Case Report
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ANAESTHETIC MANAGEMENT OF A CASE OF THORACOABDOMINAL AORTIC ANEURYSM- CASE REPORT

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ABSTRACT

An aneurysm is an abnormal enlargement of a portion of a blood vessel.1,2 These aneurysms are typically diagnosed on routine chest radiographs, CT scan or MRI for unrelated symptoms.2 Once aneurysms reach a critical size of 5 to 6 cm or show an accelerated growth of 1 cm per year, surgery is indicated.3 Until recently, surgical treatment of thoracoabdominal aneurysms were associated with a very high operative mortality and morbidity. However, recent advances in anesthetic techniques, monitoring capability, and perfusion technology have contributed to improved patient outcomes.4 The focus of anesthetic management of patients with TAAA is to preserve perfusion of the spinal cord, kidneys, and mesenteric viscera, and minimize ischemia during the procedure.5 It has been documented that cessation of blood flow to these organs can be safely tolerated for upto 20 to 30 minutes; however, the surgical procedure may take 3 to 4 hours, and effective application of circulatory management is necessary.

Keywords: Aneurysm, Anesthesia, Thoracoabdominal aneurysm.

INTRODUCTION

An aortic aneurysm is a permanent localized dilatation whose diameter is at least 1.5 times larger than the expected normal diameter of that portion of the aorta[1,2]. Aortic dissection, in contrast, is the progressive separation of the aortic wall layers that usually occurs after a tear forms in the intima and inner media. The weakened outer aortic wall is prone to progressive aneurysmal dilatation[3,4].

CASE REPORT

A 26-year-old female presented with pain in lower chest and abdomen off and on for 8 months. The pain was moderate in intensity, pricking in nature, radiating to the back and relieved by analgesics. Her Ultrasonography abdomen revealed aortic aneurysm. She was hypertensive for last 1 year and was not taking medication regularly. She had undergone 3 caesarean sections and had one fetal loss at 7 month gestation. She was pale clinically and her epigastrium was tender and there was a pulsatile mass in upper central abdomen. X-ray chest PA view revealed cardiomegaly, aortic dilatation of descending aorta and calcific foci. Her ECG was suggestive of LVH and Echocardiography showed LVEF of 60%, mild LVH and normal aortic root (32mm). Ultrasonography revealed bilateral pleural effusions, lower thoracic and upper abdominal aorta aneurysm (10.7 x 3.8 cm) with a surrounding thrombus of 7.8 cm.

Aortogram revealed normal ascending and arch of aorta, aneurysm of descending thoracic and abdominal aorta stopping just above the origin of renal arteries (16 cm in length). CT Angiography showed fusiform aneurysm of thoracic and upper abdominal aorta. Total length of aneurysm was 16 cm with maximum diameter of aneurysm 5.5 cm. TOE was also carried out which confirmed the previous findings and ruled out aortic dissection.

Resection of aneurysmal aorta and its replacement with PTFE (Gore-tex) graft was planned. On admission she was placed on metoprolol, tab losartan potassium with hydrochlorothiazide (50/12.5mg) and Isosorbide dinitrate infusion at 3 mg/ hr.

Sedation was given the night before surgery. Light premedication was given in the morning of surgery. In the operation theatre patient was found to be calm and tranquil. 16-G iv line was secured and arterial cannulation of

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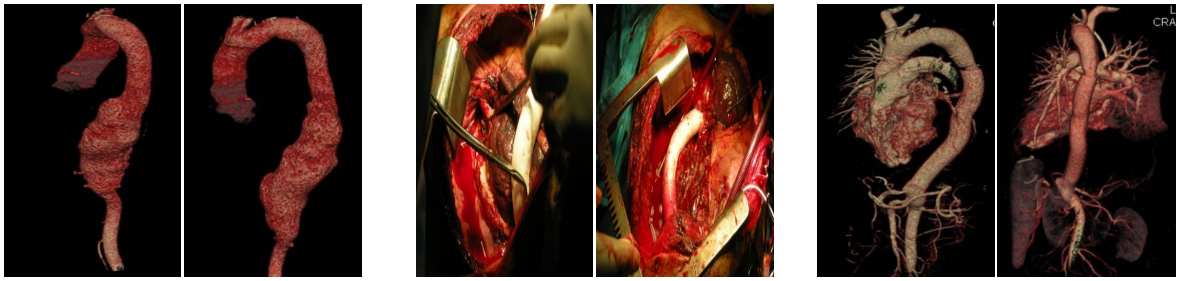
right radial artery and right femoral artery was done. Inj Midazolam 2 mg, Inj Cefuroxime 1.5 gm and Inj Vancomycin 1 gm were given. Monitoring was applied (6-lead ECG, pulse-oximeter, Foley's catheter for urine output estimation). Fentanyl 100 µg and Atracurium 40 mg were given. Depth of anesthesia was achieved by ventilating the patient with O2 and Sevoflurane. Patient was intubated with size 35 left-sided double-lumen tube, correct placement confirmed, and tube secured. Patient was connected to anesthesia ventilator and end-tidal CO2 estimation started. A 7 F triple lumen central venous catheter and 16 G central venous cannula were then placed in right internal jugular vein and baseline ACT noted. Temperature was monitored by nasopharyngeal core temperature and peripheral temperature.

Patient was placed in right lateral position and left thoraco-abdominal incision was given in the fifth intercostal space extending from just below the left nipple to the angle of scapula. Patient was heparinised with 300 U/Kg BW of Heparin. Left lung was then deflated, aneurysm identified, aortic cannula placed in the ascending aorta, and venous cannula in the pulmonary artery. CPB established and sedation, analgesia and muscle relaxation ensured by sevoflurane, fentanyl and atracurium. Serial estimations of arterial blood gases, ACT, electrolytes, urine output and glucose were made. Cardioplegia (St Thomas's sol) was given and patient cooled down to 20°C. Inj mannitol and Inj methylprednisolone were given. Patient's head was covered with ice packs except her eyes. Circulatory arrest was instituted. Aortic aneurysm opened, multiple large clots removed, diaphragm transected and PTFE 20 mm x 30 cm graft anastomosed to descending aorta just beyond the origin of left subclavian artery. Distal end anastomosed to abdominal aorta just proximal to origin of celiac trunk. Endo- aneurysmography done, flow established in distal aorta after removing aortic cross clamp. Patient rewarmed to 37 °C with the help of SNP (3 µgm/kg/min), ventilation started with both the lungs and patient successfully weaned off from CPB with Dobutamine 8 µgm/ Kg/ minute. Residual heparin effects reversed with protamine 3 mg/ Kg BW. Patient did not show any destabilization in the immediate post-CPB period. Hemostasis secured, 2 drains placed in left pleural cavity and 1 in abdominal cavity in left hypochondrium. At the end of surgery Patient was placed in supine position and DLT was replaced with 7.5 mm internal diameter ETT. She was then shifted to ICU. Her monitoring included assessment of surgical bleeding, urine output measurement, ABGs, ECG, SPO2 and temperature and she was ventilated overnight. Sedation and analgesia (Fentanyl and Atracurium infusions) were continued during the night. Patient was weaned from ventilator and later extubated once she met the preset criteria being observed at our hospital (patient fully awake, conscious and oriented, normothermic, and having adequate muscle power, no surgical bleed, no pleural effusion in the X-ray chest, ABGs and electrolytes within normal limits with minimal PEEP).



(a) (b) (c)

Figure: (a) CT angio of aortic aneurysm, (b) PTFE graft being placed, (c) Post operative CT angio.

Inotropic support was gradually tapered and stopped. Patient made good recovery and was shifted to ward on 3rd postop day. Her postop CT Angiography showed a small intramural thrombus at proximal anastomotic end, not causing any obstruction to flow. Patient was discharged from hospital on 7th postop day and advised follow-up in OPD.

DISCUSSION

Management of patients undergoing TAAA repair poses challenges like single lung ventilation, massive blood loss- leading to dilutional coagulopathy accompanying large transfusion requirements, and avoidance of paraplegia- that may result as a consequence of prolonged ischemia or resection of the great radicular artery (Artery of Adamkiewicz).

Advanced contemporary techniques like partial left heart bypass, deliberate hypothermia, DHCA, reattachment of segmental arteries, lumbar CSF drainage, arterial pressure augmentation, and intraoperative neurophysiologic monitoring have improved the safety of thoracic and thoracoabdominal aortic aneurysm repair[5,6]. Despite these advances and an improved understanding of spinal cord perfusion, spinal cord ischemia and infarction causing postoperative paraplegia or paraparesis remains an important and debilitating complication of thoracic and thoracoabdominal aortic operations. The benefits of hypothermia during ischemia are well accepted[7]. Hypothermia's protective effects are largely presumed to be secondary to decreased tissue metabolism and a generalized reduction in energy-requiring processes in the cell. However, the mechanisms may be more complex and involve, for example, membrane stabilization and reduced release of excitatory neurotransmitters[8].

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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