

IMMEDIATE OUTCOMES OF PERCUTANEOUS TRANSVENOUS MITRAL COMMISUROTOMY IN PATIENTS OF RHEUMATIC MITRAL STENOSIS

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Contribution

TN,AMG conceived the idea, planned the study and drafted the manuscript. SAJ,ZUZ helped in acquisition of data and did statistical analysis. SS drafted and critically revised manuscript. All authors contributed significantly to the submitted manuscript.

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ABSTRACT

Objective. To determine the immediate outcome of PTMC in patients of Rheumatic Mitral stenosis.

Methodology. This cross sectional study was conducted from 1st January 2011 to 31st December 2016, at Department of Cardiology, Lady Reading Hospital, Peshawar. Patients with severe MS fulfilling the inclusion and exclusion criteria were enrolled in the study. Detailed history and examination was done followed by transthoracic and transesophageal echocardiography. PTMC was performed. Pre and post-PTMC echocardiographic parameters were recorded. Post PTMC complications like moderate to severe mitral regurgitation, stroke, pericardial effusion, new onset arrhythmias and death within 24 hours were also recorded. $P < 0.05$ was taken as significant.

Results. Total of 300 patients with mean age of 26.26 ± 11.54 years were enrolled, of which 78 (26%) were males. Mean MVA pre-PTMC was 0.96 ± 0.90 cm², dilated successfully to 1.81 ± 0.48 cm² ($p = 0.000$). Immediate complications like moderate MR (30%), severe MR (2%), CVA (6%), pericardial effusion (0.33%), new onset arrhythmias (8%) and death (4%) were observed.

Conclusion. Although complications are observed during PTMC but it is a safe and effective procedure in patients of rheumatic mitral stenosis with suitable valve morphology.

Key Words. Per cutaneous trans venous mitral commisurotomy. Mitral stenosis. Mitral regurgitation. cerebro vascular accident. Mitral valve area.

INTRODUCTION

Mitral stenosis is almost always caused by rheumatic fever.^[1] Worldwide about 15.6 million people are effected with an incidence rate of 28200 each year.^[2] Rheumatic fever affects children in ages of 5 – 15 years in 80% of cases and adults in 20% cases.^[3] In developing countries the incidence rate is quite high. PTMC is one of the non-surgical commissurotomies in patients with hemodynamically significant MS.^[4] Over the last three decades since its introduction, PTMC has been proven as an effective substitute to surgical procedures in patients with MS.^[5] PTMC is cost effective, patient friendly procedure with fewer complications rates.^[6,9] Success of the procedure depends greatly on the mitral valve morphology. Thin pliable valve leaflets with minimal sub valvular disease are a key to successful procedure.^[10,11] PTMC is a class I recommendation for symptomatic patients of MS (MVA < 1.5cm²), with favour able valve morphology, in the absence of severe MR and LA, LAA thrombus, according to AHA/ACC 2014 guidelines.^[12] An important step in PTMC is the septal puncture, and is not without complications.^[13,14] Different techniques are applied for it.^[6,7] Our present study is aimed to assess the immediate outcomes of PTMC and its related complications in patients of rheumatic MS.

The aim of this study was to find out immediate complications of this procedure.

METHODOLOGY

This is a cross sectional study carried out on patients of rheumatic MS who underwent successful PTMC from 1st January 2011 to 31st December 2016. Patients of all age groups and both genders were included in this study using non-probability consecutive sampling. Patients with MVA < 1.00 cm² with symptoms were included in this study. Patients with MVA > 1.00 cm², LA/LAA thrombus, impaired LV function, other valvular pathologies like MR, AR, AS, previous procedure done on mitral valve, and congenital MS were excluded from the study.

Written informed consent was taken from all the patients who were enrolled in study. Detailed history, examination was done for all the enrolled patients, followed by the trans thoracic and trans esophageal echocardiography to check

for ejection fraction, left ventricular end diastolic diameter, left atrial/appendageal thrombus and other valvular pathologies.

Right femoral arterial and venous accesses were obtained with 6 French sheaths under local anesthesia by seldinger technique. Left and right heart pressure studies and left ventriculogram was done, to document pulmonary artery pressure and mitral valve gradient and exclude mitral regurgitation. The Brockenbrough atrial puncture needle along with Mullin's Sheath was advanced to the superior vena cava. With the needle tip within the sheath, both components were brought vertically down with the assembly pointing in the direction of the atrial septum, septal puncture was performed. Inoue balloon was used according to the height of the patient. Probing of the septum was done in the antero posterior or in full lateral view (LAO 90). Access to the left atrium was confirmed by position of sheath, measuring pressure in left lateral position on fluoroscopy and by injecting dye into the left atrium.

Pulmonary artery pressure was measured in catheterization lab in pre- and post-PTMC patients and 24 hour post procedure trans thoracic echo was performed to look for MR, MVA and MVG. Data was analysed in SPSS version 20. Continuous variables were recorded in mean and SD. Categorical variables were described as frequencies and percentages. Comparison of pre and post-PTMC variables was performed using a paired T-test.

RESULTS

Total of 300 patients were enrolled in the study. Mean age was 26.26 ± 11.54 years. About 26% (78) of the enrolled patients were male. Baseline variables of the patients are explained below. (table 1).

Mean mitral valve area was successfully dilated upto 1.81 ± 0.48 cm² from 0.96 ± 0.90 cm² with a p value of 0.000. Pre-PTMC MVG i.e. 22.26 ± 6.22 mmHg decreased to 9.36 ± 1.64 mmHg post-PTMC. Mean PAP pre-PTMC was 60.34 ± 9.8 mmHg and was reduced successfully to 45.32 ± 10.9 mmHg post-PTMC. (Table 2)

A few complications were also seen in the immediate post-PTMC period of 24 hours. Frequency and percentages given in table 3.

Table 1: Base Line Characteristics Of The Patients Enrolled In The Study (n=300)

Variable	Mean	SD	Frequency	Percentage
Age	26.26	11.54	-	-
Sex	-	-	-	-
Male	-	-	78	26%
Female	-	-	222	74%
MVA	0.96	0.90	-	-
PAP	60.34	9.8	-	-
LA size	4.6	0.67	-	-

MVA= Mitral valve area. PAP= Pulmonary artery pressure. LA= Left atrium

Table 2: Procedural Results of the study Population (n=300)

		Mean	SD	P-value	95% C.I
MVG cm ²	Pre-PTMC	22.26	±6.22	0.001	21.52-22.91
	Post-PTMC	9.36	±1.64		9.17-9.56
MVA mmHg	Pre-PTMC	0.965	±0.909	0.000	0.857 – 1.073
	Post-PTMC	1.8174	±0.481		1.760 – 1.874
PAP mmHg	Pre-PTMC	60.347	±9.8	0.001	59.1 – 61.5
	Post-PTMC	45.326	±10.9		44.03 – 46.62

PAP= Pulmonary artery pressure. MVA= Mitral valve area. MVG= Mitral valve gradient

Table 3: Immediate Complications of PTMC in Study Population (n=300)

Complications	Frequency (n)	Percentage (%)
MR:		
Mild	180	60%
Moderate	90	30%
Severe	6	2%
CVA	18	6%
Death	12	4%
Pericardial effusion	2	0.33%
New onset arrhythmias	24	8%
Tachy-arrhythmia	16	5.3%
Brady-arrhythmia	8	2.6%

MR= Mitral regurgitation. CVA= cerebro vascular accident

DISCUSSION

MS is a very frequently seen complication of rheumatic fever in developing countries.^[1] PTMC is a successful, alternative to the surgical mitral valve commissurotomy.^[5,6,7] In our study we got very successful outcomes in terms of increase in MVA, decrease in gradient across mitral valve and decrease in PAP. Our results are comparable to a study conducted by Taimur et al and Ahmed Noor et al in terms of MVA and PAP respectively, in patients with MS^[5,16]. PTMC is now becoming a regular procedure whose results can even be compared with surgical commissurotomy.^[17] However, various factors affect the outcome of procedure like age, sex, valve morphology, coronary artery disease, LVEDD, and LVEF. So pre-PTMC, a thorough evaluation of all patients is necessary.

In rheumatic heart disease, deformed valves generate abnormal turbulences and further aggravate rheumatic process. If left alone and un intervened may lead to thickening calcification and distortion of valvular and sub valvular apparatus with commissural fusion in already deformed valves. The deranged mitral valve may lead to a number of complications including enlarged left atrium leading to arrhythmias and increase in pulmonary artery pressure. Pulmonary artery pressure contributes to the presenting symptoms of patients of mitral stenosis like dyspnea. Multiple mechanisms proposed contribute to the development of pulmonary artery pressure. Retrograde

transmission of increased pressure from enlarged left atrium to pulmonary vasculature secondary to stenosed valve is the commonly agreed one. This leads to reactive pulmonary vasoconstriction and morphologic changes in pulmonary vasculature. Immediately following PTMC, PAH decreases slightly with further substantial regression occurring over time. Some PAH may persist due to permanent damage occurred in pulmonary vasculature. In our study PAP decreased from 60.34 ± 9.8 mm Hg to 45.32 ± 10.9 mm Hg (p=0.001). These findings were consistent with findings of Chen et al. who reported a reduction of PAP from 51.2 ± 14.8 to 33.9 ± 8.8 mm Hg^[8]. The incidence of complications like pericardial effusion, cerebro vascular accidents, new onset arrhythmias, immediate death and sever mitral regurgitation are less than those reported in Ahmed Noor et al and Hikmatullah Jan et al.^[16, 19] In our study only 2% of patients developed significant mitral regurgitation which is also comparable to the results of Taimur et al.^[5] Only 4% of the patients died in the immediate post PTMC period significantly less than the number reported in studies after surgical commissurotomy.^[1]

CONCLUSION

Immediate complications can be encountered in PTMC but it is a safe and effective procedure in patients of rheumatic mitral stenosis with suitable valve morphology with better results .

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