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CASE REPORT

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Segmental epidural anesthesia for cesarean section in a parturient with uncorrected Taussig–Bing anomaly with transposition of the great arteries physiology

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Here, we report a rare case of a 23-year-old term parturient with Eisenmenger syndrome due to Taussig–Bing anomaly presenting with gestational hypertension, oligohydramnios, and intrauterine growth retardation posted for elective cesarean section. Preoperatively, echocardiography of the patient was suggestive of double-outlet right ventricle (DORV) with large sub-pulmonic ventricular septal defect (VSD), right ventricular hypertrophy, bidirectional shunt and severe pulmonary artery hypertension. The surgery was successfully performed under a graded segmental epidural anesthesia with 2% lignocaine. Further contrast-enhanced computer tomography scan was done postoperatively and a diagnosis of Taussig–Bing anomaly (DORV with sub-pulmonic VSD) with transposition of the great arteries physiology was made. This is one of the rare cases of anesthetic management for cesarean section in a parturient with uncorrected Taussig–Bing anomaly being reported.

Keywords: Caesarean section, segmental epidural anesthesia, Taussig-Bing anomaly

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A patient with complex congenital cardiac disease is always a challenging task for the anesthesiologist. Such patients have complex pathophysiology, which can lead to unstable haemodynamics, arrhythmias and cardiac arrest under anesthesia. This is a rare case of a parturient with Eisenmenger syndrome[1],[2],[3] due to Taussig–Bing anomaly[4] with transposition of the great arteries (TGA) physiology[4],[5] (double-outlet right ventricle (DORV) with sub-pulmonic ventricular septal defect (VSD) presenting for elective cesarean section for oligohydramnios and intrauterine growth retardation (IUGR). We report the successful management of this patient under segmental epidural anesthesia.

A 23-year-old primigravida at term, presented with grade III dyspnea (New York Heart Association grading). This case was diagnosed as a case of congenital heart disease at 9 months of pregnancy by a primary care physician and referred to our hospital for safe confinement. Patient had a history of palpitations not associated with chest pain or any syncopal attack. At 15 years of age patient had breathlessness for which she was prescribed tablet furosemide 40 mg overdose (OD) by her primary care physician. She continued the medication only for 1-year. Previous echocardiographic evaluation done 3 years prior was suggestive of congenital heart disease (large VSD with severe pulmonary hypertension, right ventricular hypertrophy, bidirectional shunt). Patient had gestational hypertension detected in the third trimester, but was not on any treatment. Patient had also been diagnosed as a case of hypothyroidism 1-year back and was on tablet eltroxin 50 μg OD. Otherwise she was asymptomatic throughout her pregnancy.

On physical examination, patient was of average body build, with weight of 48 kg, pulse rate of 80/min, good volume with blood pressure of 130/80 mmHg in supine position and 150/90 in left lateral position. There was grade II clubbing and cyanosis. Her room air SpO2 was 80–85% and increased to 92% with oxygen supplementation. There was no pedal edema. Cardiovascular system revealed apex beat shifted to 6th intercostal space lateral to mid clavicular line. S1, S2 were normally heard, there was a loud p2 and a grade III holosystolic murmur heard in the right lower sternal border radiating to axilla. Patient's respiratory rate was 20/min with bilateral vesicular breath sounds with few basal crepitations. Fundal

height corresponded to 32 weeks of gestation, fetal heart sound was well heard with a heart rate of 140/min. Ultrasonography of the abdomen showed a live fetus with intrauterine growth restriction and oligohydramnios. Electrocardiography findings were sinus rhythm with first degree heart block, right bundle branch block and right ventricular hypertrophy. Echocardiography revealed a large sub-pulmonic VSD, bi-directional shunt, severe pulmonary artery hypertension (PAH) with right ventricular hypertrophy. Both the great vessels originated from the right ventricle (RV), suggestive of DORV [Figure 1]a. Investigations showed hemoglobin of 10.2 g/dL, a platelet count of 2.2 lakhs/mm3 and an INR of 1.2. After shifting the patient to operation theater table, a wedge was kept under the right hip and oxygen supplementation was carried out by mask. After connecting all standard monitors, she was put in left lateral position and preloaded with 200 ml crystalloids slowly. Under full aseptic precautions, after local infiltration, an 18 gauge Tuohy epidural needle was used to locate the epidural space by loss of resistance to air at L2-L3 interspace and an epidural catheter was threaded 4 cm inside. Test dose was given and there was no evidence of intravascular or subarachnoid placement. Patient was turned to supine position, and a wedge placed under the right hip. Patient continued to receive supplemental oxygen by mask. As the expected duration of the surgery was <1 h, we used 2% lignocaine through the epidural catheter. After giving 5 ml of lignocaine 2% initially through the epidural catheter we waited for 5 min. Adequate level was not achieved. Additional 5 ml of lignocaine 2% was repeated and level was checked. After injecting another 3 ml of 2% lignocaine, a T6 level was achieved. A total volume of 16 ml of lignocaine was given including the test dose. During this period blood pressure was maintained within normal limits.

Figure 1: Taussig–Bing anomaly (a) double-outlet right ventricle (RV) with sub-pulmonic ventricular septal defect (VSD), cardiac contrast enhanced computer tomography of the patient. (b) Both the great vessel originating from RV. (c) Large sub-pulmonic VSD. (d) Pulmonary artery (large dilated) and patent ductus arteriosus

After delivery of the baby, patient received injection oxytocin 5 units slow intravenous (IV)[6] (diluted to 10 ml) followed by another 5 units as an infusion. Uterus was well contracted. Total duration of surgery was 40 min and patient was shifted to Intensive Care Unit (ICU) for observation under continuous monitoring. Patient received epidural morphine for postoperative analgesia. Baby was observed in neonatal ICU in view of IUGR. Patient was ambulated within the next 24 h in the ICU. Her repeat echocardiography showed, DORV, Large VSD with bidirectional shunt, severe PAH with 4 mm patent

ductus arteriosus. Contrast enhanced cardiac computer tomography [Figure 1]b, [Figure 1]c, [Figure 1]d showed both great vessels arising from RV, sub-pulmonic VSD, large dilated pulmonary artery, suggestive of Taussig–Bing variant with TGA physiology.[4],[5] She was prescribed tablet furosemide and tablet sildenafil[7] and subsequently followed-up by the cardiologist for further management. She was discharged from the hospital on the 8th day postpartum.

The Taussig–Bing anomaly[4],[5] is a DORV with a sub-pulmonic VSD. In DORV, both the great vessels connect to the RV. Anatomically and physiologically, the Taussig–Bing anomaly closely resembles TGA with a VSD and is therefore included in the TGA family, commonly called as Taussig–Bing anomaly with a TGA physiology.[4] Definitive treatment for this congenital heart disease involves intraventricular repair and the arterial switch operation[5] in early childhood. When they survive to adult age without surgery they develop severe pulmonary hypertension with bidirectional flow clinically manifested as breathlessness and cyanosis. Females with this complex heart disease, when pregnant, have to undergo significant cardiovascular challenges during pregnancy and delivery. Pregnancy causes an increase in cardiac output of 30–50%, an increase in blood volume of 40–50% and an increase in oxygen consumption of 20%.[5] Severe pulmonary hypertension can lead to right ventricular hypertrophy and there by impaired right ventricular reserve. The increase in cardiac output and potential intravascular volume injections of up to 500 ml/uterine contraction during labor can further push this group of patients into cardiac failure. Severe PAH can also cause reversal of the shunt thereby decreasing oxygenation. Intraoperative goals in this condition are preload optimization, maintenance of heart rate and pulmonary vascular resistance (PVR), maintenance of normal or slightly higher systemic vascular resistance (SVR).[1],[5] Graded (titrated) segmental epidural anesthesia is probably the technique of choice for cesarean section in these patients. This does pose the risk of reducing the SVR. However, this reduction is minimal and can be maintained with minimal doses of vasopressors. Our patient had effectively tolerated the physiological changes of pregnancy up to 40 weeks. There were no signs of failure up to term. Maintaining SVR with injection phenylephrine boluses (20–50 μg IV) with supplemental oxygen prevents further increase in right to left shunt in these patients. We used titrated doses of epidural lignocaine 2% to prevent precipitous hypotension and did not require vasopressors in the intraoperative period. We used slow IV injection of 5 units of oxytocin[6] diluted to 10 ml, followed by infusion of another 5 units. Blood pressure was maintained within normal limits and heart rate went up to a maximum of 94/min after oxytocin administration. Regional anesthesia technique like graded

epidural anesthesia can be safely administered provided the patient is not in failure. The major advantages of graded epidural anesthesia are titratable onset and level. The other advantages are, it blunts response to surgery and can be used for postoperative analgesia.[1] In addition, the risks associated with general anesthesia like aspiration, hemodynamic response to intubation and use of opioids can be avoided. While general anesthesia has been used for patients with Eisenmenger syndrome, the effects of intermittent positive pressure ventilation, could decrease pulmonary blood flow, by increasing PVR. This can also be precipitated by hypoxia, hypercarbia, acidosis or hypothermia during general anesthesia.[5] Also general anesthetics reduce SVR, which can lead to a dominant right to left shunt and cyanosis. Invasive arterial pressure monitoring has been used and may be of help in early diagnosis of hemodynamic alterations under anesthesia.[8] Our patient had tolerated right-to-left shunting well, without any significant decompensation (failure) till the 9th month of her pregnancy. Therefore we did not secure any invasive arterial pressure monitoring. However, it is desirable to have invasive blood pressure monitoring in severe forms of congenital heart diseases.[1] Because of peripheral venous pulling of blood, auto transfusion due to contraction of uterus is generally well tolerated under regional anesthesia. However, once the effect of epidural anesthesia wears off, there will be redistribution of blood to central circulation causing right ventricular overload. Postoperative intensive care monitoring with supplemental oxygen and early institution of anti-edema measure helps to overcome this situation.

Conclusion

Segmental epidural with graded doses of local anesthetic can be safely administered for caesarean section in parturients with Taussig–Bing anomaly and Eisenmenger syndrome, if they are not in failure during pregnancy. These patients require supplemental oxygen throughout the perioperative period. However, if they are in cardiac failure, they should be optimized with medications before proceeding for elective surgery.

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References

1.

Ghai B, Mohan V, Khetarpal M, Malhotra N. Epidural anesthesia for cesarean section in a patient with Eisenmenger's syndrome. Int J Obstet Anesth 2002;11:44-7. Back to cited text no. 1

2.

Mishra L, Pani N, Samantaray R, Nayak K. Eisenmenger's syndrome in pregnancy: Use of epidural anesthesia and analgesia for elective cesarean section. J Anaesthesiol Clin Pharmacol 2014;30:425-6. Back to cited text no. 2

[PUBMED] Medknow Journal

3.

Konstantinov IE. Taussig-Bing anomaly: From original description to the current era. Tex Heart Inst J 2009;36:580-5. Back to cited text no. 3

4.

Fong J, Druzin M, Gimbel AA, Fisher J. Epidural anaesthesia for labour and caesarean section in a parturient with a single ventricle and transposition of the great arteries. Can J Anaesth 1990;37:680-4. Back to cited text no. 4

5.

Dob DP, Naguib MA, Gatzoulis MA. A functional understanding of moderate to complex congenital heart disease and the impact of pregnancy. Part I: The transposition complexes. Int J Obstet Anesth 2010;19:298-305. Back to cited text no. 5

6.

Yang CY, Wei W, Tao GC. Dangers of rapid oxytocin administration in Eisenmenger's syndrome. Int J Obstet Anesth 2011;20:96-7. Back to cited text no. 6

7.

McLaughlin VV, McGoon MD. Pulmonary arterial hypertension. Circulation 2006;114:1417-31. Back to cited text no. 7

8.

Langesaeter E, Dragsund M, Rosseland LA. Regional anaesthesia for a caesarean section in women with cardiac disease: A prospective study. Acta Anaesthesiol Scand 2010;54:46-54. Back to cited text no. 8