

A case of ostium secundum atrial septal defect for major decompressive spine surgery – covering the paths still left untreaded



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ABSTRACT

Atrial septal defect (ASD) accounts for 35% of all congenital heart diseases in adults. Patients usually present in their twenties or thirties owing to gradually progressive right ventricular remodeling because of left to right shunt, right-sided heart failure, and pulmonary hypertension. In this case report, we present the management of young female patient with ASD posted for D5 spine decompression and fixation. Patients with congenital heart disease for spine surgery present with unique set of challenges for anesthesiologists. Well-prepared anesthesia plan is essential to prevent increase in shunt fraction, shunt reversal, hypoxia, hypercapnia, acidosis, and hypothermia along with careful addressal of positioning issues to ensure smooth recovery of patient.

Key words: Ostium secundum; Shunt; Congenital heart disease

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INTRODUCTION

Patients with congenital heart disease presenting for non-cardiac surgery have been a topic of debate since time immemorial. Atrial septal defect (ASD) accounts for 35% of all congenital heart diseases in adults.¹ Patients usually present in their twenties or thirties owing to gradually progressive right ventricular remodeling because of left to right shunt, right-sided heart failure, and pulmonary hypertension.² Ostium secundum defect is most common (75%) type of ASD with male-to-female ratio of 1:2.³ Complications of ASD are atrial arrhythmias, pulmonary artery hypertension, and stroke. Eisenmenger physiology with reversal of shunt is most dreaded complication.⁴ In this case report, we present the management of young female patient with ASD posted for D5 spine decompression and fixation.

CASE REPORT

A 21-year-old female with D5 lytic lesion with paraparesis was posted for decompression and fixation with excision of tumor mass. The patient was complaining of gradually progressive numbness and weakness in bilateral lower limbs for 2 months. Effort tolerance cannot be assessed as the patient was having limited mobility. On examination, the patient was having tachycardia with significant systolic murmur. Electrocardiography (ECG) showed ST sagging along with T-wave inversion in II, III avF, and T inversion in all chest leads. 2 D echo revealed ostium secundum type of ASD of 14–15 mm size with left to right shunt and mild tricuspid regurgitation with RVSP 38 mmHg (graded mild as per the American College of Cardiology). Chest X ray showed cardiomegaly with

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increased bronchovascular markings. Blood investigations were unremarkable (Figure 1).

The patient was posted for surgery under high cardiac risk during perioperative period and risk of paradoxical embolism. All intravenous lines were thoroughly deaired. After applying the American Society of Anesthesiologists standard monitors, ECG, SpO₂, non-invasive blood pressure, and left radial artery were cannulated to allow IABP monitoring. Heart rate was 130, blood pressure was 130/90 mmHg, and SpO₂ was 99% on room air. Injection dexmedetomidine 30 mcg was given which settled heart rate to 70. After pre-oxygenation for 3 min and pre-medication with injection fentanyl 100 mcg iv, anesthesia was induced with injection etomidate 15 mg iv and injection vecuronium 5 mg iv. Injection loxicaid 60 mg iv and injection esmolol 10 mg iv were given and the patient was intubated.

Right subclavian vein was cannulated and the patient was given prone position. Bilateral ultrasonography (USG)-guided erector spinae block was given with 20 cc plus 20 cc of 0.2% ropivacaine at T3 level. Intraoperative period was uneventful. Injection paracetamol 1 g iv and injection diclofenac 75 mg were given as part of multimodal analgesia.

Extubation response was prevented with injection esmolol 10 mg iv and injection loxicaid 60 mg iv. Post-extubation patient was shifted to intensive care unit on Hudson's mask with oxygen at 6l/min for further observation and was discharged after 2 days.

DISCUSSION

ASD is one of the most common congenital heart diseases. The patient in the present case was incidentally diagnosed case of ostium secundum ASD. She did not have any symptoms pre-operatively and was diagnosed as ASD at the time of pre-operative anesthesia assessment. A carefully drafted anesthesia plan is needed in such patients owing to the risk of atrial arrhythmias, increase in shunt fraction, increase in pulmonary artery pressure, systemic artery pressure, heart failure, and shunt reversal. Patients with ostium secundum ASD are usually asymptomatic till adulthood. Initially, shunt is left to right owing to the compliant right side of heart. Right ventricular enlargement results in shifting of interventricular septum to left side leading to decrease in cardiac output. With time, right ventricular compliance decreases, right-sided heart pressure rises, pulmonary artery hypertension ensues, and right ventricle fails. Increased pulmonary pressure eventually exceeds systemic pressure and reversal of shunt occurs (Eisenmenger

physiology) thereby increasing the risk of paradoxical embolism and stroke. We emphasize the use of 2D ECHO in cases where the surgery is major and ECG shows significant changes. Intraoperative transesophageal echocardiography if available can guide minute-by-minute variations in hemodynamics.

The authors in a case report in which ASD was present in a pregnant patient for cesarean section emphasized the importance of adequate inotropic preparation in case of untoward hemodynamic derangement.⁵ The aim is to maintain adequate systemic vascular resistance and lower pulmonary vascular resistance. The use of intraoperative adrenaline has been emphasized in a case report by the authors in a patient with large ASD operated for total abdominal hysterectomy under regional anesthesia. No air should enter the intravenous line as risk of paradoxical embolism is present.⁶ Temperature monitoring using esophageal temperature probe is done to ensure normothermia.

Before induction of anesthesia heart rate was controlled with injection dexmedetomidine. Injection etomidate is cardiostable agent and maintains heart contractility. Injection lignocaine and injection esmolol were used to blunt intubation response as sympathetic response to laryngoscopy can increase systemic vascular resistance, thereby increasing shunt fraction. Nitrous oxide was avoided as it increases pulmonary vascular resistance. The patient was ventilated using pressure control ventilation keeping airway pressures minimal and positive end-expiratory pressure was avoided. End-tidal CO₂ was maintained within normal limits. The right subclavian vein was cannulated to allow central venous pressure (CVP)-guided fluid therapy and allow aspiration of air in case of embolism. Similar case management has been reported by authors in a patient large ASD with moderate pulmonary hypertension. The patient was given general anesthesia with transversus abdominis plain block for post-operative analgesia. Bilateral USG-guided erector spinae block was given in the present patient as a part of multimodal analgesia regimen was used to minimize sympathetic stimulation.

All precautions concerned with prone position such as pressure point padding, eye protection, and airway pressure monitoring were undertaken. After prone positioning, bilateral erector spinae block was given to decrease sympathetic response to surgery and good post-operative analgesia. Intraoperative adequate pre-load was maintained with CVP-guided fluid therapy. Acidosis, hypothermia, hypoxia, and hypercapnia were avoided as they alter systemic and pulmonary vascular resistance.⁷

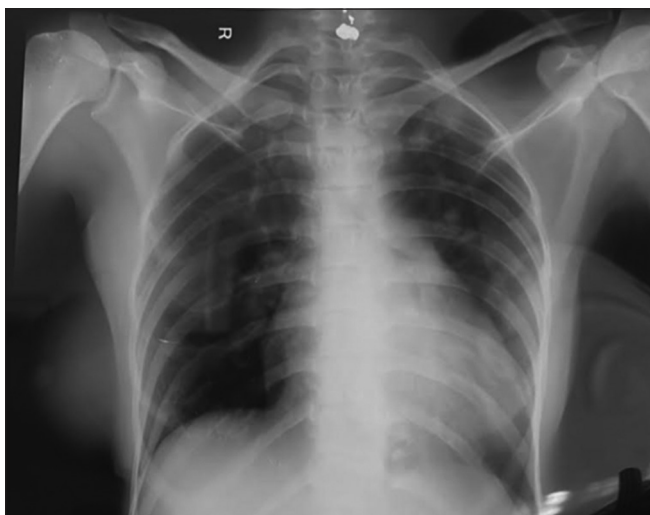


Figure 1: Chest X-ray showing cardiomegaly

CONCLUSION

Patients with congenital heart disease for spine surgery present with unique set of challenges for anesthesiologists. Well-prepared anesthesia plan is essential to prevent increase in shunt fraction, shunt reversal, hypoxia, hypercapnia, acidosis, hypothermia along with careful address of positioning issues to ensure smooth recovery of patient.

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