new entry during TEVAR deployment can cause rapid changes in true lumen flow and pressurization and reinforces the complex nature of these endovascular procedures. While a rare occurrence in this series, it also highlights the utility of intravascular ultrasound and adjunctive procedures such as bare stent extension into the visceral segment and potential need for visceral branch stenting.

In addition, this study lends support to the potential effectiveness of promoting aortic remodeling with this technique, as the authors observed a 74% rate of false lumen thrombosis but only 26% satisfying their definition of positive aortic remodeling. However, they used a slightly more stringent definition for positive aortic remodeling, defined as (1) false lumen thrombosis; AND (2) decrease in aortic dimension by 10% or greater; AND (3) increase in true lumen area by at least 10%. As the authors and others accumulate more experience with these procedures, it will be interesting to see if studies with more patients and longer follow-up corroborate the very encouraging findings reported in this study.

The treatment of aneurysmal degeneration from chronic type B dissection remains a clinical challenge. It is incumbent on cardiovascular surgeons to embrace innovation and be

early adopters of these new treatment paradigms for this pathology. Long-term follow-up and prospective data are necessary to fully understand the impact of this treatment strategy. How the application of branched or fenestrated endovascular technology to the visceral aortic segment in combination with the TEVAR and BFF technique remains to be seen.

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See Article page 2.

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Commentary: A new chapter in chronic type B aortic dissection: Balloon fracture fenestration and remodeling

Edward D. Percy, MD,^{a,b} and Ashraf A. Sabe, MD^a

Thoracic endovascular aortic repair (TEVAR) has become the standard of care in suitable patients with complicated

Edward D. Percy, MD, and Ashraf A. Sabe, MD

CENTRAL MESSAGE

Balloon fracture fenestration at the time of thoracic endovascular aortic repair of chronic dissection appears to be a safe and promising option for promoting aortic remodeling.

From the ^aDivision of Cardiac Surgery, Department of Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Mass; and ^bDivision of Cardiovascular Surgery, University of British Columbia, Vancouver, British Columbia, Canada.

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Address for reprints: Ashraf A. Sabe, MD, Division of Cardiac Surgery, Brigham and Women's Hospital, 75 Francis St, Boston, MA 02115 (E-mail: asabe@partners.org).

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acute type B aortic dissections.¹ Meanwhile, the story for how we best manage chronic type B aortic dissection (CTBAD) continues to evolve. Although TEVAR is approved for CTBAD, there has not been a trial performed to demonstrate reduced aortic rupture in these patients. Despite this, early results of TEVAR in CTBAD have been positive, with a reported procedural mortality rate of 3.2%.² Beyond a favorable procedural risk profile, several studies have demonstrated that a majority of these patients had successful false lumen thrombosis with evidence of reverse remodeling. Reverse remodeling has been associated with a survival benefit.³⁻⁵ The role of TEVAR in CTBAD has become increasingly recognized, particularly as conventional open repair remains highly morbid, with mortality rates of up to 10% in experienced centers.⁶ In light of this, an expert consensus in Europe has recommended TEVAR in CTBAD except in patients with connective tissue disorders or unsuitable anatomy.⁷ Unsuitable anatomy is often the greatest challenge. Given the fibrotic, non-compliant nature of the chronic dissection flap, adequate treatment in many patients remains unattainable when only the true lumen is addressed. In 2014, the concept of balloon-disruption of the chronic dissection flap was first described by Hofferberth and colleagues.⁸ Variations on balloon techniques have been described; however, safety and longitudinal outcome data remain limited.

In this edition of the *Journal*, Levack and colleagues⁹ present outcomes in 48 patients who underwent balloon fracture fenestration (BFF) in CTBAD. They present safety data with 1-year survival of 91%. Furthermore, freedom from reintervention was 75% at 1 year and complete thrombosis of the false lumen was achieved in 73.5%. Overall, 36 patients (75%) demonstrated positive or intermediate remodeling, based on a strict definition: false lumen thrombosis, decrease in aortic size, and increase in true lumen area. In patients with positive remodeling, the mean reduction of aortic diameter was 11 mm at final follow-up.

The authors should be commended for their continued work on advancing an innovative, sophisticated approach to managing this challenging and dynamic problem. The limitations of their study must be considered. First, the indications for BFF changed throughout the series. BFF was used initially in rescue cases for patients with rupture and prohibitive surgical risk, and later performed routinely in

those with a patent false lumen. Second, procedural techniques also evolved. Earlier stent grafts were dilated through the distal landing zone, whereas in later years they stopped short in an effort to funnel flow into the true lumen. Finally, this remains a descriptive single-center experience with limited follow-up.

The use of TEVAR in CTBAD is here to stay, although the practical indications are evolving and remain controversial. On one hand, TEVAR offers a less-invasive option in anatomically suitable patients. On the other hand, rates of reintervention appear high, and long-term outcomes remain unclear.¹⁰ We commend the authors for adding yet another important chapter to this story, and we look forward to their future work and follow-up in this promising field.

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