DOI: 10.21088/ijaa.2349.8471.12225.14

Indian Journal of Anesthesia and Analgesia
Volume 12 Number 2 April - June 2025

CASE REPORT

Anaesthetic Management of Child with Congenital Heart Disease Posted for Non-cardiac Surgery

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HOW TO CITE THIS ARTICLE:

Pavithra R., Ravi Madhusudhana, et al. Anaesthetic Management of Child with Congenital Heart Disease Posted for Non-cardiac Surgery. Ind J Anesth Analg. 2025; 12(2): 153-155.

ABSTRACT

Introduction: Congenital heart disease (CHD) pose unique challenges for anaesthetic management. These children may have impaired cardiac output, altered pulmonary dynamics and a variety of comorbidities that require careful preoperative evaluation and perioperative management.

Case Report: A 4 year old boy diagnosed with Left encysted hydrocoele of cord was posted for Left sided Herniotomy. He is a known case of Atrial Septal Defect (ASD), Patient did not have any history of previous surgeries or any NICU/PICU admissions.

Pre-operative systemic examination and airway examination were normal, 2d echo was done which showed situs solitus levocardia, 25mm large ASD with left to right shunt. dilated RA & RV. grade 1 TR with mild PAH, mild PR, noPS. LVEF 60%.

Cardiac opinion was taken and can be taken up for surgery under moderate risk.

Intraoperatively patient was induced with Inj. glycopyrolate, Inj. midazolam, Inj.Propofol and Inj.Atracurium. Patient was intubated and maintained with Isoflurane, O_2 & N_2O; monitoring of SBP, RR, NIBP, SPO_2 were done. Post-operative vitals were stable. Pt was extubated and shifted to PACU for observation.

Conclusion: Anaesthetic management of children with congenital heart disease undergoing non-cardiac surgery is complex and requires a team approach, involving paediatric anaesthesiologists, cardiologists, and surgeons. Detailed preoperative assessment, individualized anaesthetic techniques, and careful intra- and postoperative management are critical to minimizing risk and optimizing outcomes in these vulnerable patients.

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➢ **Received:** 27-01-2025 ➢ **Revised:** 17-02-2025 ➢ **Accepted:** 21-03-2025

Key Messages: Congenital heart disease with major defects can present with cardiac failure and difficult to thrive. When they present for surgery, the risk associated with anaesthesia and stress of surgery can lead on to major complications. Meticulous planning, multidisciplinary approach is necessary for a better outcome.

KEYWORDS

• Anaesthetic management • Congenital heart disease • Non-cardiac surgery • Pulmonary hypertension.

INTRODUCTION

Children with congenital heart disease (CHD) pose unique challenges for anaesthetic management, especially when undergoing non-cardiac surgery. The presence of structural or functional abnormalities in the heart can significantly alter physiological responses to anaesthesia and surgery. These children may have impaired cardiac output, altered pulmonary dynamics, and a variety of comorbidities that require careful preoperative evaluation and perioperative management. Anaesthetic strategies must be tailored to the individual's underlying cardiac condition, considering factors such as the type and severity of the heart defect, any previous interventions, and the child's current functional status.

CASE REPORT

This is a case of 4 year old boy who was diagnosed with Left encysted hydrocoele of cord posted for Left sided Herniotomy. Patient came with complains of swelling in left side of scrotum since 1 month not associated with any pain.

He is a known case of Atrial Septal Defect (ASD). No other known comorbidities and not on any regular medication. Patient had normal vaginal delivery with a birth weight of 2.5kg. Patient is vaccinated up to date till date and have achieved developmental milestones according to age. Patient doesn't have any history of previous surgeries or any NICU/PICU admissions.

Pre-operatively patient was haemodynamically stable. Pre-operative systemic examination and airway examination were normal with Mallampatti class 1. All investigations were sent and was checked.

A 2D Echo was done which showed CHD: situs solitus levocardia, 25mm large ASD with left to right shunt. Dilated RA & RV. grade 1 TR with mild PAH (PASP-30MMHG), mild PR, no PS. LV EF60%. Deficient RIMS.

Cardiac opinion was taken and can be taken up for surgery under moderate risk. Intraoperatively patient was induced with Inj. glycopyrolate, Inj. midazolam, Inj. Propofol 30mg titrated to effect and Inj. Atracurium. Patient was intubated with uncuffed 5mm tube fixed at 14cm. Maintained with Isoflurane, N_2O, O_2 and Inj Fentanyl; Intraoperatively monitoring of SBP, RR, NIBP, SPO_2 were done. Patient was kept warm.

Accidental air in IV was avoided; Tachycardia, Hypothermia, hypotension was avoided so that PVR and SVR changes were not much. Post-operative vitals were stable. Pt was extubated and shifted to PACU for observation.

DISCUSSION

Congenital heart disease occurs approximately 1 in 125 live births. Surgical intervention may be needed in Thirty percent during the first year of life due to extracardiac anomalies such as tracheoesophageal fistula, anorectal anomalies, cleft lip and palate, and renal and skeletal pathologies.[1]

Non cardiac anomalies may be associated with CHD, like CNS, nose/ear/mandibular/face, and musculoskeletal anomalies.[2]

Managing anaesthesia for children with congenital heart disease (CHD) undergoing non-cardiac surgery requires meticulous planning and execution. In Preoperative Assessment; while taking history & Examination, Type and severity of CHD -cyanotic vs. a cyanotic, shunting, valve abnormalities to be noted. Current functional status (exercise tolerance, growth, cyanosis, digital clubbing) to be evaluated.

Symptoms: cyanosis, heart failure, arrhythmias, or infections to be noted and treated if possible with Medications like diuretics, ACE inhibitors, anticoagulants.

Investigations like Echocardiography, ECG, Chest X-ray and blood tests - Haemoglobin, coagulation profile, electrolytes, and arterial blood gases may be required to quantify the problem and for treatment.

Pulmonary hypertension, significant shunts, heart failure can pose big risk in the perioperative period.

Significant perioperative risk for major complications are there with PAH, it is important to be aware of this increased risk with understanding the pathophysiology of PAH.[3,4]

Multidisciplinary Planning with Consultation with a paediatric cardiologist, Coordination with the surgical team helps in meticulous planning of anaesthesia management.

Anesthetic Induction: Choice of agents depends on the child's hemodynamics, Acyanotic CHD: Balanced anesthesia with minimal systemic vascular resistance (SVR) changes can be planned. Maintaining SVR and avoiding changes in PVR with taking care of hypotension, tachycardia, hypothermia and Pain.

Inotropes can be continued and IV induction agents titrated and the need for invasive monitoring depends on the type of surgery and cardiac lesion.[5]

With the presence of Right to left intracardiac shunts, inhalation induction, may be prolonged, while IV induction is faster. R–L shunt or shunt reversal occurs when SVR decreases or PVR increases.[6]

Advanced monitoring may include: Arterial line, central venous pressure, may be necessary with complicated cases.

Many complex factors are involved, anaesthetic management of CHD patients coming for noncardiac surgery can be based on individual experience, infrastructure for advanced monitoring and confidence in handling the case. Good foundation in physiological and pharmacological principles will help in successful management.[7]

Close collaboration among the anaesthetic, surgical, and cardiology teams ensures the best outcomes. Tailoring the plan to the individual child's pathophysiology is essential.

CONCLUSION

Anaesthetic management of children with congenital heart disease undergoing non-cardiac surgery is complex and requires a team approach, involving paediatric anaesthesiologists, cardiologists, and surgeons. Detailed preoperative assessment, individualized anaesthetic techniques, and careful intra and postoperative management are critical to minimizing risk and optimizing outcomes in these vulnerable patients.

Conflict of Interest: Nil

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