

Difficult airway with paediatric Tetralogy of Fallot: Cohesion of two difficult situations

Sir,

Tetralogy of Fallot (TOF) is the most common cyanotic congenital heart disease (CCHD) characterised by aortic override, right ventricular hypertrophy, pulmonary stenosis and ventricular septal defect (VSD).^[1] These patients have an increased risk of intraoperative complications. An associated difficult airway confers an additional challenge to the anaesthesiologist. The literature concerning the anaesthetic management of such cases is sparse. We hereby discuss the perioperative management of an 11-year-old, 35-kg female child with uncorrected TOF and a difficult airway.

The child presented for biopsy of vascular and malignant growth in the left mandible. It extended

intraorally to the midline causing anomalous dentition and rightward tongue displacement, with no oropharyngeal extension. Extra-orally, it extended from the left jaw to hyoid cartilage, restricting neck flexion [Figure 1].

A contrast computed tomography (CT) revealed a mass of size 7 × 6 × 5 cm. An echocardiogram showed TOF with long segment pulmonary atresia, large subaortic VSD, 50% aortic overriding and major aorto-pulmonary collaterals (MAPCAs), not amenable to surgical correction due to large segmental pulmonary atresia. Room air saturation was 60%–65%, and haematocrit was 48%.

Anaesthetic plan was to secure the airway with a cuffed oral endotracheal tube (ETT) using fiberoptic bronchoscope (FOB) after sedation with intra-nasal dexmedetomidine (IND). A difficult airway cart with videolaryngoscope, supraglottic airway device and nasopharyngeal airways (NPAs) was kept ready. Injection esmolol, morphine and phenylephrine were prepared to manage any cyanotic spell. Standard



Figure 1: The mandibular growth causing a difficult airway

American Society of Anesthesiologists (ASA) monitors were attached, and a 22-G intravenous cannula was secured. The child was nebulised with 2 ml of 2% lignocaine. IND 150 µg was administered. Ketamine 10 mg i.v. bolus followed by infusion at 30 mg/h was supplemented to improve the intubating conditions. A size 6 NPA (Portex®) was inserted very gently to prevent any loss of airway. A 5.0-mm ETT connector was attached to NPA for continuous oxygen insufflation. A FOB (Karl Storz Endoscope® 3.2 mm) was introduced orally. Lignocaine 2% using the spray-as-you-go technique was employed to anaesthetise the airway. Airway was secured with a 5.0-mm cuffed ETT [Figure 2]. The child was kept on spontaneous ventilation with an oxygen:air ratio of 80:20. Anaesthesia was maintained with ketamine infusion 30 mg/h and sevoflurane 2%. Child maintained a saturation of 80%–85% and stable haemodynamics with heart rate 60–75/min and non-invasive blood pressure 110–120/60–70 mmHg. Surgery was uneventful with minimal blood loss. After haemostasis confirmation, gentle suction was done with a 10F suction catheter through NPA. Trachea was extubated in deeper plane to avoid any undue coughing, struggle and tachycardia. Oxygen was supplemented through NPA in the postoperative period. NPA was removed when the child became completely awake.

The primary haemodynamic goal in TOF management is to prevent tachycardia, increased pulmonary vascular resistance (PVR) and decreased systemic vascular resistance (SVR).^[2] Any hypoxia, hypercarbia, tachycardia, systemic vasodilation or acidosis because of airway collapse, anxiety or anaesthetic agents can cause rapid desaturation, cyanosis and can prove detrimental.



Figure 2: Placement of nasopharyngeal airway and endotracheal tube

The most critical challenge was to secure the airway without risking airway collapse and to maintain the haemodynamics simultaneously. Glycopyrrolate was avoided for fiberoptic bronchoscopy to prevent the inadvertent effects of tachycardia. IND 150 µg was used as premedication. Dexmedetomidine is a selective α_2 agonist, maintains SVR and has minimal/no effect on PVR. It provides good sedation and has been used for various procedures in paediatric population.^[3,4] It has also been reported for tet-spell management in a neonate.^[5] Wajekar *et al.*^[6] have reported using dexmedetomidine infusion for frontoparietal abscess drainage in uncorrected TOF.

We also used ketamine infusion to supplement dexmedetomidine for maintaining the anaesthetic depth.^[4] Ketamine has excellent analgesic and anaesthetic properties. It increases SVR and is an induction agent of choice in TOF patients.^[2] In a case series, a combination of dexmedetomidine and ketamine provided excellent intraoperative haemodynamic stability and safe anaesthesia in uncorrected CCHD patients.^[7]

We carefully tried to balance the management of paediatric difficult airway and haemodynamic goals of TOF without any adverse events. The modification of difficult airway management with regards to the physiological effects of a CCHD is imperative in such cases. Careful titration and watchful monitoring are needed in such cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has given his consent for images and

other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

**Heena Garg, Shreehari Sameroy, Arshad Ayub,
Sanjeeb Giri**

Department of Anaesthesiology, Pain Medicine and Critical Care, All India Institute of Medical Sciences, New Delhi, India

Address for correspondence:

Dr. Arshad Ayub,
Department of Anaesthesiology, Pain Medicine and Critical Care,
All India Institute of Medical Sciences, Ansari Nagar,
New Delhi - 110 023, India.
E-mail: drarshad2k1@gmail.com

Submitted: 24-Apr-2021

Revised: 27-May-2021

Accepted: 26-Jul-2021

Published: 15-Sep-2021

REFERENCES

- Bailliard F, Anderson RH. Tetralogy of fallot. *Orphanet J Rare Dis* 2009;4:2.
- White MC, Peyton JM. Anaesthetic management of children with congenital heart disease for non-cardiac surgery. *BJA Edu* 2011;12:17-22.
- Morrison S, Ranger M, Anderson B, Fox S. Anesthetic management of uncorrected tetralogy of fallot and mitochondrial disorder: A role for dexmedetomidine. *Pediatr Anes* 2019;29:539-40.
- Bajwa SJS. Dexmedetomidine and ketamine – Comrades on an eternal journey! *Indian J Anaesth* 2021;65(Suppl 1):S1-4.
- Senzaki H, Ishido H, Iwamoto Y, Taketazu M, Kobayashi T, Katogi T, *et al*. Sedation of hypercyanotic spells in a neonate with tetralogy of fallot using dexmedetomidine. *J Pediatr (Rio J)* 2008;84:377-80.
- Wajekar A, Shetty A, Oak S, Jain R. Anaesthetic management for drainage of frontoparietal abscess in a patient of uncorrected tetralogy of fallot. *Indian J Anaesth* 2015;59:244-6.
- Goyal R, Singh S, Bangi A, Singh S. Case series: Dexmedetomidine and ketamine for anesthesia in patients with uncorrected congenital cyanotic heart disease presenting for non-cardiac surgery. *J Anaesthesiol Clin Pharmacol* 2013;29:543-6.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/ija.ija_349_21

How to cite this article: Garg H, Sameroy S, Ayub A, Giri S. Difficult airway with paediatric Tetralogy of Fallot: Cohesion of two difficult situations. *Indian J Anaesth* 2021;65:140-2.

© 2021 Indian Journal of Anaesthesia | Published by Wolters Kluwer - Medknow