



IMMEDIATE RESULTS OF PERCUTANEOUS TRANSMITRAL COMMISSUROTOMY (PTMC) IN A TERTIARY CARE HOSPITAL PUNJAB INSTITUTE OF CARDIOLOGY, LAHORE, PAKISTAN

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ABSTRACT

OBJECTIVE: To evaluate the immediate results of percutaneous transmitral commissurotomy (PTMC) in a tertiary care hospital Punjab Institute of Cardiology, Lahore, Pakistan.

MATERIALS AND METHODS: This observational study included 108 consecutive patients of rheumatic mitral stenosis who underwent PTMC, at Punjab Institute of Cardiology, Lahore Pakistan. Both males and females age 16-46 were included and data was analyzed using SPSS 20. P-value ≤ 0.05 was taken as significant.

RESULTS: Out of 108 patients, 26(24.1%) were males and 82(75.9%) were females. Mean age was 29.85 ± 7.23 (range: 16-46) years. Patients had higher sinus rhythm (90.74%) while atrial fibrillation and history of CVA were less frequent in patients as 9.25% and 1.85% respectively. Post-PTMC echo findings improved significantly as p-value < 0.001 .

CONCLUSION: PTMC is safe and effective method for patients with severe symptomatic mitral stenosis. PTMC significantly improves mitral valve area, TVPG, MVPG, MVMPG and mean LA pressure.

KEY WORDS: Percutaneous Transmitral Commissurotomy, Mitral Stenosis

INTRODUCTION:

Rheumatic heart disease is a most common cause of mitral stenosis in Pakistan and other developing countries¹. One of the most important alternative to surgery for severe mitral stenosis is PTMC². Mitral valve is the most commonly effected valve in rheumatic heart disease patients¹. PTMC is also an effective and rewarding method for mitral stenosis patients in pregnancy^{3,4}. PTMC improves clinical and echo findings. We conducted the study to assess the efficacy of PTMC on pre and post procedure echo findings of patients.

METHODOLOGY:

This prospective observational study of patients diagnosed with rheumatic mitral stenosis who underwent percutaneous transmitral commissurotomy (PTMC) was conducted at cardiology department of Punjab Institute of Cardiology, Lahore from 1st Jan 2016 to 31st December 2016.

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Patients with symptomatic Mitral Stenosis with both genders of age ≥ 15 years, patients with NYHA class $\geq II$, patients having mitral valve area (MVA) $\leq 1.5 \text{ cm}^2$ and mitral valve Echocardiographic score ≤ 8 (Wilkins et al) with normal liver, and renal function (serum creatinine < 1.5) were included in the study. While patients with significant mitral regurgitation ($MR \geq 2$), patients diagnosis with bilateral commissural calcification, patient's presence of other lesions which need open heart surgery and clot in LA and/or LAA. Patients with Wilkins Score > 10 were excluded from the study.

Echocardiography was performed for all patients one week before and after PTMC by using a GE-Vingmed Vivid 7 with a 1.7 MHz transducer in the second harmonic mode.

Mitral restenosis was defined with a cut off value of valve area $< 1.5 \text{ cm}^2$ and a loss $> 50\%$ of the initial gain in valve area at the first mitral commissurotomy. Mitral valve area was calculated by planimetry method with a cut off value $MVA = 1.2 \text{ cm}^2$. Every patient was subjected to Continuous Wave (CW) and Pulse Wave (PW) Doppler studies in apical 4 chambers view. Mitral valve gradient (Peak and Mean) was observed in left ventricular inflow in each case. In apical 4 chamber view tricuspid pressure gradient was used to assess pulmonary artery pressure $PASP = (TVPG + RAP)$.

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Percutaneous transvenous mitral commissurotomy was performed via antegrade transvenous approach with the Inoue balloon, according to the standard protocol of our center. Balloon size was selected according to the formula (height in centimeters/10 + 10). Successful PTMC was defined as increase in mitral valve area to \geq to 1.5 cm² and/or increase in area to more than twice of the initial area, with a decrease in transmitral gradient to half of the initial value and without >2 grades increase in the severity of mitral regurgitation. Procedural failure was defined as inability to cross/dilate the mitral valve. Procedure related variables included mean atrial pressure, mitral valve area, TVPG, MVPG, MVMPPG and mean LA pressure before and after PTMC.

Data was analyzed using SPSS (Statistical Package for Social Sciences) Version 21.0 for Window. Mean \pm S.D was given for quantitative variables. Frequencies, percentages were given for qualitative variables. Chi square test and Fisher exact test (if cell frequency was less than 5) was applied to observe the association of the qualitative variables, while for quantitative variable independent t test was applied. Level of significance was considered \leq 5%. All tests applied were two tailed.

RESULTS:

Out of total 108 patients, 82(75.9%) were female while 26(24.1%) were male undergoing PTMC. The mean age of the patients was 29.85 ± 7.23 (range: 16-46) years. As regard to the comorbid condition 90.74% were in sinus rhythm, 9.25% were in atrial fibrillation and only 1.85% had history of CVA. The differences between the pre and post MVAcm² (0.92 ± 0.39 vs. 1.48 ± 0.29), TVPG (62.0 ± 22.4 vs. 37.62 ± 11.45), mean atrial pressure (mmHg) (55 ± 7.4 vs. 43 ± 6.7) and mean atrial systolic pres-

sure (mmHg) as (45.71 ± 11.2 vs. 40.03 ± 7.97) results showed statistically significant (P-value < 0.05) in patients who underwent PTMC.

DISCUSSION:

Our results showed that female patients were higher indicating that females are at increased risk of mitral stenosis as compared to male patients (75.9% vs. 24.1%). Ali⁵ et al found that mitral stenosis was more in women than men (74.2% vs. 25.8%). Khan⁶ et al found that mitral stenosis was more in women than men (75% vs. 25%). Present study demonstrated similar results. Another study by Farman⁷ et al established that mitral stenosis is less prevalent in male patients compared to female patients (27.9% vs. 72%). Adhikari⁸ study results showed the contradiction may be due to bias in selection of female patients as (53.4 vs. 46.6%).

In present study the mean age of the mitral stenosis patients who underwent PTMC was 29.85 ± 7.23 years. Farman⁷ et al reported that age of the mitral stenosis patient who underwent PTMC was 30 ± 9.8 . Present study showed similar result. Adhikari⁸ et al examined that age of the mitral stenosis patient who underwent PTMC was 16.3 ± 2.9 Khan⁶ et al determined that age of the mitral stenosis patient who underwent PTMC was 35 ± 11 showed dissimilar results due to small sample size.

Present study reported high frequency (90.74%) of the sinus rhythm in severe mitral stenosis patients, similar to previous study by Adhikari⁸ who examined that frequency of the sinus rhythm in severe mitral stenosis patients as 87.7%. Khan⁶ determined that the frequency of the sinus rhythm in severe mitral stenosis patients was 74.3%. Ali⁵ et al determined that the frequency of the sinus rhythm in severe mitral stenosis patients was 29.8%. These results were dissimilar to our study due to defective sampling frame selection that study included MR patients as well.

Present study reported that the frequency of the atrial fibrillation in severe mitral stenosis patients was 9.25%, similar to previous literature by Farman⁷ determined that the frequency of the atrial fibrillation in severe mitral stenosis patients was 7.1%. Adhikari⁸ et al determined that the frequency of the A.Fib in severe mitral stenosis patients was 12.3%. Ali⁵ examined that high frequency of the atrial fibrillation in severe mitral stenosis patients as 70.16% showed dissimilar results.

Present study reported less frequency of the history of CVA in severe mitral stenosis patients as

Table-1: Patient characteristics

VARIABLE		n=108(%)
GENDER	MALE	26(24.1%)
	FEMALE	82(75.9%)
AGE (mean \pm s.d)		29.85 \pm 7.23
SINUS RHYTHM		98(90.74%)
ATRIAL FIBRILLATION		10(9.25%)
HISTORY OF CVA		2(1.85%)

Table-2: Pre and post PTMC ECHO finding

Echo variables mean \pm s.d	Pre-PTMC Procedure	Post-PTMC Procedure	P-value
MVA (cm ²)	0.92 \pm 0.39	1.48 \pm 0.29	0.001
TVPG	62.0 \pm 22.4	37.62 \pm 11.45	0.001
MVPG(mmHg)	25.9 \pm 8.4	13.7 \pm 3.26	0.001
MVMPPG (mmHg)	16.26 \pm 6.44	7.22 \pm 2.7	0.001
LA Pressure	33.46 \pm 8.14	18.21 \pm 5.2	0.001



1.85%, similar to previous literature by Farman⁷ examined that frequency of the history of CVA in severe mitral stenosis patients as 1.5%.

Present study reported statistically significant difference between pre and post procedure MVA (cm^2) after PTMC (0.92 ± 0.39 vs. 1.48 ± 0.29). According to Adhikari⁸ et al, PTMC significantly directly increases the rate of peroperative MVA (cm^2) as (0.8 ± 0.1 vs. 1.6 ± 0.2). Ali⁵ et al, PTMC significantly directly increases the rate of peroperative MVA (cm^2) as (0.684 ± 0.1226 vs. 1.533 ± 0.281). Sharma⁹ et al found that mitral stenosis patients, as expected, were more likely to improve mitral valve area after PTMC during the hospital stay as (0.87 ± 0.13 vs. 1.63 ± 0.19). Present results showed similar results.

Present study showed statistically significant difference between pre and post mean TVPG mmHg after PTMC (62.0 ± 22.4 vs. 37.62 ± 11.45). According to Khan⁶ et al, post PTMC significantly decreases pre-operative mean TVPG mmHg as (60.79 ± 9.7 vs. 45.71 ± 11.2). Sharma⁹ et al found that TVPG were more likely to improve after post PTMC (65.95 ± 19.89 vs. 40.11 ± 9.04 mmHg). Present results showed similar results

Present study reported statistically significant difference between pre and post MVPG mmHg (25.9 ± 8.4 vs. 13.7 ± 3.26). According to Ali⁵ et al post PTMC significantly decreases pre-operative

mean MVPG pressure mmHg as (26.17 ± 5.94 vs. 7.62 ± 5.007). Present results showed similar results.

Present study reported that pre PTMC mean LA pressure was 33.46 ± 8.14 and post PTMC mean LA pressure was 18.21 ± 5.2 showed statistically significant difference p-value < 0.05 . Adhikari⁸ et al examined that statistically significant difference between pre and post PTMC mean LA pressure as 27.5 ± 8.6 vs. 14.1 ± 5.8 mmHg. Farman⁷ et al found that statistically significant difference between pre and post PTMC mean LA pressure as 32.4 ± 7.6 vs. 18 ± 0.2 . Ali⁵ et al demonstrated that mean LA pressure mmHg as (29.68 ± 8.137 vs. 12.28 ± 6.99) was significantly improved after PTMC. Sharma⁹ et al found that mean LA pressure were more likely to improve after PTMC (23.25 ± 6.55 vs. 13.25 ± 5.19 mmHg). The immediate and long-term outcome of PTMC were worse in patients who had undergone previous surgical mitral commissurotomy than in those who had not¹⁰.

CONCLUSION:

PTMC has a beneficial role & effective procedure in improving mitral valve area, TVPG, MVPG, MVMPG and mean LA pressure. It offers a better choice in patients who are unable to undergo surgical procedure or it may be used as an alternative procedure.

Author's Contribution

SM: Consultant incharge of the study. MAA: Helped in conducting the study. AA: Analysis of data and proof reading. SAA: Helped in data collection. MI: Tables and Figures



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