Compression of the left subclavian artery caused by a transesophageal echocardiography probe in an infant with a right-sided aortic arch

-A case report-

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Intraoperative transesophageal echocardiography (TEE) has become an important monitoring device for patients undergoing cardiac or noncardiac surgery. Complications associated with TEE are unusual, but the potential for TEE probe compression of the posterior vascular structures has been reported in baby patients. We present here a case of compression of the left subclavian artery in an infant with a right-sided aortic arch after insertion of a TEE probe. (Anesth Pain Med 2013; 8: 196-198)

Key Words: Complications, Transesophageal echocardiography.

The use of transesophageal echocardiogram (TEE) has recently become more prevalent during monitoring of cardiac surgeries and surgeries involving possible severe hemodynamic change [1]. Although complications associated with TEE are very rare, they can occur during or after insertion of a probe [2-4]. In the present case, a TEE probe used on an infant with tetralogy of Fallot (TOF) and a right-sided aortic arch caused compression of the left subclavian artery.

CASE REPORT

An 1-year-old, 77 cm, 9.8 kg male patient presented for TOF total corrective surgery. Computed tomography thoracic aortic angiography was performed as a preoperative test. The aortography revealed that the right-sided aortic arch with the left brachiocephalic trunk was aberrant in the aortic arch (Fig. 1). The left subclavian artery, branching from the left brachiocephalic trunk was aberrant between the esophagus and vertebral body but was not severe compressed by collapsed esophagus and vertebral body (Fig. 2). Both radial artery pulses were palpated well, and no difference in blood pressure was observed between the two upper extremities. No symptoms of dysphagia or respiratory difficulty were noted, and the patient was moved to the operating room.

Ketamine and rocuronium were administered intravenously to induce anesthesia, and endotracheal intubation was performed. Anesthesia was maintained using desflurane. A 24-gauge catheter (Introcan®, B. Braun AG, Melsungen, Germany) was inserted into the left radial artery, and continuous monitoring of the arterial pressure was initiated. Next, a 22-gauge catheter

![Fig. 1. Computed tomography thoracic aorta angiography. A right-sided aortic arch and descending aorta are shown. The left brachiocephalic trunk (arrow) was aberrant in the aortic arch.](image)
We experienced compression of the left subclavian artery caused by a TEE probe in an infant who had a right-sided aortic arch. The present case had a left subclavian artery that was aberrant in the left brachiocephalic trunk, as the left subclavian artery passed between the esophagus and a vertebral body.

A right-sided aortic arch is a relatively common anomaly. Three major types of right aortic arch occur, including with mirror-image branching of the major arteries, with aberrant left subclavian artery, and with left subclavian artery no longer connected. A right-sided arch with an aberrant left subclavian artery occurs more frequently than the mirror image type. This anomaly rarely produces symptoms and is usually an incidental finding on a radiograph. Symptoms of esophageal or tracheal compression may develop in older individuals with ectasia and tortuosity of the great vessels [5].

TEE is a valuable tool for intraoperative management of children with congenital heart disease undergoing cardiac surgery [6] and improves patient care and safety [7,8]. Although a number of theoretical risks, such as mechanical injury by probe insertion and manipulation, mucosal pressure necrosis, or compression of the bronchus and the aorta by the probe, are associated with performing intraoperative TEE, complications are very rare [9-11].

Although adult TEE probes have been used successfully in patients as small as 14.7 kg [12], some authors recommend using a pediatric TEE probe for all patients weighing < 20 kg [8,12]. It seems to be reasonable to use pediatric TEE probe in this patient, but we experienced a compression of the left subclavian artery caused by a TEE probe in an infant with a right-sided aortic arch. The reproducibility of the perfusion decrease of the left arm following insertion of the TEE probe suggests that the left subclavian artery was compressed by mechanical pressure of the TEE probe. In this case report, it is important to emphasize that long-term compression of subclavian artery can lead to ischemic damage and necrosis to the left arm. When TEE is used for diagnosis during relatively short period, in most cases, compression of the artery does not lead to severe adverse events [13]. But as in the present case, used for monitoring during surgery, if compression of the artery is not detected and released early, the probe may cause vascular compression for a long period of time and can cause...
ischemia and necrosis of upper extremity. Therefore, if aberrant arteries cross the between esophagus and other structures, it is necessary to compare blood pressure of both upper extremities to continuously monitor the radial artery pressure or to continuously monitor by pulse oximetry after probe insertion.

In patients with contraindications to TEE – such as perforated viscous, esophageal pathology, active bleeding or recent surgery of upper gastrointestinal tract, or in situations in which attempted TEE probe placement is harmful, like in this case report, intraoperative TTE or epicardial echocardiography can be a useful alternative for evaluating intracardiac air, cardiovascular performance, or success of corrective procedure [14].

In conclusion, we presented a case of compression of the left subclavian artery caused by a TEE probe in an infant with a right-sided aortic arch. We suggest that these probes must be used carefully considering the monitoring method and TTE or epicardial echocardiography can be a useful alternative.

REFERENCES