# Anesthetic management of pediatric with congenital heart disease with pulmonary hypertension

Sir,

The presence of congenital heart disease (CHD) increases the morbidity and mortality of children undergoing noncardiac surgery. Certain patients have been identified as high risk group of patients among them one is CHD with pulmonary hypertension.

A 5-year-old child with 8 kg weight had atrial septal defect (ASD), ventricular septal defect (VSD), left to right shunt with severe pulmonary hypertension (PHT) and was posted for open ureterolithotomy. During preanesthetic checkup, he was having cough and tachypnea. Pulse rate was 108/min, noninvasive blood pressure (NIBP) 100/60 mm of Hg and $SPO_2$ 100% on air. His routine blood investigations were within normal limits. X-ray chest showed severe cardiomegaly. electrocardiogram (ECG) showed sinus tachycardia, biventricular hypertrophy with left axis deviation. His 2D echo showed small ostium secundum ASD with left to right shunt, large inlet VSD with bidirectional shunt (11-12 mm) and severe pulmonary arterial hypertension (PAH).

Pediatric cardiologist advised surgery with very high risk. On the day of surgery, patient was premedicated with oral midazolam 0.5 mg/kg with $SPO_2$ monitoring before 45 min. After taking him in the operation theater, ECG, pulse oxymetry, and NIBP applied. Patient was induced with injection-glycopyrrolate 0.04 mg, injection-fentanyl 2 μg/kg and injection- propofol 20 mg. Patient's airway was secured with laryngeal mask airway no. 1.5 and anesthesia was maintained with oxygen, sevoflurane with spontaneous respiration. At the end of surgery patient was extubated uneventfully and shifted to high dependency unit with standard monitoring. Postoperatively analgesic injection diclofenac sodium was given 8 hourly.

Congenital heart disease is the most common birth defect, occurring in approximately one in 125 live births. Due to advances in modern medicine, mean 90% of these children now survive to adulthood; they pose a challenge for anesthesia because perioperative morbidity and mortality is greater compared with other children.[1] Left to right shunts is the most common lesions representing over 50% of children with CHD. Most children do not manifest heart failure unless their shunt produces a pulmonary to systemic fraction of 3-1.[2] Four major complications of CHD are arrhythmias, cardiac failure, PHT and cyanosis.

The anesthetic goals in managing such a patient are to prevent an increase in pulmonary vascular resistance and depression of myocardial function. PHT crisis intervention measures such as 100% oxygen, inhaled nitric oxide, phosphodiesterase inhibitors, prostacyclin analogues, inotropes and other measures to maintain cardiac output and pulmonary blood flow must be prepared and administered accordingly as the need arises.[3] Retrospective analysis of children with PAH who had undergone noncardiac surgery or cardiac catheterization demonstrated incidences of major complications (cardiac arrest or pulmonary hypertensive crisis) and death that are many times greater than those reported in all children undergoing surgical procedures.[4] A complete history and physical examination, focusing on cardiac signs and symptoms previous surgical and catheterization procedures are essential. Echocardiography is noninvasive and the mainstay of diagnostic testing. Midazolam, fentanyl, a small dose of propofol or a low concentration of sevoflurane may be used for induction of anesthesia. When paralysis is required, neuromuscular blocking agents with minimal hemodynamic effects are preferable. (e.g. rocuronium and vecuronium)[3,4] Good intraoperative and postoperative analgesia is associated with improved surgical outcome.[5]

Hence, these types of children require knowing about the disease, to make an efficient management plan and always to be prepared to treat complications.

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| Quick Response Code: | Website: www.saudija.org |
| | DOI: 10.4103/1658-354X.144108 |