Acute Limb Ischemia Following TEVAR in Patient with Anomalous Origin of Left Vertebral Artery

Iwan Dakota MD, FESC, FFACC, FSCAI
Department of Cardiology and Vascular Medicine, University of Indonesia
Harapan Kita National Cardiovascular Center
Classification of Aortic Dissection

DeBakey
Type I  Originates in the ascending aorta, propagates at least to the aortic arch and often beyond it distally
Type II  Originates in and is confined to the ascending aorta
Type III Originates in the descending aorta and extends distally down the aorta or rarely retrograde into the aortic arch and ascending aorta

Stanford
Type A  All dissections involving the ascending aorta, regardless of the site of origin
Type B  All dissections not involving the ascending aorta
Case Illustration

• 51 year-old hypertensive male
• Referred from a private hospital with suspected Acute Aortic Dissection
• Chest pain radiating to the back and Stomach occurred 8 hrs prior to admission
Aortic CT Scan

3D
Ex: 8261
Se: 2
Volume Rendering No cut

DFOV 60.5cm
STND/+
Plan

- Thoracic Endovascular Aortic Repair
- Separated Stent Graft System
- Cover the origin of Left Subclavian Artery (LSCA) as a very short landing zone (Zone 2)
Post-TEVAR

Severe left arm pain

Dupplex Sonography

No flow detected in subclavian and brachial artery
Dupplex Sonography
What Actually Happened?

- We fully covered the origin of LSCA
- No Flow (Retrograde Flow) from Left Vertebral Art (LVA) to LSCA!!! As the origin of LVA arose directly from Aortic Arch !!!
- Acute Upper Limb Ischemia occurred
- Emergency revascularization should be done to upper limb...........
Normal Anatomy

Diagram showing various arteries including:
- Ophthalmic artery
- Supraorbital artery
- Supratrochlear artery
- Facial artery
- Right common carotid artery
- Right vertebral artery
- Right subclavian artery
- Internal carotid artery
- External carotid artery
- Left common carotid artery
- Left vertebral artery
- Left subclavian artery

Also showing the Circle of Willis and major blood vessels like the aorta and common carotid arteries.
Anomalous of L Vertebral Artery Origin
Subclavian Artery Circulation

What we can do?

Immediate Restore flow to Left Arm!!!!

1. Fenestrated Stent Graft?
2. Chimney stent technique?
3. Sent to Surgeon?
The Chimney Graft: A Technique for Preserving or Rescuing Aortic Branch Vessels in Stent-Graft Sealing Zones

Tomas Ohrlander, MD; Björn Sonesson, MD, PhD; Krasnodar Ivancev, MD, PhD; Timothy Resch, MD, PhD; Nuno Dias, MD, PhD; and Martin Malina, MD, PhD

Vascular Center Malmö-Lund, Malmö University Hospital, Malmö, Sweden.
Technical Solutions for Common Problems in TEVAR: Managing Access and Aortic Branches

Frank J. Criado, MD; Christine McKendrick, RN; and Francis R. Criado, BS

Vascular Surgery and Endovascular Intervention, Union Memorial Hospital-MedStar Health, Baltimore, Maryland, USA.
Dupplex Sonography
LESSON to LEARN

1. Be aware of abnormal origin of Left Vertebral Artery, especially if you intentionally cover LSCA origin

2. When you intentionally cover the LSCA origin be sure:
   a. Four vessel study
   b. Patency of Circle of Willis, as retrograde flow from Left Vert Artery goes to Left Arm
   c. Always evaluating L Arm blood flow, either by clinical evaluation, physical exams or duplex sonography

3. Be prepared of LSCA restoration if necessary (fenestrated or chimney stent should be available)

4. L Brachial access is crucial for LSCA chimney stent technique
Summary

- TEVAR is a procedure of choice for Descending Thoracic Aortic Dissection
- Branches of the aorta should be carefully evaluated before the procedure
- Chimney stent is effective in dealing with symptomatic subclavian artery occlusion