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Immediate and Midterm Impact of Percutaneous Transvenous Mitral Valve Commisurotomy (PTMC) on Right Ventricular Function

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Abstract:

Mitral stenosis (MS) affects right ventricular (RV) function as a result of myocardial and hemodynamic factors. Although the long-term effects of mitral commissurotomy are well known, the aim of this study was to evaluate the immediate and midterm impact of percutaneous mitral commissurotomy (PTMC) on RV function in patients with MS. This is an observational study conducted at University cardiac centre, Bangabandhu Sheikh Mujib Medical University during December 2012 to November 2013 (one year), among 50 patients Patients presenting with mitral stenosis, who fulfill the criteria to PTMC procedure attending Cardiology department of BSMMU during the study period were enrolled in this study whereas, patients with systemic hypertension, diabetes mellitus, more than mild mitral and aortic regurgitation and or aortic stenosis, with history of previous mitral and aortic valve surgery, atrial fibrillation and bundle branch block were excluded from the study. The current study shows female predominance (66%) and majority (68%) of study population were in age group between 36-40 years. 90% of study population presented with fatigue and other symptoms includes shortness of breath (85%), palpitation (65%), chest pain (28%), dizziness (25%), ankle edema (15%) and headache among 10%. Echocardiographic measurement showed, MVA significantly improved immediately and 6 months after PTMC among the study population. Hemodynamic function of the study sample revealed significantly reduction of PASP, PADP and mean PAP immediately and 6 months after PTMC. 2 D echocardiographic parameter of right ventricular systolic function showed RVOTfs%, Tei index significantly improved immediately and 6 months after PTMC.Others parameters of RV systolic function TAPSE, RVFAC and RVEF(2D and 3D) remain stable immediately after but showed significant improvement 6 months after PTMC. There was significant reduction in IVA during the immediate period following PTMC and also after 6 months.. Immediately and 6 months after successful PTMC, significant decrease in RV contractility as assessed by IVA was observed whereas other parameters of infundibular and global RV function as assessed by RVOTfs and Tei index showed significant improvement. TAPSE,RVFAC and RVEF(2D and 3D) remain stable immediately after PTMC but showed significant improvement 6 months after PTMC. Further work using larger numbers of patients is needed to confirm our findings and to assess their utility in patient follow-up and management.

Keywords: Mitral stenosis, Doppler tissue imaging, Right ventricular function, Percutaneous transvenous mitral commissurotomy

Introduction:

Mitral stenosis (MS) is a disabling and eventually lethal disease. Untreated progressive disease can lead to significant symptoms and serious complications. The great majority of cases in adults are due to rheumatic heart disease, with symptoms usually appearing 16 to 40 years after the episode of acute rheumatic fever. According to the annual report by the World Heart Federation, an estimated 12 million people are currently affected by rheumatic fever and rheumatic heart disease worldwide, prevalence of rheumatic heart disease, reporting 0.14/1000 in Japan (Kawakita 1986), 1.86/1000 in China[20] 0.5/1000 in Korea[18], 4.54/1000 in India[1], and 1.3/1000 in Bangladesh[2]. Among them mitral valve is affected in 75% cases.

Abnormalities of right ventricular function (RVF) play an important role in the development of clinical symptoms and the overall prognosis of the patients with mitral valve stenosis (MS)[4,14]. RVF may be affected by the Rheumatic process directly (Borer, Hochreiter & Rosen 1991) or through hemodynamic changes due to pulmonary vascular

alterations[11]. Hemodynamic and radionuclide studies (Burger et al. 1997, Hirata 1992) have demonstrated long term improvement in RVF after Percutaneous balloon mitral valvuloplasty (PTMC). Few studies have examined the immediate impact of PTMC on echocardiographic markers of RV systolic and diastolic function[4,7,10]. There is no study showing midterm effect on right ventricular function following PTMC. The purpose of this study is to assess the immediate and midterm effect of PTMC on RVF using two and three dimensional, pulse and tissue Doppler echocardiographic indices.

However, systematic assessment of right ventricular function is not uniformly carried out in past due to enormous attention given to the evaluation of the left heart and paucity of ultrasound studies providing normal reference value of right ventricular function. It is hoped that this study will lead to further work in future over larger populations and application of the values will enhance the value of echocardiography in recognizing right ventricular function as well as improving disease detection and patient follow-up[25].

Percutaneous valvotomy using inflatable balloon catheters was first developed as a therapeutic option for congenital pulmonary and aortic valvular stenosis almost 30 years ago. Percutaneous mitral balloon valvotomy has subsequently become a mainstay of the management of rheumatic mitral stenosis . In the past, closed or open commissurotomy (after the advent of cardiopulmonary bypass) was the mainstay of therapy for rheumatic mitral stenosis. However, in the early 1980s, several techniques of mitral balloon valvotomy were developed incorporating single or double cylindrical balloons, and even a mechanical dilator. Currently, this procedure is most often performed using trans septal access to the left atrium and a balloon catheter developed by a Japanese surgeon, Kanji Inoue.

There are few studies on immediate outcome of PTMC in patients with MS. There is also no study showing midterm effect on right ventricular function following PTMC. Because the availability, cost effectiveness and sensitivity of echocardiography in measurement of right ventricular function, the current study is done with an aim to identify some new parameters related to prognosis and outcome of PTMC in MS patients. The purpose of this study to evaluate immediate and midterm impact of Percutaneous Transvenous Mitral valve Commisurotomy (PTMC) on right ventricular function (RVF) in patients with Mitral valve stenosis

Materials and Methods:

This is an observational study conducted at University cardiac centre, Bangabandhu Sheikh Mujib Medical University during December 2012 to November 2013 (one year), among 50 patients Patients presenting with mitral stenosis, who fulfill the criteria to PTMC procedure attending Cardiology department of BSMMU during the study period were enrolled in this study. Same number of Age and sex matched healthy volunteers selected who were interested to be part of this study and none of them having evidence of structural or functional cardiovascular diseases taken as a control.

Inclusion Criteria:

Patients with mitral valve stenosis who fulfill the indications for PTMC.

Exclusion Criteria: Patients with the following criteria were not included in the study:

Systemic hypertension

Diabetes mellitus

More than mild mitral and aortic regurgitation and or aortic stenosis

Previous mitral and aortic valve surgery

Atrial fibrillation and

Bundle branch block

Study Procedure:

Initial evaluation of the patient was done by detailed history, thorough physical examination and relevant investigations: ECG, Echocardiogram and RBS done and Demographic data (age, sex, religion, occupation, address) recorded in a pre-designed data collection form. . Risk factors profile including HTN, DM, previous cardiac surgery, family H/O coronary artery disease and smoking history were noted.

Echocardiographic Measurements:

After selection of the study sample that fulfilled the inclusion criteria, two and three dimensional echocardiography and pulse and tissue Doppler studies was performed 24-72 hours before and 24 – 48 hours and 6 – 12 months after PTMC.

All study patients underwent an echocardiographic examination with the Vivid 7 Dimension ultrasound imaging system (General Electric, GE), which is equipped with a 3.5 MHz transducer for 2D-TTE, and a 4 MHz 4X matrix array transducer for 3D-TTE. The same experienced echo cardiographer performed all measurements using the recommendations of the American Society of Echocardiography

Mitral valve area (MVA) was determined by planimetry in every patient. The Wilkins score was used to judge mitral leaflet mobility, valvular and subvalvular thickening, and

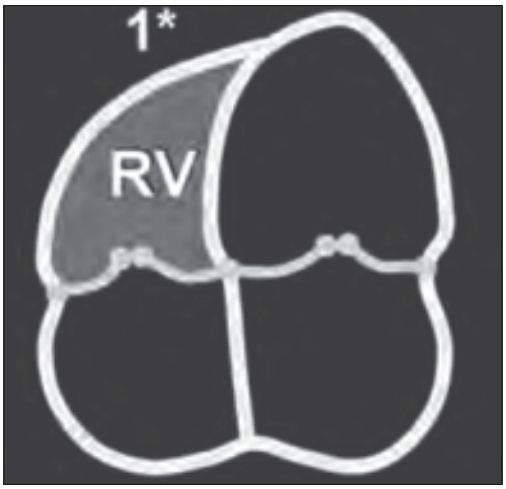

Fig.-1: *Diagram showing the recommended apichamber(A4C) view with focus on the right ventricle (RV view with focus on the right ventricle.*

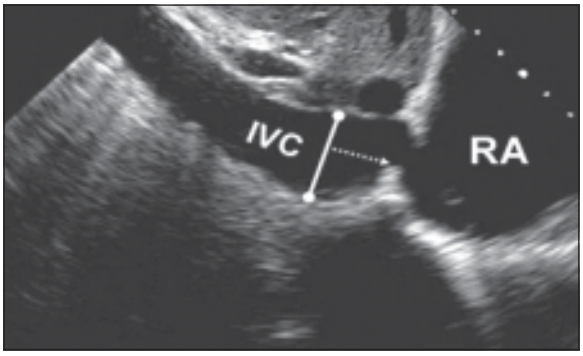

Fig.-2 : *Inferior vena cava (IVC) view. Measurement of the IVC. The diameter (solid line) is measured perpendicular to the longaxis of the IVC at end-expiration, just proximal to the junctionof the hepatic veins that lie approximately 0.5 to 3.0 cm proximalto the ostium of the right atrium.*

calcification (Wilkins et al. 1998). Twenty four to 48 h and 6 months after mitral balloon dilatation, MVA was again determined by planimetry. Systolic pulmonary artery pressure was derived from the tricuspid regurgitant jet peak velocity using the modified Bernoulli equation (peak gradient $4V^2$, where V is the maximal velocity of the tricuspid regurgitant jet). We further assumed a right atrial mean pressure of 10 mmHg in patients, based on the absence of inferior vena cava dilation greater than20 mm, and 5 mmHg in controls. From the parasternal short-axis view at the level of the aortic root, the RV outflow tract diameters at end-diastole and end-systole were measured. RV outflow tract fractional shortening (RVOTfs) was calculated using the formula RVOTfs = [RVOTd - RVOTs]/RVOTd where d and s represent enddiastolic and end-systolic dimensions.

The tricuspid annular plane systolic excursion (TAPSE) was determined by the difference in the displacement of the RV base during systole and diastole. TAPSE is acquired by placing an M-mode cursor through the tricuspid annulus and measuring the amount of longitudinal motion of the annulus at peak systole.

RV end-diastolic and end-systolic areas were measured from the apical four chamber view to calculate RV fractional area change (RVFAC).

The Tei index of RV myocardial performance was calculated as the time between tricuspid valve closures to tricuspid valve opening, divided by the RV ejection time, determined by pulsed Doppler. In the pulsed Doppler method, the ET is measured with pulsed Doppler of RV outflow (time from the onset to the cessation of flow), and the tricuspid (valve) closure-opening time is measured with either pulsed Doppler of the tricuspid inflow (time from the end of the transtricuspid A wave to the beginning of the transtricuspid E wave) or continuous Doppler of the TR jet (time from the onset to the cessation of the jet). These measurements are

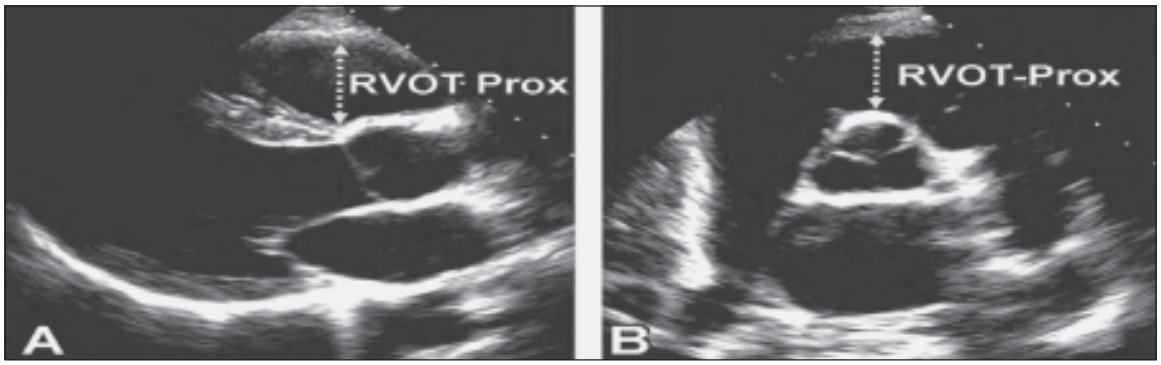

Fig.-3: *Measurement of right ventricular outflow tract (RVOT) dimensions at the proximal or subvalvular level (RVOT-Prox) and at the distal or pulmonic valve (RVOT-Distal) in the (A) parasternal long-axis RVOT anterior portion view, (B) basal parasternal short-axis view.*

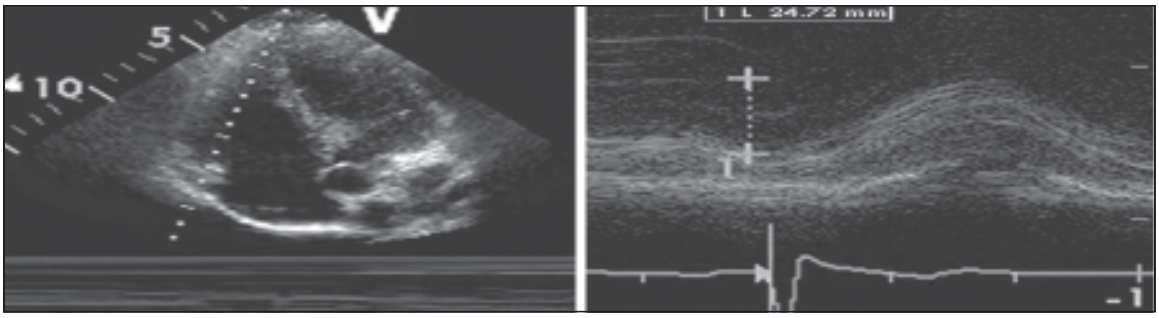

Fig.-4: *Measurement of tricuspid annular plane systolic excursion (TAPSE).*

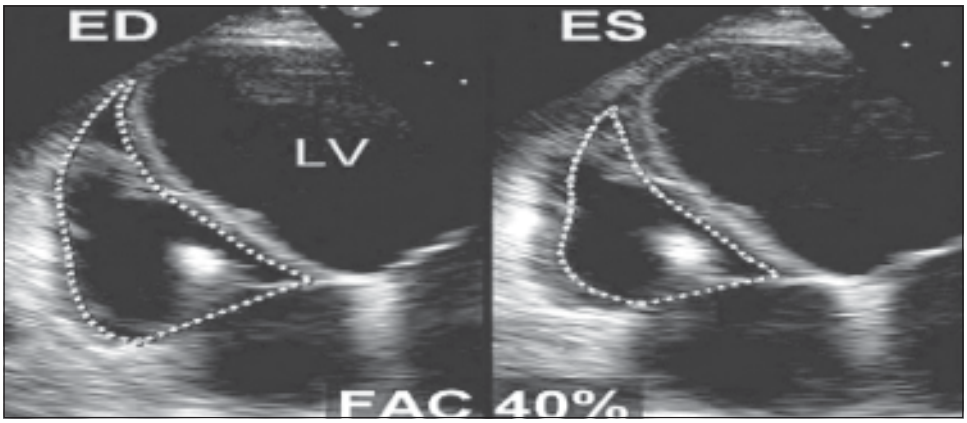

Fig.-5: *Right ventricular fractional area change (FAC). Percentage FAC = 100 X end-diastolic area (Area ED) - endsystolic area (Area ES)/end-diastolic area*

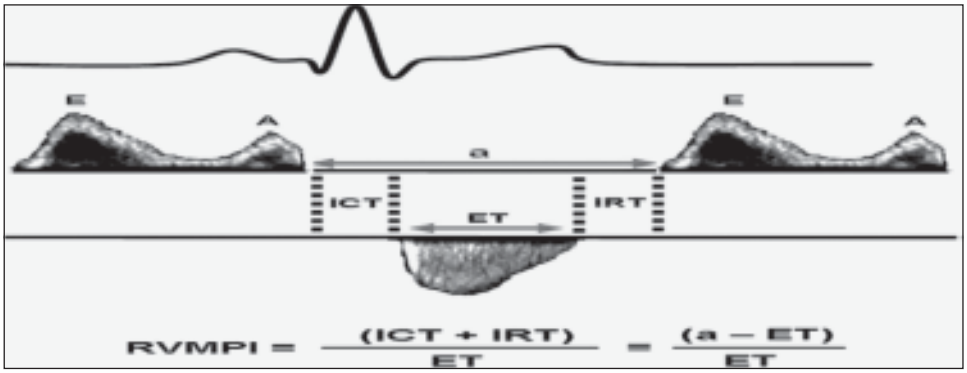

Fig.-6: *Calculation of right ventricular myocardial performance index (MPI) by pulsed Doppler and pulsed tissue Doppler [MPI = (TCO - ET)/ET]*

taken from different images, and one must therefore attempt to use beats with similar R-R intervals to obtain a more accurate Tei index or RIMP value. We did not measure regional RV Tei index from DTI (Doppler tissue imaging). The disk summation method has also been applied to determine a RV ''body'' volume, using predominantly right ventricle–focused apical 4-chamber view. RV EF from 2D methods is calculated as (end-diastolic volume - end-systolic volume)/end-diastolic volume).

3D echocardiography Disk summation methods were used for RV volume and EF calculation.

Measurement of RV Diastolic Function from the apical 4-chamber view, pulse Doppler beam should be aligned parallel to the RV inflow. The sample volume placed at the tips of the tricuspid leaflets. Pulse Doppler velocities of the transtricuspid flow (E, A, and E/A), deceleration time were measured. Pulsed wave DTI was obtained by activating the machine's Doppler tissue imaging function

with gains adjusted to eliminate transvalvular flow velocities and minimize noise. A 3.5 mm sample volume was placed at the septal and lateral side of the tricuspid annulus. Peak myocardial velocities during systole, early, and late diastole together with the isovolumic contraction time were measured at a sweep speed of 100 mm/s. Myocardial acceleration during isovolumic contraction (IVA) was measured by dividing myocardial velocity during isovolumic contraction by the time interval from onset of the myocardial velocity during isovolumic contraction to the time at peak velocity of this wave. RVS′ or RV systolic excursion velocity measured by pulsed tissue Doppler. To perform this measure, an apical 4-chamber window is used with a tissue Doppler mode region of interest highlighting the RV free wall. The pulsed Doppler sample volume is placed in either the tricuspid annulus or the middle of the basal segment of the RV free wall.

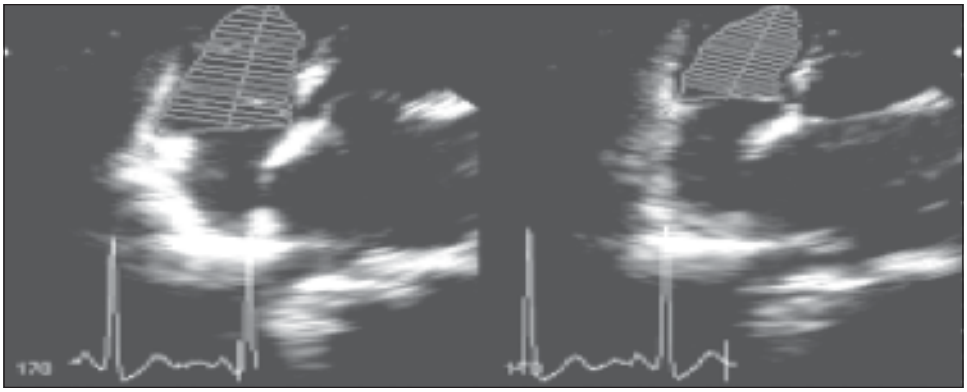

Fig.-7: *2D Measurement of RVEF (%).*

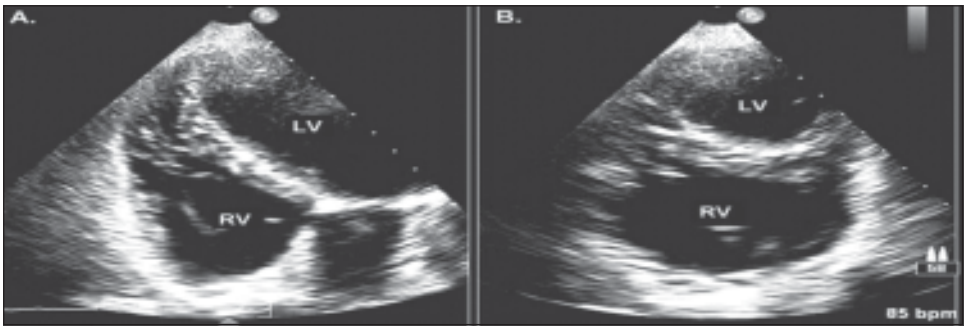

Fig.-8: *Biplane imaging of the right ventricle using 3D matrix array transducer obtained from an off-axis apical window. The orthogonal (A) and transverse (B) planes.*

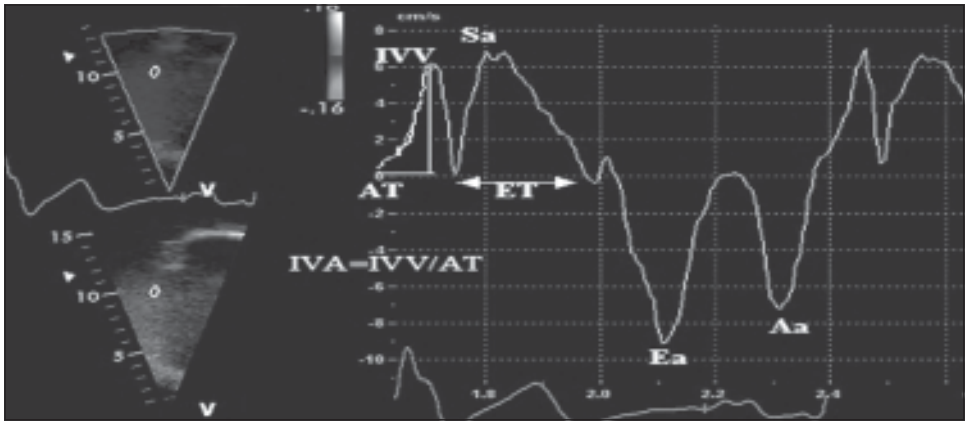

Fig.-9: *Doppler tissue velocities and time intervals obtained at lateral tricuspid valve annulus. Aa, Peak velocity during atrial contraction; AT, acceleration time; Ea, peak velocity during early diastole; ET, ejection time; IVA, myocardial acceleration during isovolumic contraction; IVV, peak myocardial velocity during isovolumic contraction; Sa, peak velocity during ejection period of systole.*

All 2D and 3D echocardiographic and Doppler studies were analyzed by 2 experienced readers by the average 5 cardiac cycles to minimize difference during the breath cycle (using the recommendation of the American society of echocardiography).

Statistical Analysis

Procedural outcome analysis was done by statistical analysis of all data including clinical and echo-cardiographic variables. Computer programmed based SPSS (statistical programme for social sciences) version 16.0 for statistical analysis. Data were expressed as mean ± SD. Analysis employed the ANOVA to determine the significance of differences before, immediate and 6 months after PTMC. The differences between patients with MS and healthy subjects were identified using an Student's *t*-test. A p value < 0.05 as considered statistically significant.

Results:

The findings of the study obtained from data analysis are presented below:

Table-I

Demographic characteristics of the study population (n=50)

Characteristics	Number	Percentage (%)
Age in years		
30-35	16	32.0
36-40	34	68.0
Mean±SD	35.36±3.36	
Sex		
Male	17	34.0
Female	33	66.0
Occupation		
Business	8	16.0
House wife	17	34.0
Others	25	50.0

Table I showing majorities (68%) of study population were in age group 36-40 years and 32% were in age group 30-35 years. The average age was 35.36 years. Regarding sex, majority were female (66%) and male (34%). In occupational status, 16% were businessmen, 34% were house wife and 50% were others.

Table-II

Clinical presentation of the study population (n=50)

Clinical presentation	Frequency	Percent
Fatigue	90	90
Shortness	85	85
Palpitation	65	65
Chest pain	28	28
Ankle Edema	15	15
Headache	10	10
Dizziness	25	25

Total will not correspond to 100% because of multiple responses.

Table-III

Echocardiographic measurements between Pre and post PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
MVA (cm)	0.68±0.13	1.61±0.10	1.60±0.12	0.001
LVESD (mm)	35.48±1.74	35.16±1.34	35.12±1.72	0.475
LVEDD (mm)	47.50±2.19	46.00±1.80	46.32±.93	0.065
LVEF (%)	60.58±4.05	60.80±1.76	61.28±2.27	0.076
IVS (mm)	7.66±0.47	7.75±0.46	7.03±.48	0.067

Statistical analysis was done by ANOVA

Table-VI

Echocardiographic data of right heart dimension of Pre and post PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
RA dimension(mm)	47.12±2.33	46.60±2.56	43.34±2.17	0.001
RVOT dimension	37.32±2.04	35.82±1.99	33.96±1.67	0.001
RV wall thickness (mm)	5.58±1.15	5.56±0.82	5.32±0.81	0.175

Statistical analysis was done by ANOVA

Table-VIII

Haemodynamic function between pre and post PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
RA pressure (mmHg)	20.62±3.04	6.68±1.53	5.18±1.10	0.001
PASP (mmHg)	60.54±13.79	40.62±13.81	28.40±40.47	0.001
PADP (mmHg)	44.00±14.10	29.84±11.12	21.58±9.88	0.001
Mean PAP (mmHg)	52.26±13.54	35.18±11.67	23.90±6.18	0.001

Statistical analysis was done by ANOVA

Table-X

2D Echocardiographic parameter of right ventricular Systolic function between before and after PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
RVEF%	45.48±5.41	46.16±4.99	50.44±5.21	0.001
RVOT fs %	52.0±5.1	67±6.0	77±0.6.0	0.001
TAPSE	14.00±1.34	14.00±1.34	15.32±0.76	0.001
RVFAC	31.32±3.51	31.98±3.10	36.82±2.37	0.001
Tei index/MPI	0.47±0.02	0.34±0.03	0.28±0.03	0.001
RVS (mm)	10.28±3.47	9.00±0.83	11.14±0.90	0.058
IVA	3.16±0.19	2.14±0.17	2.26±0.19	0.001

Statistical analysis was done by ANOVA

Table-XI

Group	P value RVEF%	P value RVOT fs %	P value TAPSE	P value RVFAC	P value Tei index/MPI	P value RVS (mm)	P value IVA
I vs II	0.068	0.001	0.875	0.087	0.001	0.085	0.001
I vs III	0.001	0.001	0.001	0.001	0.001	0.056	0.001
II vs III	0.001	0.001	0.001	0.001	0.001	0.052	0.001

Statistical analysis was done by student t test
I= Before PTMC, II= Immediately after PTMC, III= 6 months after PTMC

Table-XII

Echocardiographic measures of RV diastolic function between pre and post PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
E(cm/S)	37.12±1.46	43.84±1.82	50.40±2.17	0.001
A(cm/S)	51.18±2.03	52.22±2.73	58.42±2.77	0.001
E/A ratio	0.72±0.03	0.80±0.02	0.85±0.16	0.001
Deceleration time (ms)	227.60±7.15	167.76±10.32	150.70±7.28	0.001

Statistical analysis was done by ANOVA

Table-XIII

Group	P value RVEF%	P value RV volume
I vs II	0.067	0.078
I vs III	0.001	0.001
III vs IV	0.001	0.001

Statistical analysis was done by student t test
I= Before PTMC, II= Immediately after PTMC, III= 6 months after PTMC

Table-XIV

3 D Echocardiographic measures of RV function between pre and post PTMC

Variables	Before PTMC	Immediately after PTMC	6 months after PTMC	P value
RVEF%	43.64±5.47	44.52±5.65	48.84±5.89	0.001
RV volume	54.84±17.81	53.74±16.61	41.36±22.38	0.001

Statistical analysis was done by ANOVA

Table II demonstrates the clinical profile of the study population. 90% patients complained of fatigue, 85% presented with shortness of breath, palpitation in 65%, chest pain in 28%, ankle edema in 15%, headache among 10% and dizziness 25%.

Table III showing echocardiographic measures of study population MVA significantly increased post PTMC were statistically significant (0.001).LVESD, LVEDD, LVEF and IVS remains stable which were statistically not significant.

Table VI showing echocardiographic measurement of right heart dimension of study population. RA dimension (mm) and RVOT dimension(mm) decreased significantly post PTMC than pre PTMC which are statistically significant (0.001). RV wall thickness did not showed statistically significant improvement.

Table VIII showing hemodynamic function of study population. This is significant improvement of haemodynamic function in immediate and 6 months after PTMC than pre PTMC. RA pressure, PASP, PADP and mean PAP decreased post PTMC which are statistically significant.

Table X showing 2 D echocardiographic parameter of RV systolic function. RVEF, RVOT fs, TAPSE, RVFAC, RVS and IVA improved in post PTMC which is considered to be statistically significant whereas Tei index/MPI and IVA is significantly reduced immediate and 6 months after PTMC.

Table XII showing echocardiographic measurement of RV diastolic function. E(cm/S), A(cm/S), E/A ratio & Deceleration time showed improvement in immediate and 6 months after PTMC which were statistically significant (p=0.001).

Table XIV showing 3D echocardiographic measure of RV function. RVEF increase 6 months and RV volume decrease both of these are statistically significant (p=0.001).

Discussion:

Mitral stenosis might cause impairment of right ventricular (RV) function due to both an increase in RV after load and rheumatic myocardial disease. Mitral valve disease is associated with proportional changes in right-sided heart morphology; however, severe tricuspid regurgitation is nearly always associated with right ventricular dysfunction, suggesting a synergistic relationship. Right ventricular dysfunction is likely as important as tricuspid regurgitation because it offers an explanation for the negative prognostic impact of tricuspid regurgitation (Abello et al. 2013). Abnormalities of right ventricular function play an important role in the development of clinical symptoms and the overall prognosis of the patients with MS.

The purpose of this study was to evaluate immediate and midterm impact of Percutaneous Transvenous Mitral valve Commisurotomy (PTMC) on right ventricular function (RVF) in patients with Mitral valve stenosis.

The quantitative echocardiographic assessment of RV function is difficult because of the ventricle's complex

trapezoidal anatomy. A wide variety of techniques have been proposed, but none is currently considered the gold standard. In practice, clinicians largely rely on two modalities: two-dimensional echocardiography and DTI echocardiography. The use of 3D has been validated for the measurement of RV volumes, EF, and stroke volume and compares favorably with CMR imaging[24].

The mode of clinical presentation in this study shows, 90% patients complained of fatigue, shortness of breath in 85%, palpitation in 65%, chest pain in 28%, ankle edema in 15%, headache among 10% and dizziness in 25%. Another study Kundu et al. (2012) reported that the majority (80%) of the patients complained shortness of breath, followed by 64% with palpitation, 30% with cough, 24% with chest pain and 6% with hemoptysis which is consistent with our current study.

In the present study, before PTMC, MVA by planimetry was (0.68+0.13 cm^2) which improved significantly immediately after (1.61+0.10 cm^2) and 6 months after PTMC (1.60+0.12cm^2) (p= 0.001). LVEDD ,LVESD and LVEF remained stable.

RA and RVOT dimensions significantly decreased immediately and 6 months after PTMC (p=0.001) which is consistent with another study done by Drighil et al. (2008). RV wall thickness remained unchanged following PTMC which was not significant (p= 0.175).

In this study, RA pressure, PASP, PADP and mean PAP significantly decreased immediately and 6 months after PTMC which is significant (p=0.001). These parameters are consistent with other studies done by Drighil et al. (2008) and Borges et al. (2006) and Kundu et al. (2012).

The present study also shows, RVOTfs(%) increased after PTMC than before PTMC from 52±5.1 to 67±6.0 and 77±0.6.0 (p= < 0.001) which is comparable to study done by Drighil et al.and Kundu et al. (2012) which showed RVOTfs (%) increased from 57 ± 1.5 to 72 ± 1.2 and 54.9±4.6 to74.9.±4.8 respectively. Significant lower RVOTfs (%) 52±51 in patients group than control group RVOTfs (%) 9.6±1.0 which is consistent with Tayyareci et al. (2008) and also Drighil et al. (2008), Kundu et al. (2012). TAPSE remained unchanged immediately after PTMC (14.00+1.34 mm) which is comparable to study done by Drighil et al but significantly increased 6 months after PTMC (15.32+0.76 mm). RVFAC did not improve immediately (31.98+3.10) but significantly increased 6 months after PTMC (36.82+2.37) which is also consistent with the study of Drighil et al. (2008) and Tei et al. (1996). The Tei index was much higher before PTMC than that in immediately after PTMC and 6 months after PTMC (0.47 ± 0.2 vs. 0.34 ± 0.03 and 0.28±0.3, p <0.001). These findings are consistent with study of Kundo et al (2012) and Drighil et al. (2008). Tayyareci et al. (2008) showed RV Tei index higher in the patients with mitral stenosis 0.69 ± 0.2 than in the control group 0.28 ± 0.06. Our current study is consistent with this result. RVS/ did not improve immediately after PTMC but significantly increased after 6 months.

In this study it was documented that mean IVA significantly (P<0.05) decreased immediately after PTMC which was 3.16 +0.19m/s^2 to 2.14+0.17 m/s^2. These parameters were consistent with Drighil et al. (2008), Vogel et al. (2002), Tayyareci et al. (2006) and Kundu et al. (2012). IVA showed positive trend 6 months after PTMC which was 2.14+0.17 m/s^2 to 2.26+0.19 m/s^2. Right ventricular IVA significantly decreased which actually reflect the acute decrease in RV after load and decrease in RV contractility immediately after PTMC. IVA is likely the most trustworthy parameter of RV function. However, in the absence of a gold standard, we decided to utilize multiple parameters to study RV functional changes before and after PTMC. This finding of a decrease in RV contractility, as assessed by IVA, may be clinically useful in prompting further diagnostic evaluation for patients with MS. 2D RVEF(%) was significantly increased 6 months after PTMC than before PTMC which was 50.44+ 5.21%, 45.48+5.42 %, respectively (p<0.05) but remain unchanged immediate after PTMC (46.16+4.99 %).

RV diastolic function E(cm/s) , A(cm/s) and Deceleration time was significantly improve immediately and 6 months after PTMC than before PTMC.

3D echocardiographic study of RV function in our study shows, significantly improvement in RVEF% 6 months after PTMC than before PTMC which was 48.84+5.89%, 43.64+5.47% respectively (p=0.001) but remain unchanged immediate after PTMC (44.52+5.65%)

This study was done to find out the improvement of right ventricular function immediately and 6 months after PTMC. Our results suggest that patients with MS have depressed global and regional function compared with normal subjects. The reasons for this impaired function in MS due to passive increase of left atrial pressure and the reactive changes of pulmonary arteriolar vasculature, right ventricular after load may increase to values 25 to 30 fold above normal, leading to right ventricular overload and right ventricular failure. The rheumatic heart disease may directly involve the myocardium, thus impairing right ventricular function (Burger et al. 1993). Intramyocardial branches of coronary vessels were involved in a form of active rheumatic vasculitis

or inactive lesions characterized by medial hypertrophy and replacement fibrosis to cause dysfunction (Malhotra et al.1987).

Conclusion:

This study shows after PTMC the parameters of infundibular and global RV function as assessed by RVOTfs and Tei index showed significant improvement immediate and 6 months after whether TAPSE,RVFAC and RVEF(2D and 3D) remain stable immediately after but showed significant improvement 6 months after PTMC. Significant decrease in RV contractility as assessed by IVA was observed and may actually reflect the acute decrease in RV afterload with its consequence on contractile function of the RV. Further work using larger numbers of patients is needed to confirm these findings and to assess their utility in patient follow-up and management.

Study Limitations

- The sample size was small in number
- Observation was done only in hospital and no long term outcome was observed.
- Unavailability of 3D RV reconstruction software leading to underestimation of RV volume

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