

Anesthetic Management of Congenital Heart Disease in Parturient with Pulmonary Hypertension.

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Dr.Stuti Dubey, Dr.Sanjot Ninave, Dr.Deeksha Mishra

1. Junior Resident, Department of Anaesthesiology, Jnmc, Datta Meghe Institute Of Medical Sciences (Deemed University), Sawangi, Wardha.

2. Professor, Department of Anaesthesiology, JNMC, Datta Meghe Institute Of Medical Sciences (Deemed University), Sawangi, Wardha

3. Junior Resident, Department of Anaesthesiology, Jnmc, Datta Meghe Institute Of Medical Sciences (Deemed University), Sawangi, Wardha.

Corresponding Author: Dr. Stuti Dubey,

Post-graduate Girls hostel, Jnmc, Datta meghe institute of medical sciences, sawangi, wardha Phone no.-9425187513, Email- Drstutidubey3008@gmail.com

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Abstract

Congenital heart disease in pregnancy is rare but poses anesthetic challenges. Occasionally, pregnant women with pulmonary hypertension and atrial septal defects (ASD) present for anesthesia. These individuals have a higher likelihood of developing perioperative cardiovascular problems, making them high-risk candidates for anesthesia. Anesthesia necessitates constant pulmonary and systemic hemodynamic stability as well as extensive cardiovascular monitoring. Physiological changes in pregnancy are poorly tolerated in presence of PAH. This is a case of a primigravida with a large Atrial septal defect and moderate pulmonary hypertension with moderate tricuspid regurgitation undergoing a successful elective cesarean section with epidural anesthesia.

1. Introduction:

Different heart conditions can make pregnancy more difficult than usual. Cardiac instability occurs when the heart is unable to adapt to the quick physiological changes required during pregnancy, albeit the incidence varies from 1–4%. Among the common congenital acynotic heart diseases, ASDs are anatomically classified into four types: 1) Ostium secundum (85%), 2) Ostium primum (10%), 3) Sinus venosus (5%), and 4) Coronary sinus defects (rare) (1). An increase in pulmonary blood flow and pulmonary hypertension results from left to right intracardiac shunt that overloads the right ventricle. Congestive cardiac failure and right ventricular hypertrophy are the outcomes. Here is a case of primigravida with a large Atrial septal defect and moderate pulmonary hypertension

with moderate tricuspid regurgitation who underwent elective cesarean section under epidural anesthesia successfully.

2. Case-Report:

A 26 yr old primigravida at 38 weeks with large Atrial septal defect and moderate pulmonary hypertension with moderate Tricuspid regurgitation was admitted to our hospital for safe confinement. Her Echo revealed Ostium secundum ASD, left to right shunt approximately 22mm, moderate TR, moderate PAH, and normal LV systolic function of 57% with no LV diastolic dysfunction. Her ability to withstand exercise was good. She had a BP of 122/84 mmHg, a Spo₂ of 97%, and an HR of 89 beats per minute while breathing room air, respiratory rate was 17/minute, NYHA class I. On cardiology consultation, she was advised for Inj

Furesamide 10mg BD and Tab Metoprolol 25mg OD.

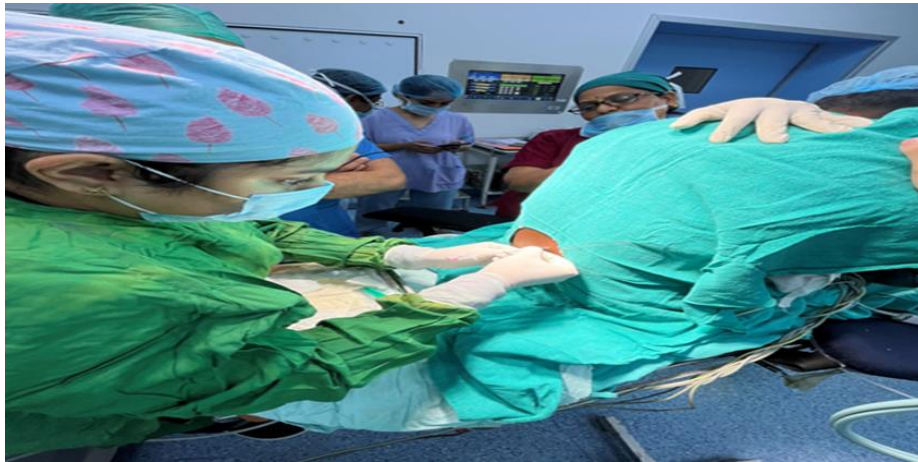


Image a

On auscultation, a pan-systolic murmur was heard with loud S2. When auscultating, the chest was clear. No evidence of pericardial effusion was present. No cyanosis or clubbing. Right axis deviation and sinus rhythm were visible on the ECG. There were no other issues discovered during the physical check. Blood coagulation, hematological, and biochemical tests were all within normal ranges. The patient was Nbm for 8 hours. After informing the patient and relatives of the delivery's dismal results, their informed consent was gained. As an antiemetic prophylactic, 50 mg of ranitidine and 4 mg of ondansetron were injected intravenously. A multipara monitor with NIBP,

ECG, pulse rate, and Spo2 was used, and intravenous Ringer lactate was started. Infective endocarditis prophylaxis with Amoxicillin 2g IV given 30 minutes before incision. With the patient sitting and lumbar epidural anesthesia was administered in the L2-L3 interspace (Image a), 2ml of 2% lignocaine injection was administered as a test dose.

Anesthesia instituted slowly with 0.5% ropivacaine with fentanyl (2mcg/ml), a total volume of 12ml in a graded manner, giving 3ml every 2 minutes (Image c). Sensory blockade up to T8 was achieved in 10 minutes.



Image b



Image c

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Intraoperatively she had two brief episodes of systemic hypotension, one during and another just immediately after epidural in the range of 86/58mmHg and 90/60mmHg which were managed with Inj Ephedrine 12mg. Surgery was uneventful otherwise. Lasix 10mg IV over 2 minutes was given just before delivery. Below the right buttock, a wedge was positioned. 2.5kg infant delivered scores of 7 and 9 on the APGAR scale at 1 and 5 minutes of age (Image b) A drip of 20 units of IV oxytocin was started for the patient. Even after surgery, the patient was given additional oxygen at a rate of 4 L/min through a mask for the following 12 hours, even though the oxygen saturation was still between 96 and 97%. Injection Tramadol 75 mg was injected epidurally to provide postoperative analgesia. The patient was moved to the recovery area before being moved to the ward the following day. Diuretics and metoprolol were continued in the postop period as advised by Cardiology. She had a trouble-free recovery after surgery and was discharged on POD 10 with the advice of Cardiology OPD follow-up.

3. Discussion:

It is generally accepted that the diagnostic criteria for pulmonary hypertension include Mean Pulmonary Artery Pressure (mPAP) of greater than 25 mmHg while at rest or more than 30 mmHg while engaged in physical activity. It excludes diseases including valve disease, myocardial disease, and congenital heart disease. The enhanced activity of thromboxane or diminished activity of prostacyclin or impaired synthesis of nitric oxide has also been associated with PPH (2). Despite being rare, pulmonary hypertension in pregnant women is fatal regardless of the disease's severity. Hence pregnancy has been suggested to be the contraindication in pulmonary hypertension (3). Hormonal changes during pregnancy allow for substantial interstitial fluid accumulation. This fluid is suddenly transferred to the mother's circulatory system after delivery, greatly increasing preload and exacerbating pulmonary hypertension.

These cases pose huge anesthetic challenges. The first 10 days after giving birth pose the greatest danger to life. In healthy pregnant women, PVR is 34% less than in non-pregnant states, as prostacyclin production is increased fivefold (9).

The withdrawal of this pulmonary vasodilator effect of prostacyclin in the immediate post-partum period may account for a majority of deaths (4). Normal Vaginal delivery can lead to increased mortality in the early post-partum period, hence Luthra A et al advocated the use of epidural anesthesia and elective cesarean section to prevent hemodynamic changes of labor and to spare fetus as well as the risk of hypoxemia secondary to maternal physical exertion (5) With careful epidural analgesia vaginal delivery can be successful, hence LSCS can be restricted to obstetric indications only (6). In our case, elective LSCS was planned for safe confinement. Various schools of thought have developed alternative approaches to anaesthetic management for such patients. The goals of management should include—avoiding an increase in Pulmonary vascular resistance (PVR), avoiding a decrease in venous return (VR) and reduction in Systemic vascular resistance (SVR), and avoiding myocardial depression (10). Though general anesthesia is recommended for LSCS, maternal myocardial depression, neonatal depression, sudden cardiovascular collapse, increase in pulmonary vascular resistance due to Nitrous oxide, and inadequate analgesia are some of the disadvantages (7). If preload and afterload are well maintained, regional blocks can be given (3). Epidural analgesia not only avoids an increase in Pulmonary vascular resistance (PVR) due to the absence of airway manipulation, it provides optimal analgesia in combination with controlled vasodilatation to accommodate autotransfusion and decreases the chance of right heart failure (8). Taking into account the aforementioned factors, we used epidural anesthesia to manage the case satisfactorily. Tramadol was administered through an epidural catheter for postoperative analgesia, resulting in a stable cardiovascular condition (11).

Use of Ropivacaine which is less cardiotoxic and selectively provides more sensory block. Using epidural anesthesia we not only successfully managed the case but also used opioid-based analgesics through epidural and provided good postoperative analgesia.

4. Conclusion:

In this case, we had a successful outcome with an epidural block, but also used opioid-based analgesics through epidural to provide adequate postop analgesia. Epidural Block can be a good alternative to General anesthesia. One should modify the anesthesia method to avoid PVR rise, SVR decrease, hypotension, and hypoxia with rigorous tracking of vitals during and after surgery because no firm conclusions can be taken from a single case. A multidisciplinary strategy is the most effective way to handle patients with ASD during pregnancy and deliver better results.

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