

Heart, Lung and Circulation (2017) xx, 1–4  
1443-9506/04/\$36.00  
<http://dx.doi.org/10.1016/j.hlc.2017.08.015>

# Aortic Cannulation in DeBakey Type I Aortic Dissection Facilitates Subsequent Deployment of a Frozen Elephant Trunk

Jonathan M. Hemli, MBBS FRACS<sup>a\*</sup>, Allan Mattia, MD<sup>a</sup>, Eden Payabyab, MD<sup>b</sup>, Yuriy Dudy, MD<sup>a</sup>, S. Jacob Scheinerman, MD<sup>a</sup>, Derek R. Brinster, MD<sup>a</sup>

<sup>a</sup>Department of Cardiovascular & Thoracic Surgery, Lenox Hill Hospital, New York, NY, USA

<sup>b</sup>Division of Cardiovascular Surgery, Virginia Commonwealth University Medical Center, Richmond, VA, USA

Received 23 June 2017; received in revised form 7 August 2017; accepted 11 August 2017; online published-ahead-of-print xxx

Arterial cannulation in acute DeBakey type I dissection can be difficult. Moreover, the residual dissected aorta is susceptible to further adverse events in the future. Implanting a stent-graft into the descending aorta during the initial dissection repair ('frozen elephant trunk') has been demonstrated to promote favourable aortic remodelling, mitigating some of these longer-term complications. We describe a technique for cannulation of the ascending aorta in acute dissection that facilitates expeditious antegrade deployment of a frozen elephant trunk.

## Keywords

Aortic dissection • Cannulation • Stent-graft • Elephant trunk

Each option for arterial cannulation in DeBakey type I dissection has its own advantages and pitfalls. Although femoral cannulation has long been regarded as a staple strategy, use of the right axillary artery has become increasingly popular [1]. The apex of the left ventricle has been accessed directly, and some have described cannulation via the right superior pulmonary vein [2]. More recently, cannulation of the ascending aorta itself has become recognised as a viable alternative.

Patients with a DeBakey type I dissection are also at risk for future events affecting their downstream aorta. Consequently, more surgeons are attempting to address the distal aorta during the index repair of the dissection.

Traditional techniques for thoracic endovascular aortic repair (TEVAR) not only require fluoroscopy, but may necessitate more advanced imaging. The procedure is often performed in a hybrid operating suite, a luxury not available to all institutions.

We describe our technique for cannulation of the ascending aorta in aortic dissection, facilitating subsequent deployment of a frozen elephant trunk (FET).

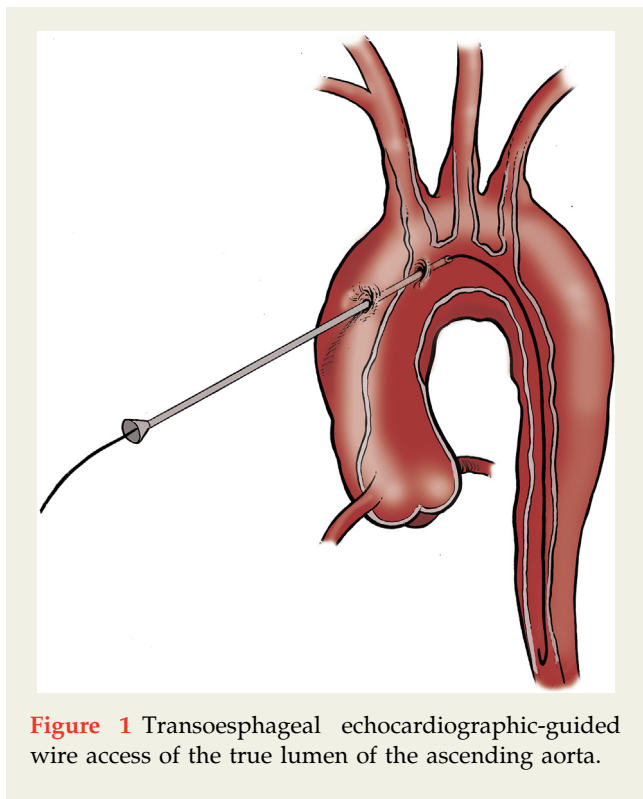
## Surgical Technique

The preoperative computed tomographic (CT) scan is used to identify the site on the ascending aorta that would result in true lumen access; this is usually along the postero-medial aspect of the lesser curvature, adjacent to the pulmonary artery.

The true lumen is cannulated utilising a Seldinger technique (Figure 1). Transoesophageal echocardiography (TEE) is used to confirm that wire access has been established in the true lumen, prior to cannulation. Three-dimensional (3D) echocardiography affords easier confirmation of wire location, as well as pulsatility of the dissection flap [3].

\*Corresponding author at: Department of Cardiovascular & Thoracic Surgery, Lenox Hill Hospital, 130 East 77th Street, 4th Floor, New York, NY 10075, USA. Tel.: +1 212 434 3000, Fax: +1 212 434 4559, Email: [jhemli@northwell.edu](mailto:jhemli@northwell.edu)

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**Figure 1** Transoesophageal echocardiographic-guided wire access of the true lumen of the ascending aorta.

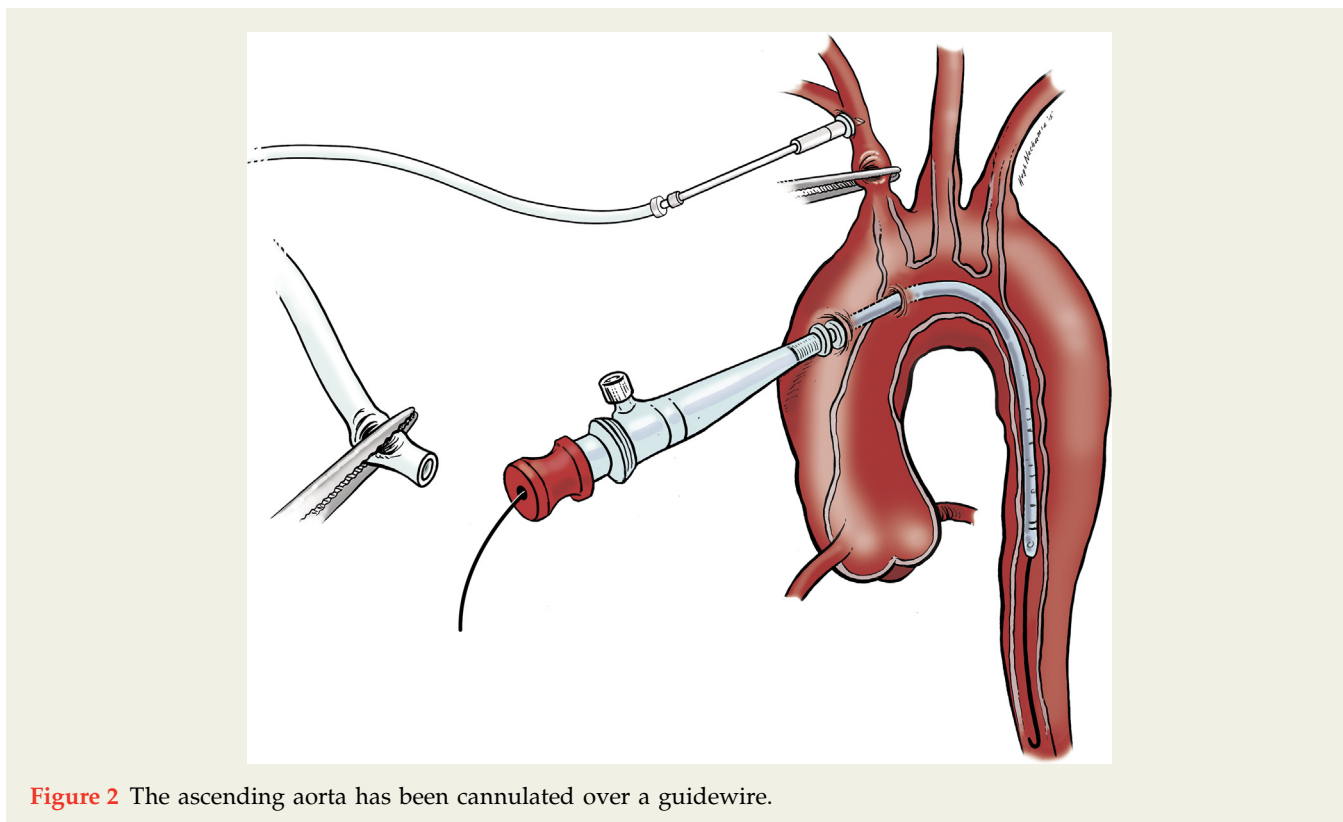
A DLP root cannula (Medtronic Inc, Minneapolis, MN, USA) is inserted into the innominate artery (if it is not dissected) for antegrade cerebral perfusion during circulatory arrest (**Figure 2**).

The patient is cooled to moderate hypothermia at 28 degrees centigrade. The circulation is arrested, and the arterial limb of the bypass circuit is divided, leaving the aortic cannula in place. The ascending aorta is resected. An Amplatz Super-Stiff guidewire (Boston Scientific, Marlborough, MA, USA) is passed through the arterial cannula well distally down the descending aorta (**Figure 3**). The arterial cannula is removed. A thoracic stent-graft (W.L. Gore & Associates Inc, Flagstaff, AZ, USA) is inserted over the guidewire, antegrade, and is deployed distal to the left subclavian artery (**Figure 4A & B**). The size of the stent-graft is selected in advance, based on CT measurements of the proximal descending aorta.

A Vascutek Gelweave Ante-Flo Graft (Terumo Cardiovascular Group, Ann Arbor, MI, USA) is anastomosed to the arch, the suture line incorporating the posterior wall of the stent-graft, securing its position and preventing late migration (**Figure 5**). The side-arm of the aortic graft is cannulated, the graft is cross-clamped, and circulation is resumed.

## Discussion

Although femoral cannulation has been regarded as a ‘go-to’ technique in acute dissection, it not only has the potential to cause a malperfusion syndrome, it is also associated with an inherent risk of stroke. The right axillary artery is useful for arterial cannulation; the vessel itself is only uncommonly dissected, it facilitates antegrade flow through the aortic arch, and it can be used for selective antegrade cerebral perfusion.



**Figure 2** The ascending aorta has been cannulated over a guidewire.

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