Emergency LSCS in A Patient with Rheumatic Heart Disease and Severe Mitral Stenosis and PAH (NYHA III)

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Abstract: The incidence of rheumatic mitral stenosis has grossly decreased in India. Still, among heart diseases complicating pregnancy, rheumatic mitral stenosis occupies a greater segment. The unique physiological changes in pregnancy and the pathological impact of mitral stenosis over pregnancy and labour are discussed in detail. A multidisciplinary approach in the diagnosis and management reduces the mortality and morbidity during peripartum. The anaesthesia management used in a case of an emergency LSCS in a patient with severe MS is discussed at length in this article.

Keywords: LSCS, mitral stenosis, rheumatic heart disease, severe, PAH

1. Introduction

A pregnant patient primi gravida at 32.3 weeks of gestation by scan and 31.5 weeks by date with rheumatic heart disease with severe mitral stenosis and pulmonary hypertension, which was diagnosed at the seventh month of pregnancy, was posted for emergency LSCS. The intraoperative management is discussed.

2. Prevalence of MS in Pregnancy

Heart disease occurs during pregnancy in 0.4% to 4.1% of patients and is a leading non-obstetric cause of maternal mortality ranging from 0.4% to 1% among patients of class I and II to 5-15% among in class III and IV NYHA functional classification.¹

3. Case Report

- A 30 year old, primigravida at 32.3 weeks of gestation by scan, weighing 54kg presented with active labour pains and complained of dyspnoea on exertion and dry cough, which she developed at the 7th month of gestation. At the time of her routine antenatal check up, she presented with mid-diastolic murmur with loud S1 at the apical area. She was investigated thoroughly and confirmed to have mitral stenosis. Her ECG showed bilateral atrial enlargement with right bundle branch block pattern with right ventricular hypertrophy with intra ventricular conduction defect. Echocardiography was also done which showed severely stenosed mitral valve (0.9 cm²), peak/mean pressure gradient 16/14-mm of Hg, mild PHT with LVEF of 60% and intact IAS and IVS.
- The patient was on Tab. Metoprolol XL 25 mg 1 tab. OD , Tab. Ecosprin/Asprin 75mg 1 tab. OD, with Inj. Penidura 12 lac units every 21 days.
- After one month of this treatment regimen, she was taken for LSCS due to foetal distress. On preanaesthetic examination on the operation table, her pulse was 86/min, regular in rate & rhythm with no apex pulse deficit, blood pressure of 138/90 mm Hg with no signs of failure. Auscultation revealed mid diastolic murmur grade 4/6 with loud S1 , opening snap at the apical area, loud P2 at pulmonary area and clear breath sounds without any crepitations was appreciated. Her obstetric examination revealed 32.3 weeks size uterus with LOA and FHS was 160/min. There was no hepatomegaly. Her routine investigations were within normal limits and ECG findings were same as before. However portable Echocardiography showed increased difference in peak/mean pressure gradient from 16/11 mm Hg to 30/24 mm Hg, otherwise all other parameters were same as before.
- After taking informed written high risk consent in a language they understood best, she was taken up for LSCS. Patient was nil by mouth for 8 hours prior to surgery. Left lateral tilt was given. Before induction she was given Inj. Ranitidine 50mg IV, Inj. Metoclopramide 10mg. IV as aspiration prophylaxis with Inj. Cefotaxime 1gm IV. A 14F Ryle’s tube was passed & thorough suction was done. Thereafter patient was premedicated with Inj. Midazolam 1mg IV slowly after dilution and
Increased cardiac output demands more blood than usual. Increased heart rate decreases diastolic filling time.

4.1 Pregnancy aggravates MS in the following ways:

1. Increase pulmonary blood volume causes the pulmonary capillary pressure to exceed the colloid osmotic pressure thereby increasing the chances of pulmonary edema.
2. Increased heart rate decreases diastolic filling time.
3. Increased pulmonary capillary venous pressure.

4.2 Problems encountered by the anesthesiologist in the management of symptomatic patients are:

1) Interaction with cardiac medications such as digoxin, calcium channel blockers, diuretics, anticoagulants. The parturient with MS has an increased incidence of congestive cardiac failure, atrial fibrillation, etc.
2) Fluctuations in hemodynamic status during labor and delivery. The parturient with MS has an increased incidence of congestive cardiac failure, atrial fibrillation, etc.
3) Considerations for two lives—Mother and Child. On the other hand, parturients with MS have a higher incidence of congestive cardiac failure, atrial fibrillation, etc.

4. Discussion

Mitral Stenosis is the sole predominant valvular lesion in most of the parturients. A pregnant patient with this heart disease challenges the anesthesiologist's skills. Pregnancy and labor each physiologically imposes demands on the circulation and cardiovascular system of the patient, thus, anesthesiology may cause even more stress to an already compromised heart and cardiovascular system. Fundamental derangements produced by lesion of mitral stenosis are:

1) Obstruction to blood flow from left atrium to left ventricle
2) Increase left atrial pressure
3) Increase pulmonary capillary venous pressure

4.1 Pregnancy aggravates MS in the following ways:

- Increased heart rate decreases diastolic filling time through narrow ostium.
- Increased cardiac output demands more blood than usual must flow through the orifice.
- Increased pulmonary blood volume causes the pulmonary capillary pressure to exceed the colloid osmotic pressure thereby increasing the chances of pulmonary edema.
- Autotransfusion with labor pains and after delivery of the baby can aggravate the conditions 2 and 3 as above and can convert the compensatory stage into a decompensatory stage.

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disease process. Epidural anaesthesia is the choice in the patient with moderate stenosis while in the patient with severe stenosis general anaesthesia is beneficial.9

Choosing an epidural anaesthesia in such type of patients demand careful titration of local anaesthetic drugs with cautiously treated hypotension with fluid infusion to establish normal filling pressures. Drop in systemic vascular resistance and blood pressure should be managed with phenylephrine hydrochloride. Ephedrine will increase the heart rate thus not useful in severe mitral stenosis. A single spinal bolus is not indicated for a fear of hypotension as severe decrease in systemic vascular resistance will reflexly increase the heart rate and lower the left ventricular filling.

1) We preferred to give General Anaesthesia considering many factors like:
   - Foetal distress
   - Precious pregnancy
   - Multivalvular disease like severe mitral stenosis with pulmonary hypertension.
   - Nitrous oxide with a low concentration of volatile drug and an opioid is a good combination for intraoperative management. Although nitrous oxide can evoke pulmonary vascular constriction and increased peripheral vascular resistance it seems unlikely the magnitude of this change would justifying avoiding this drug in every patient with mitral stenosis.
   - The muscle relaxant with minimal effect on heart rate, blood pressure and systemic vascular resistance e.g. vecuronium, atracurium are useful in the patient with mitral stenosis.
   - Head up position just before delivery in anticipation of sudden increase in pre-load produced the autotransfusion of large volumes of blood into the circulation by the contracting uterus. The head high diverted much of the autotransfused blood into the lower extremities.6
   - Opioids based general anaesthesia provide good haemodynamic stability. Fentanyl (20-50 µg/kg, total) or morphine (0.5-1.0 mg/kg, total) induction will be beneficial, but can cause respiratory depression in mother as well as in fetus.8
   - Naloxone should always be kept ready for resuscitation.

2) Considering all these factors, we induced our case with Inj. Etomidate IV and Inj. Fentanyl 100 mcgs IV after delivery of the baby to provide analgesia. Our case was referred for balloon valvuloplasty afterwards.

5. Conclusion

In patients with severe symptoms inspite of adequate medical therapy, mitral valve commissurotomy or balloon valvuloplasty should be recommended and can be done in second trimester successfully.10 Thus we want to stress that an overall review of these patients is required to decide an anaesthetic technique and proper and adequate intraoperative as well as postoperative care is the key to the outcome of such cases.

References
