

Preface

It is an honor for me to serve as Guest Editor for this issue of *Annals of Cardiothoracic Surgery*. This edition is dedicated to the innovative technique known as “Frozen Elephant Trunk” (FET), completing the series which includes the previous two “Arch” issues.

Lesions involving both the aortic arch and the descending thoracic aorta, including aneurysms and dissections, remain surgical challenges and are referred to as complex lesions of the thoracic aorta. Various approaches have been used to treat these patients, including deep hypothermic circulatory arrest, sternotomy, left thoracotomy, and clam-shell incision. Such complex lesions have also been treated using a two-staged operation (elephant trunk procedure via a median sternotomy followed by lateral thoracotomy). After the introduction of endovascular techniques in recent years, hybrid operations were proposed. These included the FET, developed in the mid-1990s by Kato, and the aortic arch de-branching and stenting techniques, employed for the first time in 1998 by Buth. Although the latter technique has extended treatment to high-risk patients unsuitable for more aggressive surgery, mid- and long-term follow-up results are currently inadequate.

During the mid-1990s, a new elephant trunk prosthesis was developed not only to treat concomitant aortic arch and proximal descending arch pathologies in a single stage, but also to reduce the complications associated with the conventional elephant trunk. This paved the way for the development of a new technique, named the “FET” by Borst. Composed of a covered stent, made of nitinol or stainless steel, and sutured to the distal end of a conventional polyester vascular graft, these prostheses are deployed antegradely through the opened aorta by means of an introducer. The vascular prosthesis is fixed to the distal aortic arch and allows reconstruction of the arch itself.

The development of commercially-available prostheses such as the Chavan-Haverich and E-vita open was preceded by the use of prostheses which were “home-made”. A new, branched stent graft, Thoraflex™ (Vascutek, Terumo), has recently been introduced. In the United States, Pochettino, Bavaria and Roselli, using a commercially available prosthesis such as the Gore-TAG for treating descending aorta pathology, (W.L. Gore and Associates, Flagstaff, AZ, USA), introduced a new technique by deploying the prosthesis antegradely through the open aorta and suturing it to the proximal aortic arch.

Advantages of the FET include a notable reduction in the risk of proximal endoleak and stent migration. In acute and chronic dissections, thrombosis of the false lumen is favored because it reduces the risk of additional aortic dilation and consequent need for re-operation. However, various complications have been reported with the FET. Additional endovascular or surgical procedures are occasionally necessary, predominantly due to the occurrence of endoleaks and false lumen patency downstream from the FET prosthesis in patients operated on for acute or chronic aortic dissection. Another complication is the incidence of temporary or permanent spinal cord injury, in which the underlying mechanisms appear to be multifactorial and far from being completely defined.

In this issue, we have invited the pioneers in this field to provide a comprehensive overview of the current state of FET practice, including its indications, surgical techniques, results and complications. Their experiences, critical analyses and perspectives have shaped the amazing expertise encapsulated in this issue. In addition, we have included videos of the surgical techniques performed using available FET prostheses.

Finally, I would like to thank all those who have participated in this endeavor and made the publication of this issue of the *Annals of Cardiothoracic Surgery* possible.

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