Case Report

ANAESTHETIC CHALLENGE IN UNDIAGNOSED MITRAL VALVULAR DISEASE IN EMERGENCY LOWER SEGMENT CAESAREAN SECTION IN A SECONDARY LEVEL HOSPITAL – A CASE REPORT.

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Abstract

Although the incidence of Rheumatic Mitral Stenosis is grossly reduced in Indian subcontinent, it occupies a greater segment among heart diseases complicating pregnancy. A 25 years old lady, who was not known as a case of valvular heart disease, was admitted in a secondary level hospital for emergency lower segment caesarean section. The patient developed severe pulmonary oedema during operation which was managed successfully.

Key-Words: Rheumatic Mitral Stenosis, Caesarean Section, Anaesthetic management.

Introduction

Valvular heart disease in young women is most commonly due to rheumatic heart disease, congenital abnormalities, or previous endocarditis and may increase the maternal and foetal risks associated with pregnancy. Rheumatic mitral stenosis forms 88% of the heart diseases complicating pregnancy[1]. The likelihood of an adverse outcome is related to the type and severity of maternal valvular disease and the resulting abnormalities of functional capacity, left ventricular function, and pulmonary pressure. The mortality and morbidity are considerably reduced by better perinatal care, where the anaesthesiologist plays a major role in the multidisciplinary approach[2,3].

Case Report

The patient, a 25 years old police constable, was admitted in Combined Military Hospital (CMH), Saidpur on 09th september 2010, with the complaints of: amenorrhoea for 37 weeks,occasional pain in abdomen and per vaginal discharge. She was a primi gravida, married for 2 ½ years and was not under antenatal check up. She underwent operation for breast lump under general anaesthesia 10 years back which was uneventful. There was no previous history of rheumatic fever (but history of occasional fever in childhood), bronchial asthma, diabetes mellitus or hypertension.The patient developed ruptured membrane at night on 9th september 2010. She was put under medical induction for delivery. As the medical induction failed and there was foetal distress, emergency Lower Segment Caesarean Section (LSCS) was planned. Pre-anaesthetic check up was done. The patient was suffering from dry cough for last 2-3 days. She was anxious and restless (due to labour pain) with tachycardia (Pulse-120/m). Chest examination revealed scanty bilateral basal crepitation and diastolic murmur. There was no dependent oedema. Emergency LSCS was planned under Sub-Arachnoid Block (SAB). The patient was preloaded with 500ml Hartmann's solution and initial dose of third generation cephalosporin was given iv. Subarachnoid block was activated at L3-4

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Level in sitting position. Supplementary O_2 was given by ventimusk @ 5L/m. SpO_2 was 93%, heart rate (HR) was 120-130/m on cardiac monitor with sinus rhythm. After about 8-10 min of the beginning of operation, the patient suddenly developed respiratory distress. SpO_2 came down to 80%. Chest auscultation revealed bilateral profuse crepitation. The baby was taken out quickly. Patient's head end was raised about 30^0, 100% O_2 at high pressure was delivered by anaesthetic face mask. Immediately inj frusemide 80mg was given intravenously. All preparations for Endotracheal (ET) intubation were kept ready. SpO_2 rose to 90%. Patient was feeling better. Urine output was good (>1ml/min). There was no incidence of peroperative vomiting, shivering or hypotension. At the end of operation (duration about 1hour), the patient was shifted to Intensive Care Unit (ICU). Head end was raised to 30^o and supplemental O_2 @5L/m was delivered by ventimask. Urine output was monitored. SpO_2 was 93%, patient was feeling much better. Chest auscultation revealed bilateral basal crepitation. Inj Frusimide 20mg was given intravenously with K+ supplimentation. Heart rate was around 130/m on multiparameter cardiac monitor with sinus rhythm. Chest skiagram showed patchy opacities in mid and lower zones of both lung fields along with cardiac shadow with straight left border (Fig-1).

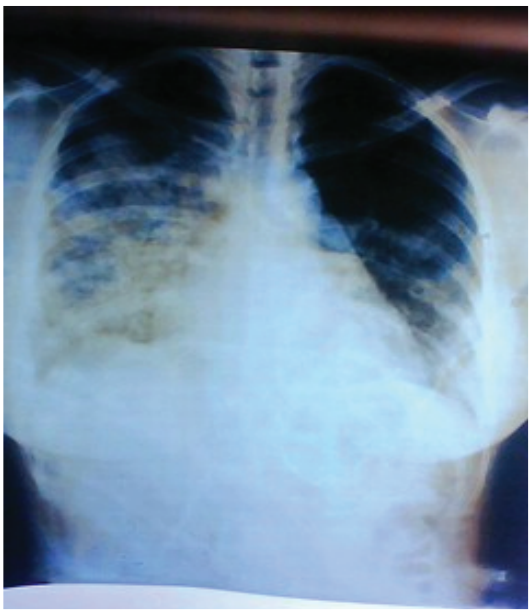

Fig-1: CxR after operation

After about 6 hours, heart rate came down to 84-90/m. Chest auscultation revealed scanty bilateral basal crepitation, diastolic murmur at the apex. Digitalis was started orally. Patient's condition improved a lot. She had no difficulty in breathing. Repeated Chest x-ray (CXR) on 3rd Post Operative Day (POD) showed almost clear lung fields(Fig-2).

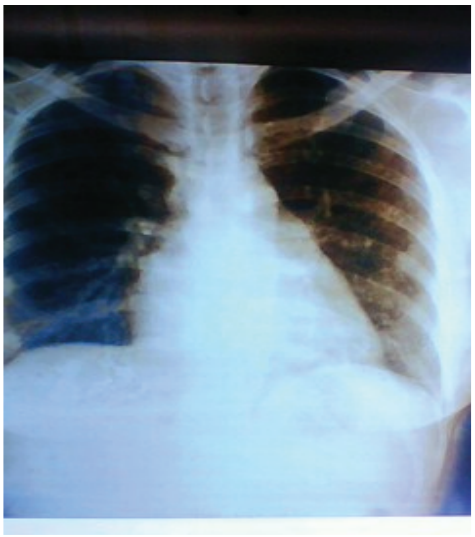

Fig-2: CxR on 3rd POD

The patient was discharged on 8th POD and referred to cardiologist in tertiary level hospital (CMH Dhaka) for evaluation of cardiovascular status where echocardiography revealed mild Mitral Stenosis (valve area-2.6cm^2) with no pulmonary hypertension (Fig-3).

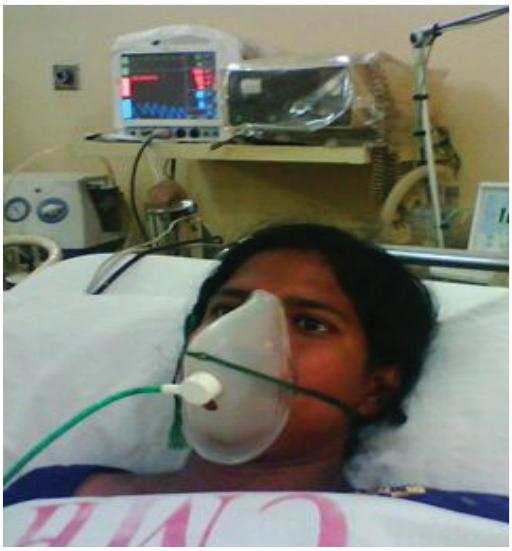

Fig-3: Patient in ICU after operation

Discussion

Pregnant patient with heart disease is a unique challenge to the obstetrician and anaesthesiologist, dealing with high risk parturients and requires a thorough understanding of the impact of pregnancy on the haemodynamic response to the patient's cardiac lesion. Rheumatic heart disease at present is the most common cardiac disorder in pregnancy, with Mitral Stenosis (MS) as a single most prevalent lesion[4,5].

Although the physiologic changes in the cardiovascular system appear to begin in the first trimester, these changes continue in the second and third trimesters[1]. There is 40-50% increase in cardiac output, 15-25% increase in heart rate, 45% increase in intravascular volume than the pre-pregnant values[1,6].

When the normal mitral valve orifice area of 4-6 cm^2 is progressively reduced to 2 cm^2, the classical symptoms of mitral heart disease start appearing. Mitral stenosis prevents emptying of the left atrium and subsequent filling of the left ventricle, resulting in decreased stroke volume and decreased cardiac output. Consequent to the fixed cardiac output state, the heart cannot cope up with situations warranting increased metabolic demand or increased blood volume. When the stenosis progresses, the left atrium dilates and the left atrial pressure increases. A pressure gradient develops during diastole between the left atrium and the left ventricle. This pressure gradient is the haemodynamic hallmark of mitral stenosis. Hence, back pressure on the pulmonary vessels leads to pulmonary congestion and in severe cases, pulmonary oedema[1,7].

The increased heart rate of pregnancy limits the time available for left ventricular filling, resulting in increased left atrial and pulmonary pressures and an increased likelihood of pulmonary oedema. Tachycardia secondary to labour pain, increases flow across the mitral valve, producing sudden rises in left atrial pressure, leading to acute pulmonary oedema. The risk of maternal death is greatest during labour and during the immediate post-partum period. The sudden increase in the pre-load immediately after delivery, due to autotransfusion from the uterus, may flood the central circulation, resulting in severe pulmonary oedema. In addition, there continues to be autotransfusion of blood for 24-72 hours after delivery. Thus the risk of pulmonary oedema extends for several days after delivery. In a study of women with mitral stenosis, predictors of adverse maternal outcomes included a reduced mitral valve area (<1.5cm^2) and an abnormal functional class before pregnancy. Foetal mortality increases with deteriorating maternal functional capacity; foetal mortality is 30% when there is New York Heart Association (NYHA) class IV disease in the mother[2].

The goals for the anaesthetic management of patients with mitral stenosis include:

1. Maintenance of an acceptable slow heart rate,
2. Immediate treatment of acute atrial fibrillation and reversion to sinus rhythm,
3. Avoidance of aortocaval compression,
4. Maintenance of adequate venous return,
5. Maintenance of adequate Systemic Vascular Resistance (SVR) and
6. Prevention of pain, hypoxaemia, hypercarbia and acidosis, which may increase pulmonary vascular resistance[1]. Sudden drops in Systemic Vascular Resistance (SVR) in the presence of a fixed cardiac output can be prevented by small bolus of phenylephrine, with volume expansion when necessary. Supplemental oxygen administration with pulse oxymetry monitoring to minimize increases in pulmonary vascular resistance and maintenance of left uterine displacement for good venous return are mandatory[1]. During pregnancy, women with valvular heart disease should be evaluated once each trimester and whenever there is a change in symptoms, in order to evaluate any deterioration in maternal cardiac status[1,2].

For the past two decades, regional anaesthesia has proved to be a safe technique in cardiac patients presenting for Caesarean Section. Epidural anaesthesia is an attractive option[1,8]. Epidural anaesthesia is preferred in patients with mitral

stenosis as the onset of block is slow therefore the haemodynamics are more controllable. Prophylactic ephedrine should be avoided. If a need for vasopressor arises, the drug of choice in patients with Mitral Stenosis (MS) is low dose phenylephrine[4]. General anaesthesia has the disadvantage of increased pulmonary arterial pressure and tachycardia during laryngoscopy and tracheal intubation. Moreover, the adverse effects of positive pressure ventilation on the venous return may ultimately lead to cardiac failure. Despite these disadvantages, if general anaesthesia is contemplated, tachycardia, inducing drugs like atropine, ketamine, pancuronium and meperidine, should be totally avoided[1,8]. Our case was labeled as an undiagnosed mitral valvular disease because; there was no known history of valvular heart disease or rheumatic fever (probably the patient was not properly treated for fever in childhood). Moreover, assessment of the pregnant patient with heart disease may be complicated by the normal anatomical and functional changes in the cardiovascular system during pregnancy. These changes may result in signs and symptoms that may mimic heart disease, such as fatigue, shortness of breath, palpitation, dizziness, and oedema[7]. We chosed Subar-Achnoid Block (SAB) in this case because it is routinely practiced for LSCS in our institution unless there is any contraindication. Emergency LSCS has some risks for General anaesthesia e.g failed intubation, maternal pulmonary aspiration, neonatal exposure to potentially depressant drugs[9]. Conversely, spinal anaesthesia is easier to perform, has a more rapid, predictable onset, produces an intense block, and does not have the potential for serious systemic drug toxicity[9].

Conclusion

Rheumatic mitral stenosis complicating pregnancy is still a frequent cause of maternal death. A better understanding of the physiological changes in pregnancy and the pathological impact of mitral stenosis over pregnancy and a multidisciplinary approach in diagnosis and management reduce the mortality and morbidity. Irrespective of the mode of delivery and anaesthetic technique, these patients are at a great risk of haemodynamic stress due to autotransfusion of blood from the uterus. This may lead to pulmonary hypertension, pulmonary oedema and cardiac failure. Therefore, intensive monitoring and therapy should be continued till the haemodynamic parameters return to normal.

References

1. Kannan M, Vijayanand G. Mitral stenosis and pregnancy: Current concepts in anaesthetic practice. Indian J Anaesth 2010; 54: 439-44.
2. Reimold SC, Rutherford JD. Valvular heart disease in pregnancy. N Engl J Med 2003; 349: 52-9.
3. Stoelting RK, Dierdorf SF. Anesthesia and co-existing disease. 5th ed. Philadelphia: Churchill Livingstone; 2007. p. 29-32.
4. Chohan U, Afshan G, Mone A. Anaesthesia for caesarean section in patients with cardiac disease. J Pak Med Assoc 2006 January; 56(1): 32-8.
5. Coskun D, Mahli A, Korkmaz S, Demir FS, Inan GK, Erer D, Ozdogan ME. Anaesthesia for caesarean section in the presence of multivalvular heart disease and severe pulmonary hypertension: a case report. Cases Journal 2009; 2: 31-5.
6. Ioscovich AM, Goldszmidt E, Fadeev AV, Grisaru-Granovsky S, Halpern SH. Peripartum anesthetic management of patients with aortic valve stenosis: a retrospective study and literature review. Int J Obstet Anesth 2009 Oct; 18(4): 379-86.
7. Sachse K, Hannallah M. The anesthetic management for cesarean delivery in a patient with Shone's Syndrome: a case report. Anesthesia & Analgesia 2008 November; 107(5): 1652-54.
8. Boso EB. A case for combined spinal-epidural anesthesia for cesarean section in a patient with aortic stenosis. W V Med J 2008 Mar-Apr; 104(2): 20-1.
9. Morgan GE, Mikhail MS, Murray MJ. Clinical Anesthesiology.3rd ed. McGraw-Hill; 2002. p. 828-9