

FREQUENCY OF LEFT ATRIAL THROMBUS DETECTED BY TRANSESOPHAGEAL ECHOCARDIOGRAPHY IN PATIENTS OF TIGHT MITRAL STENOSIS HAVING NEGATIVE TRANSTHORACIC ECHOCARDIOGRAPHY AT GULAB DEVI CARDIAC COMPLEX

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ABSTRACT

INTRODUCTION: Patients with mitral stenosis (MS) having atrial fibrillation (AF) are more prone to develop left atrial (LA) thrombus. Systemic embolism, related to LA thrombus is a well-known risk of Percutaneous Mitral Balloon Valvotomy (PMBV) of the mitral valve. Therefore presence of LA thrombus is a contraindication to PMBV.

OBJECTIVE:

Objective of this study was to detect the frequency of LA thrombus by transesophageal echocardiography (TEE) in patients of tight MS in whom transthoracic echocardiography (TTE) could not detect any LA thrombus.

PATIENTS AND METHODS:

In this cross sectional study, we took 100 indoor patients with tight MS on non-probability consecutive sampling. Data was collected after meeting inclusion criteria. Patients were taken in this study after acquiring written informed consent. Symptoms were inquired from all patients and functional status was assessed by New York Heart Association class. Unstable patients were medically managed before the procedure. TEE was done on the same day before undergoing PMBV to look for clot in LA.

RESULTS:

The mean age of the patients was 32.20 years and SD was 11.3 years. There were 36(36%) male patients and 64(64%) female patients. LA thrombus was present in 40% of patients on TEE out of which 19 were male patients (52.77%) and 21 were female patients (32.81%).

CONCLUSION:

Patients with mitral stenosis having AF are more prone to develop LA thrombus. In this study, the frequency of LA thrombus was 40% recorded, which is high. Due to the potential risk of embolization, it is strongly recommended to perform TEE in patients with

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normal TTE study before undergoing PMBV. The presence of a LA thrombus should be considered a contraindication to the PMBV of the mitral valve.

KEY WORDS:

Mitral Stenosis, Atrial Fibrillation, Percutaneous Mitral Balloon Valvotomy.

INTRODUCTION:

Mitral valve stenosis is a narrowing of the mitral valve orifice that increases resistance to blood flow from the LA to the left ventricle. MS usually occurs as a result of rheumatic fever but there are other less common causes as well. About 25 percent of patients have isolated mitral stenosis and about 40 percent have both mitral stenosis and mitral regurgitation. MS does not usually cause symptoms unless it is severe which is mitral valve area less than 1.0 cm².¹ In MS, blood flow through the diseased valve is reduced which results in enlargement of LA because of the volume and pressure overload. In MS, LA often contracts rapidly in an irregular fashion which is called AF.^{2,3} Such patients are at high risk of developing LA thrombus due to blood stasis in LA.^{4,5}

PMBV is an effective and safe procedure for patients with tight MS in which diseased mitral valve is opened by balloon dilatation. The benefits are sustained by long-term follow-up in most of these patients.^{6,7}

PMBV in patients with MS with LA thrombus is frequently associated with thromboembolic events. These events are most likely caused by embolization of LA thrombus, which is dislodged during the procedure. Thus the presence of LA thrombus is considered to be a contraindication to the PMBV of the mitral valve in patients with MS.⁸ TEE has shown to be a method of choice which is much better than TTE for the identification of LA thrombus. A study was conducted on 120 patients of tight MS in which TTE could not detect LA thrombus in 13 patients while TEE detected LA thrombus in these 12 out of 13 patients (92.3%).⁹

The purpose of this study was to determine the frequency of LA thrombus by TEE in patients with tight MS in which the TTE procedure has failed to detect the LA clot. If this frequency is significantly high then it can be recommended to perform TEE in cases where TTE is negative for LA thrombus to avoid thromboembolic complications.

PATIENTS AND METHODS:

Study Design: Cross-sectional survey.

Setting: Study was conducted in patients admitted in Cardiac Complex, Gulab Devi Hospital Lahore.

Sampling Size: Sample size of 100 cases was calculated with 95% confidence level, 5.5% margin of error and taking expected percentage of LA thrombus detected on TEE i.e. 92.3% the patients in which TTE failed to pick LA thrombus.

Sample Technique: Non-probability consecutive sampling.

Sample Selection:

a) Inclusion Criteria

- *Tight mitral stenosis*, planned to undergo PMBV
- *Atrial Fibrillation*, diagnosed on ECG
- Have negative TTE for *LA thrombus*

b) Exclusion Criteria

- Uncooperative patients

DATA COLLECTION:

100 indoor patients with tight mitral stenosis fulfilling inclusion criteria were enrolled in this study after taking written informed consent. Demographic profile was obtained from the patients. Symptoms were inquired from all patients and functional status assessed by New York Heart Association class. Unstable patients were medically managed before the procedure. TEE was done on the same day before undergoing PMBV to look for clot in LA.

Data Analysis techniques

All data was analyzed by SPSS version 16. Quantitative variables like age were presented by mean and standard deviation. Qualitative variables like gender and presence or absence of LA thrombus on TEE were presented by frequency and percentage.

RESULTS:

The mean age of the patients was 32.20 years and standard deviation was 11.13 years. The age range was 62.00 years. The minimum age of patient in this study was 16.00 years and maximum age range was 78.00 years. The patients were divided into age groups of less than 20 years(6%), 20-40 years(77%), 40-

60years(15%) and more than 60 years(2%). In the sex distribution, there were 36(36%) male patients and 64(64%) female patients. In the TEE study, LA thrombus was diagnosed in 40% of patients with MS in whom TTE could not pick it. LA thrombus was present in 19 male patients(52.77%) and 21 female patients(32.81%). In age groups distribution, LA thrombus was found in 2 patients of age less than 20 years(33.33%), in 30 patients of age between 20-40years(61.03%), in 7 patients of age between 40-60 years(87.5%) and in 1 patient of age more than 60 years(100%).

Table: Distribution of Patients by LA thrombus (n=100)

	Frequency	Percent	Valid Percent	Cumulative Percent
Present	40	40.0	40.0	40.0
Absent	60	60.0	60.0	100.0
Total	100	100.0	100.0	

DISCUSSION:

Patients with MS having AF are vulnerable to develop LA thrombus. Systemic embolization is a recognized complication of PMBV of the mitral valve in patients with MS having LA thrombus. Kulick DL et al reported that 4% of patients with tight MS who underwent PMBV developed thromboembolic events¹⁰. Some studies have even reported higher rates of such complications^{12,13,14}. The exact frequency of embolization in patients with MS with LA thrombus is unknown, but it can be assumed that they are at higher risk than patients without thrombus.

The ability to identify and separate those patients at high risk of systemic emboli would significantly reduce the morbidity of this procedure. TTE has a low sensitivity for detection of LA thrombus, particularly clot in the LA appendage.⁷ TEE gives superior visualization of the LA appendage, and previous studies have shown TEE a more sensitive detector of LA thrombus.^{12,13} In

present study the mean age of patients was 32.20±11.13. As compared to the study of Niaz Z et al¹⁵ the mean age of patients was 28.88±12.50, which is comparable with our study. In our study, there were 36 male (36%) and 64 female (64%) patients which is also comparable to Niaz Z et al study, where 42 patients were males (37.5%) and 70 patients were females (62.5%).¹⁵ In our study, LA thrombus on TEE was present in 40% of patients with MS in whom TTE could not detect it. LA thrombus was more commonly present in male patients (52.77%) as compared to female patients (32.81%).

Farman MT et al conducted a study in 100 patients of MS with AF in which there were 52 males and 48 females. TTE was performed in all patients and in 24% of patients LA thrombus was detected. TEE was performed in the remaining 76% patients and additional 14 patients with LA thrombus was detected in this subgroup. Therefore a total of 38% of the

patients with LA thrombus were identified which is comparable with our study.¹⁶

Our study findings are significant than those of Rao et al who performed TEE in a series of 120 patients with rheumatic MS. LA thrombus was found in 34 patients on TEE (28.33%).¹⁷ Our findings are significant than those of Kronzon et al who reported that 26% of patients who had undergone TEE before PMBV of the mitral valve were found to have LA clot.¹¹

Our findings are also significant than those of Acarturk et al who reported that 20.8% of patients undergoing PMBV of the mitral valve had a detectable LA clot on TEE which was undetected by TTE.¹²

Sebastian F.T.M et al reported 40% detection of cardiac source of embolism on TEE in non-valvular patients with TIA and stroke.¹⁸ In a small group of 50 patients with MS and AF, Hwang et al found LA thrombus in 28 patients (56%) by TEE.¹⁹ In another small study of 22 patients with MS and AF, Karatasakis et al detected LA thrombus by TEE in 12 patients (54%).²⁰

In a large study of 490 patients, Srimannarayana et al had reported the prevalence of LA thrombus of 33.5%. Considering the large size of study group, this can be considered a representative figure for the prevalence of LA thrombus in patients with severe MS and AF. Thus it can be concluded that one out of every three patients with severe MS and AF may have a LA thrombus.²¹ Goswami et al studied 200 patients of tight MS had described AF as an independent risk factor for LA thrombus formation.²²

The present study showed that TEE can be safely performed and can accurately detect LA thrombus in patients of tight MS with AF before undergoing PMBV of the mitral valve in whom TTE could not detect any thrombus.

CONCLUSION:

Patients with rheumatic MS having AF are more prone to develop LA thrombus. TEE is

better than conventional TTE in detecting LA thrombus in such patients. Because of the potential risk of embolization in such patients, we strongly recommend TEE after having normal TTE study to identify LA thrombus before PMBV. The identification of a LA thrombus should be considered a contraindication to the PMBV of the mitral valve.

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