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Case Report *Volume 6 Issue 1*

Blue Bulky Bleeding Aorta: A Case Report on Iatrogenic Acute Aortic Dissection During Off-Pump CABG

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Abstract

Iatrogenic acute aortic dissection is a catastrophic complication of cardiac surgeries. Perioperative aortic dissections are reported to be Stanford Type A dissections and are associated with significant mortality. A high index of suspicion is needed to diagnose intraoperative IAAD due to its atypical and rare presentation. Imaging such as CT aortogram and MRI scans which are diagnostic gold standards, is not feasible intraoperatively. Consequently, TEE aids in early diagnosis and surgical decision-making. Several authors emphasized the role of TEE in diagnosing IAAD. We report a case where a TEE-based diagnosis of IAAD guided the patient management and outcome.

Keywords: Iatrogenic Acute Aortic Dissection; Intraoperative Aortic Dissection; Transesophageal Echo; OPCAB; Cardiac Surgeries

Abbreviations

IAAD: Iatrogenic Acute Aortic Dissection; TEE: Transesophageal Echo; LV: Left Ventricular; CPB: Cardiopulmonary Bypass; DHCA: Deep Hypothermic Circulatory Arrest; NIRS: Near-Infrared Spectroscopy; LIMA: Left Internal Mammary Artery; LAD: Left Anterior Descending; SVG: Saphenous Vein Graft; OM: Obtuse Marginal.

Introduction

Iatrogenic acute aortic dissection (IAAD) typically occurs when there is damage to the aortic wall caused by catheter-based Cath lab procedures, surgical manipulations, or other invasive techniques. Although uncommon, IAAD is a catastrophic complication with high mortality if not promptly addressed. Aortic dissections associated with cardiac surgeries are frequently reported to be Stanford Type A dissections, which are perilous [1]. Early diagnosis significantly improves patient outcomes and reduces the risk of life-threatening events, such as aortic arch vessels and coronary flow compromise, and acute aortic regurgitation. We report one such case where timely suspicion and transesophageal echo (TEE)-guided diagnosis of IAAD aided in patient management and outcome.

Case Report

We report a case of a 72-year-old male, with a previous history of hypertension, who was diagnosed with triple vessel coronary artery disease and was scheduled to undergo coronary artery bypass grafting. Pre-operative

blood investigations were unremarkable, mild cardiomegaly was noted in the pre-operative chest X-ray.

A 2D echocardiogram revealed mild concentric left ventricular (LV) hypertrophy with an LV ejection fraction of 48%, and regional wall motion abnormality was noted in the distal LAD territory. A routine pre-anesthetic evaluation was otherwise unremarkable, and the patient was cleared for surgery as ASA PS III.

On the day of surgery, the patient did not report any new symptoms, and the blood pressure was noted to be within normal limits. The patient received general anaesthesia with endotracheal intubation and intermittent positive pressure ventilation as per standard institutional protocols. A transesophageal echo (TEE) probe was placed pre-operatively. We also noted an atypically positioned aorta in the mid-esophageal 5-chamber view on the TEE (Figure 1).

Figure 1: Pre-operative midesophageal 5 chamber TEE view showing an atypically placed aorta.

Standard intra-operative infusions of inotropes, and nitroglycerin (to maintain the hemodynamics), along with Propofol (1 mg/kg/hour) and Fentanyl (1 mcg/kg/hour) were initiated. A MAC of 1-1.3 was targeted using Sevoflurane, and boluses of 1mg Vecuronium were given for intra-operative muscle relaxation.

A midline sternotomy incision was made. On inspection, the ascending aorta appeared to be soft, relatively thinned walled and more horizontally unfolded than normal by the surgeons. 3 mg/kg of Heparin was administered after LIMA was harvested. The LIMA to LAD and the SVG to OM distal anastomosis were done with stable hemodynamics. Proximal anastomosis to the aorta was attempted using a side clamp.

The blood pressure during clamping was 120/68 mm Hg and no episode of hypertension was noted during anastomosis. On releasing the side clamp, the aorta appeared tense, distended with localized cyanosis at the site of clamp. There was significant oozing at the site of the proximal anastomosis. Additional reinforcement suture bites caused further spurting of blood. The patient remained hemodynamically stable with a blood pressure of 110/62 mm Hg despite the tense aorta. Acute dissection of the aorta was suspected immediately.

On TEE, we noted a new onset Stanford Type A aortic dissection extending from clamp site to the descending thoracic aorta. Native coronary arteries, and aortic arch vessels were not involved, and the aortic valve function was seemingly normal.

Adequacy of cerebral perfusion was monitored using cerebral oximetry (NIRS). A team decision was made to go on peripheral bypass with femoral artery and right atrial cannulation. Deep hypothermic circulatory arrest (DHCA) (18°C -20°C) was also established. The ascending aorta was replaced with a Dacron graft and the proximal OM graft was reimplanted onto the graft conduit.

The patient was rewarmed and weaned off the cardiopulmonary bypass uneventfully. Blood and blood products were administered to treat coagulopathy secondary to DHCA (Figure 2).

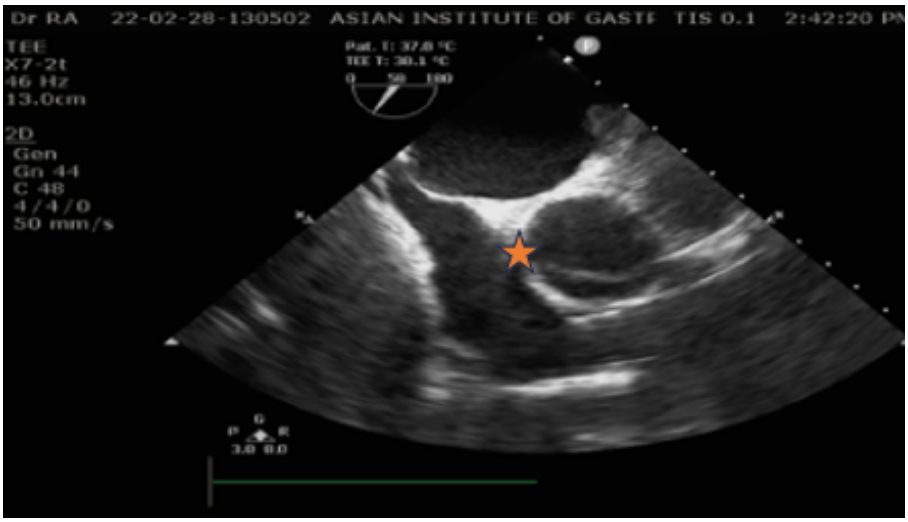

Figure 2: Aortic short axis view showing aortic dissection flap.

The post-operative period was uneventful. The patient was extubated after 12 hours with no neurological deficits or organ dysfunction. The patient was mobilized on post-operative day 2 and was discharged from the ICU on day 3. The post-operative graft patency was noted, and the ascending aorta appeared normal with no evidence of pseudoaneurysms/leaks. There was no evidence of pericardial collection or regional wall motion abnormalities on the post-operative echo. The patient was discharged from the hospital on post-operative day 5 (Figure 3).

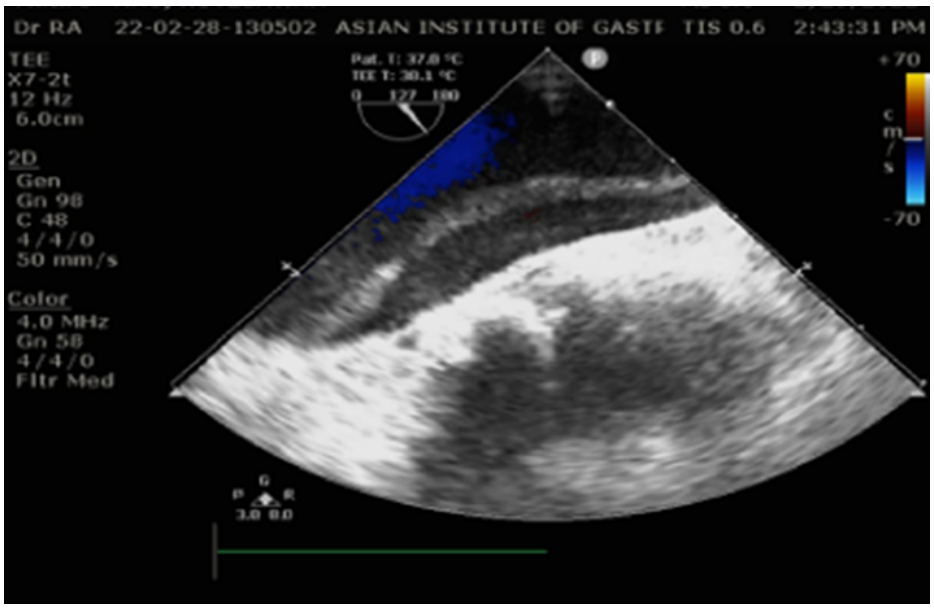

Figure 3: The aortic dissection flap is seen extending into the thoracic aorta.

Discussion

Iatrogenic acute aortic dissection is a potentially fatal complication during cardiac surgeries. Although a rare occurrence with an incidence of 0.12% to 0.23%, IAAD is associated with significantly high mortality rates of nearly 20% to 43% [2].

Several risk factors such as advanced age, history of hypertension, aortic atherosclerosis, dilatation and thinning of the aortic wall and hereditary connective tissue disorders have been associated with IAAD. For high-risk patients, it may be that alternative methods should be performed without side-clamping of the aorta to prevent this complication.

Rapid real-time diagnosis and aggressive management can drastically aid in improving patient prognosis. The diagnosis of intraoperative IAAD can be challenging due to its atypical presentation.

Several authors have emphasized the role of TEE in the early diagnosis of IAAD. Intra-operative TEE is reported to have a sensitivity of 98 % and specificity of 95 % in the diagnosis of IAAD [3].

Routine use of TEE for cardiac surgery has ostensibly reduced the mortality rate of IAAD from 75% to 17% [4]. In on-pump CABG surgeries, TEE is recommended before cannulation, immediately after cannulation, with the onset of CPB, periodically throughout CPB, after decannulation, and at the end of the procedure to minimize the risk and assist with the detection of IAAD [5].

Hwang et al. attributed a marked improvement in survival (from 25% to 85%) in patients who developed IAD to the routine use of TEE examination of the aorta throughout the case [6]. Shea NJ, et al. [7] reported that 40% of their IAAD cases were only detected under TEE guidance [7].

Conclusion

Although there are several risk factors identified in predicting the risk of perioperative IAAD in cardiac surgeries, there is a need for a standard scoring tool to stratify patients, to individualize treatment plans and prevent this potentially fatal complication. Routine use of advanced imaging such as TEE, especially in high-risk patients aids in early diagnosis and surgical decision making.

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