

Endovascular Treatment Options for the Aortic Arch

Akiko Tanaka, MD, PhD, Anthony Estrera, MD*

KEYWORDS

• Aortic arch • Thoracic endovascular aortic repair • Hybrid procedure approach

KEY POINTS

- Endovascular aortic repair to treat aortic arch abnormality has rapidly expanded in the last 2 decades, and surgeons now have options to treat patients who are poor candidates for open surgery.
- The devices and techniques should be tailored to the extension of the aortic abnormality and anatomy of the individuals.
- Recent studies demonstrate promising results with branched endografts, but one of the major drawbacks of the devices is that considerable time is required to prepare the custom-made graft, which may not be available for emergent or urgent cases.
- Introduction of commercially available devices is forthcoming. In addition, the risk of stroke following endovascular repair of the aortic arch remains as high as for conventional open surgery.
- Until the long-term outcomes become available, the indications of endovascular treatment should be carefully considered in patients with low risk for open surgical repair, especially in young patients with connective tissue disorders.

INTRODUCTION

Thoracic endovascular aortic repair (TEVAR) has emerged as a less invasive alternative to conventional open surgery. Endografting techniques require a minimum 15-mm landing (sealing) zone proximally and distally and a minimum of 20 mm in a highly angulated arch to seal out the diseased aorta from the inside.¹ TEVAR for descending thoracic aortic aneurysms, in lesions with minimal anatomic restrictions, rapidly became the first-line treatment. At the same time, aneurysms of the aortic arch have been the “Achilles heel” of TEVAR² due to the vital branches to the brain, curvature of the arch, and high blood flow in the area.³ Thanks to substantial advances in endovascular techniques and graft materials, there now are several options for endovascular aortic arch repair.

In this article, the authors discuss the current available endovascular repair techniques for the aortic arch abnormality.

Difficulties in Managing Aortic Arch Disease with Conventional Open Repair

Conventional open aortic arch repair requires a long cardiopulmonary bypass and circulatory arrest with deep hypothermia, which leads to inflammatory and ischemic insults to the patient. Contemporary studies have demonstrated that postoperative adverse events following open total arch replacement remain high: stroke was observed in 2.8% to 3.4%; prolonged ventilation (>48 hours) in 6% to 13.4%; and in-hospital mortality in 4.5% to 9.7%.⁴⁻⁷ These results are reported from the experienced large-volume

Department of Cardiothoracic and Vascular Surgery, McGovern Medical School at The University of Texas Health Science Center at Houston (UTHealth) and Memorial Hermann Hospital, 6400 Fannin Street, Suite #2850, Houston, TX 77030, USA

* Corresponding author.

E-mail address: Anthony.L.Estrera@uth.tmc.edu

Cardiol Clin ■ (2017) ■-■

<http://dx.doi.org/10.1016/j.ccl.2017.03.005>

0733-8651/17/© 2017 Elsevier Inc. All rights reserved.

centers, and outcomes in the low-volume centers may even be worse. Thus, less invasive treatment options have been sought for the aortic arch abnormality, and innovative endovascular techniques have been used to conquer the anatomic challenges of the aortic arch.

HYBRID PROCEDURE APPROACH

Open Aortic Arch Repair with "Frozen Elephant Trunk"

There are 2 types of "hybrid" aortic arch repair. One type is open aortic arch repair with distal extension using the stent graft. This method is often referred to as "frozen elephant trunk,"⁸ "stented elephant trunk,"⁹ or "antegrade thoracic stent grafting."¹⁰ Elephant trunk is the technique first reported by Borst and colleagues¹¹ in 1983 to treat extensive aortic aneurysm, in which a free "tangling" graft was left in the descending aortic aneurysm for the

ease of the second-stage procedure. In 1996, Kato and colleagues¹² reported a successful experience with combined open surgical and endovascular aortic repair of the distal arch abnormality, modifying the classical elephant trunk technique. In their series, the stent graft was deployed as a replacement of conventional distal anastomosis of the aortic arch graft to reduce the pump and circulatory arrest time. This technique also enabled treatment of patients with extensive aortic aneurysm, involving the transverse arch and the descending aorta, with open aortic arch repair with antegrade stent grafting (Fig. 1). Although the original technique obviated a distal anastomosis, most of the current techniques prefer hand-sewing of the proximal end of the frozen elephant trunk (or the cuff) to avoid migration. To date, the frozen elephant trunk technique is indicated for extensive aortic aneurysms involving the transverse arch and descending aorta. It is also used to treat acute

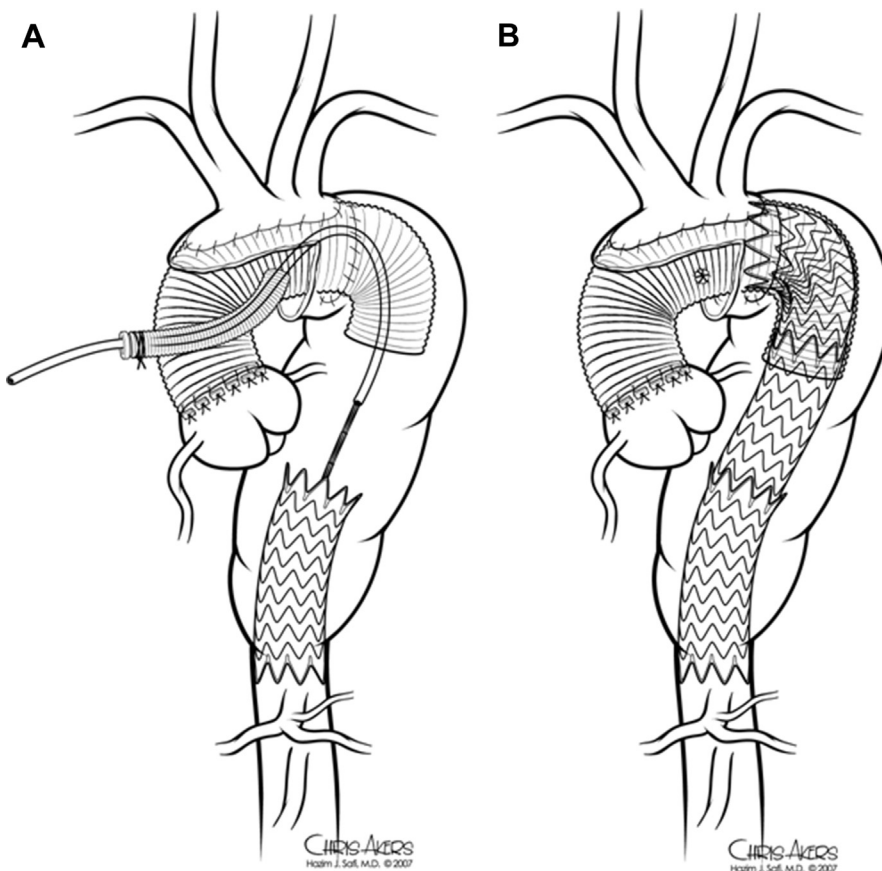


Fig. 1. Antegrade delivery of the stent graft without use of cardiopulmonary bypass. (A) Graft replacement of the ascending and transverse arch was completed using the elephant trunk technique. A stent graft is being deployed to the distal descending aorta through the side branch of the open repair graft. (B) Additional stent grafts were delivered to complete the aneurysm repair. (Courtesy of Chris Akers, MA, Memorial Hermann Hospital; Hazim J. Safi, MD, McGovern Medical School at UTHealth, Houston, TX.)

Download English Version:

<https://daneshyari.com/en/article/5600047>

Download Persian Version:

<https://daneshyari.com/article/5600047>

[Daneshyari.com](https://daneshyari.com)