



Effect of Percutaneous Transvenous Mitral Commissurotomy in Severe Mitral Stenosis: A Cross-Sectional Study

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ABSTRACT

Introduction: The inflow obstruction from the left atrium to the left ventricle due to rheumatic involvement of apparatus is the main cause of Mitral stenosis. The patients with mitral valve involvement are found to have a combination of stenosis and regurgitation. Due to the thromboembolic phenomenon, left atrial dilatation and stasis predispose thrombus formation. So, even after percutaneous treatment, the elevated pressure in MS patients causes morbidity and mortality.

Aim: To assess the effect of percutaneous transvenous mitral commissurotomy (PTMC) in reducing pulmonary hypertension in patients with severe mitral stenosis

Methodology: A total of 134 patients were included in the study. All of them had severe mitral stenosis with elevated pressure of more than 55 mmHg. The age range of patients was between 16 to 62 years. These patients were assessed by echocardiography post-PTMC. Age, gender, and other demographic details were also noted.

Results: Mean age of patients was 36.44 ± 11.37 years. Hypertension was found in 49 patients, and diabetes in 48 patients. Mean baseline systolic pressure was found to be 73.62 ± 9.10 mmHg and mean artery systolic pressure was 44.09 ± 5.06 mmHg. After the commissurotomy, the pulmonary artery systolic pressure reduced from baseline by 38.90 ± 5.20 . In 125 patients the Transvenous mitral commissurotomy was effective and in 9 patients it was ineffective.

Conclusion: This study was found to be successful because it had fewer patients with pulmonary hypertension after the completion of treatment. For the reduction in mean pulmonary artery, systolic pressure balloon valvotomy is a useful technique irrespective of age and gender.

Key Words: Pulmonary artery systolic pressure, Balloon valvotomy, Effectiveness, Transvenous mitral commissurotomy, Pulmonary hypertension, Thromboembolic Phenomenon

INTRODUCTION

The inflow obstruction from the left atrium to the left ventricle due to rheumatic involvement of apparatus is the main cause of Mitral stenosis. The patients with mitral valve involvement are found to have a combination of stenosis and regurgitation. Due to the thromboembolic phenomenon, left atrial dilatation and stasis predispose thrombus formation. ¹ So, even after percutaneous treatment, the elevated pressure in MS patients causes morbidity and mortality. The management approach is based on the following factors such as symptomatic status, suitability of valve for

percutaneous balloon valvuloplasty, and degree of stenosis. In some patients with Mitral stenosis, the percutaneous balloon dilatation of the mitral valve is accepted as an alternative technique to mitral valve replacement. ² LA clot formation was found in 7.5 % and this result was assessed on echocardiography with no clot on trans-thoracic echocardiography/ ³ When a thrombus is dislodged it caused the embolization of left atrial thrombi. The contraindication for PTMC is a left atrial clot. So, to detect the clot, Transoesophageal echocardiography is the best technique. ^{4,5} In this region, rheumatic heart disease is more prevalent

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than developed countries. Patients are usually unaware of the disease which is diagnosed later. The aim of this study was to find the rate of reduction in severe pulmonary hypertension after 24 hours of PTMC which is assessed on echocardiography.

Study design: A cross-sectional study

Place and Duration: This study was conducted at Shaheed Mohtarma Benazir Bhutto Medical College Layari Karachi Pakistan from January 2020 to January 2021

Methodology:

A total of 134 patients with Mitral stenosis and high pulmonary pressure of more than 55 mmHg with an age range of 16 to 62 years were included in the Study. Patients with multiple valvular lesions assessed on echocardiography were excluded from the study. Some patients were found to have severe mitral stenosis because they had a mitral valve area $<1.5 \text{ cm}^2$.⁶ Some patients' echocardiography showed elevated pulmonary artery systolic pressure which was the cause of severe pulmonary hypertension.⁷ The approval of the study was taken from the hospital committee and patients' consent was also taken to use their data in this study. These patients were assessed on echocardiography post-PTMC. Age, gender, and other demographic details were also noted. Data was assessed on SPSS version 20.0

RESULTS

Out of 134 patients, 57 were male and 77 were female. The mean age was 36.44 ± 11.367 years. The average BMI was $22.50 \pm 2.80 \text{ kg/m}^2$. Hypertension was found in 49 patients, diabetes in 48 patients. The average PASP post-PTMC was $46.08 \pm 7.07 \text{ mmHg}$ and the mean reduction was 38.90 ± 5.20 (As shown in Table 1). In this study, the effective PTMC was in 125 patients. A Chi-square test was done for stratification. It was found from the results that there is no association of PTMC with age, gender, diabetes, and hypertension (As shown in Table 2).

Table 1: Characteristics of the study population (n = 134)

Characteristics	Number (%)
Gender	
Male	57(42.53%)
Female	77(57.46%)
Mean (Age)	36.44 ± 11.37
Mean (BMI)	22.50 ± 2.80
Diabetes	
Yes	48(35.82%)
No	86(64.17%)

Hypertension

Yes	49(36.56%)
No	85(66.43%)
Baseline PASP(mmHg)	73.62 ± 9.10
Post PTMC (mmHg)	46.08 ± 7.07
Reduction in PASP (%)	38.90 ± 5.20

Table 2: Association of PTMC effectiveness with risk factors

	Effectiveness of PTMC Yes	No	P-value
N	125	9	
Gender			
Male	49(39.2%)	4(44.44%)	0.435
female	76(60.8%)	5(55.55%)	
Age group			
<42 years	72(53.73%)	4(44.44%)	0.826
≥ 42 years	62(46.26%)	5(55.55%)	
Diabetes Mellitus			
Yes	38(28.35%)	4(44.44%)	0.675
No	96(71.64%)	5(55.55%)	
Hypertension			
Yes	40(29.85%)	4(44.44%)	0.706
No	94(70.14%)	5(55.55%)	

DISCUSSION

To delay mitral valve replacement balloon valvotomy is an effective technique. It has advantages like reducing mortality and morbidity rates. In this study, the reduction in PASP is very significant which shows the success of this study. PASP reduction rate was found in 1/3rd of the population. In the study of Arora et al., the success rate was 89%. He also showed the effects of valvotomy. All the procedures were performed by common techniques of valvotomy. All of the results were noted in long and short-term follow-ups.⁸ In one of the studies by Alkhalife et al., the number of patients was 110 who were undergoing balloon valvotomy.⁹ The positive result was achieved by reducing transmitral PG, increasing valve area, and reducing pulmonary artery pressure. The success rate was 95%. Another study by Bhat et al. studied 101 patients and divided them into two groups who were undergoing balloon valvotomy by means of IBMC or PMMC. The success rate and follow-up of both these techniques were compared. The success rate was almost the same in both the techniques 44 of 48 in the IBMC group and 45 of 50 in the PMMC group. The follow-up period was also the same for both the groups which also showed the same event rates and hemodynamic parameters. PASP reduction was also the

same.¹⁰ In the study conducted by Zaman et al., the success rate was 94%.

In this study, the PASP reduction was in majority of patients. Average diastolic pressure was reduced from 17.5±4.1 mm Hg to 4.5 ±3.2 mmHg. LA pressure reduced from 35.1±6.6 mmHg to 10.6±5.2 mmHg. RV systolic pressure was found to be reduced from 68± 11 mmHg to 29±12 mmHg. So these results are also in accordance with this study which shows that this study holds the fact of reduction in PASP. Before the rise of PVR, PTMC should be performed so that it doesn't become irreversible.

CONCLUSION

This study was found to be successful because it had fewer patients with pulmonary hypertension after the completion of treatment. For the reduction in mean pulmonary artery, systolic pressure balloon valvotomy is a useful technique irrespective of age and gender.

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Conflict of interest

None

Permission

It was taken from the ethical review committee of the institute

Author Contribution

All authors contributed equally towards the data collection, data analysis & compilations

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