The solution is in the future, but hopefully it won't always be

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Zhang and colleagues¹ present a systematic review and meta-analysis of the literature regarding aortic reintervention after thoracic endovascular aortic repair (TEVAR) for dissection, an interesting and timely subject, given the wide availability of endovascular technology today. The authors evaluated 27 studies that included data from 2029 TEVAR cases of 2403 aortic dissection cases with a mean follow-up of 34 months. The most common reasons for reintervention were type I endoleak (35.2%), new dissection (14.4%), and persistent false-lumen perfusion (9.3%).

Although Zhang and colleagues¹ used only 2 databases to identify published studies, they should be congratulated for addressing an evolving and crucial topic. The purpose of a meta-analysis is to aggregate enough data from underpowered studies to draw meaningful conclusions. The fact that the authors had to combine data on 2 substantially different pathologies (acute and chronic type B aortic dissection) suggests there are not enough data to draw robust conclusions.

In a meta-analysis by Moulakakis and colleagues² regarding acute complicated type B aortic dissection, 2531 patients treated with TEVAR had a pooled 30-day or in-hospital mortality rate of 7.3%; in comparison, the mortality rate was 2.4% for 2347 patients treated with conservative medical management for uncomplicated acute type B aortic dissection in 2347 patients and 19% for 1276 patients treated with open surgical repair. Patients treated with TEVAR appeared to have more favorable outcomes regarding aortic remodeling and aortic-specific survival than those treated with medical therapy alone. That report emphasized the need for randomized trials.

The Investigation of Stent Grafts in Aortic Dissection With Extended Length of Follow-up (INSTEAD-XL) trial retrospectively analyzed data from 140 patients with stable type B aortic dissection who were randomly assigned to optimal medical treatment and TEVAR (n = 72) or optimal medical treatment alone (n = 68) for aorta-specific,

Retrograde filling of false lumen after TEVAR for acute type B aortic dissection.

Central Message

The industry should use an engineering perspective to address problems by developing new technologies instead of adapting existing ones.

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all-cause outcomes, and disease progression 5 years after the index procedure.³ The results suggested that adding TEVAR to optimal medical treatment improves 5-year aorta-specific survival and delays disease progression.³ The 1-year results from the Acute Dissection Stentgraft or Best Medical Treatment (ADSORB) trial of the GORE TAG (WL Gore & Associates, Flagstaff, Ariz) stent graft for acute uncomplicated type B aortic dissection showed that placing a stent-graft induces thrombosis of the false lumen and reduction of its diameter.⁴

According to the 2014 European Guidelines⁵ for acute uncomplicated type B aortic dissection, medical therapy is always recommended (class I, level of evidence C), but TEVAR should be considered (class IIa, level of evidence B). In complicated aortic dissection, TEVAR is recommended (class I, level of evidence C), but surgery may be considered (class IIb, level of evidence C).

Until recently, many of the acute and chronic dissections in the United States were treated with endovascular procedures performed off-label. Despite the previously described results^{3,4} and US Food and Drug Administration approval of devices for treating aortic dissection, the optimal therapy paradigm has not been identified yet. The devices used today are slight modifications of devices designed to perform a different function in another segment of the thoracic aorta.

Zhang and colleagues¹ mention a high proximal endoleak rate of 35.2%, which suggests that we are applying a technology that was designed for another disease process and that most of the patients do not have suitable anatomy for TEVAR. The number of patients who would have been

stable without the need for initial intervention remains unknown.

The long-term results of open surgical reintervention in a chronic type B aortic dissection are acceptable. In a propensity-adjusted analysis⁶ of data from 122 patients who underwent open repair or TEVAR for chronic type B aortic dissection, open repair was more effective, and TEVAR was associated with a higher rate of treatment failure. These findings suggest 2 important points: Early endovascular therapy for acute dissection seems to be intended to prevent future surgical procedures, even though such procedures have good results and current device designs need to be modified.

It is important for the industry to take a fresh look from an engineering point of view and develop technology that addresses specific problems, instead of adapting existing technology that was designed to address a different problem.

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