

Case Report

"The Balloon of Hope" - Successful Management of Tight Mitral Stenosis with Balloon Mitral Valvuloplasty In An Antenatal Woman

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Abstract

Mitral Stenosis is one of the most common manifestation of rheumatic heart disease. In pregnant women it is the most commonly seen acquired valvular lesion. It is also one of the common causes of maternal death from cardiac diseases world over. Mortality remains low in women from developed countries but there is a rise in rate of fetal morbidity as the severity of mitral stenosis worsens. Presenting a case of pregnant woman with severe mitral stenosis, successfully managed with balloon mitral valvuloplasty at mid trimester of pregnancy.

Key Words: Mitral stenosis, Balloon, Mitral valvuloplasty.

Introduction

Rheumatic valvular disease is one of the major cardiac problems complicating pregnancy in India. In a survey conducted in 1995 the incidence of rheumatic mitral stenosis was 5.4 per 1,000 school children. This problem has been reduced to 0.5-0.64 per 1,000 in another survey conducted in 2002.² As per a study done at a tertiary centre, rheumatic mitral stenosis accounts for 88% of the heart diseases complicating pregnancy.³

Cardiovascular disease complicating pregnancy has an overall incidence of 1-3%. It causes 10-15% of maternal mortality. Mitral stenosis is the most common valvular lesion in women of reproductive age group. As per Indian statistics from studies conducted in 2005, in rural areas, rheumatic heart disease had a prevalence rate of was 4.8/1000. In urban areas it was found to be much less and the rate was 1.98/1000.⁴

Mitral stenosis is often associated with mitral regurgitation, but maternal morbidity is mostly seen with mitral stenosis. There is a significant reduction in mortality and morbidity by application of cardiac interventional procedures, multidisciplinary approach and better perinatal care.⁵

Case Report

Mrs. A, 26 years old G2A1 with mitral stenosis who had undergone Open mitral valvotomy at 14 years of age in 2004. Her Menstrual history reveals regular cycles 3/30 days. Her Last Menstrual Period was on 17/5/15 and her Expected date of delivery was on 24/2/16. She was admitted at 15 weeks gestation for evaluation. 2D-Echo evaluation after admission showed Mitral valve orifice of 0.9 cm² (severe mitral stenosis) and an Ejection Fraction of 62%. As she was in her early second trimester she was counseled and planned for

Percutaneous balloon mitral valvuloplasty at 20 weeks of gestation and discharged. She was readmitted at 19 weeks with complaints of class III Dyspnoea.

On Examination

She was moderately built and nourished. Height - 150 cms. Weight - 62 kgs. No pallor, no icterus, no cyanosis, no clubbing, no pedal edema.

Heart rate: 88bpm. Pulse - Regular, Normal in volume and character. Blood Pressure was 90/60mmHg. Cardiovascular system examination showed normal S1, S2 and a Grade 3/5 mid-diastolic murmur heard in the mitral area. Respiratory system examination was normal. P/A: uterus was 20 weeks size and Fetal heart rate was good.

Investigations: All lab parameters were within normal limits.

2D ECHO: Rheumatic heart disease - Severe residual mitral stenosis, Mitral Valve Orifice Area - 0.9cm², mild mitral regurgitation, Grade 3 tricuspid regurgitation with mild pulmonary artery hypertension, left atrium dilated, left ventricular systolic function - normal and Ejection Fraction was 62%.

Treatment

She was stabilized with beta blockers (T. Metoprolol - 12.5 mg BID). An anomaly scan was done and showed no anomalies. She was taken up for elective Balloon Mitral Valvuloplasty (Figure 1). The procedure was done at 20 weeks gestational age on 30/9/15. The procedure was uneventful and the patient was shifted to cardiac Intensive Care Unit in a hemodynamically

stable condition. She recovered well and was discharged with T. Propranolol 10mg BID. and T.Furosemide 20mg OD after a week stay.

Her Post procedure echo showed mild residual mitral stenosis and mitral orifice area was 1.7cm², with mild mitral regurgitation.

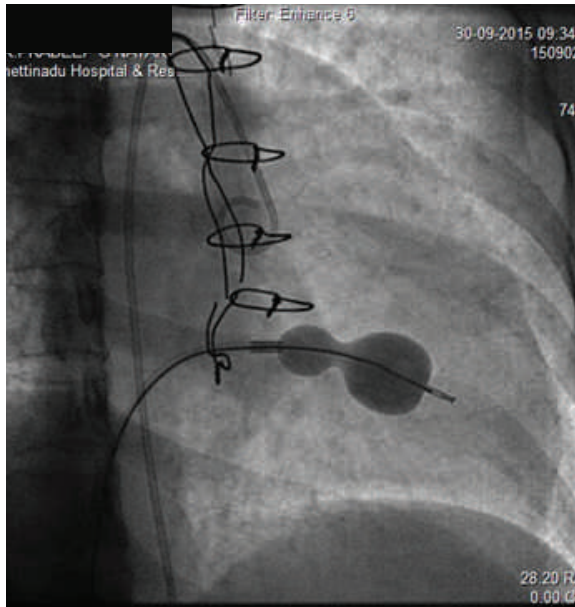


Fig 1 : BMV fluroscopic image of trans mitral placement of catheter

Followup

Patient was on regular antenatal care. At every visit she was reviewed by both obstetrician and cardiologist. At 37 weeks she was admitted and antepartum fetal surveillance done. At 38 weeks she was taken up for Elective LSCS in view of Cephalopelvic disproportion, under Infective Endocarditis cover. She delivered a live boy baby of weight 3.380kgs, with APGAR 8/10, 9/10. Post operative period was uneventful. Suture removal was done on post operative day 10 and patient discharged.

Discussion

Mitral stenosis (Fig 2) is a condition in which there is a fixed cardiac output caused by left atrial outflow obstruction leading to increase in the pressure of left atrium and pulmonary vasculature.⁶ The severity is graded as shown in Table 1.

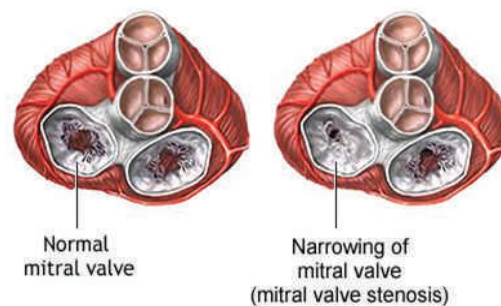


Fig 2 : Schematic diagram showing Mitral stenosis

Measurement	Normal	Mild	Moderate	Severe
MVArea(cm ²)	4.0 -6.0	1.5 -2.5	1.0 -1.5	<1.0
MPG(mmHg)	<2	2 - 6	6 -12	>12
PA Pr (mm Hg)	10 -20	<30	30 - 50	>50

Table 1 : Grading of Mitral Stenosis ⁷

Hemodynamic Parameter	Change during normal pregnancy
Blood Volume	Increases by 40 - 50%
Cardiac output	Increases by 30 - 50% above the baseline
Stroke volume	Increases by 30%
Heart rate	Increases by 10 - 15 beats per minute
Intravascular volume	Increases by 45%
Systemic vascular resistance	Decreases by 20%
Blood Pressure	Decreases by 10mm Hg
Oxygen consumption	Increases by 30 - 40%

Table 2: Cardiovascular Changes In Pregnancy ⁸

Effect of Mitral Stenosis on Pregnancy

Mother can have Pulmonary oedema or atrial fibrillation while fetus shows Intrauterine fetal growth restriction and Preterm birth.⁹

Effect of Pregnancy on Mitral Stenosis

Pregnancy brings about the various hemodynamic changes (Table 2), so that asymptomatic patients may develop symptoms or complications.¹⁰ In Pregnant women with mitral stenosis there is an increase in maternal morbidity and adverse fetal outcome if they are not tackled.

Prepregnancy Counselling

Pre pregnancy counseling should be started from adolescence. It should provide the information about all the risks of pregnancy which affect their health and of their fetus. It gives an opportunity for the assessment of the woman's cardiac condition and review of current medications. Contraceptive advice should be given regarding the risks of thrombosis or infection associated with various contraceptive methods.¹¹ Barrier methods are safe in all cardiac patients and have added the benefit of protection against the sexually transmitted infections.

Criteria for Percutaneous Mitral Valvuloplasty

Patient should have moderate to severe Mitral stenosis with no calcified leaflets of the valves and no significant regurgitation or arrhythmias.¹² Advantages of BMV include percutaneous approach under local anaesthesia with good hemodynamic results in selected patients.

Disadvantages: Preterm uterine contractions (increased risk for abortion), Maternal arrhythmias leading to fetal distress, Ionizing radiation exposure to the fetus, Cardiac tamponade requiring surgical intervention.

Newer Advances in Bmv

Transthoracic esophageal echo [TTE] is used with fluoroscopy to guide BMV. It is a useful adjunct to fluoroscopy in trans-septal puncture. It helps in visualization of valve anatomy, determination of transvalvular gradients and MVA, detection of MR and allows early detection of complications. Transesophageal echo [TEE] is superior to TTE in excluding left atrial thrombi and in monitoring wire and balloon positioning.

Conclusion

Balloon mitral valvuloplasty in mid trimester of pregnancy is a relatively safe and effective interventional cardiac procedure which gives optimum results.¹³ It helps the patients with moderate to severe mitral stenosis and overcomes the risks associated with the diseased valve.¹⁴ Improvements in the procedure by the use of TEE has reduced the radiation exposure for the fetus.

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