

Percutaneous Transluminal Mitral Commissurotomy for Mitral Stenosis in Shahid Gangalal National Heart Centre, Kathmandu, Nepal

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Abstract

Mitral stenosis (MS) is almost invariably the result of long term complication of rheumatic fever. Based upon the nature and severity of MS, patients can be managed with medical treatment, percutaneous transvenous mitral commissurotomy (PTMC) or surgery. PTMC is proven to be simple, effective and safe; it is considered as treatment of choice in the management of MS. In Shahid Gangalal National Heart Centre, PTMC service started in 2001. First PTMC in the centre was done on 14th April 2001. Till June 2016, 6023 PTMCs were done in the centre. Multiple studies evaluated the safety and efficacy of PTMC in different groups of patients. These studies clearly demonstrated the safety and effectiveness of PTMC in our centre. This article summarizes the historical development, current status and future perspectives of PTMC procedure at Shahid Gangalal National Heart Centre, a tertiary care cardiac centre in Nepal.

Introduction

Acquired Mitral stenosis (MS) is almost invariably the result of long term sequelae of rheumatic fever.¹ Approximately 25% of patients with rheumatic heart disease (RHD) have isolated MS, and an additional 40% have combined MS and mitral regurgitation (MR).^{2,3}

Based upon the nature and severity of MS, patients can be managed with medical therapy, percutaneous transluminal mitral commissurotomy (PTMC) or surgery. Since 1984, PTMC has revolutionized the treatment of patients with symptomatic MS.⁴ Patients with favorable morphology have procedural success rate of more than 90% whereas procedural mortality nowadays is less than one percent. Urgent surgery for severe MR during PTMC is rarely required.⁵ Nearly half of all patients who undergo PTMC remain free from cardiovascular death or surgery at 20 years, only 25% of them need repeat procedure.⁶ PTMC can be repeated for those who develop restenosis if mitral valve is still suitable for it. PTMC clinical applications have been widely accepted and a large series has been reported.⁷ It was proven that, it is as effective as open valvotomy and more effective than closed valvotomy.^{8,9,10} As there are very few contraindications for the procedure, so it has greatly decreased the need for surgery.¹¹ It has established itself as the procedure of choice for symptomatic MS patients.

PTMC is recommended for symptomatic patients with severe MS (mitral valve area (MVA) ≤ 1.5 cm²) and favorable valve morphology in the absence of left atrial (LA) thrombus and or moderate-to-severe MR.¹² In this article experience of PTMC in Shahid Gangalal National Heart Centre (SGNHC), Bansbari, Kathmandu, Nepal is reviewed.

Overview of PTMC at SGNHC

To serve the Nepalese patients with MS, PTMC service started in SGNHC in 2001.¹³ First PTMC in the centre was done on 14th April 2001. Till June 2016, 6023 PTMCs were done in SGNHC. Government of Nepal provides free PTMC services to all the patients. This service is beneficial for poor patients.

During these years, few studies on safety and efficacy of PTMC in different subgroups were published. In the first study published to evaluate the safety and efficacy of PTMC in SGNHC, Two hundred patients from January 2003 to July 2004 were studied. Seventy four percent of the patients were female. Age ranged from 10 years to 61 years with the mean age 29 years. Atrial fibrillation (AF) was present in 32 % of the cases. Mean MVA increased from 0.9 ± 0.1 cm² to 1.8 ± 0.2 cm². Mean LA pressure decreased from 21 to 7 mmHg. There was no mortality during the hospital stay or within the first month of the procedure. Two patients developed severe MR.¹⁴

One thousand and one patients from March 2003 to March 2008 were studied. Seventy eight percent of the patients were female. Age ranged from 9 years to 68 years with mean age 31.2 ± 12.4 years. MVA increased from 0.88 ± 0.1 cm² to 1.67 ± 0.2 cm². LA pressure decrease from 29.7 ± 8.6 to 12.8 ± 5.3 mmHg. Severe MR was noted in 2.1% patients. One had to undergo urgent mitral valve replacement (MVR) due to severe MR, two died of pulmonary edema due to severe MR. There were three deaths due to cardiac tamponade and one death in pregnant women who died due to abortion and subsequent septicemia.¹⁵

In a recent prospective¹⁶ study where Successful PTMC was defined as mean LA pressure decrease by >50% as compared to the baseline, MVA increase by > 50% as compared to the baseline and final absolute MVA of > 1.5 cm² in the absence of more than moderate MR, all the 262 patients who underwent PTMC during July 2013 to June 2014 were included in the study, Seventy four percent of the patients were female. Age ranged from 10 to 76 years with mean age of 33.2±12.5 years. AF was present in 26.7% patients; 2% patients were pregnant; 4.6% patients previously underwent surgical or balloon commissurotomy. LA size ranged from 3.3 cm to 7.9 cm with the mean of 4.97±0.76 cm. The procedural success was achieved in 84% patients. Mean LA pressure decreased from 26.8 ± 8.9 mmHg to 15.6 ± 7.2 mmHg. MVA increased from 0.9 ± 0.17 cm² to 1.6 ± 0.28 cm². Moderate to severe MR was seen in 49(18.7%) patients after PTMC but none of them required emergency MVR. There was no mortality related to the procedure.

PTMC in elderly

In a retrospective study in elderly¹⁷ patients, 49 patients aged 60 years and above underwent PTMC between March 2007 to March 2013. It accounts less than 2% of the total PTMC done during the study period. Successful PTMC was defined as increase in MVA >1.5 cm² without more than moderate MR. Female to male ratio was 3.4:1. Patient age ranged from 60 to 77 years with the mean age of 64.5±4.0 years. AF was present in 61.3% patients. LA size range from 3.6 to 8.8 cm with the mean of 5.5±1.2 cm. The MVA increased from 0.9±0.1 to 1.6±0.3 cm² following PTMC. Mean LA pressure decreased from 25.4±6.6 to 12.9±4.5 mmHg. Severe MR occurred in one patient. Successful results were observed in 83.6% patients. There were no other complications like death, pericardial effusion.

PTMC in children

In a retrospective study was performed from November 2009 to May 2013 to evaluate the safety and efficacy of PTMC in children.¹⁸ During the study period total 2237 PTMC were done, among them 100 patients aged less than 15 years underwent PTMC procedure for severe MS. Successful PTMC was defined as increase in MVA by 50% or more, or MVA more than 1.5 cm² and decrease in mean LA pressure to 18 mmHg or less without significant MR or any other complications. The mean age was 13±1.6 years and 48% were male. The mean LA size was 4.4±0.6 cm. After PTMC, MVA increased from 0.7±0.1 cm² to 1.5±0.3 cm² and mean LA pressure decreased from 29±7.9 mmHg to 13.9±6.2 mmHg. Success rate of PTMC was 94%.

PTMC in Juvenile Patients (younger than 20 years of age)

In a retrospective study of PTMC in 131 juvenile patients who underwent elective PTMC¹⁹ from July 2013 to June 2015 were studied. Patients with symptomatic MS and MVA less than 1.5 cm² with favorable mitral valve morphology were included. Among the 131 patients 53.4% were female and AF was present in 16 (12.3%) patients. LA size ranged from 2.9 to 6.1 cm with the mean of 4.5±0.6 cm. The mean MVA increased from 0.8±0.1 cm² to 1.6±0.2 cm² following PTMC. Mean LA pressure decreased from 27.5±8.6 to 14.1±5.8 mmHg. Post procedure severe MR was seen 3.8% patients. Among them one patient needed MVR after the PTMC, patient died after MVR. Successful PTMC was defined as increase in MVA to >1.5 cm² without more than moderate MR. Our success rate was 87.7%.

PTMC in pregnancy

A study was done in twenty two pregnant women from Jan 2003 to Dec 2007 to evaluate the safety and efficacy of PTMC with severe MS. PTMC was done during the 24.2±4.6 weeks of gestation. Mean

age was 23±4.2 years and two patients were in AF. Fluoroscopy time needed to complete the procedure was 7.5±4.8 min. Procedure was successful in all patients. Mean MVA increased from 0.7±0.2 cm² to 1.8±0.2 cm². Mean LA pressure decreased from 28.1±4.3 mmHg to 15.3±6.2 mmHg. Twenty patient had a normal delivery whereas two underwent caesarean section. There was no maternal morbidity or mortality or intrauterine growth retardation.

PTMC in special condition

Expertise in the field of PTMC from our centre was well tested in a recent publication.²⁰ Though LA appendage clot is contraindicated for PTMC. All cases of MS with significant dyspnea and MVA <1.5 cm² with LA appendage clot and a condition which preclude the patient to continue anticoagulation therapy and needed urgent intervention from January 2011 to December 2013 were included. Patients with LA body thrombus, LA appendage clot extending into Left atrium, mitral regurgitation with >3 grade, bicommissural calcification or severe calcification, and severe aortic valve disease were excluded. Age of the patients ranged from 20 years to 58 years with the Mean age of 31.4 ±9.3 years. Male to female ratio was 0.35. Twenty patients underwent PTMC despite LA appendage clot for different reasons. The successful PTMC was defined as the doubling of MVA from the initial area or achieving the MVA of 1.5 cm² or drop of LA pressure to half the initial value. LA mean pressure decreased from 20 to 10 mmHg. Subjective improvement was reported in all 20 patients. All had fulfilled criteria for successful PTMC. There has been no mortality during hospital stay and in one-week follow-up. No one had any neurological complications or stroke. There was no need for emergency surgery in any of the cases.

Though there are multiple studies to evaluate the safety and efficacy of PTMC in our patients, we still don't have any study about the long term effect of PTMC in our patients. We need a long term study to evaluate the safety and efficacy of this simple procedure in immediate future. However, difficulty in following up the patient remains a big hurdle.

Conclusion

Though the long term safety and efficacy is yet to be studied in our patient population, immediate results show that PTMC is proven to be safe and effective method of choice in the treatment of in Nepalese MS patients.

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