Iatrogenic ascending aortic stenosis detected by transesophageal echocardiography after decannulation in pediatric patient undergoing cardiac surgery

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Introduction

- Transesophageal echocardiography (TEE) has become a useful tool for patients with congenital heart disease (CHD) undergoing cardiac surgery.
- Technological advancements, particularly the use of small probe sizes, have enabled TEE in small pediatric patients.
- TEE has been shown to be of major benefit in assessing the adequacy of the surgical repair, monitoring cardiac function, and in the detection of residual pathology.
- We report a case of unusual cause of weaning failure detected by TEE.

Case report

A 7-months-old girl (59.4 cm, 5.6 kg), with Down syndrome

Preoperative TTE: 6.5 mm-sized secondum type ASD and 3 mm sized perimembranous VSD with pulmonary HTN

Monitoring and induction

- Routine monitoring: ECG, NIBP, end tidal CO₂, pulse oximetry
- General anesthesia was induced by intravenous administration of fentanyl 25 µg, rocuronium 25 µg and maintained with continuous infusion of a solution containing sufentanil, midazolam and vecuronium.
- After tracheal intubation, establishment ABP and CVP monitoring.
- An 8 mm-diameter omniplane TEE probe 3-7 MHz (S7-3t, Philips IEE3 system, Philips Healthcare, Andover, MA, USA) was inserted smoothly into the esophagus.

Initiation of CPB

- The aorta was cannulated for initiation of CPB.
- Suddenly disappeared ABP wave and no blood flow through cannula.
- The aortic cannula was immediately removed: suspecting acute aortic dissection or sudden cardiac arrest.
- Epinephrine 2 µg was injected and the waveform of ABP was reappeared soon after decannulation.

First cannulation site repaired and CPB on

- The surgeon sutured the decannulated site in purse-string manner and additionally placed one more suture to reinforce the purse-string suture.
- TEE was evaluated: there was no significant complication such as aortic dissection, hematoma.
- Aortic cannulation was carried out once again at the distal part from the previously cannulated site. SVC and IVC were cannulated, and then CPB was initiated uneventfully. : Approximately 70 min after the initiation of CPB, patch closures for ASD and VSD were finished.

Rewarming and Weaning from CPB

- Rewarming and pump flow was reduced → unstable V/S checked: SBP and MBP were maintained between 40-50 mmHg and 30-40 mmHg

TTE evaluation:

A mild esophageal aortic long axis view demonstrated a stenotic lesion on the ascending aorta. With color Doppler, a high flow velocity jet was observed (Fig. 1). Peak velocity of blood flow at the stenotic part was 4.17 m/s, and mean PG between the proximal and distal part of the lesion was 49 mmHg on continuous wave Doppler echocardiography, which was consistent with severe aortic stenosis (Fig. 2).

Discussion

- Complications associated with aortocaval cannulation can cause significant morbidity and may be fatal. Various complications associated with aortocaval cannulation are also well documented: air embolism, aortic dissection and vena cava tear, stenosis of the SVC after decannulation.
- In our case, severe stenosis of the ascending aorta worsened the patient’s vital signs and necessitated an immediate management. Appropriate management was possible because early detection with TEE was followed.
- TEE can play a critical role in early detection of these complications. If it is available, careful monitoring with constant vigilance using TEE should be continued during cardiac surgery.