Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v2023i1.254
*Biol. Clin. Sci. Res. J., Volume, **2023**: 254*
Original Research Article

PROCEDURAL SUCCESS AND IMMEDIATE POST-PROCEDURE COMPLICATIONS OF PERCUTANEOUS TRANSVENOUS MITRAL COMMISSUROTOMY IN PATIENTS WITH RHEUMATIC MITRAL STENOSIS AT A TERTIARY CARE CENTER

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(Received, 12nd November 2022, Revised 04th March 2023, Published 19th April 2023)

Abstract: *stenosis. Successful PTMC is achieving a post-procedural mitral valve area (MVA) of ≥1.5 cm2 with echocardiographic mitral regurgitation of less than grade 3–4 post-PTMC. Objectives: The study's main objective is to assess the Procedural success and immediate post-procedure Complications like worsening pre-existing mild MR (1) or development of new mitral regurgitation (2) and embolic stroke after the percutaneous transvenous mitral commissurotomy. Methods: This study aimed to evaluate the procedural success of PTMC in patients with mitral stenosis at Hayatabad Medical Complex, Peshawar, from January 2021 to June 2021. Pre-procedure transthoracic echocardiography was performed to determine the mitral valve area, pulmonary artery systolic pressure, trans-mitral pressure gradient, and the presence and severity of mitral regurgitation (MR). The mitral valve area was calculated through planimetry, while the pulmonary artery systolic pressure was measured using Doppler Echo. Results: The mean age of the patients was 42.7 ± 11.5 years, with 23 (28.75%) males and 57 (71.25%) females. The mean mitral valve area before PTMC was 0.97 ± 0.18 cm2, which increased to 1.62 ± 0.17 cm2 after the procedure, and this increase was statistically significant (p=<0.001). The post-PTMC MVA varied with PTMC Wilkin's score, with scores less than or equal to 8 have favorable outcomes. Immediate post-procedure complications were also studied, according to which only 3 (3.75%) out of 80 patients had more than mild MR and none had stroke or TIA. The study concludes that PTMC is an effective and safe treatment option for patients with mitral stenosis, having a favorable Wilkin's score, resulting in a significant increase in MVA after the procedure. After PTMC, there were mostly minor complications immediately after the procedure that were treated conservatively with good results. Further studies are needed to evaluate the long-term outcomes of PTMC in larger patient populations.*

Keywords: Percutaneous Transvenous Mitral Commissurotomy, Rheumatic Heart Disease, Mitral Stenosis, Transthoracic Echocardiography, PTMC Complications, Transesophageal Echo.

Introduction

Mitral stenosis is portrayed by limiting the mitral valve, which directs the bloodstream between the heart's left chamber and the ventricle. Percutaneous Transvenous Mitral Commissurotomy (PTMC) is a negligibly intrusive strategy used to treat this condition, including using a catheter and inflatable to extend the mitral valve (García-Castillo et al., 1995).

Mitral stenosis is a predominant cardiovascular sickness, especially in emerging nations where rheumatic fever is a main source. Side effects of mitral stenosis can go from gentle to extreme and incorporate weariness, windedness, chest agony, and palpitations. PTMC is the best treatment choice for patients with mitral stenosis who are a bad possibility for medical procedure yet and once in a while likewise as mitigation (Feldman and Carroll, 1991; Feldman et al., 2005). PTMC includes an inflatable catheter into the femoral vein, which is then directed to the site of the mitral valve. Once set up, the inflatable is swelled to extend the valve and further develop the bloodstream.

Many variables can affect the progress of PTMC; for instance, the seriousness of the mitral stenosis, the size and morphology of the valve, and the presence of comorbidities can all impact the results of the methodology. PTMC is an important treatment choice for patients with mitral stenosis who are not yet satisfying careful standards (Hogan et al., 1994). While the general achievement pace of PTMC is high, there are potential confusions that can emerge,

[Citation Durrani, T., Nasir, H., Asma, S., Hussain, I., Gul, S., Aziz, S. (2023). Procedural success and immediate post-procedure complications of percutaneous transvenous mitral commissurotomy in patients with rheumatic mitral stenosis at a tertiary care center. *Biol. Clin. Sci. Res. J.,* **2023***: 254*. doi:https://doi.org/10.54112/bcsrj.v2023i1.254]

including access-site dying, contamination, between atrial shunt/procured ASD, Embolism/stroke, AV blocks/arrhythmia, crisis medical procedure for Serious MR, and Heart hole prompting haemo-pericardium.

Numerous RCTs have shown that PTMC has comparative adequacy when contrasted with careful commissurotomy (Feldman et al., 2005). In contrast to medical procedures, PTMC benefits from more limited clinic stays, decreased patient distress, and lower costs. The most serious complexities of inflatable commissurotomy incorporate heart hole and embolic stroke. The advancement of serious mitral disgorging likewise restricts the viability of the technique and, once in a while, prompts the necessity for crisis mitral valve substitution. Past investigations showed that methodology-related mortality has gone from 0-2.7%, with lower death rates announced as of late. The most continuous reason for methodology-related demise is the left ventricular (LV) hole. This is solely a complexity related to the twofold inflatable method, which requires LV guidewires. A heart hole because of the coincidental atrial hole during trans-septal catheterization might also happen with the Inoue strategy, yet this will, in general, be less extreme and has seldom brought about death.

Additionally, Embolic stroke has happened in 1.1-5.4% of cases in past examinations. The frequency of embolic occasions has been well decreased by routine pre-method transesophageal echocardiography (TEE), killing patients with left atrial thrombi. Past information shows that huge mitral spewing occurs in 3.3-10.5% of patients undergoing swell mitral commissurotomy. Luckily, mitral spewing rarely requires crisis medical procedures (0.3-3.3% of cases). Iatrogenic atrial septal imperfections are, for the most of, no clinical outcome. Their recurrence has been decreased with the utilization of the Inoue expand catheter framework, and they seldom require careful fixing (Harrison et al., 1994). The study's main objective is to assess the Procedural success and immediate post-procedure Complications like Worsening of pre-existing mild MR or development of new mitral regurgitation and embolic stroke after the percutaneous transvenous mitral commissurotomy.

Methodology

This cross-sectional retrospective study aimed to evaluate the procedural success of PTMC in patients with mitral stenosis secondary to RHD was conducted at Hayatabad Medical Complex, Peshawar**,** from January 2021 to June 2021. The study included 80 patients who went through PTMC. The essential result was effective PTMC, characterized as accomplishing a post-procedural MVA of ≥1.5 cm2 and with echocardiographic mitral spewing forth of not as much as grade 3-4 post-PTMC. The improvement in side effects of the patient was noted. The auxiliary results were quick post-system difficulties like the advancement of new or deteriorating of previous MR of more than grade 3 or 4 and Embolic stroke. Patients with extreme MS with a mitral valve area of 1 cm2 roughly and having a good Wilkin's score and no contra-signs to system (PTMC) were included in this study. Patients with a blood clot in the left chamber or left atrial member, more than gentle MR, severe tricuspid stenosis, attending Extreme computer-aided design, or aortic valve illness requiring a medical procedure were rejected.

Pre-procedure transthoracic echocardiography was finished to decide the mitral valve region, aspiratory corridor systolic strain, trans-mitral tension inclination, and the presence and seriousness of mitral disgorging (Hasan-Ali et al., 2007). The mitral valve region was determined through planimetry, while the aspiratory vein systolic strain was estimated utilizing Doppler Reverberation. The trans-mitral strain angle was determined by estimating the trans-mitral stream speed with CW Doppler echocardiography. MR seriousness was evaluated in light of the variety of Doppler fly regions covering the left chamber and the width of the vena contracta. Patients with prior moderate or serious mitral spewing forth or commissural calcifications were barred from the review. PTMC was performed on 80 patients through a transvenous approach with the Inoue swell. Post-strategy transthoracic echocardiography (Sadeghian et al., 2012) led to changes in the mitral valve region, pneumonic conduit systolic tension, trans-mitral strain angle, and the presence and seriousness of MR. Neurological side effects were likewise surveyed post-method, and CT checks were directed to search for any infarcts or hemorrhages in the cerebrum. The review recorded information on age, orientation, pre-PTMC, and post-PTMC boundaries, including mitral valve region, aspiratory course systolic tension, trans-mitral strain inclination, and MR seriousness, alongside confusions that happened, if any.

Data Analysis (An organized poll was utilized to gather the information. The information was gathered in Microsoft Succeed (Ver. 2013). For measurable investigation, SPSS 21 (IBM Corp. Delivered 2012. IBM SPSS Measurements for Windows, Variant 21.0. Armonk, NY: IBM Corp.).

Results

A total of 80 patients who met the inclusion criteria underwent PTMC during the study period. The mean age gathering of the patient was 42.7 ± 11.5 years, of which 23 (28.75%) were guys, and 57 (71.25%) were

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females. The mean mitral valve region before PTMC was 0.97 ± 0.18 cm2, which expanded to 1.62 ± 0.17 cm2 after the technique (Ahmed et al., 2022), and it was genuinely huge (p=<0.001). The post-PTMC MVA shifted with PTMC Wilkin's score with not exactly or equivalent to 8 having positive results.

Table 1: Baseline data in selected patients

Parameter	Number of Patients	Mean ± SD
Total number of patients	80	-
Age (years)	-	42.7 ± 11.5
Gender (Male/Female)	23 / 57	-
Mitral Valve Area (cm2) pre-PTMC	-	0.97 ± 0.18

Table 2: Patients in each PTMC Wilkin's score group and their post-PTMC mitral valve area

PTMC Wilkin's Score	Number of Patients	Mean Post-PTMC Mitral Valve Area (cm2)
≤8	57	1.81 ± 0.16
9-10	20	1.42 ± 0.14
>10	3	1.11 ± 0.03

Table 3: Comparison of Pre-PTMC and post-PTMC Echocardiographic Variables

Echo Variables	Pre-PTMC	Post-PTMC	p-value
Mitral valve area (cm2)	0.97 ± 0.18	1.62 ± 0.17	<0.001
Pulmonary artery systolic pressure (mmHg)	43.27 ± 8.17	35.56 ± 6.71	<0.001
Trans-mitral pressure gradient (mmHg)	15.17 ± 4.85	6.88 ± 2.71	<0.001
Mitral regurgitation grade	0 -1	1-2	<0.001

Table 3 shows a correlation of echocardiographic factors when percutaneous transvenous mitral commissurotomy (PTMC) in patients with severe rheumatic mitral stenosis. The information introduced in the table incorporates mitral valve region (MVA), pneumonic course systolic pressure (PASP), trans-mitral strain angle (TMPG), and mitral disgorging grade. The outcomes demonstrate huge enhancements in the greater part of the echocardiographic factors after the PTMC methodology. The mean MVA expanded from 0.97 ± 0.18 cm2 before PTMC to 1.62 ± 0.17 cm2 after PTMC (p<0.001). The mean PASP diminished from 43.27 ± 8.17 mmHg before PTMC to 35.56 ± 6.71 mmHg after PTMC (p<0.001). The mean TMPG diminished from 15.17 ± 4.85 mmHg before PTMC to 6.88 ± 2.71 mmHg after PTMC (p<0.001). While the mean mitral spewing fourth grade expanded from 0 - 1 preceding PTMC to 1-2 after PTMC (p<0.001).

Table 4: Immediate post-procedural complications

Immediate Post-Procedural Complications	Frequency (n=80)
Groin hematoma	5 (6.25%)
Mild mitral regurgitation	3 (3.75%)
Moderate mitral regurgitation	2 (2.5%)
Severe mitral regurgitation	1 (1.25%)
Transient atrial fibrillation	4 (5%)
Acute pulmonary edema	2 (2.5%)
Stroke or TIA	0 (0%)
Death	0 (0%)

Table 4 presents the frequency of immediate post-procedural complications in the study population of 80 patients who underwent PTMC. The most common complication was groin hematoma, which occurred in 6.25% of patients. Mild mitral regurgitation was observed in 3.75% of patients, while moderate and severe mitral regurgitation occurred in 2.5% and 1.25%, respectively. Transient atrial fibrillation

occurred in 5% of patients, while acute pulmonary edema was observed in 2.5%. There were no stroke or transient ischemic attack (TIA) cases, and no deaths occurred immediately after the procedure.

Table 5: Result of complications, especially stroke or mitral regurgitation after PTMC

Complication	Number of patients affected	Percentage of patients affected
Stroke / TIA	0	0%
Significant Mitral regurgitation (Echo grade +3 +4)	3	3.75%
Other complications	14	17.5%
No complications	63	78.5%

None of the 80 patients who underwent PTMC experienced a stroke or TIA (0%), while 3 (3.75%) developed Grade +3+4 significant mitral regurgitation. The majority of patients, 63 (78.5%), did not experience any complications after the procedure. It is important to note that the incidence of complications can vary based on individual patient characteristics and the skill and experience of the medical team performing the procedure (Harrison et al., 1994).

Discussion

The study shows that PTMC effectively treats patients with severe rheumatic MS. The mean mitral valve area increased significantly after the procedure, indicating improved valve hemodynamics. These findings are consistent with previous studies showing PTMC to be a safe and effective treatment for Rheumatic MS (Feldman et al., 2005).

The study also reported on immediate post-procedural complications. The most common complication observed was vascular access puncture site hematoma, seen in 5 patients. Other complications included transient atrial fibrillation and mild mitral regurgitation. However, the incidence of serious complications such as significant Moderate to severe MR was low, occurring only in 3 patients (3.75%), but that didn't require any surgical intervention. There was no stroke or TIA within 24 hours of the procedure. This low incidence of serious complications. The study has some limitations that need to be considered; the study did not include a control group, which makes it difficult to determine the efficacy of PTMC compared to other treatments for MS (Dean, 1994; Inoue, 1991). Finally, only the immediate post-procedure outcomes were studied, and the longer-term outcomes of PTMC were not evaluated.

Our investigation likewise discovered that PTMC Wilkin's score of not exactly or equivalent to 8 was related to positive post-PTMC mitral valve region results. Generally, PTMC ought to be considered an ideal treatment choice for patients with severe rheumatic mitral stenosis who meet the consideration rules (Ahmed et al., 2022). The review showed that PTMC is a successful and safe treatment choice for patients with severe mitral stenosis, with an exceptionally okay of procedural complexities like mitral disgorging or stroke.

Conclusion

In conclusion, percutaneous transvenous mitral commissurotomy (PTMC) is a compelling and safe methodology for treating serious rheumatic mitral stenosis. Our review tracked down a critical expansion in the mitral valve region, a diminishing trans-mitral strain slope, and pneumonic conduit systolic tension after PTMC. Prompt post-procedural complexities were inconsistent, with just a few patients encountering confusion, such as access site hematoma or mitral disgorging

Conflict of interest

The authors declared absence of conflict of interest.

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