CASE REPORT

Anesthesia Management of Cardiac Patient Posted for Non-cardiac Surgery

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Abstract

Perioperative anesthesia management of pediatric patients with congenital heart disease (CHD) coming for non-cardiac surgery is challenging. Tetralogy of Fallot (TOF) is a cyanotic CHD with the right to left shunt. The challenge for anesthesiologists in handling patients with CHD coming for non-cardiac surgery relies on the patient's age, the complexity of heart lesion, the patient's capacity to compensate, and the urgency of surgery. We report a case of uncorrected TOF posted for open reduction and internal fixation of left radius–ulna fracture.

Keywords: Anesthesia management, Congenital heart disease, Left to right shunt, Non-cardiac surgery, Regional anesthesia, Tetralogy of Fallot.

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Introduction

Congenital heart disease (CHD) occurs in approximately 1 in 125 live births.[1] Tetralogy of Fallot (TOF) accounts for 10% of CHD.[2] Its presence increases the perioperative risk and mortality. Perioperative considerations in these patients include preoperative preparation for surgery, intraoperative anesthesia management, and handling common postoperative issues in the intensive care unit.[3]

Case Description

A 15-year-old male patient, weight 25 kg, height 158 cm with a history of TOF presented to the tertiary care center for open reduction and internal fixation of left radius–ulna fracture.

He had fallen from the staircase following which he sustained a forearm injury. On clinical examination, he had peripheral cyanosis, clubbing (grade III). He had a history of cyanotic spells 8 months ago and a history of repeated respiratory infections, poor effort tolerance (<1 flight). He had not undergone any corrective or palliative heart surgery and was not on any medication.

The preoperative evaluation showed room air saturation of 84% and partial pressure of oxygen 80 mm Hg (on arterial blood gas analysis). Other blood investigations were within the normal limit. 2D echocardiography showed-TOF; large, malaligned VSD (subaortic) with the right to left shunt; severe infundibular valvular pulmonary stenosis PSG-85 mm Hg; left ventricular ejection fraction 60%. The child was started on intravenous fluid 12 hours before surgery to avoid dehydration. Infective endocarditis prophylaxis was given before the surgery.

A valid written informed consent was taken from parents. All resuscitative and cardiac drugs were kept ready. Meticulous attention was given so that all syringes and intravenous tubing were free of air bubbles to prevent paradoxical air embolism. Standard anesthesia monitors were attached. Oxygen supplementation with polymask @5 L/minute was given. With all aseptic precautions ultrasound-guided left supraclavicular block (subclavian perivascular) using 22G, 5 cm long stimuplex needle was given. Six milliliters of 0.5% bupivacaine and 2% lignocaine each were injected after careful negative aspiration of blood. Complete sensory and motor anesthesia was achieved in ten minutes. Mild sedation with dexmedetomidine 0.5 µg/kg/minute was given as IV infusion. Maintenance IV fluid Ringer lactate was given @ 2 mL/kg/hour. Surgery (TENS nailing of left radius–ulna) was done under a tourniquet with minimal blood loss and was uneventful. The patient was monitored in the recovery room for few hours and then shifted to ICU for further postoperative monitoring. The postoperative period was uneventful.

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Discussion

Anesthesia goals in patients having cyanotic heart disease (right to left shunt) are to maintain or increase systemic vascular resistance (SVR) and to minimize pulmonary vascular resistance (PVR) and prevent hypercyanotic episodes intraoperatively.[4] General anesthesia was not our first choice as the patient can have prolonged induction and easily have cyanotic spells due to an imbalance of SVR to PVR.[5,6] Also, they can have arrhythmias, hypovolemia, hypothermia, etc., which can induce a cyanotic spell. In our case, we gave USG-guided upper limb block along with IV sedation using dexmedetomidine. Hypovolemia, hypoxemia, hypo/hypercapnia, hypo/hyperthermia, hypo/hyperglycemia, and other metabolic derangements were avoided throughout the intra- and postoperative period.

In patients with TOF, tachycardia, dehydration, and sympathetic stimulation must be avoided, as it can cause spasm of hypertrophied pulmonary infundibulum leading to the development of

hypercyanotic or tet spell, characterized by rapidly falling SPO_2, hypotension, and ischemic ECG changes. Even with favorable outcomes, patients with CHD coming for non-cardiac surgery are still under the high-risk category after operation;[7] hence, these patients should be observed in a high dependency unit or intensive care unit.

Pain management is a critical factor during intra- or postoperative management. Opioid infusion or patient-controlled analgesia for major operations has been the primary postoperative intervention for pain in patients with CHD.[7,8] The use of regional anesthesia for well-compensated patients with CHD was reported with no complications.[9] Regional block avoids all the above complications and hence was our choice.

Dexmedetomidine is a highly selective alpha 2 agonist that provides anxiolysis and cooperative sedation without respiratory depression. It decreases central nervous system sympathetic outflow in a dose-dependent manner and has analgesic effects and maintains a safe milieu in these patients.[10]

In our case, we avoided general anesthesia and gave supraclavicular block for anesthesia with sedation using dexmedetomidine with stable hemodynamics and good perioperative outcome.

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