THORACIC ENDOVASCULAR AORTIC REPAIR IN TYPE A AORTIC DISSECTION:

EXCITING RESULTS WITH UNSOLVED PROBLEMS

To the Editor:

Despite medical advances, the mortality associated with type A aortic dissection remains high after prompt surgical intervention and even higher in patients with inoperable disease. We therefore read with great interest the recent achievement by Nienaber and colleagues¹ in managing patients with Stanford type A aortic dissection (TAAD) for whom the risks of open repair were too high by using thoracic endovascular aortic repair (TEVAR). Nienaber and colleagues¹ are to be credited for their high procedural success rate and low complication rate. They followed up the 11 patients who survived the procedure with regular computed tomographic scans and demonstrated favorable aortic remodeling. Nevertheless, this well-investigated study is deserving of additional comments.

In 2016, Cristiano and associates² pointed out that current Dacron polyester fabric grafts exhibit more than 4 times reduction in compliance relative to native arteries. It is reasonable to expect that the effect of compliance reduction of the ascending aorta is more severe in wire-containing stents such as those used in TEVAR. This reduction in aortic elasticity may lead to alterations in left ventricular hemodynamics and eventually to ventricular remodeling and even heart failure.^{2,3} Moreover, as mentioned by Nienaber and colleagues,¹ the patients selected for TEVAR were those with advanced age and multiple comorbidities. These patients are most susceptible to the effect of decreased aortic elasticity after TEVAR.³⁻⁵ It has been found that increased aortic stiffness is associated with impaired myocardial deformation parameters, and this may elucidate potential mechanisms for impaired vascular-ventricular coupling in the pathogenesis of heart failure.⁶ Anatomic follow-up with regular computed tomographic scans alone is thus insufficient, and data on arterial stiffness⁵ and echocardiographic parameters (such as left ventricular ejection fraction)⁷ should be checked to evaluate the impact of thoracic stents on the cardiovascular system.

The Editor welcomes submissions for possible publication in the Letters to the Editor section that consist of commentary on an article published in the Journal or other relevant issues. Authors should: • Include no more than 500 words of text, three authors, and five references. • Type with double-spacing. • See <http://jtc.etsnetjournals.org/misc/fora.shtml> for detailed submission instructions. • Submit the letter electronically via jtcvs.editorialmanager.com. Letters commenting on an article published in the JTCVS will be considered if they are received within 6 weeks of the time the article was published. Authors of the article being commented on will be given an opportunity of offer a timely response (2 weeks) to the letter. Authors of letters will be notified that the letter has been received. Unpublished letters cannot be returned.

Type A aortic dissection with acute coronary involvement is not uncommon, with an incidence of 6% to 19% in published studies.⁸⁻¹⁰ In our own study,⁸ as many as 30% of these patients with acute involvement of a coronary artery do not have any clinical manifestations of coronary malperfusion (which is consistent with a previous study⁹), and neither can the involvement be identified by presurgical nonelectrocardiographically gated thoracic aortic computed tomographic angiography. Most of these patients, who should be excluded from TEVAR, were incidentally discovered during surgery to have coronary involvement.⁸ Treating these patients with TEVAR may lead to unwanted consequences. Accordingly, we suggest conducting more thorough image studies before TEVAR, such as electrocardiographically gated aortic multidetector computed tomographic angiography, to obtain a precise evaluation of involvement of coronary arteries by intimomedial flap extension, thus helping to avoid this potential problem.¹¹

Ting-Ting Yang, MD^a

Ting-Wei Chang, MD^b

Ying-Fu Chen, MD, PhD^{c,d,e}

^aSchool of Post-Baccalaureate Medicine

^bSchool of Medicine

^cGraduate Institute of Medicine

Kaohsiung Medical University

^dDivision of Cardiovascular Surgery

Kaohsiung Medical University Hospital

Kaohsiung, Taiwan

^eSin-Lau Christian Hospital

Tainan, Taiwan

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PATIENT SELECTION AND DEVICE DEVELOPMENT ARE CRUCIAL FOR THORACIC ENDOVASCULAR AORTIC REPAIR IN TYPE A AORTIC DISSECTION

Reply to the Editor:

Yang and colleagues highlight several important points regarding the complicated management of patients with acute type A aortic dissection (TAAD). Despite recent advancement in surgical techniques, the surgical mortality for TAAD remains between 15% to 25% in current series,¹ which reflects the significant morbidity and mortality associated with open repair of TAAD. Furthermore, many more patients are deemed to be at too high risk for surgical repair, and the mortality with medical management approaches 90%. An endovascular treatment option for TAAD (Figure 1) thus might provide a therapeutic option for this unmet need and be a welcome advance for this highly lethal condition.

We agree that at present the long-term effects of wire-containing endografts in the ascending aorta are unknown. Decreased aortic compliance may lead to deleterious left ventricular hemodynamics in the long term. In their letter, Yang and colleagues point out that patients included in the study of Nienaber and colleagues² had significant comorbidities and may have been more susceptible to the negative effects of decreased aortic elasticity. It must be emphasized, however, that patients with an extensive burden of comorbid conditions are also more likely to die after surgical repair of TAAD. This is thus the patient population most likely to derive a mortality benefit from a less-invasive endovascular option for TAAD. Younger patients without extensive comorbidity should still undergo traditional open surgical repair until further data regarding endovascular repair are available.

Until recently, most endograft implantation in the ascending aorta has been performed with devices not specifically designed for this anatomic location. The different

FIGURE 1. Transapical approach for acute type A aortic dissection treated with thoracic endovascular aortic repair.

hemodynamic forces seen by the left ventricle after an ascending aorta endograft need to be carefully studied and applied in the engineering and design of new location and disease-specific devices. Currently, there is a paucity of research on this subject.

Yang and colleagues raise an important point regarding the current design of endografts for the ascending aorta, particularly with respect to coronary involvement. Improved preoperative imaging modalities may be useful in identifying patients with TAAD whose anatomy is suitable for a thoracic endovascular aortic repair approach. Ultimately, patient selection will be essential, and endovascular and open repair platforms should be viewed as potentially complementary strategies in the treatment of TAAD.

George J. Arnaoutakis, MD^a

Wilson Y. Szeto, MD^b

^aDivision of Thoracic and Cardiovascular Surgery
University of Florida
Gainesville, Fla

^bDivision of Cardiovascular Surgery
University of Pennsylvania
Philadelphia, Pa