CASE REPORT

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Low dose bupivacaine spinal anesthesia for emergency cesarean section in a patient with uncorrected tetralogy of fallot, presenting with placenta previa

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ABSTRACT

Background: Pregnant women with congenital heart disease tetralogy of fallot who undergo cesarean section have their own challenges for the anesthesiologist, not to mention if they have pregnancy complications such as placenta previa. The choice of the safest anesthetic technique is still debated today. The anesthetic technique must be able to maintain systemic vascular resistance, avoid increasing pulmonary vascular resistance, and be aware of the threat of blood loss due to placenta previa.

Case Report: 29 years old pregnant woman, weighing 46 kg and height 155 cm, G1P0A0, Gravida 27-28 weeks, single alive fetus, fetal distress, comes with complaints of shortness of breath, vaginal bleeding due to placenta previa with tetralogy of fallot planned emergency cesarean section. The patient presented with functional class NYHA II-III. We used low-dose spinal anesthesia with 5 mg bupivacaine 0.5% and 25 ug fentanyl as an adjuvant. Colloading was done with gelofusin colloid fluid to replace the amount of bleeding. Hemodynamics prior to anesthesia were BP 120/80, Heart Rate 80 x/minure, SpO2 72% with a non-rebreathing mask 10 litre/minute. There was no severe hypotension during surgery, and was hemodynamically stable with limited use of vasopressors. After the cesarean section was completed, the patient was transferred to the ICU and treated for 2 days, and was only discharged after 5 days of treatment without additional complications.

Conclusion: The use of low-dose spinal anesthesia in combination with adjuvant fentanyl results in a relatively safe anesthetic technique with minimal hemodynamic changes and adequate analgesia for cesarean delivery.

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INTRODUCTION

Tetrology of Fallot (TOF) is the most commonly encountered congenital cardiac lesion in pregnancy. It accounts for 5-6% of cases of congenital heart. Unrepaired tetralogy of Fallot consists of a ventricular septal defect, an aorta that overrides the ventricular septal defect, an aorta that overrides the ventricular septal defect, and right ventricular outflow tract obstruction (infundibular, valvular or both) with resulting right ventricular hypertrophy. Women with repaired tetralogy of fallot and well compensated hemodynamic function tolerate pregnancy well. In patients with unrepaired tetralogy of fallot, the anesthesiologist should avoid a decrease in SVR, which worsens the severity of the right-to-left shunt. It is also important to maintain adequate intravascular volume and venous return.[1]

Management of a pregnant patient with uncorrected tetralogy of Fallot is a challenging task for the anesthesiologist, dealing with the hemodynamic response to the patient's cardiac problem. Here, we report a successful anesthetic management of a parturient with uncorrected tetralogy of fallot and placenta previa posted for emergency cesarean section.

CASE REPORT

A 29-year-old gravida 1, para 0, at 28 weeks gestation, was admitted to our emergency ward with a complaint of vaginal bleeding with contraction and breathlessness on routine work. The patient was a known case of a heart disease since childhood and was advised surgery, but she had not undergone it and was not taking any medication. No complaints were found during pregnancy, but she got tired easily in moderate activities. There was no history of surgery, previous anesthesia and no history of diabetes mellitus, asthma or hypertension. In physical examination, she had clubbing finger grade IV (Figure 1), cyanosis, peripheral and central. Her pulse rate was 75 beats/min and her blood pressure was 111/60 mm of Hg. There was no variation of pulse and blood pressure in the extremities. When laying on the operating bed, her SpO2 on room air was 72%. From the cardiovascular system we found a pansystolic murmur of grade 3 in the pulmonary as well as aortic areas, radiating all over pericardium. Rest of the examination was normal. Her hemoglobin was 13.4 g/dl and thrombocytes 147.000/

uL. The last echocardiography showed overriding aorta, right ventricular hypertrophy, Right to left shunt, tricuspid regurgitation severe, pulmonary stenosis severe with ejection fraction 54%. Systolic function in left ventricle is good with conclusion tetralogy of fallot. Chest X-ray showed a boot-shaped heart. The fetus was in bradycardia state with heart rate 80-90 times per min and considered as fetal distress.

Anesthetic management

Her physical status is ASA 4E (Emergency) with uncorrected cyanotic congenital heart disease that is tetralogy of fallot with placenta previa and fetal distress. We have given informed consent before the operation begins explaining this is a parturient with high risk of anesthesia and the fetus is in a bradycardia state with conditions continuing to decrease. The patient remained fasting, put in an intravenous (i.v) line, given ringer lactate fluid, ranitidine iv 50 mg, and ondansetron 4 mg iv before induction. We prepared one packed red cell (PRC) 250 cc to handle the bleeding from placenta previa. Low-dose spinal anesthesia was planned for cesarean section to minimize hemodynamic fluctuation. In the operating theatre, 5 lead ECG, noninvasive blood pressure and pulse oximetry were connected to the patient while oxygen supplementation continued.

Figure 1. Clubbing finger.

A low dose spinal anesthesia was given using 5 mg of hyperbaric bupivacaine and 25 µg of fentanyl in sitting position through L3-L4 interspace using spinocath 27 G. Immediately after injecting the drug with barbotage technic into the subarachnoid space, there was slightly decrease in blood pressures following spinal anesthesia, but we could handle it with limited use of vasopressor. The anesthesia was adequate and produced a block up to T6 level. The Cesarean Section was performed, a female baby was born weighing 1.2 kg, and having APGAR scores of 3 and 5 at 1 and 5 minutes respectively. Administration of oxytocin bolus was avoided and only low oxytocin infusion was given, producing satisfactory uterine contraction with minimal blood loss of 300 mL. The surgery lasted 45 minutes with minimal alteration in hemodynamics. Total fluids given were 500 cc of gelofusin colloid and ringer lactate 500 cc with urine output 500 mL. Vitals at end of surgery were as follows: SpO2 90% with non-rebreathing mask 10 litres per minute, BP 111/60 mmHg, and RR 26 times per min.

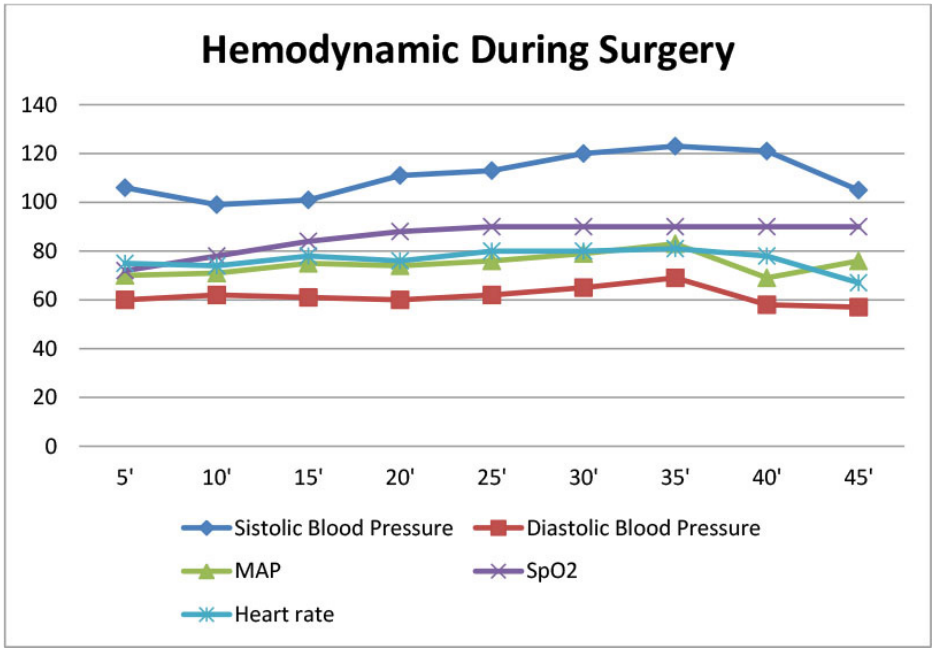

Figure 2. Hemodynamics during surgery.

After surgery, the patient was transferred to recovery room with stable hemodynamic and bromage score 2. The analgesic given is ketorolac injection per 8 hours, paracetamol drips 1 gr per 8 hours and fentanyl syringe pump 16 mcg per hour. The patient was comfortable, and pain-free with no respiratory distress at the end of the surgery. After observation in the recovery room, the patient was transferred to intensive care unit (ICU) for further observation. She was treated in ICU for 2 days with stable hemodynamic condition and subsequently discharged on the fifth day with recommendation of follow-up in cardiology department. The baby only last for 24 hours due to premature conditions and limited resources in our hospital. Hemodynamics during surgery can be seen in figure 2.

DISCUSSION

TOF patients tolerate physiological changes of pregnancy depending on corrective or palliative procedure, whether any residual defects remain after the procedure, the patient's functional status before pregnancy and presence of pulmonary hypertension.[2] The goal of anesthetic management in this patient is the precarious balance between SVR dan PVR. Hypotension was managed by strictly titrated infusion of vasopressors, to not raise pulmonary arterial resistance.[3] In addition, postoperative pain should be avoided because pain will cause right ventricular infundibular outflow spasm so that it can aggravate right-to-left shunt. Another target for anaesthetizing patients with tetralogy of Fallot is to prevent hypovolemia, hypoxia, hypercarbia and acidosis which results in an increase in pulmonary vascular resistance, and conversely decreases SVR.

Many theories concluded that general anesthesia (GA) was considered a gold standard for managing anesthesia of patients with congenital heart disease

(CHD) as hemodynamic fluctuation caused by single-shot spinal anesthesia due to sympathectomy and vasodilation can worsening the right-to-left shunt and cardiac dysfunction. But recent evidence suggests that GA may have some important effects. An intravenous anesthetic agent like propofol and inhalational anesthetic agents like isoflurane or sevoflurane can decrease cardiac contractility and peripheral vascular resistance resulting in increased right-to-left shunting of blood. An increase in intrathoracic pressure due to mechanical ventilation can decrease venous return to the heart resulting in decreased cardiac output. Pregnancy is associated with reduced gastric emptying which rises the risk of aspiration while securing the airway.[4] Low-dose spinal anesthesia, on the other hand, prevents the risk of hypotension because the intensity of sympathetic block is minimal, so a decrease in SVR can be avoided. This technique can be used as an alternative to anesthesia in patients with tetralogy of Fallot, but it depends on the condition of the patient at the time of induction.[5]

In this case we used low dose spinal hyperbaric bupivacaine 5 mg combined with fentanyl 25 mcg produces adequate block with minimal systemic side effects. Before performing anesthesia, we chose a colloid solution (gelofusin) for co-loading and replace fluid loss caused by vaginal bleeding due to placenta previa to prevent excessive vasodilation after spinal anesthesia. Placenta previa can cause bleeding which results in the patient becoming hypovolemic. Hypovolemia causes cyanosis by decreasing preload, narrowing Right Ventricular Outflow Tract (RVOT) but also causes increased R→L shunt because of low systemic pressure.[6] One strategy to maintain stable hemodynamics during spinal anesthesia for cesarean section is to use low-dose bupivacaine in combination with an opioid adjuvant. In this patient we also find few episodes of hypotension and but no desaturation. A case report in India discussed the management of anesthesia with low dose spinal anesthesia using bupivacaine 6 mg with adjuvant fentanyl 25 mcg in a cesarean section patient with uncorrected tetralogy of Fallot presenting with abruption placenta to avoid a decrease in SVR and an increase in PVR. This technique is routinely used in heart defect pregnant patients in these hospital. They avoid the use of general anesthetic techniques in patients with heart defects because of the risk of increased PVR due to positive pressure given during surgery, and the presence of hypoxia, hypercarbia and acidosis that can worsen the patient's condition so they prefer regional techniques with preservation of spontaneous respiration and consequently, minimal interference with the complex ventilation-perfusion.[7] Fentanyl acts synergistically as an adjuvant with bupivacaine, lowering the pain threshold without increasing sympathetic blockade. There have been many studies that proved the effectiveness of the use of opioids in spinal anesthesia, especially in cesarean sections. Fentanyl can accelerate the onset and prolong the duration of bupivacaine block, provide good analgesia during surgery and prolong the duration of postoperative analgesia. Side effects found such as nausea, vomiting and shivering are also minimal.[8]

CONCLUSION

Pregnancy can carry high risk in patients with congenital heart disease presenting with placenta previa. If the patients require surgery, the choice of regional and general anesthesia adapted to the patient's condition. Low-dose spinal anesthesia combined with fentanyl as adjuvant can be considered an alternative technique to general anesthesia, in selected parturients with uncorrected TOF presenting for cesarean section, especially in cases with risks of administering a general anesthetic are deemed high. Postoperative patients with conditions like this case should remain closely monitored to avoid possible worsening of the right-to-left shunt.

CONFLICT OF INTEREST

The author declares there is no conflict of interest regarding publication of current case report.

ETHICAL CONSIDERATION

Patients had received signed written informed consent regarding publication of their respective medical data in medical journal with confidentiality of patient personal information/identity.

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