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Original Article

Patient profile and results of percutaneous transvenous mitral commissurotomy in mitral restenosis following prior percutaneous transvenous mitral commissurotomy vs surgical commissurotomy

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ABSTRACT

Background: Patients with mitral restenosis who have undergone prior PTMC or surgical commissurotomy have increased. Predictors of outcome of repeat PTMC in either subgroup of patients may be different.

Aims and objectives: Aim was to assess and compare the immediate results of PTMC in patients who had undergone a prior PTMC or surgical commissurotomy.

Methods and results: This is a single center, prospective, open label study. Of 70 patients in study, 44 (62.85%) patients had prior history of PTMC and 26 (37.15%) had prior surgical commissurotomy (closed/open). Average time from the initial procedure was 8.88 ± 5.36 years overall, 6.75 ± 3.38 for patients with prior PTMC and 16.73 ± 3.67 for patients with prior surgical commissurotomy. Prior PTMC group had 75% female, patients with prior surgical commissurotomy were older (44 ± 7 vs 33.57 ± 9.1 years, $p = 0.001$), had higher NYHA class (III/IV in100% vs 86.36%, $p = 0.006$.), higher atrial fibrillation (73.1% vs 25% $p < 0.0001$) and higher Wilkins' score (>8 in 88.46% vs 68.18%, $p = 0.05$). Successful PTMC was lower (65.4% vs 84.1%) in patients with prior surgical commissurotomy, though statistically not significant ($p = 0.07$). After PTMC, mitral valve area, PA systolic pressure, LA

Abbreviations: AF, atrial fibrillation; BMV, balloon mitral valvotomy; CMC, closed mitral commissurotomy; LA, left atrium; LAMP, left atrial mean pressure; MS, mitral stenosis; MVA, mitral valve area; MVR, mitral valve replacement; NSR, normal sinus rhythm; NYHA, New York Heart Association; OMC, open mitral commissurotomy; RHD, rheumatic heart disease; PA, pulmonary artery; PASP, pulmonary artery systolic pressure; PTMC, percutaneous transvenous mitral commissurotomy; TIA, transient ischemic attack.

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mean pressure and trans-mitral gradient were similar. Post procedure complications were not different in both the groups.

Conclusion: PTMC for mitral restenosis in patients with prior surgical valvotomy is as effective as in patients with prior PTMC despite older age, higher NYHA class, higher Wilkins score and atrial fibrillation and can be considered in all patients with restenosis irrespective of the type of past procedures done.

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1. Introduction

Rheumatic heart disease (RHD) is a common cause of mitral stenosis in developing countries.[1] Treatment of severe mitral stenosis surgically by closed mitral commissurotomy (CMC) was first developed in 1940's.[2] With the development of cardiopulmonary bypass in 1960's, open surgical mitral commissurotomy (OMC) and replacement of mitral valve became the surgical procedure of choice. Percutaneous approach became the therapy of choice for suitable valves after introduction of percutaneous balloon dilatation techniques as described by Inoue in 1984[3] and Lock et al in 1985.[4] Modification of their techniques further, have led to improved results. Mitral restenosis after PTMC or surgical valvotomy is now commonly seen.[5] After a prior CMC, distorted cardiac anatomy because of a prior ventriculotomy, amputated left atrial appendage and surgical adhesions[6–10] is a concern in attempting PTMC. Few studies comparing results of PTMC done for mitral restenosis in patients with prior PTMC and prior surgical commissurotomy, showed varying results in success.[6–10] Our study aims to compare the results of PTMC for mitral restenosis in patients with prior PTMC and prior surgical commissurotomy and determine the predictors of outcome.

2. Material & method

The study is a prospective, open label, single center study. Consecutive patients, who underwent PTMC in our hospital, from March 2007 to November 2012 for symptomatic mitral restenosis after a previous successful PTMC or surgical commissurotomy were included in the study. Mitral restenosis was defined by a valve area$<1{\cdot}5$ cm^2 and a loss $>50\%$ of the initial gain in valve area at the first mitral commissurotomy and symptomatic patients were considered for PTMC. Patients with mitral regurgitation grade $>2/4$, left atrial thrombus not responding to oral anticoagulants, extensive valve calcifications, patients needing surgical intervention for other valve or coronary artery bypass grafting or patients who had limited life expectancy due to other reasons were excluded.

Demographic profile and clinical variables importantly included were age, gender, New York Heart Association (NYHA) functional class at presentation, presence of atrial fibrillation and heart failure, history regarding penicillin prophylaxis, type and details of previous commissurotomy. Echocardiography was performed by an independent echocardiographer on the day preceding the PTMC and post-PTMC after 24–48 h. Valve area was assessed by planimetry, Doppler pressure half-time and Gorlin's equation. Echocardiography was done on a Siemens–Accuson 300× JPx machine with a p4-2 probe. The reference measurement for valve area was by planimetry. Investigational variables included the echocardiographic Wilkins score, pre and post-PTMC mitral valve area, severity of mitral regurgitation, mean gradient across valve, Pulmonary artery systolic pressure, left atrial size and other relevant echocardiographic parameters.

Trans-esophageal echocardiography was performed in patients with a suboptimal trans-thoracic study, patients with history of a previous embolic event and in patients with a possible left atrial thrombus as suspected by trans-thoracic study. Patients with left atrial thrombus were treated with oral anticoagulant for at least two months, and PTMC was performed only if resolution of the left atrial thrombus was demonstrated by a repeat trans-esophageal echocardiography.

All patients underwent PTMC using the trans-septal antegrade technique, after written informed consent. Single balloon Inoue technique was used in all patients. The maximum size of balloon inflation was determined by the equation: Maximum balloon diameter (mm) = (patient's height (cm)/10) + 10. Successful PTMC was defined as increase in mitral valve area to $\geq$ to 1.5 cm^2 and/or increase in area to more than twice of the initial area, with a decrease in trans-mitral gradient to half of the initial value and without $>2+$ increase in the severity of mitral regurgitation. Suboptimal PTMC was defined as any increment in mitral valve area less than defined as success. Procedural failure was defined as inability to cross/dilate the mitral valve. Procedure related variables included mean left atrial pressure, mean mitral valve gradient before and after PTMC. Prospectively collected procedure related complications like death, mitral valve replacement (MVR), pericardial tamponade, thromboembolism, post-PTMC mitral regurgitation $>2+$ were analyzed.

Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables as percentage. Student t test and chi-square analysis were carried out for comparison of continuous and categorical variables, respectively using SPSS. p Values<0.05 were considered statistically significant.

3. Results

Of a total of 70 patients included in the study, 44 (62.85%) patients had prior history of PTMC and 26 (37.15%) patients had a prior surgical commissurotomy (closed/open). Average time from the initial procedure was 8.88 ± 5.36 years overall and was 6.75 ± 3.38 years for patients with prior PTMC vs 16.73 ± 3.67 years for patients with prior surgical commissurotomy ($p < 0.001$). Patients in the prior PTMC group were

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