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Commentary: Endovascular solutions for chronic type B aortic dissection: Keep pushing the envelope in a safe way and helping our patients

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CENTRAL MESSAGE

Laser septotomy joins the endovascular toolkit as a way of obliterating the FL in chronic type B aortic dissection. Experience, careful patient selection, and collaboration with industry are needed.

Thoracic endovascular aortic repair (TEVAR) for chronic type B aortic dissection has inconsistent results. The purpose of conventional TEVAR for such cases is to exclude and halt the expansion of a descending thoracic aneurysm that has formed as a result of a previous acute type A or type B aortic dissection. To obtain this result, the total aortic diameter of the descending thoracic aorta should be reduced in size or stay unchanged, the true aortic lumen needs to expand, or the false lumen (FL) needs to shrink in diameter. Any of these results indicates positive aortic remodeling.

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The main reason why the results of treating chronic type B dissection are inconsistent is that the thick septum and downstream fenestrations that characterize this condition allow persistent flow into the FL of the thoracoabdominal aorta. In addition, the proximal and distal landing zones of the endograft ideally should be free of dissected tissue, and the landing zones should be approximately 42 mm in diameter and, ideally, 2 cm proximal to the entry tear.

Because few cases meet all of these requirements, alternative techniques have been developed to improve the proximal and distal landing zones. Cervical debranching and chimney graft placement in the left common carotid artery, fenestrated physician-modified endovascular grafts,

or branch endografts not yet approved by the US Food and Drug Administration could be used to extend the proximal landing zone during TEVAR. For the distal landing zone, various techniques of occluding the FL have been advocated, such as FL embolization with a combination of coils, Onyx, and glue for smaller FL and candy-plug embolization for larger FL. Another alternative is rupturing the septum by ballooning and/or needle-fenestrating and expanding the stent graft to fit the entire diameter of the aorta.

Unfortunately, no devices currently on the market are specifically designed to treat chronic type B aortic dissection and take into consideration the thick septum associated with this condition. Thus, collaboration with industry is critical for progress.

In this issue of the *Journal*, Fukuhara and colleagues at the University of Michigan¹ report the use of laser septotomy to optimize the distal landing zone during TEVAR procedures for chronic type B aortic dissection. Theirs is the first description of this technique, and the authors should be congratulated. The University of Michigan thoracic aortic surgery group has a great history of collaboration across disciplines, and they have pushed the envelope in improving TEVAR results across the entire spectrum of type B aortic dissections.² Their continuous effort and their results are noteworthy.

In this series,¹ the authors used this advanced technique in 11 highly selected patients who had no pre-existing aortic septal fenestrations adjacent to the distal landing zone. Technical success was achieved in all cases but one, which is a testament to the skills and knowledge of the operators. The tools for this procedure included a steerable catheter, plus a laser catheter that was advanced via the steerable catheter with intravascular ultrasonographic guidance. The length of the septotomy was 6 to 10 cm, and the median levels of the proximal and distal laser fenestrations were T7.5 and T10, respectively. No mortality or stroke was noted in this series; 1 patient developed paraplegia. All but 1 patient had positive aortic remodeling with complete

exclusion of the FL, which is impressive. No major changes in the downstream aorta not covered by the stent graft were seen, and no late open repairs were required during a median follow-up period of 8.2 months.

Doubtless, this technique is a useful addition to the existing spectrum of adjunct techniques to obliterate the FL in patients with chronic aortic dissection. Although the authors conclude that the technique is simple, reproducible, and less demanding than, for example, needle fenestration, it appears to involve a significant learning curve. Requisite skills for a successful procedure include tactile guidance of the laser catheter, mastery of the C-arm angles for perpendicular laser-catheter positioning under fluoroscopy, ability to direct and reroute the wires in the true and false lumens, assessing the diameter of the lumen (true or false) to ensure that it will permit accurate positioning of the laser catheter, and familiarity with intravascular ultrasonography. When using a continuous septotomy method is not feasible, spot laser fenestrations followed by large balloon dilations can be done instead. The technical details are important. Equally important is being familiar with the specific catheters and the proper safety protocols regarding the laser. In addition, patient selection as outlined by the authors¹ and others³ is critical.

We would like to thank the authors for this great contribution and for pushing the envelope in a safe way to advance the treatment of challenging pathologies.

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