Journal of Cardiothoracic and Vascular Anesthesia 000 (2022) 1–2

Contents lists available at ScienceDirect

Journal of Cardiothoracic and Vascular Anesthesia

journal homepage: www.jcvaonline.com

## Letter to the Editor

### Transesophageal Echocardiography for Plug Closure After Aortic Arch Replacement

To the Editor:

Management of the left subclavian artery during total arch replacement for acute aortic dissection can be challenging.[1] Its deep location in the thorax is difficult to access, and bleeding from the left subclavian artery can be hard to control. Moreover, the left vertebral artery arises from the left subclavian artery and must also be considered. In some cases of dissection, the flap extends into the left subclavian artery, which may cause upper extremity malperfusion.[2] In this case, direct ligation of the origin of the left subclavian artery after replacement is preferable; but if this is not possible, endovascular closure can be performed later. Detection of the false lumen using angiography alone may be difficult when endovascular repair is attempted.[3] Transesophageal echocardiography may be required, as it can visualize the branches of the aortic arch.[4] We describe endovascular plug closure of a dissected left

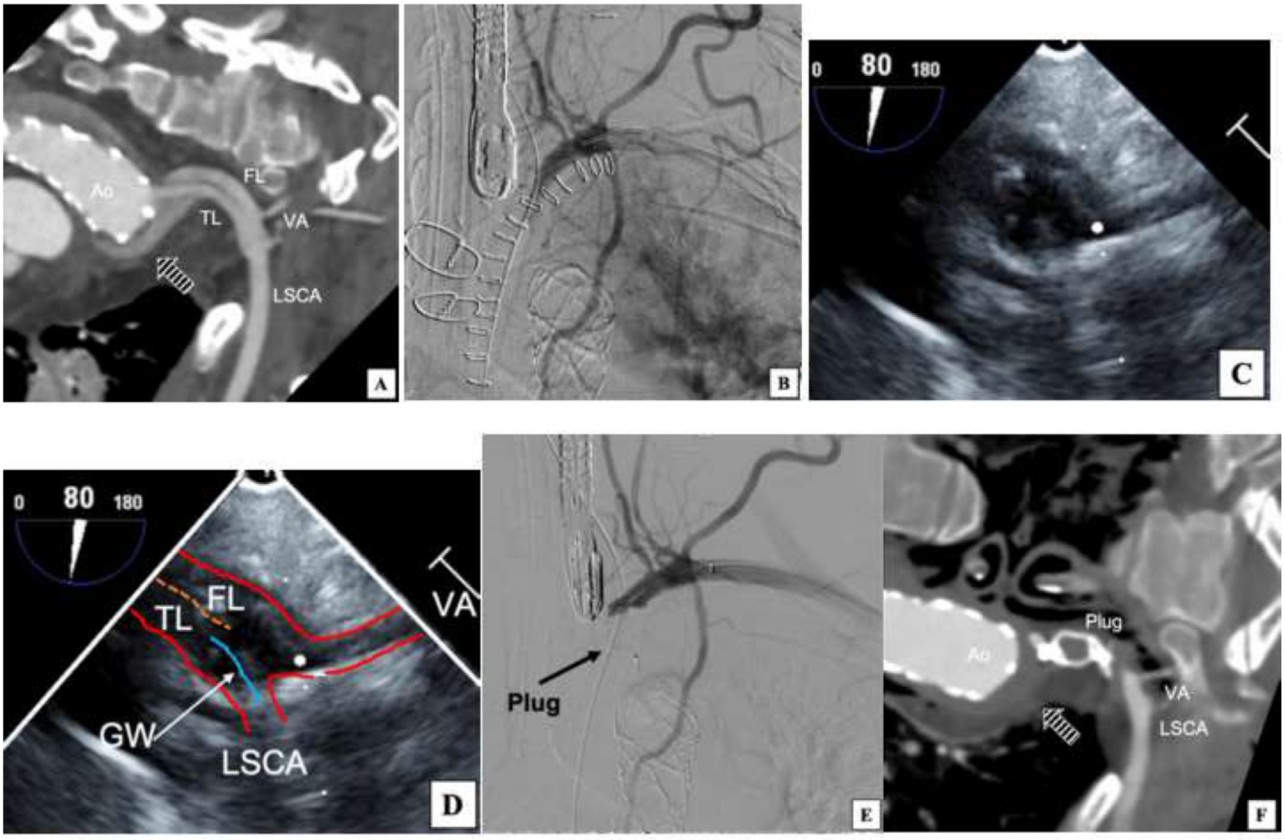


Fig 1. (A) Postoperative contrast-enhanced computed tomography showed retrograde blood flow around the frozen elephant trunk (striped arrow) from the false lumen of the left subclavian artery. The communication between the true and false lumens was at the level of the origin of the vertebral artery. (B) Left brachial artery angiography. (C) and (D) Transesophageal echocardiogram showed the left subclavian artery and vertebral artery. The left subclavian artery contained a true and false lumen. The entry of the false lumen was at the vertebral artery origin. The red lines denote vascular walls. The blue line indicates the guidewire. The dotted orange line indicates the intimal flap. (E) Postoperative angiography showed the plug placed at the origin of the left subclavian artery. (F) Postoperative contrast-enhanced computed tomography showed disappearance of the false lumen in the original left subclavian artery. Retrograde flow was no longer present (striped arrow). Abbreviations: Ao, aorta; LSCA, left subclavian artery; VA, vertebral artery; GW, guidewire; TL, true lumen; FL, false lumen

subclavian artery using transesophageal echocardiography to guide the catheter into the true lumen for plug placement.

A 47-year-old man (height, 168 cm; weight, 85 kg) presented to the emergency room with back pain. An aortic dissection that originated in the distal aortic arch and extended across all 3 branches of the aortic arch was visualized on computed tomography (CT). Total arch replacement using a frozen elephant trunk technique was performed. Because the left subclavian artery origin was distal to the left carotid artery origin, the frozen elephant trunk was inserted between the 2, and the left subclavian artery was bypassed. The origin of the left subclavian artery could not be ligated during surgery. Contrast-enhanced CT after surgery showed retrograde blood flow around the end of the frozen elephant trunk from the false lumen of the left subclavian artery. Communication between the true and false lumens was observed at the level of the vertebral artery origin (Fig 1A). Six days after surgery, endovascular plug closure was performed because CT showed the false lumen was still open around the stent graft. After anesthetic induction, left brachial artery angiography was performed, but the tip of the guidewire was difficult to localize precisely (Fig 1B). Transesophageal echocardiography was used to confirm the wire was located in the true lumen (Video Clip 1; Figure 1C and D). Plug closure was then successfully completed (Fig 1E). The postoperative CT showed no contrast around the open stent graft and no enlargement of the false lumen (Fig 1F).

## Conflict of Interest

None.

## Acknowledgements

The authors would like to thank Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1053/j.jvca.2022.12.026.

## References

1 Hage A, Ginty O, Power A, et al. Management of the difficult left subclavian artery during aortic arch repair. Ann Cardiothorac Surg 2018;7:414–21.

2 Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (Irad): New insights into an old disease. JAMA 2000;283:897–903.

3 Rocchi Guido, Lofiego Carla, Biagini Elena, et al. Transesophageal echocardiography-guided algorithm for stent-graft implantation in aortic dissection. J Vasc Surg 2004;40:880–5.

4 Orihashi K, Matsuura Y, Sueda T, et al. Aortic arch branches are no longer a blind zone for transesophageal echocardiography: a new eye for aortic surgeons. J Thorac Cardiovasc Surg 2000;120:466–72.

Hiroki Nakamura, MD*,[1]
Takuma Maeda, MD, MPH, PhD*
Takamune Minote, MD*
Akiyuki Kotoku, MD†
Shigeki Koizumi, MD‡
Hitoshi Matsuda, MD‡
Yoshihiko Ohnishi, MD*
*Department of Anesthesiology, National Cerebral and Cardiovascular Center, Osaka, Japan
†Department of Radiology, National Cerebral and Cardiovascular Center, Osaka, Japan
‡Department of Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Osaka, Japan

https://doi.org/10.1053/j.jvca.2022.12.026