Sevoflurane in an infant with dilated cardiomyopathy due to myocarditis and hypocalcaemia

Sir,

A 9-month-old infant with dilated cardiomyopathy (DCM) due to myocarditis and hypocalcaemia was posted for cataract extraction in both eyes at 1-week interval under general anaesthesia.

The child was weighing 4.5 kg with microcephaly, microphthalmos, microstomia, micrognathia, deep set eyes, diffuse grade 1 Ashworth spasticity of both lower limbs, hepatosplenomegaly and global developmental delay.

At 6 months of age, the infant was admitted to hospital for congestive cardiac failure for 15 days and was managed conservatively with calcium, angiotensin converting enzyme (ACE) inhibitors and carnitine. Blood investigations at the time of hospital admission showed raised total leucocyte count and erythrocyte sedimentation rate, serum potassium – 5.2 mmol/l, albumin globulin ratio 0.73, serum calcium 8.5 mg/dl, ionised calcium 3.94 mg/dl and normal thyroid profile., Immunoglobulin G for herpes simplex virus 1, 2 and cytomegalovirus were strongly positive indicating congenital infection and had normal karyotype (46XY) and abdominal ultrasound. Chest X-ray showed cardiomegaly with increased pulmonary markings [Figure 1]. Echocardiography showed DCM with an ejection fraction of 30% with patent foramen ovale and

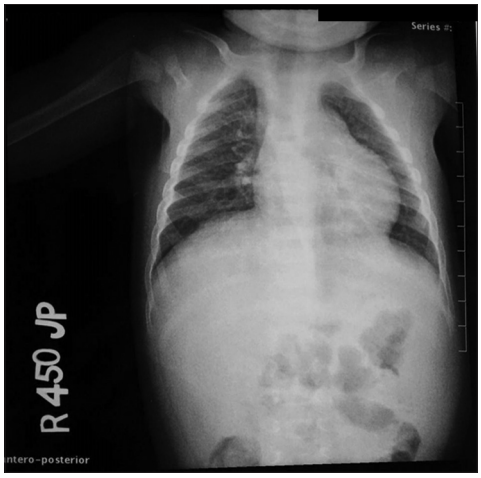

Figure 1: Chest X-ray showing cardiomegaly and increased pulmonary vasculture

no pulmonary arterial hypertension. The infant was reviewed after a month with repeat echocardiography which showed same changes.

Following standard fasting protocol, all drugs were continued on the morning of surgery. Paediatric cardiologist was called as standby for intraoperative pacemaker insertion if required. The infant was induced with sevoflurane in a graded manner via face mask with oxygen, and an intravenous line was secured. Intravenous glycopyrrolate 0.03 mg, fentanyl 5 μg was administered. The infant could be intubated with 4.0 mm uncuffed endotracheal tube under sevoflurane and propofol (2 mg/kg) at 3 min after induction.

Arterial line was secured and vitals (heart rate, saturation, temperature, invasive blood pressure and $EtCO_2$) were monitored continuously. Anaesthesia was maintained with oxygen, nitrous oxide and

sevoflurane with 3 volume % concentration with spontaneous ventilation. Crystalloid was administered as per Holliday-Segar recommendations. The procedure took 90 min. Patient was stable throughout the procedure and trachea was extubated after withdrawing sevoflurane. The infant was monitored for 24 h in the paediatric intensive care unit and discharged on second post-operative day. The infant was posted for other eye procedure a week later. Same precautions and procedures were followed and was discharged successfully on post-operative day two.

DCM with an incidence of 1.13 cases/100,000 children[1] is characterised by dilatation and impaired contraction of the left ventricle or both ventricles. It may be idiopathic, familial/genetic, viral and/or immune, toxic or related to endocrine disease and malnutrition. It can present with progressive heart failure, arrhythmias, thromboembolism and sudden death.[2] There are very few clinical signs until DCM is severe. In smaller children, any history of a cough, decreased effort tolerance, poor feeding, failure to thrive, syncopal episodes or chest pain should result in a thorough examination looking for cardiomegaly and clinical signs of cardiac failure. Often there is associated mitral valve regurgitation, tricuspid valve regurgitation or both.[3]

Main issues of anaesthetic concerns were difficult intubation due to microcephaly, microstomia, short neck and spasticity, associated myopathy, dehydration, the risk of embolism and recovery. The pre-operative assessment included a mandatory echocardiogram to determine ventricular function. Potassium level was evaluated as these patients may be receiving diuretics or digoxin and hypokalaemia is corrected before the operation. ACE inhibitors were continued on the day of surgery despite the risk of intraoperative hypotension[4] after consultation with paediatric cardiologist. Dobutamine and amrinone infusion were prepared as inotropic agents to manage hypotension.[5] Increase in peripheral vascular resistance (PVR) due to hypercarbia or hypoxia, and decrease in the venous return due to high airway pressures were avoided as elevated PVR in the presence of a low cardiac output in these patients may cause rapid haemodynamic deterioration.

In conclusion, better pre-operative assessment should be followed by formulation of anaesthetic plans keeping in mind the cardiac status, a continuation of ACE inhibitors, anticipating difficult intubation, maintaining euvolaemia and avoiding cardio-depressant drugs. Sevoflurane may be safely used in in infants with DCM as it causes less haemodynamic alterations and it could also help in tracheal intubation without muscle relaxant.

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Conflicts of interest

There are no conflicts of interest.

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