



Emergency Brain Abscess Drainage in a Case of Uncorrected Complex Congenital Heart Disease under Monitored Anesthesia Care

Shoba Philip* and Praveen KP

Department of Anesthesiology and Critical Care, Lourdes Hospital, India

Abstract

Complex congenital cyanotic heart diseases are rare, incidence being <1%. The commonest is Tetralogy of Fallot. Ventricular septal defect (VSD) allows high flow through the pulmonary circulation by left to right shunt resulting in secondary pulmonary hypertension. When this is uncorrected, it causes a reversal of shunt across the septal defect and paradoxical embolism of air or septic emboli into the cerebral circulation occurs resulting in brain abscess. The incidence of brain abscess is 5-18.7% [1]. Brain abscess drainage poses specific challenges to the anesthesiologist and most cases are done under balanced general anesthesia [2] with its associated inevitable problems. Hence some centers have been trying brain abscess drainage under Scalp block without or with sedation (Monitored Anesthesia Care) [1] with special measures taken to maintain airway, haemodynamic stability and cerebral perfusion without raising the intracranial pressure. Here we present a case of a 6 year old girl, who was a diagnosed case of Complex Congenital Heart Disease (severe pulmonary stenosis, transposed aorta, pulmonary artery ASD and VSD with right to left shunt), uncorrected, now come with brain abscess, posted for emergency drainage under Monitored Anesthesia Care. Very little literature is available supporting this new trend in Anesthesia especially in a child where airway catastrophe can even cause death.

Keywords: Complex congenital uncorrected heart disease; Brain abscess; Monitored Anesthesia Care

Introduction

A 6 year old girl, presented to the Neurology department of our hospital, with high spiking fever, vomiting, nausea, drowsiness, tiredness and weakness of left upper and lower limbs since 1 week. Past history revealed that she was one of the twins, delivered by LSCS at 35wks, 1.8kg neonate, who underwent elective intubation and mechanical ventilation for respiratory distress. She was diagnosed to have a complex cyanotic congenital heart disease, which as per ECHO in the first week of birth -Pulmonary Atresia with large PDA Left aortic Arch, transposed Aorta and Pulmonary artery hypo plastic Right ventricle, tricuspid atresia, Interatrial septum showing large ASD with right to left shunt and 10mm large VSD with left to right shunt. Her milestones were delayed and had undergone treatment for cyanotic spells which are under control now with beta blockers, lasix and digoxin. Other twin is male and is healthy. Parents had not agreed for surgical correction in early stage due to financial reasons. On examination, she was conscious but sick looking, stunted in growth weight 13kg, height 98cm, BMI of 13.5, clubbing grade [Figure 1-3] in fingers and

toes, poor oral hygiene, central cyanosis present; Heart rate-56/mt, BP-86/50mmHg. Examination of cardiovascular system revealed a bulging precordium, apex 5th left intercostal space 2cm lateral to midclavicular line, left parasternal heave, normal heart sounds in all areas, ejection systolic murmur grade 3 in left



Figure 1 Clubbing of fingers.



Figure 2 Clubbing in toes with cyanosis.

Submitted: 13 December 2019 | **Accepted:** 03 January 2020 | **Published:** 04 January 2020

***Corresponding author:** Shoba Philip, Department of Anesthesiology and Critical Care, Lourdes Hospital, Pachalam, Cochin, Kerala, India, Tel: 91 9847920355; Email: dr.shobaphilip@gmail.com

Copyright: © 2020 Philip S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Philip S, Praveen KP (2019) Emergency Brain Abscess Drainage in a Case of Uncorrected Complex Congenital Heart Disease under Monitored Anesthesia Care. Int J Clin Anesthesiol 2: 3.



Figure 3 Cyanosis in Conjunctiva.

sternal border. She was drowsy, with Glasgow coma scale 14/15, pupils bilateral equal and reacting to light, right sided motor power was 5/5 both limbs whereas left sided power was 1/5 in both limbs (Figure 4,5). There was no sensory deficit and cranial nerves were within normal limits. No remarkable findings in the respiratory or gastrointestinal systems. Examination of airway showed assessments like thyromental distance, sternomental distance, mouth opening, Mallampatti class II, normal neck range of movements, no neck stiffness but central incisors of upper jaw were slightly protruded. Oral hygiene was poor though no caries. As physical status was class III.

Investigations

Hb 20g%, PCV 66.8%, TC14, 300, Platelet 1.5L, creatinine 0.6, sodium-136 mg potassium-3mg, random blood sugar 189mg%, APTT 43 INR 2.3. CT brain revealed an abscess 6.7*4.3cm in the frontoparietal region on the right side. Viral markers were negative.

She was put on infective endocarditis prophylaxis with Injection Vancomycin 70mg i/v and hydrated well with 4ml/kg/hr of Ringer lactate after proper desiring of IV line and Normal saline to maintain mean arterial pressure above 65mmHg and total intake adjusted to maintain a urine output of 0.5ml/kg/hr in the ICU. Her baseline saturation on room air was 71% and oxygen was supplemented with face mask at 4L/mt to maintain peripheral oxygen saturation above 88%. Baseline ABG showed pH. 7.42 PCO₂ 42 PO₂ 39 HCO₃ 25. Repeat ECHO revealed Levocardia SVC and IVC draining into RT atrium Large ostium secundum ASD RIGHT AV VALVE ATRETIC Left AV valve draining into Left ventricle, two ventricles large non-restrictive VSD 2 semilunar valves Aorta anterior, pulmonary artery posterior Pulmonary valve atretic, trivial AR Left sided Aortic arch No coarctation small PDA with a gradient of 42 mmHg No vegetation (Figure 6).

Airway assessment revealed slightly protruding upper incisors; but other than that all other indices of difficult airway like thyromental distance, sternomental distance neck movements were within normal limits. Mallampatti was class II. She was cooperative so we decided to try Monitored Anesthesia Care for brain abscess drainage. She was premeditated with tab Pantodac 20mg, Tab Ondansetron 2mg on the morning of surgery. Her beta blocker was continued to prevent any cyanotic spell. She had a good running intravenous line and Ringer lactate @ 4ml/kg/hr was given to maintain urine output more

than 0.5ml/kg/hr. Her temperature was 37.2C and she was already loaded with antibiotics to prevent infective endocarditis Inj Vancomycin 70mg i/v. She was shifted to the operation theatre with oxygen facemask at 4L/mt of oxygen. Meanwhile, the theater was warmed to 21C, the anesthesia machine checked, Ambu bag ready for resuscitation; cuffed endotracheal tubes of sizes 5.5, 6, 6.5 were kept ready along with proper lighting laryngoscope and well working suction. Defibrillator kept ready and Inj Phenylephrine was diluted and labeled and kept ready to

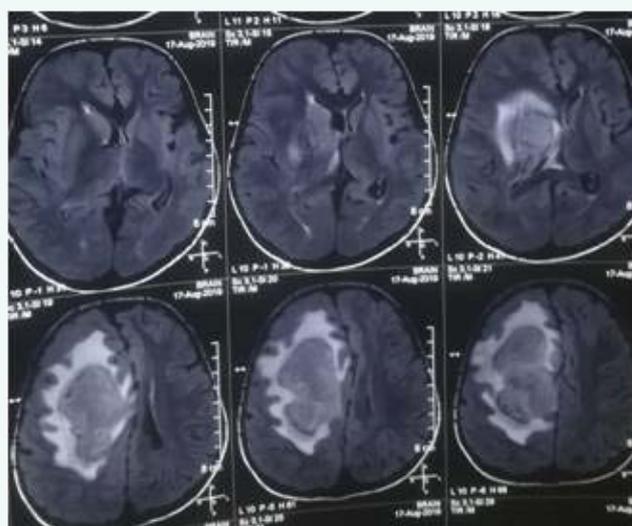


Figure 4 CT scan of Brain showing abscess Rt.



Figure 5 Cardiomegaly in CXR.



Figure 6 Intra OP Monitor.



tackle any kind of hypotension which can worsen the saturation. Theatre table was covered with warmer so that child could be positioned. The child was shifted to the theatre with oxygen at 4L/mt and transport pulse oximeter showing saturation range between 79%-81%. Standard preinduction monitors like pulse oximeter, noninvasive Bp monitor, ECG, temperature probe in the axilla and precordial stethoscope were placed. She was in sinus rhythm, with saturation of 85% and temperature of 37.2 C. BP was 90/60mmHg, chest clear. She was educated about the procedure that it was going to be done under sedation and if she ever felt uncomfortable to notify us by raising the hand. She was given IV glycopyrrolate 0.008mg/kg, 0.04mg/kg midazolam, 2mcg/kg fentanyl, titrated doses of ketofol (ketamine-propofol). Preoxygenated with 100%O₂ to step up saturation to 95%, then, Classic LMA SIZE 3 was put to maintain the airway as we wanted to avoid an airway catastrophe; O₂-Air at 50% each with sevoflurane at 1-1.5MAC delivered as per Anesthetic gas monitor (AGM). ETCO₂ varied between 28-34%. Additional local anesthetic infiltration at burr hole sites were given using 2% lignocaine 5ml. Throughout the procedure saturation was maintained above 85%, ETCO₂ 28-34%, heart rate 64 to 80, MAP > 65mmHg. The whole procedure took only 20mts and child was shifted out with transport pulse oximeter to the recovery and once recovery score of 9 was attained, LMA removed and she was shifted to the ICU. In the ICU, vitals were monitored and she was allowed to take sips of orals 2hrs after the procedure as there was no nausea/vomiting. The postop period was uneventful, with no cyanotic spells; dehydration was corrected and child was discharged 1wk later in a stable condition.

Discussion

Complex cyanotic congenital heart diseases are rare, the commonest among them being Tetralogy of Fallot which has 4 components, namely overriding of aorta, pulmonary stenosis, ventricular septal defect and pulmonary outflow tract obstruction. All these changes cause increased blood flow in the pulmonary circuit leading to pulmonary hypertension. Once reversal of shunt occurs, more amount of deoxygenated blood flows into the left side of heart and the rest of the body causing central cyanosis. There is sludging of circulation leading to reduced blood flow in the brain causing paradoxical emboli causing seizure or spontaneous/iatrogenic stroke leading to weakness/seizures/septic/air emboli which get deposited in the brain causing brain abscess/pneumocephalus. The VSD (ventricular septal defect) may be small or large. There is stunted growth in the child and she is prone to infections. Repeated vomiting also can occur and contribute to impaired nutrition, dehydration and tiredness. This can also lead to hypoglycaemia, electrolyte disturbances. Reduced albumin values can interact with the induction agents and muscle relaxants. So though balanced general anesthesia

is the standard mode, it is being thought that a well-controlled monitored anesthesia care along with local infiltration of burr hole sites/ scalp block, with /without supraglottic airway devices, can provide near ideal condition for drainage of brain abscess while maintaining haemodynamics, intracranial pressure, preventing nausea and vomiting and maintaining peripheral oxygen saturation.

A well balanced general anesthesia with endotracheal intubation is the gold standard, especially in paediatrics to prevent airway catastrophe [3]. But good results are being obtained with supraglottic airway devices while maintaining spontaneous respiration under adequate plane of anesthesia. Hence we tried to do this case under Monitored Anesthesia Care [4] as this child was cooperative too. Titrated doses of analgesics, sedatives and induction agents can achieve this with careful observation of the vital signs and airway. We used Ketofol (ketamine-propofol) along with 20mcg of fentanyl, 1mg midazolam and sevoflurane. Any rise in heart rate or blood pressure was tided over by bursts of sevoflurane. Anesthetic goals to be followed are: avoid hypoxia, avoid hypercarbia, electrolyte disturbances, hypoglycaemia, avoid drugs which increase pulmonary vascular resistance like nitrous oxide, maintain adequate level of anesthesia, maintain blood pressure by maintaining systemic vascular resistance. Maintain haemodynamic stability and hydration. Avoid sudden increases in oxygen demand like crying, pain, surgical stimulus reaction, bucking. Ketamine will increase systemic vascular resistance and reduce the right to left shunt while maintaining blood pressure. Propofol prevents nausea and vomiting and decrease in BP by propofol is attenuated by ketamine. So ketofol is very useful. Nitrous oxide must be avoided as it can increase pulmonary vascular resistance and can cause pneumocephalus. A well running IV line with no air bubbles is mandatory. All these features promote monitored anesthesia care because agents in general anesthesia can be avoided. Thus safe an anesthesia with minimum drugs and haemodynamic, respiratory and cerebral stability.

References

1. Sethi S, Kapil S. Scalp block for brain abscess drainage in a patient with uncorrected tetralogy of Fallot. *World J Clin Cases*. 2014; 2: 934-937.
2. Raha A, Ganjoo P, Singh A, Tandon MS, Singh D. Surgery for brain abscess in children with cyanotic heart disease: An anesthetic challenge. *J Pediatr Neurosci*. 2012; 7: 23-26.
3. Wajekar AS, Shetty AN, Oak SP, Jain RA. Anaesthetic management for drainage of frontoparietal abscess in a patient of uncorrected Tetralogy of Fallot. *Indian J Anaesth*. 2015; 59: 244-246.
4. 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*. 2019; 7: 23-26.