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Anesthetic Management of a Patient with Operated Case of Double Valve Replacement with Severe Tricuspid Stenosis with Twin Pregnancy for LSCS: A Case Report

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Abstract: ***Pregnancy significantly increases demands on the cardiovascular system. There is a risk of increased peri-partum morbidity and mortality due to preexisting heart disease. Pregnancy stresses the cardiovascular system. Wide fluctuations in hemodynamic stress can be anticipated during labour and delivery. Patients with stenotic valvular lesions are particularly prone to complications at delivery, and the anesthesiologist should be familiar with anticipated difficulties and their management.***

Keywords: anesthesia, LSCS, operated case of AVR and MVR, sevre tricuspid stenosis, aortic and mitral valve replacement, twin pregnancy

1. Introduction

Pregnancy significantly increases demands on the cardiovascular system. There is a risk of increased peri-partum morbidity and mortality due to preexisting heart disease. Pregnancy stresses the cardiovascular system. Wide fluctuations in hemodynamic stress can be anticipated during labour and delivery. Patients with stenotic valvular lesions are particularly prone to complications at delivery, and the anesthesiologist should be familiar with anticipated difficulties and their management.(1)

2. Case Presentation

A 26 Year old female came with history of 9 months amenorrhea with twin pregnancy with history of aortic and mitral valve replacement.

No history of chest pain, dyspnea, abdominal pain, breathlessness, pedal edema. Primigravida with 36-37 weeks gestational age with twin pregnancy 2 doses of tetanus toxoid taken Patient had past surgical history of mitral valve and aortic valve replacement done 5 years ago under general anesthesia. Patient was on Tablet. Warfarin 5 mg and tablet. metoprolol succinate 25mg. Patient was on Low Molecular Weight Heparin till 12 weeks of pregnancy later on started on tablet. Warfarin 5mg and Warfarin since one month and was shifted on Low Molecular Weight Heparin 0.6ml (60mg) s/c H/s.

Physical examination

Physical examination revealed her to be afebrile with regular, normal and good volume pulse with 84 beats per minute and blood pressure of 120/70mmHg.

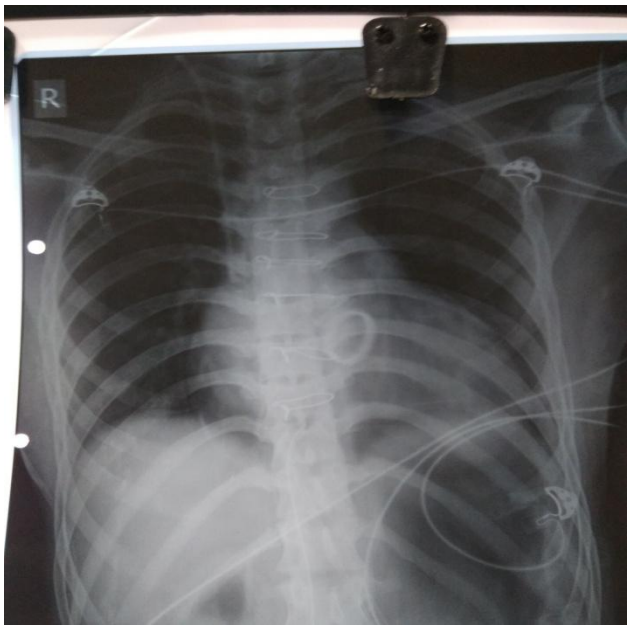
No cyanosis, clubbing, pedal edema. JVP was not raised. Mouth opening was adequate with Mallampati classification grade 2.

CVS: S1 and S2 heard with metallic grunt and there is parasternal heave. No evidence of pedal edema.

Respiratory: Air entry equal both the sides with no added sounds

Per Abdomen: No Tender Hepatomegaly and no dilated veins.

All investigations were within normal limits including complete blood picture, renal function test, liver function test, electrolytes and PT/INR (0.9).



2D ECHO showing well functioning prosthetic valves with an ejection fraction of 55%. Mild Pulmonary hypertension with raised gradient along prosthetic aortic valve (65/44mmHg) and Severe Tricuspid Stenosis (18/8mmHg).

Goals of Anesthesia in this Patient

- Maintenance of normal sinus rhythm and adequate SVR
- Maintenance of high preload and after load.
- Avoid bradycardia and hypotension
- Avoid hypoxia.

Intra Operative Management

Patient was in labour and posted for emergency LSCS. Patient received low molecular weight heparin at 10pm before the day of the surgery. Inj. Ceftriaxone 2gm IV given for infective endocarditis prophylaxis preoperatively 30 min prior. Under local anesthesia right IJV was canulated for CVP measurement. CVP was 9 cm of H2O pre operatively. Patient induced with inj. Fentanyl 60µg(1µg/kg) and inj. Thiopentone sodium 250mg and inj. Succinylcholine 100mg IV intubated with portex endotracheal tube no 7 and fixed at the mark of 20 cm and maintained with muscle relaxant vecuronium and isoflurane. Intra operative fentanyl and paracetamol were given for analgesia. After delivery of two babies and uterine retraction CVP was measured which was 15 cm of H20 and inj. Lasix 10mg IV given .Procedure was uneventful. Patient reversed with Inj. Neostigmine 2.5mg and Inj.glycopyrolate 0.5 mg. patient was awake with spontaneous respiration and intact reflexes, patient extubated and shifted to ICU for observation. Post operatively CVP measured which was 9cm of H2O. Patient was hemodynamically stable and shifted towards next day.

3. Discussion

This is a case of aortic and mitral valve replacement with severe tricuspid stenosis with twin pregnancy. This will be a risky situation for anesthesiologist because he/she has to manage three lives and also has to manage antiplatelet therapy for prosthetic valves. As the patient had severe tricuspid stenosis right IJV cannulation was preferred as we have to maintain preload and after load. Narcotic based general anesthesia was preferred to avoid intubation response. We preferred thiopentone sodium as induction agent as ejection fraction of the patient is normal and patient is hemodynamically stable so we did not use etomidate as there are very few references using etomidate as induction agent for LSCS. CVP was measured preoperatively which was 9 cm H20. After delivery of two babies and after uterine retraction CVP was 15 cmH20 which was managed by giving Inj.lasix 10mg intravenously. Paracetamol was given intravenously for analgesia intraoperatively.

The anesthetic challenges we faced in this case were

1) Twin pregnancy

Considering pregnant Patient, risk of aspiration, risk of difficult airway, Aortocaval compression, Desaturation due to decreased FRC, Ante partum and postpartum hemorrhage

2) Aortic valve replacement and mitral valve replacement on anticoagulants

Patients with mechanical prosthetic heart valves are exposed to a significant threat of thromboembolism and valve dysfunction if proper anticoagulation is not achieved.[1] Patients with new generation prosthetic mechanical mitral valves should receive warfarin to a target INR of 2.5–3.5 and for older types of valves the target INR should be 3.5–4.5 [3].

This will be a tricky situation for the anesthesiologist to face as discontinuation of anticoagulation in the perioperative period can precipitate life threatening thromboembolism whereas continuation may cause significant bleeding during surgery. There should be close collaboration between cardiologist, obstetrician and obstetric anaesthetist.

The Patient should be transferred to heparin therapy at the 36^{th} week with close monitoring , preferably using antifactor Xa activity and aiming for activity >0.55U/ml. If antifactor Xa activity assays are not available, the apTT ratio should be maintained at or above 2.0 to allow for the increased heparin resistance in the third trimester. Heparin should be discontinued at the start of labour and restarted after 4-6hours after delivery. Oral anticoagulants should be resumed after 24 hours. If labour occurs preterm while the patient is still on oral anticoagulants, a caesarean section should be performed after reducing the INR to 2.0.

A vaginal delivery should be avoided if patient is on oral anti coagulation because of the danger of fetal intracranial bleeding. Vaginal delivery can be recommended, If patient is not on oral anticoagulants at the onset of labour , there is no significant prosthetic dysfunction and if there is no significant cardiovascular disease.[4]

The risk of thromboembolism by withholding warfarin in patients with mechanical valve prosthesis with atrial fibrillation is found to vary between 1% to 20% in various studies [5-9]. The prosthetic valve itself may get occluded by thrombus in 1–13% cases [10]. In emergency surgery, the affect of warfarin needs to be neutralized by FFP, the dose of which depends upon the individual and this is titrated till INR < 1.5. In addition to this, vitamin K may also be given intravenously in small doses as large doses may lead to resistance to warfarin when it is restarted following surgery.

3) Tricuspid Stenosis

The problems in tricuspid stenosis are similar to those in mitral stenosis. There is a large, right atrial–right ventricular diastolic gradient, and flow across the stenotic tricuspid valve is related to valve area. The compensatory mechanisms in tricuspid stenosis are also similar to those in mitral stenosis. An increase in right atrial pressure maintains flow across the stenotic valve and is associated with hepatomegaly, jugular venous distention, and peripheral edema. [11]

4. Conclusion

We were able to achieve our goals of anesthetic management as there was successful case plan and execution.

The case was successfully managed with all required anesthetic considerations like

1) Proper evaluation of the patient.
2) Formation of good anesthetic plan.
3) Anesthetic implications and proper measures to avoid them.

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