Left subclavian artery occlusion: Incidental transesophageal echocardiography diagnosis

Dharmesh Radheshyam Agrawal, Mohammed Rehan Sayeed[1]

Consultant Anesthesiologist, Apollo Hospital, [1]Consultant Cardiac Surgeon, HBS Frontier Lifeline Hospital, Bengaluru, Karnataka, India

A 53-year-old man presented to us with complaints of breathlessness and chest pain on exertion since last 6 months. Risk factors for coronary artery disease included diabetes mellitus (5 years) and hypertension (12 years). Transthoracic echocardiogram showed normal left ventricle systolic function without any wall motion abnormalities. Coronary angiogram revealed significant three-vessel coronary artery disease. Biochemistry and hematology were within normal limits. He was taken up for coronary artery bypass surgery. Intraoperative monitoring apart from American Society of Anesthesiologists standards included Transesophageal echocardiography (TEE) (multiplane 5 MHz transesophageal probe GE Vingmed Ultrasound, Horten, Norway).

After uneventful induction of anesthesia, a TEE was performed. The aortic arch was visualized after withdrawing the probe from descending aortic short axis view. On following aortic arch branches we found no flow in one of the arch vessels, while following this vessel up we confirmed that this is a left subclavian artery (LSCA) goes away from the probe while left common carotid artery remains parallel to the probe [Video 1]. Following this vessel down we found occlusion was extending till origin of LSCA [Video 2]. A pulse wave Doppler placed in distal LSCA revealed flow was toward the probe, which in the normal vessel should have been away from the probe [Figures 1 and 2]. Origin of the left common carotid artery and innominate artery were patent. This was immediately notified to the surgeon, and we used right internal mammary artery for grafting thus avoided coronary-subclavian steal syndrome. Off-pump coronary artery bypass was completed uneventfully. The postoperative course was free of any events and patient was discharged on 5th postoperative day in a hemodynamically stable condition.

Visualization of aortic arch vessels with TEE is no longer considered a blind zone.[1] TEE is a well-accepted modality for visualizing the aortic arch and its branches. There are the various method described in the literature to identify each aortic arch vessel according to size and flow characteristic.[1-3] The carotid flow was identified on pulsed-wave Doppler echocardiography by a low-resistance flow velocity pattern characteristic of cerebral blood flow (higher systolic and lower diastolic antegrade flow velocity). The left subclavian pulsed-wave Doppler was differentiated from carotid flow by its high-resistance flow velocity pattern characteristic of peripheral arteries (systolic antegrade flow with short early diastolic reversal and lower [usually no] antegrade diastolic flow velocity).

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Website: www.annals.in

DOI: 10.4103/0971-9784.159816

Quick Response Code:

Address for correspondence: Dr. Dharmesh Radheshyam Agrawal, 605, Brigade Mayfair, Cambridge Road, Near Ulsoor Police Station, Ulsoor, Bengaluru - 560 008, Karnataka, India.
E-mail: sanjuagrawal7710@gmail.com

Cite this article as: Agrawal DR, Sayeed MR. Left subclavian artery occlusion: Incidental transesophageal echocardiography diagnosis. Ann Card Anaesth 2015;18:419-20.

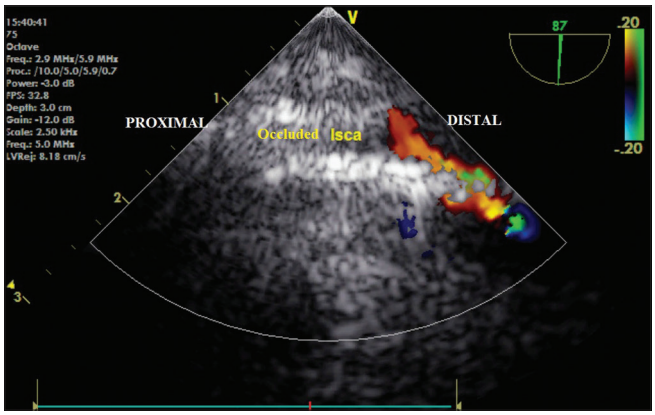

Figure 1: Color Doppler in left subclavian artery (LSCA) showing occluded proximal LSCA

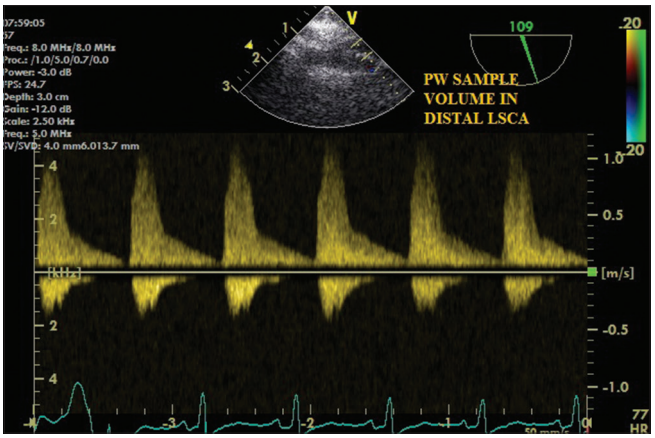

Figure 2: Pulse wave sample volume in distal left subclavian artery (confirming retrograde flow)

Usage of the left internal thoracic artery (LITA) for coronary artery bypass graft (CABG) is the norm in current era due to improved patency rates on a longer run. However, this can be a tricky one, especially in cases of occluded LSCA. Using LITA in cases of occluded LSCA will lead to coronary-subclavian steal syndrome. In coronary-subclavian steal syndrome blood flow is diverted from the coronary artery to a subclavian artery due to significant occlusion of LSCA.

The prevalence of significant LSCA stenosis is around 0.2–6.8% in a patient referred for CABG.[4,5] This will lead to coronary subclavian steal syndrome provided LITA is used for grafting. There is an increase in the incidence of coronary-subclavian steal syndrome recently. LSCA occlusion is easily diagnosed on computed tomography angiogram or magnetic resonance angiogram. However, these tests are not done routinely preoperatively. One can pick up occluded LSCA by TEE which is being routinely used in cardiac surgery.

Financial support and sponsorship

Nil.

Conflict of interest

There are no conflict of interest.

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