

Examine the Outcomes of Close Mitral Commissurotomy and Compare the Findings with Balloon Mitral Valvotomy in Patients with Mitral Stenosis

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ABSTRACT

Objective: To examine the results of closed mitral valvotomy with balloon mitral commissurotomy in patients with rheumatic non calcific mitral stenosis.

Study Design: Comparative/observational study.

Place and Duration of Study: This study was conducted at the Department of Cardiology, Mayo Hospital, Lahore from January 2018 to June 2018.

Materials and Methods: Eighty two patients of both genders with ages 10 to 60 years were enrolled. Patients were categorized into two groups, Group A included 41 patients and treated with closed mitral valvotomy, Group B included 41 patients and treated with balloon mitral commissurotomy. Functional outcomes were examined of both techniques and compared the results. Follow-up was taken at 1 week and at six months after surgical treatment and results were compared.

Results: There were 14 (34.15%) patients were males and 27 (65.85%) were females in group A while in Group B, 20 (48.78%) patients were males and 51.22% were females. Residual atrial septal defect was found in 4 patients at 6 months after balloon mitral commissurotomy. Severe mitral regurgitation was found in 2 patients of closed mitral valvotomy while 6 patients had severe MR of balloon mitral commissurotomy. Urgent mitral valve replacement was performed in 3 patients of balloon mitral commissurotomy. There were 1 mortality found in Group A while 2 in Group B.

Conclusion: Closed mitral valvotomy resulted better outcome as compared to balloon mitral commissurotomy. Closed mitral valvotomy technique had low procedural cost as compared to balloon mitral commissurotomy.

Key Words: Balloon mitral commissurotomy, Closed mitral, Rheumatic noncalcific mitral stenosis

Citation of articles: Khalid S, Younis KA, Bhatti TA, Javed MW. Examine the Outcomes of Close Mitral Commissurotomy and Compare the Findings with Balloon Mitral Valvotomy in Patients with Mitral Stenosis. Med Forum 2019;30(6):134-137.

INTRODUCTION

Worldwide, balloon mitral commissurotomy and closed mitral valvotomy are the most effective treatment modalities used for the treatment of rheumatic mitral stenosis. Now a days balloon mitral valvuloplasty is gaining popularity due to less procedural complications but till now the procedure of choice for rheumatic mitral stenosis is still under consideration. Many of studies illustrated that closed mitral valvotomy is safe and effective with low rate of complications.¹⁻³

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Received: January, 2019

Accepted: February, 2019

Printed: June, 2019

Expert use of procedure with metal dilator can be very effective with low risk of complications. Balloon mitral valvotomy is considered safer technique for pulmonary valve stenosis. Several previous studies reported that balloon mitral commissurotomy as the modality of choice in patients with mitral stenosis.⁴ Many of studies regarding treatment of mitral stenosis demonstrated the immediate and short term outcomes of both techniques⁵⁻⁷, with very low rate of severe complications.⁸ Balloon mitral commissurotomy consider as suitable for the patients with mitral valve disorder with low risk of morbidity and mortality. Multiple randomized trials illustrated that both open and closed mitral surgical procedures showed no significant difference regarding clinical echocardiography, hospital stay, mortality and morbidity associated to surgical techniques to PMV.⁹⁻¹¹ PMV in elderly patients and surgical management of these patients has a high risk of morbidity and mortality.¹²

There is a few studies conducted regarding assessment of outcome of closed mitral valvotomy and balloon mitral commissurotomy in patients with rheumatic

mitral stenosis.¹³⁻¹⁵ This study was carried out to examine the functional outcomes of closed mitral valvotomy and balloon mitral commissurotomy in patients with mitral stenosis.

MATERIALS AND METHODS

This comparative/observational study was carried out at Department of Cardiology, Mayo Hospital, Lahore from 1st January 2018 to 30th June 2018. A total of 82 patients of both genders were included. Patient's ages were ranging from 10 to 60 years. Patients detailed medical history including sex, age, previous valvotomy history closed or balloon, NYHA classification, atrial fibrillation, echocardiography, end diastolic, mean diastolic gradient, Associated tricuspid, aortic and mitral regurgitation were recorded preoperatively. All the patients were divided into two groups, Group A included 41 patients and treated with closed mitral valvotomy, Group B included 41 patients and treated with balloon mitral commissurotomy. Left atrial size, functional status, transmitral end diastolic gradient and mean diastolic gradient and mitral valve area were examined. Follow-up was taken at 1 week and at six months after surgical treatment and results were compared. All the statistical data was analyzed by SPSS 20. Pvalue <0.05 was significantly considered.

RESULTS

There were 14 (34.15%) male patients and 27 (65.85%) female patients with mean age 29.15 ± 11.25 years in group A while in group B, 20 (48.78%) patients were males and 51.22% were females with mean age 27.45 ± 12.64 years. NYHA classification was recorded in Group A as 1, 24, 15 and 1 patients in class I,II,III and IV respectively and in Group B there were 1, 23, 16 and 1 patients according to NYHA classification. Atrial fibrillation in Group A was noted in 9 patients and in Group B in 12 patients. Pre-operative Mean MVA in Group A was $0.72 \pm 0.24 \text{ cm}^2$ ranging from 0.47 to 1.2 and in Group B it was $0.82 \pm 0.16 \text{ cm}^2$. Mean end diastolic pressure gradient in Group A and Group B was recorded as 6.02 ± 3.85 and 8.35 ± 4.54 respectively. Mean diastolic pressure gradient in Group A and Group B was 17.42 ± 5.38 and 18.52 ± 6.43 . Mitral regurgitation was noted as absent, trivial, mild, moderate and severe in 21, 10, 9, 1 and 0 in Group A while 20, 12, 9 and 0 in Group B (Table 1).

At 1 week after treatment mean mitral valve area in Group A and Group B was recorded as 1.76 ± 0.28 and $1.68 \pm 0.72 \text{ cm}^2$ respectively. Severe mitral regurgitation was found in 2 patients of closed mitral valvotomy while 6 patients had severe mean gradient of balloon mitral valvotomy. End diastolic pressure gradient (DPG) and mean diastolic pressure gradient in Group A and Group B was noted as 2.57 ± 0.38 and 2.86 ± 1.45 and 5.35 ± 0.85 and 6.46 ± 0.76 respectively. Atrial septal defects found in 29 patients of balloon mitral

valvotomy. NYHA classification was recorded in Group A as 38, 2, 1 and 0 patients in class I,II,III and IV respectively and in Group B there were 37, 2, 1 and 1 patients according to NYHA classification. Atrial fibrillation was found in 5 patients and 4 patients in group A and group B. Urgent mitral valve replacement was performed in 3 patients of balloon mitral valvotomy. There were 1 mortality found in Group A while 2 in Group B (Table 2).

At 6 months follow-up the mean mitral valve area in Group A and Group B was noted as 1.72 ± 0.24 and $1.61 \pm 0.65 \text{ cm}^2$. End diastolic pressure gradient and mean DPG in Group A and Group B was noted as 2.32 ± 0.29 and 2.76 ± 1.30 and 5.25 ± 0.56 and 5.39 ± 0.85 respectively. Atrial fibrillation found in 2 patients in Group A and 1 in Group B. According to NYHA classification I,II,III and IV was recorded as 36, 2, 2, 0 patients in Group A and 33, 5, 1 and 0 patients in Group B respectively. Septal defects found in 4 patients in Group B (Table 3).

Table No.1: Preoperative details of all the patients

Variable	Group A (n=41) CMC	Group B (n=41) BMV
Age Mean	29.15 ± 11.25	27.45 ± 12.64
Gender		
Male	14 (34.15%)	20 (48.78%)
Female	27 (65.85%)	21 (51.22%)
NYHA classification		
I,II,III and IV	1, 24, 15 & 1	1, 23, 16 & 1
Atrial fibrillation	9	12
Mean MVA (cm ²)	0.72 ± 0.24	0.82 ± 0.16
Mean end DPG mm/hg	6.02 ± 3.85	8.35 ± 4.54
Mean DPG mm/hg	17.42 ± 5.38	18.52 ± 6.43
Mitral regurgitation		
Absent	21	20
Trivial	10	12
Mild	9	9
Moderate	1	0
Severe	0	0

Table No.2: At 1 week postoperative findings

NYHA classification	Group A (n=41) CMC	Group B (n=41) BMV
I,II,III and IV	38, 2, 1 & 0	37, 2, 1 & 1
Atrial fibrillation	5	4
Mean MVA cm ²	1.76 ± 0.28	1.68 ± 0.72
Mean end DPG mm/hg	2.57 ± 0.38	2.86 ± 1.45
Mean DPG mm/hg	5.35 ± 0.85	6.46 ± 0.76
severe Mitral Regurgitation	2	6
Atrial septal defects	0	29
Urgent mitral valve replacement	0	3
Mortality	1	2

P>0.05

Table No.3: At 6 months follow-up

	Group A (n=41) CMC	Group B (n=41) BMV
NYHA classification		
I,II,III and IV	36,2,2,0	33,5,1,0
Atrial fibrillation	2	1
Mean MVAc _m 2	1.72 ± 0.24	1.61 ± 0.65
Mean end DPG mm/hg	2.32 ± 0.29	2.76 ± 1.30
Mean DPG mm/hg	5.25 ± 0.56	5.39 ± 0.85
Atrial septal defects	0	4

P-value >0.05

DISCUSSION

Many of studies conducted to compare the results of closed mitral valvotomy and balloon mitral commissurotomy. A study conducted by Baig et al demonstrated that closed mitral valvotomy shows better outcome as compared to balloon mitral valvuloplasty.¹⁶ Another study regarding surgical management of mitral stenosis reported that closed mitral valvotomy showed better results before the onset of atrial fibrillation and congestive cardiac failure, and that all patients should have anti-coagulation.¹⁷

In the present study, 41 patients were treated with closed surgical valvotomy and 14 (34.15%) patients were males and 27 (65.85%) were females with mean age 29.15±11.25 years and 41 patients were treated with balloon mitral valvuloplasty in which 20 (48.78%) patients were males and 51.22% were females with mean age 27.45±12.64 years. A study conducted by Krishnakant¹⁸ reported that number of female patients was high as compared to males with mean age 30.16±10.5 years in closed mitral group and 28.98±11.62 years in balloon mitral valvuloplasty treated patients. In our study we found at 1 week after surgical treatment mean mitral valve area in Group A and Group B was recorded as 1.76±0.28 and 1.68±0.72 cm² respectively. Severe mitral regurgitation was found in 2 patients of closed mitral valvotomy while 6 patients had severe MR of balloon mitral commissurotomy. End diastolic pressure gradient and mean DPG in Group A and Group B was noted as 2.57±0.38 and 2.86±1.45 and 5.35±0.85 and 6.46±0.76 respectively. These results were comparable to some other studies in which functional status, restenosis, mitral valve area diastolic pressure was shows no significant difference.^{17,18} In our study there was no significant difference found with respect to mitral valve area, diastolic and NYHA classification at 6 months and 1 week postoperatively. A study conducted regarding surgical management of mitral stenosis demonstrated that there was no statistical significant difference found regarding outcomes of closed mitral valvotomy compared to balloon mitral valvuloplasty.¹⁹ One the study reported that balloon mitral valvuloplasty showed better results as compared to closed mitral valvotomy.²⁰ Turi and colleagues²¹

found sustained improvement in a young population (mean age, 27 years) with a mean echo score of 7 and no difference in early or intermediate results between balloon valvuloplasty and closed or open commissurotomy. Two dimensional echocardiography was used for assessment of mitral valve area, left atrial size, end diastolic gradient and mean diastolic gradient in this study. In our study At 6 months follow-up the mean mitral valve area in Group A and Group B was noted as 1.72±0.24 and 1.61±0.65 cm². End diastolic pressure gradient and mean DPG in Group A and Group B was noted as 2.32±0.29 and 2.76±1.30 and 5.25±0.56 and 5.39±0.85 respectively. Atrial fibrillation found in 2 patients in Group A and 1 in Group B. According to NYHA classification I,II,III and IV was recorded as 36,2,2,0 patients in Group A and 33,5,1 and 0 patients in Group B respectively. Septal defects found in 4 patients in Group B. another study shows no significant difference at 6 months follow-up after closed mitral valvotomy. and balloon mitral valvuloplasty.²²

CONCLUSION

It is concluded that closed mitral stenosis technique for mitral stenosis is safe and effective for female patients. Moreover closed mitral valvotomy and balloon mitral commissurotomy both techniques shows better outcomes with no significant difference and less rate of complications. In some patients closed mitral valvotomy showed better outcomes as compared to balloon mitral commissurotomy.

Author's Contribution:

Concept & Design of Study: Salman Khalid
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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