ORIGINAL RESEARCH PAPER

Volume-9 | Issue-5 | May-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A COMPARATIVE STUDY OF THE EARLY OUTCOME FOLLOWING CLOSED MITRAL VALVOTOMY AND BALLOON MITRAL VALVOTOMY IN RHEUMATIC MITRAL STENOSIS

Surgery

Dipak Choudhury* Assistant Professor, Dept. of Cardiothoracic Surgery, Gauhati Medical College & Hospital, Guwahati-781032. *Corresponding Author

A R Baruah Professor & Head, Dept. of Cardiothoracic Surgery, Gauhati Medical College & Hospital, Guwahati-781032.

Bornali Dutta Professor, Dept. of Cardiology, Gauhati Medical College & Hospital, Guwahati-781032.

ABSTRACT

Background: Mitral stenosis is a valvular heart disease characterized by the narrowing of the orifice of the mitral valve of the heart.The treatment of rheumatic mitral stenosis ranges from conservative medical management to CMV,OMV,BMV or mitral valve replacement with prosthetic valve.
Methods: The study based on randomized 60 consecutive patients with severe rheumatic mitral stenosis [defined as mitral valve area less than 1 cm^2] who were alternately assigned to undergo either CMV or PTMC.
Results: Results were reduction in peak transmitral gradients in both the groups along with improvement in mitral valve area and reduction in LA diameter in time.
Conclusion: Both closed mitral valvotomy and PTMC are successful means of treatment with a gain in valve area and reduction in transmitral gradient. Though, no mortality was in CMV group, one death was reported in the PTMC group.

KEYWORDS

Mitral Stenosis, Closed Mitral Vulvotomy, Percutaneous Transmitral Commissurotomy

INTRODUCTION

Mitral stenosis is a valvular heart disease characterized by the narrowing of the orifice of the mitral valve of the heart. Almost all cases of mitral stenosis are due to disease in the mitral valve apparatus secondary to rheumatic fever[1] and the consequent rheumatic heart disease as evident with rheumatic changes present in 99% of stenotic mitral valves excised at the time of mitral valve (MV) replacement. Rheumatic valvular disease always acquired before age 20 and becomes clinically evident one to three decades later. The degree of calcification varies; it is more common and of greater severity in men, older patients and those with a higher transvalvular gradient.

Depending upon the severity of the disease, the treatment of rheumatic mitral stenosis ranges from conservative medical management to closed mitral valvotomy (CMV), open mitral valvotomy (OMC), and the more recent balloon mitral valvotomy (BMV) or mitral valve replacement with prosthetic valve[2].Closed mitral valvotomy is one of the very old surgical technique having been around for decades. With the advent of open heart surgery and balloon mitral vulvotomy, the number of closed mitral vulvotomy performed in the Western nations is relatively small nowadays[2].However the simplicity, technical ease and lower cost make it commonly performed mitral valve surgery in Eastern and developing nations like India. Although CMV is almost an obsolete procedure in the West, it is still routinely performed in India and other Asian countries in large scale. Balloon Mitral valvotomy is a minimally invasive therapeutic procedure to correct an uncomplicated mitral stenosis by dilating the valve using a balloon. Open mitral valvotomy is more invasive procedure where sternotomy and Cardiopulmonary bypass is required for repair and valvotomy.

METHODS

The study based on randomized 60 consecutive patients with severe rheumatic mitral stenosis [defined as mitral valve area (MVA) less than 1 cm^2] who were alternately assigned to undergo either CMV (CMV group = 30 patients) or PTMC (PTMC group = 30 patients) in the Cardio-Thoracic Surgery Department and Cardiology Department of Gauhati Medical College Hospital,Guwahati. Patients undergoing BMV were managed by cardiologists in the cardiac care unit and those undergoing CMV were managed in the postoperative intensive care unit. The patients were personally studied from the time of their admission to the time of discharge or death and followed up in their subsequent visits. Closed mitral vulvotomy was carried out with antero-lateral thoracotomy, using transventricular Tubbs dilator with or without finger dilatation. Patients assigned to PTMC underwent the Inoue balloon (Toray Medical, Tokyo, Japan) technique. Echocardiographic assessment (Siemens,Model Acuson CV70) was performed thereafter 24 hrs for the PTMC group and 7 days for the CMV group before discharge and repeated at 1, 3 and 6 months later.

RESULTS

The age of the patients in this series ranged from 11 years to 50 years in the CMV group and 12 years to 51 years in the PTMC group with a peak between 21-30 years with a percentage of 43.33% and 40.0% respectively in both the groups.

In the present study, there were female predominance with 11 male patients (36.66%) and 19 female patients (63.33%) in the CMV group and 9(30.0%) male and 21(70.0%) female in the PTMC group respectively.

Changes in Mean transmitral pressure gradient

There was a fall in the mean and peak transmitral gradients in both groups of patients determined by Doppler echocardiography at 3 day, 1 month, 3month and 6 month after the procedure. Transmitral peak gradients were in the ranges of 9 to 20 mm Hg with mean and SD 16.067±2.477 mmHg before CMV and 11 to 19 mm Hg with mean and SD 14.728±1.866 mmHg before BMV. They decreased significantly immediately after both the procedures to range between 5 and 15 mm Hg. The comparison of reduction in mean trans-mitral gradient after CMV and PTMC at six months follow up is 4.217±.904(mean & SD) for CMV group and 4.948±1.129(mean & SD) for PTMC group. The two-tailed P value equals 0.0079 and by conventional criteria, this difference is considered to be very statistically significant.

Changes in Mitral valve area

Immediately after balloon mitral valvuloplasty, mitral valve area increased from 0.755± 0.126(mean & SD) cm^2 to 1.30± 0.154(mean & SD) cm2. At one week follow up after Closed mitral commissurotomy, MVA increased to 1.2cm^2 from baseline of 0.735±0.122 cm^2.The overall increase in mitral valve area at six month follow up for the CMV and BMV group is up to 1.687± 0.353 cm^2 and 1.556± 0.303cm^2 respectively. Immediate Echocardiographic results showed no statistically significant difference between the 2 groups regarding the final MVA as the two-tailed P value equals 0.1286.

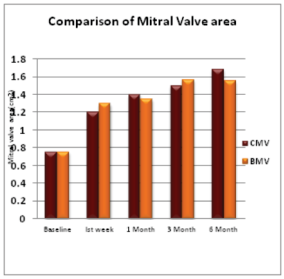

Fig.1 Bar diagram showing the increase in Mitral valve area (cm2) at different stages of follow up.

Changes in Left at rial dia meter

The left atrial diameter is measured in echocardiography by using M-mode scan of parasternal long axis view (PLAX) and parasternal short axis view (PSAX). The normal left atrial diameter is 19-40 mm.

The comparison of left atrial diameter before and after Closed mitral valvotomy and Balloon mitral valvotomy with subsequent follow-up period is shown below in graph where the mean & SD in pre-operative and post-operative after six months for CMV and BMV group are 55.47±8.42, 44.24±4.76 and 51.63±6.16, 46.00±4.99 respectively. P value is less than 0.0001 and 0.0003 for CMV and BMV groups which are considered to be extremely statistically significant.

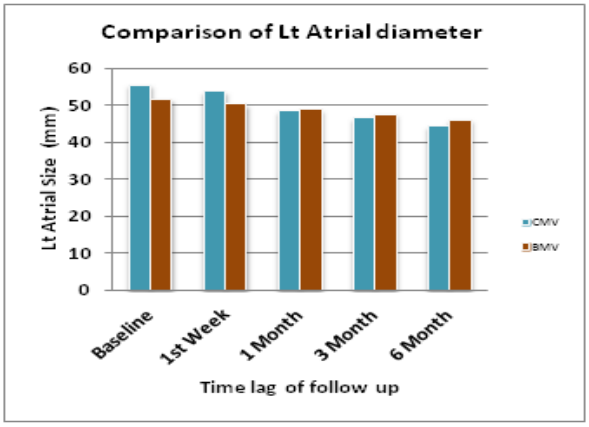

Fig. 2 Bar diagram showing the reduction in LA size at different stages of follow up

Of the 30 patients who underwent PTMC, 26 had a successful procedure (86.66%), compared with 100% patients who underwent CMC. Two patients who underwent PTMC had to cross over to CMC and one patient underwent Mitral valve replacement. There was a mortality of one female patient of 48yrs old who had hemopericardium and cardiac tamponade following Right atrial injury during the procedure. The Patient underwent emergency Midline sternotomy, but succumbed to her injury due to cardiogenic s hock.

DISCUSSION

Mohamed Ben Farhat et al[3] found Residual atrial septal defect in 2 patients and severe grade 3 mitral regurgitation in 1 patient in the BMC group. Raju S Iyer[4] et al concluded in their study that seven patients out of fifty (14%) in the failed BMV group had to be switched over to the surgical procedure, of whom 3(6%) had to undergo a mitral valve replacement. In our study none in the CMV group needed a valve replacement. One patient in PTMC group required emergency valve replacement due to severe mitral regurgitation. In this study, the average hospital stay was 7 and 3 days respectively for CMV and BMV group.

CONCLUSION

We conclude that both closed mitral valvotomy and PTMC, which is considered as the standard mitral commissurotomy procedure worldwide, are successful means of providing relief from severe mitral stenosis with a gain in valve area and reduction in transmitral gradient. Both techniques have almost similar procedural success, and follow-up events without much difference in overall results, although the duration of hospital stay was appreciably less in the PTMC patients (3 vs 6 days). One patient had to undergo emergency valve replacement due to complication of severe regurgitation in PTMC group. One death in the PTMC group reported as compared to CMV group. Most of the patients with rheumatic valvular disease in this country come from the poorer class of the society and this low cost CMV surgery, which is questioned whether this is an outdated surgery for mitral stenosis in the western world, is still relevant to the patients of developing country. CMV is a simple and safe procedure in expert hand with very minimum risk and is a well acceptable alternative to PTMC procedure in terms of cost and complications.

Table 1. Details of patients crossed over

Sl. No.	Age/Sex	First technique	Reasons for crossover	Technique used next	Result
1	48yrs/F	PTMC	RA injury	Emergency exploration for CMV/MVR	Death
2	40yrs/F	PTMC	Sealed RA injury followed by pericardial adhesion	Elective MVR with23mm SJM prosthetic valve	Success
3	41yrs/M	PTMC	Failure of septal puncture	CMV	Success
4	31yrs/F	PTMC	Balloon couldn't be positioned across MV into LV	Elective CMV	Success

Table 2. Comparison of complications for CMV and Balloon commissurotomy

Complications		CMV	PTMC
Mitral Regurgitation<2+		3(10%)	5(16.6%)
Mitral Regurtation,severe		0	1
Atrial septaldefect		0	2(6.6%)insignificant
Mitral valve replacement		0	1
OMC		0	0
Thromboembolism		0	0
Failure	Chamber injury	0	2
	Septosto my failure	0	2(6.6%)
	Failure of LV entrance	0	1(3.3%)
Infection		0	0
Re-exploration		1(3.3%)	0
Death		0	1(3.3%)

REFERENCES

1. Mensah GA: The burden of valvular heart disease. In: Otto CM, Bonow R O , e d . Valvular Heart Disease: A Companion to Braunwald's Heart Disease, Philadelphia: Saunders/Elsevier; 2009:1 18.
2. Zerzina rahman1, mostafa nuruzzaman1, nazib ahsan1, ayesha sultana1, rezwanul hoque2, aslam hossain2. Closed Mitral Commissurotomy (CMC) at Bangabandhu Sheikh Mujib Medical University - Outcome Study. University Heart Journal Vol. 6, No. 2, July 2010.
3. Ben Farhat M, Ayari M, Maatouk F, Betbout F, Gamra H, Jarra M, Tiss M, Hammami S, Thaalbi R, Addad F. Percutaneous balloon versus surgical closed and open mitral commissurotomy: seven-year follow-up results of a randomized trial. Circulation 1998;97(3):245-50.
4. Raju S Iyer, MCh, Rajnish Jain, MD[1], Manoj Padmanabhan, MCh, Abha Chandra, MCh, Sanjeev Agarwal, DM[2], Raja Sekhar, DM[2], Dilip Dronamraju, FRCS.Asian Cardiovasc Thorac Ann 1998;6:285-287.