

Percutaneous Mitral Valvuloplasty in a Mid-Term Pregnant Woman with Severe Rheumatic Mitral Stenosis

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A 28-year-old woman with severe mitral stenosis underwent percutaneous mitral valvuloplasty at 26 weeks' gestation. Balloon dilation using a double 18-18 mm balloon resulted in improvement in mean mitral pressure gradient (32 to 8 mmHg) and in calculated mitral valve area (0.9 to 2.4 cm²) without complications and any evidence of fetal distress during procedures with an estimated radiation exposure to the fetus of 0.13 rem. This procedure resulted in the disappearance of symptoms of congestive heart failure and allowed for normal full term spontaneous delivery of a 3.51 Kg boy without any complication.

Key Words: Mitral stenosis, Balloon dilatation, Pregnancy

INTRODUCTION

Although rheumatic heart disease is increasingly rare in developed countries, it remains the most common cardiac disorder in much of the world¹⁾. Surgery is an effective treatment for mitral valve stenosis. Percutaneous mitral valvuloplasty has been shown to be a new therapy for patients with mitral stenosis²⁻⁴⁾ and has achieved excellent results in the majority of patients with severe mitral stenosis. This report describes our first clinical application with this procedure in a pregnant woman with severe rheumatic mitral stenosis.

CASE REPORT

A 27 year old pregnant woman was admitted to the hospital with severe dyspnea. She had been free of cardiac symptoms until one month prior to admission (25 weeks gestation). She began to be

treated with digoxin and diuretic therapy. On two days before admission, she suffered from severe dyspnea and orthopnea.

Physical examination showed an acutely distressed woman in moderate respiratory distress. The blood pressure was 100/60 mmHg and the pulse rate was 120/min; respirations were 28/min. The jugular venous pressure was increased to 12 cm above the sternal angle. Cardiac examination revealed a prominent right ventricular heaving. The first heart sound was increased and the second sound was narrowly split with an accentuated pulmonic component. There was a grade 4/6 diastolic rumble with presystolic accentuation at the apex. Abdomen was protruded due to enlarged uterus. Height of uterine fundus was up to the umbilicus. There were no abnormal findings on gynecological examination except enlarged uterus due to 26 weeks gestation. The obstetrical ultrasonographic examination revealed no abnormal findings on the fetus. There was no peripheral edema.

The electrocardiogram showed the findings of left atrial enlargement. Two dimensional and Doppler echocardiographic findings were consistent with severe mitral stenosis. There was evidence of left atrial enlargement, normal left ventricular

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dimension and function. There was no evidence of mitral regurgitation and echogenic mass in left atrium.

1. Mitral Valvuloplasty

After intensive treatment with diuretics she could remain in the supine position. To protect the fetus from radiation, she was wrapped in a lead shield from the diaphragm to the symphysis pubis. Fetal monitoring, including fetal heart rate, was done during the procedure.

Using the percutaneous femoral approach, a 7 Fr. Swan-Ganz catheter was placed in the pulmonary artery and an 8 Fr. pigtail catheter was placed in the left ventricle. The pressures, thermodilutional cardiac output and oximetry were recorded. After prevulvuloplasty measurements (Table 1), transseptal catheterization was accomplished from the right femoral vein using a modified Brockenbrough needle and an 8 Fr. Mullins transseptal sheath (USCI). Systemic anticoagulation was achieved with 5000 units of heparin given after successful transseptal catheterization. Left heart pressures and transvalvular gradients were then measured directly to corroborate the previously obtained wedge pressure measurement. The 7 Fr. wedge balloon catheter was advanced through the mitral and aortic valves to the descending aorta, followed by insertion of a 0.035 inch, 260 cm long Teflon-coated exchange guide wire through the flow directed catheter. The sheath and balloon catheter were then removed, leaving only the guide wire in place. After dilating the septal puncture site

with 8 mm balloon (Meditech Inc.), a second guide wire was introduced to the descending aorta through the double lumen catheter which was inserted through the first guide wire. After removal of this catheter, two 18 mm balloon catheters (9

Table 1. Hemodynamic Results before and after Mitral Valvuloplasty

	Pre-valvuloplasty		Post-valvuloplasty	
Pressure (mmHg)	S/D (a(v))	mean	S/D (a(v))	mean
Pulmonary artery				
wedge	39(45)	38	18(21)	16
main	77/37	58	46/20	32
Right Ventricle	84/3.3		40/6.5	
Right Atrium	18(15)	14	13(11)	12
Left Atrium	35(42)	38	18(21)	16
Left Ventricle	82/0		90/0	
Aorta	82/70		90/70	
Heart Rate (beats/min)	120		120	
Mitral Gradient (mmHg)	32		8	
Cardiac Output (liter/min)	4.9		6.6	
Mitral Valve Area (cm ²)	0.9		2.4	

a(v): atrial a and v wave pressure; D: diastolic; S: systolic

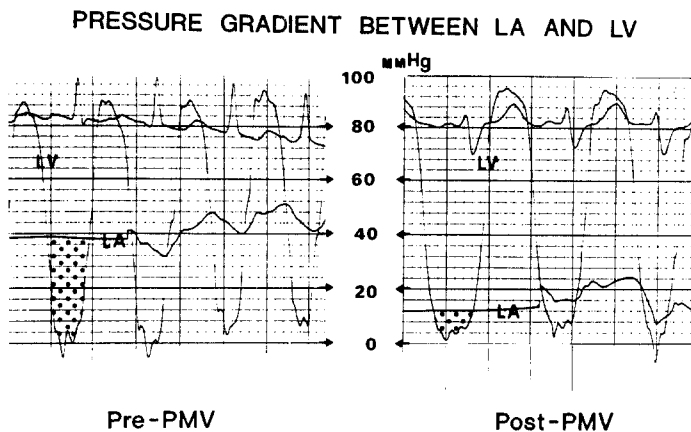


Fig. 1. Simultaneous left ventricular (LV) and left atrial (LA) pressure tracing before (Pre-PMV) and after (Post-PMV) valvuloplasty.

Fr.) were advanced across the septum through the left atrium and positioned across the mitral annulus. Two balloon inflations with a mixture of saline solution and iodinated contrast medium were then performed until the indentation in the balloon due to the mitral stenosis disappeared.

Immediately after catheter valvotomy, all hemodynamic measurements, including determinations of transvalvular gradient and cardiac output, were repeated (Table 1). Figure 1 shows the simultaneous left atrial and left ventricular pressure before and after balloon dilatation. there was a decrease in mean diastolic gradient across the mitral valve to 8 mmHg and an increase in cardiac output to 6.6 liters/min. The mitral valve area was increased to 2.4 cm². Pulmonary arterial systolic pressure decreased to 46 mmHg. Right heart oximetry demonstrated no evidence of a left to right shunt across the atrial septum. To minimize radiation exposure to the fetus, left ventricular cineangiogram was not performed. However, definite evidence of mitral regurgitation was not detected by physical examination and by Doppler examination of the mitral valve. The procedure was completed in 2 hours (fluoroscope time; 35 min.) and the patient tolerated it well with minimal discomfort. There was no evidence of fetal distress and the amount of radiation was 0.13 rem during the procedure.

She delivered a 3.51Kg, healthy, full-term boy without any evidence of fetal abnormalities. Follow-up examination of this boy for 17 months has shown normal growth and development.

DISCUSSION

Our findings demonstrate that percutaneous mitral valvuloplasty is an effective and safe procedure for treating pregnant patients with mitral stenosis. The patient had immediate symptomatic

relief and the hemodynamic data showed significant relief of pulmonary hypertension and a significant increase in mitral valve area. Palacios⁵⁾, Safian⁶⁾, Mangione⁷⁾ and their co-workers also reported successful outcome. These favorable results suggest that percutaneous mitral valvuloplasty could be the treatment of choice for selected pregnant patients with mitral stenosis refractory to medical treatment.

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