



PERCUTANEOUS BALLOON MITRAL VALVULOPLASTY IN PREGNANCY TO REDUCE MATERNAL AND FETAL MORBIDITY AND MORTALITY

Gynaecology

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ABSTRACT

Heart disease is the leading non-obstetric cause of maternal mortality. The commonest heart disease in pregnancy is Rheumatic valvular disease. 75% of these women have dominant mitral stenosis of which 25% deteriorate during pregnancy. In 25% of women with mitral stenosis symptoms appear for the first time during pregnancy. PBMV was first introduced in 1984 and is now a popular procedure. Physiological changes in pregnancy aggravate mitral stenosis. This study makes an attempt to present the maternal and perinatal outcome in 14 pregnant women who underwent PBMV during pregnancy.

KEYWORDS

Percutaneous Balloon Mitral Valvotomy (PBMV), Mitral Stenosis (M.S), Mitral valve Area (M.V.A.), Lower Segment Caesarian Section (L.S.C.S), Chronic Rheumatic Heart Disease (CRHD) New York heart Association (NYHA)

INTRODUCTION

Heart disease is the leading non-obstetric cause of maternal mortality (1). The commonest heart disease in pregnancy is Rheumatic valvular disease. 75% of these women have dominant mitral stenosis of which 25% deteriorate during pregnancy. In 25% of women with mitral stenosis symptoms appear for the first time during pregnancy. PBMV was first introduced in 1984 and is now a popular procedure. (2), Physiological changes in pregnancy aggravates mitral stenosis (3,4)

1. Increased heart rate resulting in decreased diastolic filling time through narrow valve orifice.
2. Increased cardiac output resulting in increased flow through mitral orifice.
3. Increased pulmonary blood volume resulting in the pulmonary capillary pressure exceeding colloidal osmotic pressure, thereby increasing the chances of pulmonary edema to occur.
4. Autotransfusion during labour and after the delivery of the baby adding extra volume can aggravate the above conditions and convert a compensated stage to a decompensated stage.

AIM

To present the maternal and perinatal outcome in 14 pregnant women who underwent PBMV during pregnancy during a period of 2 years and 9 months at Mahavir Institute of Medical Sciences.

MATERIAL AND METHODS

PBMV was done in 14 women during pregnancy with severely symptomatic mitral stenosis during this period.

STUDY AT GMH NAYAPOOL DURING A PERIOD OF 2 YEARS 9 MONTHS .

There were 172 pregnant women with heart disease of which 116 had Chronic Rheumatic Heart Disease . 50% of them had dominant mitral stenosis. 14 pregnant women underwent PBMV during pregnancy at Osmania General Hospital and delivered at Government Maternity Hospital (GMH) during this period . 3 of these 14 women had their second delivery at GMH.

14 CASES

17 PREGNANCIES

RESULTS:

PARITY WISE DISTRIBUTION

7 were primigravida, 4 were G2P1L1 and 3 were G3 P2L2. 50% of the women were primigravida

AGE WISE DISTRIBUTION

Of these women, 2 were aged below 20 years, 9 were between 21 to 25 years and 3 were aged 28 years.

NYHA FUNCTIONAL CLASS (pre PBMV)

10 patients belonged to class III (71.42%) and 4 to class IV (28.57%). All the patients improved atleast by one functional class within 24 to 48 hours after the procedure.

4 cases were diagnosed before pregnancy (28.57%), 8 during present pregnancy (57.14%),

1 case during previous pregnancy (7.14%) and 1 case was diagnosed 20 days after the first delivery (7.14%). In about 25% of women with mitral stenosis, symptoms first appear during pregnancy and hence detected in pregnancy . 25% of women with heart disease deteriorate during pregnancy.()

DURATION OF PREGNANCY AT THE TIME OF PBMV

In 4 patients PBMV was done at 30-32 weeks of gestation , in 5 patients at 26-28 weeks , in 4 patients at 24-26 weeks and in 1 patient at 20-22 weeks of gestation.

Ideal gestational age for PBMV is after 20 weeks (2nd trimester).()

Radiation exposure to the foetus is 0.2 rads . Exposure greater than 10 rads , therapeutic abortion is advised. Radiation hazard is more if the procedure is done before 20 weeks of gestation. ()

DRUGS USED : Tab. Digoxin 0.25mg once daily for 5 days in a week, Tab. Lasix 20mg twice daily, Syrup Potassium chloride 2 tsp. Thrice daily, Inj. Benzathene Penicillin 12 lakh unit intramuscular once in 21 days, Infective Endocarditis prophylaxis given before delivery.

EVALUATION OF THE PATIENT FOR PBMV

• CARDIAC EVALUATION

1. ECG

2. 2D Echo for the severity of MS and the morphology of mitral valve, mobility of mitral valve, mitral valve area, degree of calcification, severity of mitral regurgitation, sub valvular apparatus and transmitral gradient. (Pressure gradient between left atrium and left ventricle in diastole). Pulmonary artery systolic pressure is also estimated to know the severity of pulmonary hypertension.

• ANTENATAL EVALUATION:

All the patients underwent a detailed obstetric evaluation and follow up, including ultrasound examination, both before and after the procedure . After PBMV patients were carefully followed up including repeated USG evaluation for foetal growth and well-being. Spontaneous labour was awaited unless there was an obstetric indication for caesarean section .

PROCEDURE OF PBMV: Informed consent was obtained from the patients and the risks associated with the procedure explained . Abdomen is covered with lead apron circumferentially from subcostal margin to symphysis pubis. Fluoroscopy was used only when absolutely essential . Under local anaesthesia a guide wire is introduced through the right femoral vein into the right atrium. Interatrial septum is punctured and balloon is positioned in left atrium. Heparin is administered (50 u/kg intravenously) The mitral valve mean and end-diastolic gradients were recorded before and immediately after the valve dilatation. The step wise dilatations were done till transmitral end diastolic gradient is decreased to less than 5mm of Hg. The LA pressure tracings are carefully observed for any appearance of a prominent V wave which is suggestive of significant mitral regurgitation trace. The mitral valve area and mitral regurgitation were

assessed by 2-D echo cardiography after the procedure. The procedure is considered successful if MVA increased by >50% as compared to the baseline and the final absolute mitral valve area >1.5 cm² in the absence of significant MR.()

	Pre PBMV	Post PBMV
The mean mitral valve area	0.6cm ² 1.75cm ²	
1.0cm ²	0.8cm ²	1.85cm ²
0.7cm ²	0.9cm ²	1.6cm ²
Mean mitral gradient	17mmHg	3mmHg

POST PBMV COMPLICATIONS : 2 cases developed moderate mitral regurgitation after the procedure. 1 patient developed Deep vein Thrombosis of right lower limb 6 days after the procedure and was treated with Heparin followed by oral anti coagulants.

MODE OF DELIVERY: 10 patients had vaginal delivery (71.42%) , 7 by spontaneous vaginal delivery and 3 by outlet forceps .Lower segment Caesarean section (LSCS)done in 4 cases(28.57%) , 3 cases under epidural anesthesia and 1case under General anesthesia.

INDICATIONS FOR LSCS:

Severe oligohydramnios (AFI: 2-3),Intruterine growth retardation (IUGR) with abnormal Doppler ,breech in primigravida and cephalo pelvic disproportion.(CPD). Indication for LSCS is only obstetric .

ANAESTHESIA FOR LSCS: Epidural anesthesia is anesthesia of choice in the patient with moderate mitral stenosis while in severe MS general anesthesia is used. Ephedrine will increase the heart rate and hence not used in severe MS. Spinal anesthesia is not indicated for the fear of hypotension as severe decrease in systemic vascular resistance which results in reflex tachycardia and decreased left Ventricular filling. General anesthesia is considered in foetal distress, precious pregnancy,multivalvular disease like severe mitral stenosis with pulmonary hypertension and aortic regurgitation or stenosis. Nitrous oxide with low concentration of volatile drug and an opiod is used for intra-operative management . The muscle relaxant with minimal effect on heart rate, blood pressure and systemic vascular resistance is used. Vecuronium, Atracurium are usually used.

3of these 14 women had their second delivery at GMH. 1 patient had spontaneous vaginal delivery and 2 patients were delivered by repeat cesarean section.

PERINATAL OUTCOME: 4 babies were weighing between 2.1-2.5 kg, 8 were weighing between 2.6-3 kg, 2 were weighing 3.25kg. There was no effect on the weight of the babies, all the babies were born with good APGAR score .

1 women delivered a dead baby. She had only one antenatal check up. She came neither for antenatal check up nor had review check up with cardiologist after PBMV.She came to the hospital in labour with IUD.

DISCUSSION: Rheumatic valvular involvement is the commonest heart disease in pregnant women.andin upto 75% of these patients MS is the dominant lesion. The presence of MS may impair a pregnant women's ability to generate an increased cardiac output despite an increase in blood volume, heart rate and decreased systemic vascular resistance leading not only to low systemic perfusion but also pulmonary congestion. Deterioration may occur in 25% of these patients. The maternal death rate is nearly 1% and varies directly with the NYHA functional class (0.4% for women in class I or II, 6.8% for those in class III or IV). (It can reach as high as 17% in those patients with atrial fibrillation. The highest risk is during labour and the delivery period .) Ideally if sever MS is diagnosed in a non pregnant woman desiring pregnancy, it should betreated by PBMV or surgical intervention before the patient conceives. However, because of several reasons, this is not always possible. After pregnancyhowever severe MS presents a challenging problem if managed only medically because of unacceptable foetal and maternal complications.

Thus in severe MS, MVA should be increased by some intervention. However open heart surgery during pregnancy carries 15-35% foetal mortality. () . The mortality is associated with the, use of high doses of heparin and hypo tension and induced hypothermia. With closed mitral valvotomy, the risk of foetal mortality is 5-15% .Open mitral valvotomy is associated with high maternal mortality .

CONCLUSION: PBMV is a safe,quick and effective method for the management of pregnant women with severe symptomatic mitral stenosis. The procedure is durable and results in symptomatic, anatomic and heamodynamic improvement in these critically ill patients. The maternal and perinatal outcome was excellent.

PBMV is a boon for women with severe MS .

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