



Uncorrected tetralogy of Fallot for drainage of fronto-parietal brain abscess: Anaesthetic management

Aarushi Jain¹, Sarvjeet Kaur², Gagandeep³, Nipun Saini⁴, Rajvir Kaur⁵

^{1, 4-5} Junior resident, Department of Anaesthesia, Guru Gobind Singh Medical College & Hospital, Punjab, India

² Professor, Department of Anaesthesia, Guru Gobind Singh Medical College & Hospital, Punjab, India

³ Assistant Professor, Department of Anaesthesia, Guru Gobind Singh Medical College & Hospital, Punjab, India

DOI: <https://doi.org/10.33545/26649268.2019.v1.i1a.5>

Abstract

Tetralogy of fallot is the most common congenital heart disease with right to left shunt. Incidence is about 10% of all congenital heart diseases and has a dilated aorta which overrides the ventricular septal defect, right ventricular tract obstruction and right ventricular hypertrophy. Brain abscess is associated with 13-70% cases of tetralogy of fallot. We hereby present a case of 8 year boy presented to emergency with complaints of headache, vomiting, fever since 5 days and history of dyspnea on exertion (NYHA III). Patient was taken up for emergency surgery under general anaesthesia on double ionotropic support (dopamine and dobutamine @ 10ug/kg/min). Patient was Shited to paediatric ICU with ionotropic and ventilatory support.

Keywords: tetralogy of fallot, intracranial abscess, ionotropic support

1. Introduction

Tetralogy of fallot consists of: pulmonary stenosis, aortic overriding, right ventricular hypertrophy with ventricular septal defect [1]. Lesions of brain like cerebral intravascular thrombosis, intracranial suppuration, cerebral abscess frequently occur in association with congenital heart diseases especially uncorrected diseases [2]. Brain abscess occurs due to paradoxical embolism and bypassing the natural phagocytic action of lungs. Persistently low arterial O₂ saturation in these patients manifests clinically as polycythemia, persistent cyanosis, clubbing of digits and poor exercise tolerance. The anaesthesiologist must be familiar with the patient's anatomy and physiology to anticipate intraoperative events and modulate blood flow through systemic, pulmonary shunts.

2. Case Report

An 8 year old male child weighing 25 KGS presented to emergency department with complaints of headache, vomiting, fever since 5 days, seizure since 1day. H/O dyspnea (NYHA III), GCS- E₄M₆V₅, Central and peripheral cyanosis with clubbing present. Pansystolic murmur present in all cardiac auscultation areas. Vitals: PR- 120/min, Bp- 98/60 MMHG (dopamine – 10 mcg/kg/min, dobutamine – 10 mcg/kg/min), Spo₂% - 60- 90 % (high flow reservoir mask with O₂ flow @ 10L/min). Patient was having urinary catheter in situ.

Preoperative blood investigations were :Hb- 16.1g%, Haematocrit- 52%, Neutrophilia- 75.5%, Serum electrolytes- 130/3.8/94, Pre op ABG- (7.32/40/26/20/1.3). ECG- RBBB with right heart strain pattern. MRI- left fronto-parietal brain abscess with midline shift of 9.1 mm. Echo- TOF (VSD 9-10mm) +50% aortic override with bidirectional shunt predominantly L-R with adequate size pulmonary annulus and normal biventricular function.

Pre- operative Advice was to continue medications and give infective endocarditis prophylaxis. Informed written consent taken from the parents in their vernacular language.

Considering patient's condition emergency drainage of abscess under general anaesthesia was planned (ASA IV E).OT was Prepared, Difficult airway cart was kept ready. All intravenous lines were de-aired. Bolus syringes of dopamine (1ml/hr= 1ug/kg/min), dobutamine (1ml/hr= 1ug/kg/min), noradrenaline (1ml= 40ug), phenylephrine (10:1) were prepared and transfusion pump were kept ready. Bair Hugger was used to keep patient normothermic. Beta blocker, amiodarone, lidocaine, adenosine, epinephrine, atropine and Defibrillator were kept ready.

Patient was shifted to operation theatre and monitors were attached- pulse oximeter, end-tidal ETCO₂, ECG, invasive bp, temperature probe, non-invasive bp. Preoperative Vitals were recorded: Bp- 92/56mmhg(dopamine & dobutamine @ 10 ug/kg/min), Heart rate – 116/min, Spo₂% - 60%- 90% on O₂ mask@ 10L/min. Pre-oxygenation was done with 100% oxygen for 3mins. Inj Dexamethasone- 0.1mg/kg i/v. Inj Fentanyl- 1ug/kg i/v were used as premedication. We used Inj. Ketamine – 1mg/kg i/v as induction agent. Inj. Vecuronium- 0.1mg/kg i/v relaxant was given and airway was secured with 5.5mm,cuffed endotracheal tube and patient was kept on pressure control ventilation (Pinsp=11,RR= 18/min, pEEP=0). Maintenance of anaesthesia was done with - O₂: N₂O= 50:50, sevoflurane (0.4-0.6%). USG guided – right internal jugular vein was secured with 5.5 FR triple lumen central catheter. Arterial line was secured in left dorsalis pedis artery for invasive blood pressure monitoring.

During intra-operative period

- Patient's saturation kept varying between 84-90%. Inj fentanyl boluses= 20ug i/v and inj paracetamol 15mg/kg i/v given 15 min before extubation was given to keep patient pain free during surgery. Euvolemia (normal saline) and normothermia were maintained. 2 episodes of decrease of systolic blood pressure were managed successfully with infusion of dopamine and dobutamine increased to 15ug/kg/min i/v and bolus

doses of phenylephrine (20ug) i/v. Inj Leveracetam 10mg/kg i/v was given. Intraoperative ABG was done (7.41/50/30/22/1.2).Urine output of 30ml was recorded. Procedure was completed successfully within 1 hour.

- Patient was kept electively intubated (as Discussed with neurosurgeon) and shifted to paediatric icu on bair circuit with oxygen flow @ 6L/min and ionotropic support and inj fentanyl was given 20ug i/v bolus.
- In pediatric ICU (PICU) post op infusion of midazolam (1mg/hr) and fentanyl (12ug/hr) started and midazolam was stopped in the evening of post op day 1, next day in the morning patient was extubated, ionotropic support was tapered. After 6 days patient was shifted toward without any ionotropic and oxygen support. After 20 days child was stable and referred to higher centre for further management of TOF.

3. Discussion

- Brain abscess is a serious, life threatening condition which requires urgent intervention. It is a focal intracerebral infection that begins as a localized area of cerebritis and develops into a collection of pus surrounded by a well-vascularized capsule^[3]. Congenital Heart Disease remains the commonest cause of brain abscess amongst children. Among Congenital heart diseases, TOF being the commonest.
- Preoperative antibiotic cover was given to prevent bacterial endocarditis. All lines were kept de-aired to prevent paradoxical air embolism. During the procedure hypoxia, hypercarbia, hypothermia, hypovolemia and acidosis were avoided to prevent high pulmonary vascular resistance which may lead to right to left shunt^[4]. CVP guided fluid administered to avoid hypovolemia and hypervolemia as hypovolemia increases right to left shunt. Injection dexamethasone was given to decrease cerebral edema and intracranial pressure.
- Perioperative haemodynamic stabilization was biggest concern for the clinicians and for the safety of patient. Ketamine was used as induction agent to maintain systemic vascular resistance. Fentanyl was used and vecuronium to facilitate intubation preventing decrease in SVR and do not release histamine in body.
- Patient was electively hyperventilated and pressures were kept low to avoid increase in pulmonary vascular resistance. Patient was kept normothermic Pain relief is an important component and we used fentanyl boluses, paracetamol to keep patient pain free. The prognosis for cardiogenic brain abscess is poor and mortality ranges from 30% to 71% even with available surgical intervention^[5].

4. Conclusion

An aggressive multidisciplinary perioperative management resulted in successful management of our patient who required urgent surgery with ionotropic support both before and after intervention and post op mechanical ventilatory support.

5. References

1. Sethi S, Kapil S. Scalp block for brain abscess drainage in a patient of uncorrected tetralogy of fallot. *World J Clin Cases.* 2014; 2(12):934-7.
2. Twite MD, Ing RJ. Tetralogy of Fallot: perioperative anaesthetic management of children and adults. *Semin Cardiothorac Vasc Anaesth.* 2012; 16: 97-105.
3. Raha A, Ganjoo P, Singh A, Tandon MS, Singh D. Surgery for brain abscess in children with cyanotic heart disease: An Anaesthetic challenge. *J Pediatr Neurosci.* 2012; 7:23-6.
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.* 2008; 84:377-80.
5. Behram RE, Kleigman RM, Nelson WE, Vaughan VC. Congenital cardiac disease with cyanosis. In: *Nelson textbook of Pediatrics.* Philadelphia: WB Saunders, 1992, 1149-53.