PERCUTANEOUS TRANSMITRAL BALLOON COMMISSUROTOMY [PTMC] PROCEDURAL SUCCESS AND IMMEDIATE RESULTS

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Back ground: Percutaneous trans-mitral balloon commissurotomy for stenosed mitral has been practiced with good results in Cath Lab of department of cardiology Lady Reading Hospital Peshawar.

Objectives: The aim of this study is to audit percutaneous trans-mitral balloon commissurotomy [PTMC] in our current set up.

Methods: One hundred and fifty patients underwent PTMC, from, 1st January 2009 to 10th March-2013 in Cath Lab of department of cardiology Lady Reading Hospital Peshawar.

Results : Females were 65% percent and male were 35%. Age range was from 19 years to 55years and the mean age was 27 years. The procedural success was achieved in 144(96%) patients, in one patients we failed to dilate a tough septum, in one patient, the balloon got stuck to the septum and failed to cross the mitral valve(MV), two patients developed severe mitral regurgitation (MR) due to PTMC, one patients had successful emergency mitral valve replacement(MVR),another patient died soon after MVR. Two patients developed ischemic stroke due to systemic embolization .In optimal PTMC,70% were having mild MR,25% moderate MR and 5% leaflet perforation with mild MR. Hemodynamic data in the Cath. Lab showed left atrial mean (±SD) pressure dropped from 28 (±3.1) mmHg to 09 (±2.3) mmHg. LA-LV gradient dropped from an average of 25 to 5 mmHg. Echocardiographic assessment showed mean (±SD) mitral valve area increased from 0.90 (±0.20) cm2 to 1.80 (±0.4) cm2 ($p<0.001$) and PA pressure dropped from78 (± 25) to 35 (±10) mmHg ($p<0.01$).

Conclusion:
We conclude that PTMC is a safe procedure with good success rate and optimal results.

PJC 2013; 24: 05-10

INTRODUCTION

The incidence of rheumatic fever is on decline in the western world[1,2] but is still a common problem in developing countries like Pakistan with a prevalence rate of 22/1,000 population. This high prevalence rate put Pakistan among the highest in the world.[3] Recent reports has documented incidence of RF as high as 206/100.000 and rheumatic heart disease (RHD), prevalence as high as 18.6/1000 though there are variations in the different geographical areas.[4,5,6]

Patients who develop acute rheumatic fever have an asymptomatic period of approximately 15 to 20 years before symptoms of mitral stenosis(MS)develop. It then takes approximately 5 to 10 years for most patients to progress from mild disability (i.e., early New Yark heart association (NYHA Class II) to severe disability (i.e., NYHA functional Class III or IV) and needs PTMC. Mitral valve surgery is most often

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PJC Vol 24, No. 1 & 2
January — June 2013

performed for mitral regurgitation (MR) because most patients with mitral steno¬sis (MS) are treated by this percutaneous approach.[7]

The mitral valve (MV) is the most frequently affected valve. It is solely affected in 25% and is affected with other valves in 40% of patients.[8] Inoue K and colleagues were the first to perform PTMC in 1982. Since then PTMC became a standard procedure to help patients with MS favorable for it.[9] PTMC tends to delay the need for MV replacement for about ten years or more and some of these patients may be amenable for redo valvuloplasty.[10]

PTMC is recommended for symptomatic patients with moderate to severe MS (i.e., a mitral valve area < 1 cm2/m2 body surface area [BSA] or <1.5 cm2 in normal-sized adults) and with favorable valve morphol¬ogy, no or mild MR, and no evidence of left atrial thrombus. Even mild symptoms, such as a subtle decrease in exercise tolerance, are an indication for intervention because the procedure relieves symptoms and improves long-term outcome with a low pro¬cedural risk. In addition, PTMC is recommended for asymptomatic patients with moderate to severe MS when mitral valve obstruction has resulted in pulmonary hypertension with a pulmonary systolic pres¬sure greater than 50 mm Hg at rest or 60 mm Hg with exercise.[11]

The most crucial step in PTMC is the trans septal puncture, which is best located in the fossa ovalis or the lower third of the interatrial septum for easy crossing of the MV by the balloon and the most serious complications are accidental puncture of the aorta or the atrial wall causing bleeding or tamponade.Left atrium may be entered via patent foramen ovale (PFO). The valve dilatation may also lead to severe mitral regurgitation The successfulness of the procedure is measured in the Catheter Laboratory by the drop in the mean LA pressure and the drop in the trans- valvular pressure gradient. While it is evident by echocardiography if the mitral valve area (MVA) became > double tit is increased by >1cm^2.[7]

The likelihood of hemodynamic benefit and the risk of com¬plication with PTMC are predicted by anatomic features of the stenosed valve. Rigid thickened valves with extensive subval¬vular fibrosis and calcification lead to suboptimal results. Echocardiographic scoring system i.e Wilkin,s scoring is helpful in slecting cases,in which, leaflet rigidity, leaflet thickening, valvular calcification, and subvalvu¬lar disease are each scored from 0 to 4, A score of 8 or lower is usually associated with an excellent immediate and long-term result, whereas scores exceeding 8 are associated with less impressive results includ¬ing the risk of development of MR.[13,12] Even, in patients with suitable anatomic findings, long-term results are favorable, with excellent survival rates without functional disability or need for surgery or repeat PTMC.[14]

We carried out this study to audit all my cases of percutaneous trans-mitral balloon commissurotomy [PTMC], so far I have done from, 1st January 2009 till 10th March 2013.

MATERIAL AND METHODS

This is a cross sectional study, conducted from, 1st January 2009 to 10th March-2013 in Cath Lab of department of cardiology Lady Reading Hospital Peshawar.

One hundred and fifty patients with severe MS for PTMC (Most of them had Wilkins score <9) and made written consent for the procedure were enrolled. Patients with MR> grade2, LA thrombus of any type, bilateral commissural calcification or significant aortic valve (AV) disease were excluded. PTMC was done with the standard Inoue technique for all patients. Detailed clinical data, trans-thoracic and trans- esophageal echo, full procedural record and a post transthoracic echo on next day post procedure day were accomplished for all patients. All those

patients were excluded from the study whom, TEE showed left atrial thrombus, left atrial appendage thrombus or MR equal or more than moderate.[13,15]

The data was analyzed using Statistical Package for Social Scienc testing of difference between proportions was conducted, with a value corresponding to p <0.05 for significance.

RESULTS

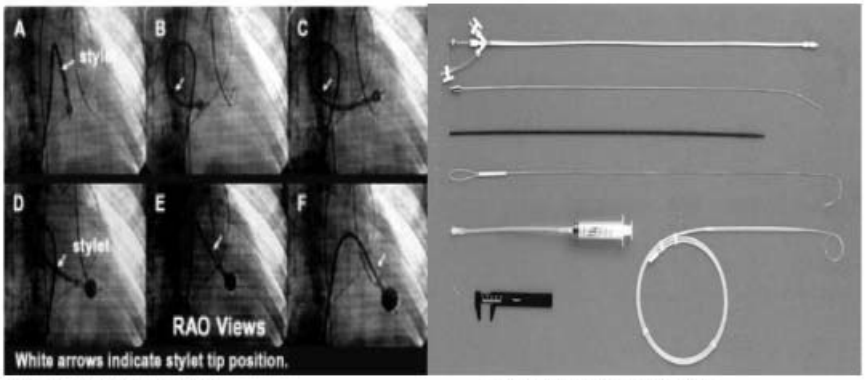
Total number of patients were 150, Females were 65% percent and male were 35%. Age range was from 19 years to 55years and the mean age was 27 years. The procedural success was achieved in 144(96%) patients, in one patients we failed to dilate a tough septum, in one patient, the balloon got stuck to the septum and failed to cross the MV,two patients developed severe MR due to PTMC, one patients had successful emergency MVR,another patient died soon after MVR. Two patients developed ischemic stroke due to systemic embolization . In optimal PTMC,70% were having mild MR,25% moderate MR and 5% leaflet perforation with mild MR. Hemodynamic data in the Cath. Lab showed left atrial mean (±SD) pressure dropped from 28 (±3.1) mmHg to 09 (±2.3) mmHg. LA-LV gradient dropped from an average of 25 to 5 mmHg. Echocardiographic assessment showed mean (±SD) mitral valve area increased from 0.90 (±0.20) cm2 to 1.80 (±0.4) cm2 (p<0.001) and PA pressure dropped from78 (± 25) to 35 (±10) mmHg (p<0.01). (Table)

DISSCUSSION

Mitral stenosis is mostly rheumatic in origin in the developing countries. It is more common in young female having average to low socio-economic background. PTMC is a safe procedure

TABLE

Total number of PTMC	n=150		
Female	65%		
Male	35%		
Age range	19 years to 55 years		
Successful PTMC	144(96%)		
		Pre PTMC	Post PTMC
	Mild MR	55%	70%
	Moderate MR	15%	25%
	Leaflet perforation	00	5%
	Left atrial pressure(±SD) mmHg	28(±3.1)	09 (±2.3)
	LA-LV gradient dropped (average)mmHg		25 to 5
	mean (±SD) mitral valve	0.90(±0.20)	1.80 (±0.4
	PA pressure mmHg	78 (± 25)	35 (±10)
PTMC abandoned	2 (1.3%)		
SEVERE MR	2(1.3%)		
MVR DONE IN URGENCY	2(1.3%)		
MORTALITY FROM PTMC	0		
MORTALITY FROM MVR	1(0.7%)		
ISCHAEMIC STROKE	2(1.3%)		



Procedure in PTMC

Instruments in PTMC

through PFO or interatrial septal punture, for opening of the achieving better mitral valve area (MVA), reducing significant and similar fall in right ventricular systolic pressure to acceptable levels with no to minimal associated complications.

In our study, total number of patients were 150, Females were 65% percent and male were 35%. Age range was from 19 years to 55years and the mean age was 27 years. The procedural success was achieved in 144(96%) patients.The age and sex distribution of our patients was not different from the data from other developing countries.[17,18] Our procedural success rate was similar to that reported by Nobuyoshi and colleges from Jaban, who studied 102 patients with a success rate in 92% and comparable to Arora and colleges from New Delhi who studied 4,838 patients with a success rate of (99.8%). Also, our results are in keeping with those of Paul and his team at Texas who had 87% success rate in their 45 patients. This data reflects procedural success rate in relation to the load of work and hence the experience of the centre.[17-19]

We achieved optimal results in 96% of our patients which were comparable to that achieved by Arora and colleges, Nobuyoshi from Jaban, Yonga from Nairobi and Luiz from Brazil but they are different from Texas group who achieved optimal results in 71% of their study group. Of special note was the results of our patients who had special problems or difficult cases which showed optimal results in 92% of them[17-20]

Our results show similar as reported by Ishikura et al and Hassan et al. There was similar success, less number of compluications,similar fall in right ventricular systolic,mitral valve gradient (MVG) and right ventricular systolic pressure (RVSP) .This is comparable to PTMC done in the same unit by Adnan, Hikmatullah Jan as well in international series as well.[21,22,23]

In our study,hemodynamic data in the Cath. Lab showed left atrial mean (±SD) pressure dropped from 28 (±3.1) mmHg to 09 (±2.3) mmHg. LA-LV gradient dropped from an average of 25 to 5 mmHg. Echocardiographic assessment showed mean (±SD) mitral valve area increased from 0.90 (±0.20) cm2 to 1.80 (±0.4) cm2 ($p<0.001$) and PA pressure dropped from78 (± 25) to 35 (±10) mmHg ($p<0.01$). In several series, the hemodynamic results of PTMC have been favorable and comparable to our study, with reduction of the transmitral pressure gradient from an average of approximately 18 to 6 mm Hg , and an average doubling of the calculated mitral valve area, from 1 to 2 cm2.[11,24]

In our study one patient died soon after MVR,which was performed as severe MR developed, during PTMC, this is similar to reported mortality rate with ranged from 1% to 2%.[11,24] In our study, two patients developed severe

MR due to PTMC, one patients had successful emergency MVR. Two patients developed ischemic stroke due to systemic embolization. The procedural complications in our series were not so different from those obtained by Arora.18181818 The complications is comparable to another international studies in which cerebral emboli and cardiac perforation occurred in 1% of patients, and the development of MR severe enough to require operation in 2% (approximately 15% develop lesser, but still undesirable, degrees of MR).[11,24]

In comparison to this in our study, in our study,in patients who were decalred successful procedure,lesser MR (but undesirable) occurred ,which was mild in70% and moderate MR in 25% and leaflet perforation with mild MR in 5% of cases. But these were not much different from Pre PTMC MR status as exclusion criteria was MR more than mild.

In international literature,approximately 5% of patients are left with a small residual atrial septal defect, but this closes or decreases in size in most. Rarely, the defect is large enough to cause right-sided heart failure; we noticed it in 3% of the patients.[11,24]

CONCLUSION

This study demonstrated that PTMC in our current set up is a safe procedure with a good success rate and optimal results.

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