPED technique could include the longer time to deploy the t-Branch device while TV are catheterized, thereby increasing ischemic times in the ipsilateral lower extremity and pelvis, which are well-recognized risk factors for postoperative spinal cord ischemia (SCI) [3]. In their series, Malekpour et al. reported only one case (5%) of post-procedural SCI, but none of the patients required conversion to the standard technique because of abnormalities detected during intraoperative neuromonitoring. Indeed, SCI after BEVAR is a complex and multifactorial entity, and its prevention mandates multimodal protection strategies [4].

Also, the SCAPED approach invariably requires use of upper arm access (UEA); although usually safe, UEA is a risk factor for post-procedural stroke [5] and one case (5%) of peri-operative stroke was reported in the series of Malekpour et al. Recently, the feasibility of totally transfemoral t-Branch implantation has been demonstrated using novel steerable sheaths [6]. The main advantage of a totally retrograde approach to BEVAR procedures would be the minimization of aortic arch crossing with endovascular tools thereby reducing the risk of cerebral embolization, as well as the possibility of expanding t-Branch applicability to those patients without available UEA.

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Lastly, use of inner branches as alternative configuration has been recently reported to allow BEVAR in patients with narrow aortic lumen(s), as in chronic post-dissection cases or after failed prior aortic repair. As inner branches can be incorporated into physician-modified endografts [7], they can further expand applicability of repair to non-elective circumstances; however, physician-modified devices should only be used by adequately trained physicians in patients without other reasonable options.

The described technique represents a convenient tool that endovascular specialists should add to their armamentarium. Although used by Malekpour et al. as first-line option for their t-Branch cases, routine implementation of the SCAPED technique in clinical practice cannot be advised and further side-to-side comparison with routine approaches is awaited to obtain broader comparative evidence on the safety and effectiveness of each, thereby enabling us to offer tailored treatments that will match the individual anatomy and presentation of our patients in a comprehensive risk–benefit evaluation. As our knowledge and confidence with complex endovascular aortic procedures increase, are we sequentially and progressively scraping the sky?

**Funding** none.

**Compliance with Ethical Standards**

**Conflict of interest** None.

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