

FREQUENCY OF LEFT ATRIAL THROMBUS IN PATIENTS OF MITRAL STENOSIS SUITABLE FOR PERCUTANEOUS TRANS-SEPTAL MITRAL COMMISSUROTOMY

Badar UI Ahad Gill¹, Tariq Abbas², Rehan UI Haq³, Bilal Ahsan Qureshi⁴, Kashif Ali Hashmi⁵, Ijaz Ahmed⁶, Amna Javaid⁷

¹⁻⁷ Department of Cardiology, Chaudhry Pervaiz Elahi Institute of Cardiology, Multan, Pakistan

Address for Correspondence:

Dr. Badar UI Ahad Gill,

Department of Cardiology, Chaudhry Pervaiz Elahi Institute of Cardiology, Multan, Pakistan

E-Mail: badargill1@hotmail.com

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ABSTRACT

Objective: To determine frequency of left atrial thrombus in patients of mitral stenosis suitable for percutaneous trans-septal mitral commissurotomy.

Methodology: It was a Descriptive cross sectional study conducted in the Outpatient Department of Chaudhry Pervaiz Elahi Institute of Cardiology, Multan from April 2012 to October 2012. Ninety Five patients of tight mitral stenosis (Mitral valve area $\leq 1\text{cm}^2$ and mean transvalvular gradient $> 10\text{ mm Hg}$) having sinus rhythm suitable for PTMC (as assessed on trans-thoracic echocardiography) were included in the study. Trans esophageal echocardiography was performed for the presence or absence of left atrial thrombus.

Results: Out of 95 patients, male were 37.9% while female were 62.1%. Mean age of the patients was 26.88 ± 6.76 years. Left atrial thrombus was identified in 8(8.4%) patients. In age ≤ 25 years, there were 42 patients and 4(9.5%) were diagnosed to have left atrial thrombus while in age > 25 years, there were 53 patients and 4(7.5%) patients had left atrial thrombus on trans-esophageal echocardiography. Among 59 females, left atrial thrombus was diagnosed in 5(8.4%), while in 36 males, left atrial thrombus was diagnosed in 3(8.3%) patients.

Conclusion: Left atrial thrombus occurs in a significant proportion of patients with mitral stenosis and a normal sinus rhythm and thus should be monitored routinely with trans-esophageal echocardiography in patients who are planned to undergo percutaneous trans-septal mitral commissurotomy.

Key Words: Mitral Stenosis, Left Atrial Thrombus, Trans-esophageal Echocardiography

INTRODUCTION

Mitral stenosis is obstruction to blood flow between the left atrium and left ventricle, caused by mitral valve narrowing. The predominant cause of mitral stenosis (MS) is rheumatic heart disease. Among patients of mitral valve involvement, about 48.6% of all patients with rheumatic heart disease have isolated mitral stenosis and 51.4% have combined mitral stenosis and mitral regurgitation.¹ Left atrial dilatation and stasis secondary to mitral stenosis may cause thrombus formation which may lead to cerebrovascular events, coronary embolization, renal emboli and infarction because of thromboembolic phenomenon.² The risk of thromboembolism correlates directly with patients age and left atrial size and inversely with cardiac output. Before the era of anticoagulation therapy and surgical treatment, approximately 25% of all fatalities in patients with mitral valve disease were secondary to systemic embolism.³ Rarely massive thrombosis develop in left atrium resulting in pedunculated ball-valve thrombus, which may suddenly aggravate obstruction to left atrial outflow or may cause sudden death.

The management approach to the individual with mitral stenosis depends upon symptomatic status, degree of stenosis and suitability of valve for percutaneous balloon mitral valvuloplasty. The technique of percutaneous balloon dilatation of the mitral valve by the transseptal approach has been generally accepted as an alternative to mitral valve replacement or surgical commissurotomy in a subgroup of patients with symptomatic mitral stenosis. Mitral stenosis is frequently associated with left atrial thrombi and systemic emboli are a well-known complication of balloon dilatation of the mitral valve.⁴ About 20% of the patients with mitral stenosis and systemic embolic events are in sinus rhythm.³ The reported incidence of LA clot formation in sinus rhythm (SR) is 6.6%, assessed on trans-esophageal echocardiography and having no clot on trans-thoracic echocardiography.⁵ These events are believed to be caused primarily by embolisation of left atrial thrombi, when a thrombus is dislodged during the procedure. So the presence of left atrial thrombi is a contraindication to balloon dilatation of the mitral valve. Therefore, Transesophageal echocardiography (TEE) is used routinely before percutaneous transvenous mitral commissurotomy (PTMC) to detect left atrial appendage thrombus to avoid the risk of embolic complications.^{6,7}

The aim of our study was to determine frequency of left atrial thrombus in patients of mitral stenosis suitable for percutaneous trans-septal mitral commissurotomy

METHODOLOGY

After taking informed consent from patients and permission from ethical committee, ninety five patients of tight Mitral

stenosis, Suitable for PTMC (Mitral valve area $\leq 1 \text{ cm}^2$, mean transvalvular gradient $> 10 \text{ mm Hg}$, Wilkins Score less than 10 and not more than mild mitral regurgitation on trans-thoracic echocardiography) were included in the study by Non probability purposive technique. Patients with atrial fibrillation, other valvular lesions, previous history of thrombo-embolic phenomenon and with Left Ventricle systolic dysfunction i.e. EF $< 50\%$ were excluded from the study. TEE was performed by the cardiologist having 5 years post fellowship experience of echocardiography, on vivid 7 G.E echocardiography machine. The presence or absence of left atrial thrombus was noted.

Statistical package for social sciences (SPSS) version 14.0 was used for statistical analysis. Quantitative variable of the study was age of the patients and it was calculated as mean \pm standard deviation. Qualitative variables were gender and presence of left atrial thrombus and they were calculated as frequencies and percentages. Stratification was done on different variables like age and gender to see the effect of these variables on the outcome through the application of chi square test. P-value < 0.05 was considered to be statistically significant.

RESULTS

There were 95 patients in total. Males were 36/95 (37.9%). Females were 59/95 (62.1%). Mean age of the patients was 26.88 ± 6.76 years ranging from a minimum of 16 years to a maximum of 59 years. Left atrial thrombus was identified in 8/95 (8.4%) patients, whereas there was no thrombus identified in left atrium in 87/95 (91.6%) patients.

When the effect of age was noted on the frequency of left atrial thrombus it was noted that in patients with age ≤ 25 years, there were 42 patients. Males were 16/42 (38.09%) where as females were 26/42 (61.9%). Among these patients 4/42 (9.5%) were diagnosed to have left atrial thrombus. In patients with age > 25 years, there were 53 patients in total. Males were 20/53 (37.8%) whereas females were 33/53 (62.3%). Among these patients 4/53 (7.5%) patients had left atrial thrombus on trans-esophageal echocardiography. P-value was found out to be 0.729 by chi-square test (Table 1).

When the effect of gender was noted on the frequency of left atrial thrombus, it was identified that among 59 females, left atrial thrombus was diagnosed in 5/59 (8.4%) patients. While in 36 males, left atrial thrombus was diagnosed in 3/36 (8.3%) patients. The p-value was calculated to be 0.981 through application of the chi-square test (Table 2).

DISCUSSION

Risk factors for clot formation in MS patients in patients with normal sinus rhythm have been evaluated in various studies and mitral valve surface area did not reveal a significant

Table 1: Effect of Age on Frequency of Left Atrial Thrombus

Age Group	No of Patients	Left Atrial Thrombus	P-value
Age < 25	Total = 42	4 (9.5%)	0.729
	Males = 16 (38.9%)		
	Females = 26 (61.9%)		
Age > 25	Total = 53	4 (7.5%)	
	Males = 20 (37.8%)		
	Females = 33 (62.3%)		

relation to clot formation in these studies.⁸ However, the issue is quite controversial, as a study from Spain in 2000 revealed a significant relation between small mitral valve surface area and clot formation, with an odds ratio of 0.17.⁹ This issue has been supported by other studies and it has even been emphasised that in multivariate analysis, the only independent predictor for left atrial clot formation is mitral valve area.¹⁰ Despite these reports, another study has shown no significant relation between mitral valve area and mean valve gradient, and clot formation.¹¹ Stroke is one of the most serious complications of PTMC and is likely secondary to embolism from a left atrial thrombus. The presence of left atrial thrombi is a common finding in rheumatic mitral valve disease, and the incidences reported in previous studies ranged from 7.4% to 32%.^{12,13} Left atrial thrombus is considered to be an absolute contraindication to the procedure due to the risk of embolism. Warfarin depletes the reduced form of vitamin K, which is an important cofactor for post-translation modification (carboxylation) of coagulation factors II, VII, IX and X, thus inhibiting the coagulation pathway. If coagulation is inhibited by warfarin and no more thrombus is formed, gradual dissolution of the thrombus by tissue-type plasminogen activator-related fibrinolysis can be expected. Some reports have shown that left atrial thrombi may resolve in some patients after anticoagulant therapy, and PTMC can be performed subsequently.¹²⁻¹⁴

In our study there were 95 patients in total. There was a female preponderance with upto 62.1% females whereas males were 37.9%. This was in line as the reported incidence and prevalence of rheumatic valvular disease is more common in females than males and the same fact is reflected in our study. Mean age of our patients was 26.88 ± 6.76 years ranging from a minimum of 16 years to a maximum of 59 years. This is also in line with other studies, for example, in one study from Peshawar, 1544 patients were studied, out of these males were 608 (39.4%), females were 936 (60.6%). Mean age was 30.84 ± 12.6. Mean age of males was 30.56 ± 13.1 years and females were 31.02

Table 2: Effect of Gender on the Frequency of Left Atrial Thrombus

Gender	No of Patients	Left Atrial Thrombus	P-value
Male	36	3 (8.3%)	0.981
Female	59	5 (8.4%)	

± 12.6 years.⁶

In our study, Left atrial thrombus was identified in 8/95 (8.4%) patients, whereas there was no thrombus identified in left atrium in 87/95 (91.6%) patients. This is in line with other studies which have shown the frequency of left atrial thrombus in up to 6.5% patients.^{6,7} In one Pakistani study, the reported percentage of left atrial thrombus of up to 14% has been reported.⁷ However, in that study even those patients were included who had atrial fibrillation, whereas in our study only patients with normal sinus rhythm were included and atrial fibrillation was taken as an exclusion criteria. Atrial fibrillation contributes to the development of thrombus due to stasis in the left atrium and therefore the reported percentage of left atrial thrombus was higher as compared to our study. When the effect of age was noted on the frequency of left atrial thrombus it was noted that the frequency of left atrial thrombus was higher in age group < 25 years, as 4 (9.5%) out of a total of 42 were diagnosed to have left atrial thrombus, while in patients with age > 25 years, 4/53 (7.5%) patients had left atrial thrombus on trans-oesophageal echocardiography. However, the difference was statistically non-significant with a P-value 0.729. When the effect of gender was noted on the frequency of left atrial thrombus, it was noted that it was slightly more frequent among females as 5 (8.4%) out of 59 females had left atrial thrombus on echocardiography whereas 3 (8.3%) out of 36 patients had the thrombus. However, the difference was statistically non-significant as the p-value was calculated to be 0.981.

CONCLUSION

Left atrial thrombus occurs in a significant proportion of patients with mitral stenosis and a normal sinus rhythm and thus should be monitored routinely with trans-esophageal echocardiography in patients who are planned to undergo percutaneous trans-septal mitral commissurotomy, to avoid the catastrophic complication of systemic embolization of thrombus.

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