

General Anesthesia Technique in Tetralogy of Fallot Patient Undergo Tooth Extraction Surgery

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ABSTRACT

Background: Tetralogy of fallot is one of the congenital cyanotic heart disease that is often found in children. The disorder has four features, a ventricular septal defect (VSD), aortic overriding, infundibular stenosis, and hypertrophy right ventricular. Like other congenital heart disease, tetralogy of fallot sometimes related to fatal complications, such as bacterial endocarditis which was related to dental infections. Anesthetic management in tetralogy of Fallot is often described in patients with known cardiac disease. Perioperative considerations include preoperative preparation for surgery, intraoperative anesthetic management, and common postoperative issues in the intensive care unit.

Case: A three-year-old boy had history of Tetralogy of Fallot. He has many severe early childhood caries. From the physical examination, many severe caries and roots gangrene was found in both jaws. He was planned to get teeth extraction under general anesthesia.

Discussion: Tetralogy of fallot (TOF) is a congenital cyanotic heart disease that is often found in children, approximately around of 7–10% from overall congenital heart disease in children. Children with TOF have an increased risk of bacterial endocarditis. Invasive procedure was performed under general anesthesia. Patient was successfully operated under general anesthesia.

Conclusion: Tetralogy of Fallot is a congenital cyanogenic heart disease that is a challenge for anesthetist. General anesthesia is the best suitable anesthetic technique in instable patient.

Keywords: bacterial endocarditis; caries; general anesthesia; TOF; VSD

INTRODUCTION

Tetralogy of Fallot (TOF) is a congenital cardiac disease that consists of ventricular septal defect, aortic overriding, pulmonary stenosis, and

right ventricular hypertrophy. Children with TOF are in a high risk of caries, especially in primary dentition. In the field of dentistry, bacterial endocarditis is closely related to dental infection.

Incidence of bacterial endocarditis in TOF is 15%. Anesthetic management in tetralogy of Fallot is often described in patients with known cardiac disease.

CASE

A three-year-old boy was referred to special dental care clinic in Dr. Kariadi general hospital from his pediatric cardiologist to get teeth extraction prior heart surgery. Patient was diagnosed as TOF since was born. Diagnoses from the pediatric cardiologist were diagnosis of function (DF): without heart failure, diagnosis of anatomy (DA): TOF, and diagnosis of etiology (DE): congenital heart disease cyanotic type. Physical examination showed his weight was 11 kg, heart rate at 126 beats/ minute, respiratory rate at 24/minute, cyanotic lips, systolic murmur grade III/6 on 4th intercostal space on left parasternal line. Fingers and toes showed clubbing shape (Figure 1). The saturation on right and left thumb 56%, right and left toe 62%. Intra oral examination showed cyanotic in lip, buccal, and gingival mucosa. Diagnosis of dental caries and roots gangrene in teeth no 11, 21, 41, 12, 22, 42, 43, and 44. Oral hygiene was in mild to moderate condition.



Figure 1. Clubbing and cyanotic fingers

and toes.

ECG showed a normal sinus rhythm with right axis deviation and right ventricular hypertrophy. Hemoglobin and hematocrit were increased: 18.2 g/dl and 62.3% respectively

Echocardiography diagnosed a TOF with Right Ventricular Hypertrophy (RVH), Ventricular Septal Defect (VSD) perimembrane, overriding aorta, pulmonary stenosis with pressure gradient 58 mmHg (Figure 2).



Figure 2. Echocardiography

Dental treatments for the case consist of curative efforts. Curative treatment is extraction of the teeth. To prevent bacterial endocarditis, patient was given a prophylactic Ampicillin 200 mg per 8 hour prior before treatment. Considering the dental treatment will harm the patient, so he was scheduled to the dental treatment under general anesthesia ASA class III.

During pre operative fasting period, a peripheral venous catheter (22 gauges) was inserted and patient was given lactated ringer (35 ml/hour).

Prior to induction, vital signs were NonInvasive Blood Pressure (NIBP) 97/59 mmHg, heart rate 112 beats/minute, respiratory rate 26/minute and SpO2 59%; improved to 63% after pre-oxygenation.

Premedication with Sulfas Atropine 0,1 mg and Midazolam 2 mg. Anesthesia was induced with IV Propofol 20 mg and Fentanyl 10 mcg, maintained with Sevoflurane 1 MAC. The surgery estimation was about 45 minutes.



Figure 3. Perioperative condition

Standard monitoring was started using electrocardiogram, pulse oxymetry, and NIBP. Patient was ventilated with 100% oxygen at a rate of 20/minute. Per operative vital signs variations were recorded: heart rate 109-117 bpm, SpO₂ =56%-69%, mean arterial pressure 51-64 mm Hg.



Figure 4. Perioperative monitoring

Blood loss was estimated at 5 ml. Surgery lasted for 1 hours and patient extubated after spontaneous adequately

breathing. He was shifted to the ward.

DISCUSSION

Oral and dental treatment in a child with congenital heart disease is very important. Main point which have to be noticed is that patient with this disorder is highly susceptible to bacterial endocarditis. Patient was scheduled to undergo mouth preparation under general anesthesia.

The pathophysiology of tetralogy of Fallot is associated with an increased right ventricle postload and an intracardiac right-left shunt. It results in a decreased pulmonary artery flow, chronic hypoxemia, hypercarbia, respiratory alkalosis and cyanosis, polycythemia and hyperventilation. Complications include cardiac arrhythmias; right and left heart failure, venous and arterial thrombosis, infections (endocarditis and cerebral abscess) and hypercyanotic spell. In this reported case, patient had no complication yet.

Anesthetic management of patient with uncorrected TOF must respect an imperative: prevention of worsening right-left shunt. Therefore, anesthetic techniques should prevent dehydration, avoid decreasing systemic vascular resistance and avoid increasing pulmonary vascular resistance.

Using safe anesthetic agents and doses, and suitable ventilation, general anesthesia has advantages of allowing better maintenance of hemodynamic stability, airway control, better hemodynamic and respiratory monitoring.

Opioids and benzodiazepines such as fentanyl and midazolam provide sedation and amnesia with excellent hemodynamic stability. We used

midazolam and low sevoflurane concentrations to maintain anesthesia and thus to minimize its effect on systemic vascular resistance. All complications were prevented by medication, then patient was early stable and shifted to the ward.

CONCLUSION

TOF is a congenital cyanogenic heart disease. that is a challenge for anesthetist. General anesthesia is the best suitable anesthetic technique in instable patient.

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