# ORIGINAL RESEARCH PAPER

## Surgery

## PRE AND POST OPERATIVE ASSESSMENT OF PATIENTS UNDERGOING MITRAL VALVE REPLACEMENT AND ITS CO-RELATION WITH PROSTHESIS PATIENT MISMATCH

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**ABSTRACT**

The aim of the study is to find out the effect of prosthesis patient mismatch on clinical outcome after mitral valve replacement. Prosthesis patient mismatch is present when effective orifice area of the inserted valve is too small in relation to body size. Twenty five patients were studied each in PPM group and non PPM group. The mitral prosthesis used in PPM group was 23mm TTK Chitra which had smaller effective orifice area. The peak and mean gradient was higher in PPM group as compared to non PPM group, but the NYHA class improved in both the groups. Thus the present study demonstrated that PPM does not affect the clinical outcomes.

## INTRODUCTION:

The concept of prosthesis patient mismatch (PPM) was first described in 1978 by Rahimtoola et al [1,2]. PPM is said to be present after heart valve replacement when in vivo effective orifice area [EOA] of the prosthetic valve is found to be less than the native healthy valve area[3].

Previous studies have demonstrated that PPM is associated with inferior haemodynamics, less regression of Left ventricular hypertrophy [LVH], more cardiac events and higher mortality rates after Aortic valve replacement[AVR][4,5] However, the haemodynamics and clinical impacts of PPM after Mitral valve replacement [MVR] are relatively unexplored[6,7].

Rheumatic heart disease is highly prevalent in Asia and India affecting Mitral valve more frequently requiring surgical or cardiology intervention, in the form of, Closed Mitral commissurotomy, Valve repair, Valve replacement (MVR).

The proposed study is an open prospective study of patients undergoing MVR during the period 2013 -2016.

After Preoperative assessment with 2D ECHO Doppler patients were subjected to MVR surgery.

Post-operatively patient were subjected to 2-D-doppler ECHO at three months to assess particularly the Pulmonary artery pressure, pressure gradients, effective valve area to diagnose PPM in addition to general information.

Patients were divided post-operatively in two groups; group A.PPM and group B .Non-PPM

## PATIENTS AND METHODS:

Baseline clinical data were prospectively collected in a computerized database.[8] Of the 50 patients included in this cohort, all had a complete Doppler echocardiographic examination performed at our institution three months after MVR. The Doppler echocardiographic measurements were performed as described.[8,7] Mitral valve EOA was determined by the pressure half time. The peak and mean transprosthetic pressure gradients were determined by the simplified Bernoulli equation. The systolic pulmonary arterial pressure was calculated by adding the systolic right ventricular pressure derived from the tricuspid regurgitation to the estimated right atrial pressure.

**PPM definition**: In the present study, the projected indexed EOA was derived from the echoardiographic calculation of effective orifice divided by body surface area. PPM was defined as clinically significant if the projected EOA indexed for body surface area was <1.2 cm²/m².

## STATISTICAL METHODS:

Statistical analysis was done by using descriptive and inferential statistics using Chi square test and Student's unpaired and paired't' test. Software used in the analysis was SPSS 22.0 and Graph Pad Prism 5.0 version. P<0.05 is considered as level of significance.

## RESULTS:

In group A six patients were male and nineteen patients were female. Group B had same distribution. There was no significant difference between the number of males and females in between the two groups.

In group A the maximum numbers of patients were between 35-44 yrs of age. In group B the maximum no of patients were in the same age group.

In PPM group the BSA was 1.53± 0.08 and in non PPM group was 1.41±0.16 which was statistically significant.

In PPM group 23 mmTTK Chitra was more commonly used as compared to non PPM group which had small effective orifice area.

Post operative reduction in size of left atrium in group A was 41.72±9.28mm and in group B was 41.36±6.94mm which was not statistically significant.

In group A the post operative pulmonary hypertension was 24.64±4.30 mmHg and group B it was 24.20±6.65 mmHg which was not statistically significant reduction in pulmonary hypertension.

In group A post operative left ejection fraction was 51.68±11.88 % and in group B the left ventricular ejection fraction was 60.92±9.21 % which was significant elevation in left ventricular ejection.

It was found that in group A the indexed effective orifice area was 1.09±0.12 cm²/m² and in group B was 1.72±0.15 cm²/m² which was more and statistically significant as shown in the graph
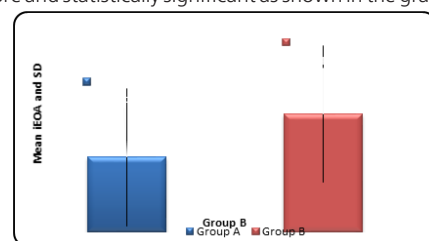


**Graph 1: Comparison of iEOA in both the group**

In group A Post operative peak gradient was 13.05±3.01 mmHg and in group B was 10.42±2.80 mmHg which was statistically significant as shown in the graph
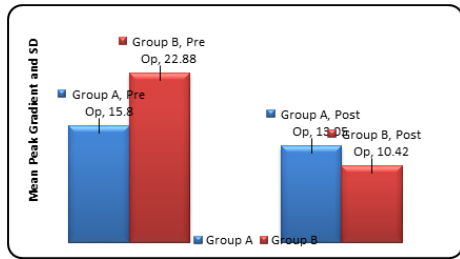


**Graph 2: Comparison of peak gradient in both the groups**

Clinical symptoms- In both the groups there was clinical improvement in the NYHA class. Only one patient with indexed effective orifice area of 1.0cm2/m2 was symptomatic with peak gradient of 18mm and mean gradient of 7mm. NYHA class improved in both the groups post operatively Mortality and morbidity-There was no in hospital mortality and morbidity in any of the groups.

**CONCLUSION:**
The concept / phenomenon of valve prosthesis patient mismatch described in 1978, has stood the test of time. From the time valve prosthesis mismatch has received a great deal of attention, but studies has come to varying conclusions.

Studies investigating the importance of valve prosthesis patient mismatch have focused on hospital and long term mortality, and measures of patients functional status and quality of life. These studies have had mixed results.

Present study also has mixed results. The incidence of PPM was 50%. The prosthetic valve most commonly used in PPM group was 23 mm TTK Chitra valve which gave a high peak and mean gradient. There was no statistically significant effect on left atrial size and pulmonary hypertension in between the two groups. The left ventricular ejection fraction and the peak and mean gradient improved in non PPM group. But postoperatively symptom wise there was no significant difference between the two groups.

In our study TTK Chitra mitral mechanical prosthesis showed satisfactory clinical performance even in smaller prosthesis size. Thus we conclude that PPM does not affect the short term outcomes after mitral valve replacement in our patients. In future we need to implant appropriate size prosthesis with good haemodynamics.

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