

Frequency of Clot in Left Atrium (LA) in Patients of Severe Mitral Stenosis (MS) with Atrial Fibrillation (AF)

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ABSTRACT

To determine the frequency of clot in left atrium (LA) in patients suffering from tight mitral stenosis (MS) with atrial fibrillation. A cross-sectional descriptive type study at two centers was performed. A total of 50 adult patients with tight MS and AF were included. A 12 leads electrocardiography was performed once for each patients to look for AF after transthoracic echocardiography (TTE) and clinical examination features revealed tight MS. Patients with AF were selected and TTE was done to detect clot in LA. Transesophageal echocardiography (TEE) was performed whenever clot could not be detected with TTE. Among 50 patients studied. There were 20 males and 30 females, TTE was done of all patients and LA clot were detected in 10 patients (20% of total) and TEE were performed in remaining 40 patients (80% of total) and additional 12 patients (24% of total) with clot in LA were detected. Therefore total of 44% of patients had LA clot. Among them 4% had clot in LA body and 40% had in LA appendage. LA dimension was found to be relevant (P value = 0.004) with the presence of clot in patients of severe MS with AF. LA spontaneous echo contrast (LASEC) was found in all patients. LA clot was present in 44% patients with tight MS and AF. Larger LA diameters is a strong predictor- of presence of LA clot in severe MS with AF.

Keywords: Mitral stenosis, Atrial Fibrillation, LA Clot.

INTRODUCTION

The incidence of Mitral Stenosis (MS) has decreased in developed countries due to impressive alleviation of rheumatic fever. However, in our part of the world it is one of the major health problems and a great challenge for the health care professionals.¹⁻³ In patients with pure MS, left ventricle is usually normal but the left atrium is enlarged and hypertrophied as a result of increased LA pressure.

Moreover, patients with severe symptomatic MS, 50% or more have chronic AF.⁴ Both LA enlargement and AF may alter the course of disease by providing the potential source of mural thrombi (LA clot) and the risk of systemic embolism.^{5,6} Apart from cerebral embolization these emboli may

result in occlusion of arteries of the extremities, occlusion of the aortic bifurcation and visceral or myocardial infarction.⁴ Due to these serious implications of LA thrombus, it is mandatory to search the LA in every patient of MS for any evidence of thrombus especially if it is presenting with AF.⁴ Echocardiography is the best noninvasive method for detecting the LA thrombus.

However there are well-recognized limitations in detecting LA thrombus by 2-D transthoracic echocardiography (TTE) especially those in the LA appendage.⁷ Transesophageal echocardiography (TEE) has been shown to overcome this problem and has proved to be highly sensitive for detecting LA thrombi.⁸⁻¹¹ Once a thrombus is detected in LA the treatment plan, strategies, surgical and interventional techniques are

greatly altered.⁹

Despite the fact that LA thrombus is very common in association with severe MS and atrial fibrillation; the prevalence in our vulnerable population was not known due to lack of local studies and data. This study provides us the data by which we can quantitate the proportion of patients having LA thrombus among this high-risk group i.e. patients with MS and atrial fibrillation. Moreover, this data will also help us to realize the magnitude of the problem, making right health strategies and decision about the issues of anticoagulation in different settings of severe MS.

PATIENTS AND METHODS

This cross sectional descriptive study was conducted and patients were taken from Punjab Institute of Cardiology and Sheikh Zayed Hospital (SZH) Lahore. Patients with clinical findings of severe MS were screened. Those patients with severe MS and AF were selected for this study. A written informed consent was obtained, a study proforma was filled, and information regarding personal details, history, clinical examination, findings of ECG and echocardiogram was documented. All the patients having age of 18 years or above, who were found to have absent or fibrillatory P waves with varying R-R intervals on surface ECG and their 2-D echo examination showing mitral valve area of $\leq 1.0 \text{ cm}^2$, were included in this study. Parasternal long- and short-axis views, the apical four-chamber view and apical long-axis view were obtained to detect LA thrombus.

TEE was performed whenever the nature of mass was controversial or thrombus could not be detected with conventional 2-D transthoracic echocardiography. Patients with significant (moderate or severe) mitral insufficiency or any other significant valvular or congenital heart disease besides severe MS, patients with Left ventricular dysfunction, Hypertensive heart disease, Thyrotoxicosis, Chronic obstructive airway disease (COAD) were excluded from the study. The data was analyzed by SPSS 20. The measurable (quantitative) variables such as age, mitral valve area etc. was presented by mean \pm S.D value and

compared, where required, by student's t-test. The various proportions of qualitative data were also presented by 95% confidence interval. The difference in proportions was compared by chi-square test of proportion, wherever needed.

RESULTS

Fifty patients were included in the study. There were 20 male and 30 female patients with the mean age of 39.20 ± 11.41 years. Mean mitral valve area of 50 patients was $0.82 \pm 0.14 \text{ cm}^2$, while mean values of pressure gradient across mitral valve and LA dimension were $24.04 \pm 6.38 \text{ mmHg}$ and $58.58 \pm 13.50 \text{ mm}$ respectively. All the patients underwent transthoracic echocardiography that revealed thrombi in LA body in 10 patients. Remaining 40 patients underwent TEE that revealed thrombi in LA appendage in 12 patients. No thrombus was detected in LA body with the help of TEE. LA spontaneous echo contrast (LASEC) was found in all patients (Table 1).

Table 1: Frequency of LA clot in patients of mitral stenosis with AF.

	LA Thrombus		P-value
	Present	Absent	
Mean age (years)	38.910.27	39.3512.10	0.85
Male (20)	10	10	
Female (30)	12	18	
Mean MVA (cm^2)	0.81 ± 0.14	0.82 ± 0.15	0.98
Mean PG (mmHg)	17.68 ± 05.64	15.95 ± 05.36	0.12
Mean LA dimension (mm)	63.50 ± 15.70	55.6 ± 10.95	0.004
% of LA Thrombus	44%	56%	
% of LASEC	100%	100%	

DISCUSSION

Rheumatic mitral stenosis with atrial fibrillation is a common clinical problem in Pakistan.¹⁻³ It is a potential source of thrombus formation and associated with a very high risk of embolic cerebro-vascular accidents, which is reported to be as much as seventeen times greater than in unaffected controls.¹² TEE is well

established as the gold standard for detecting thrombi in the left atrium and the LA appendage. The sensitivity and the specificity of TEE are reported to be 100% and 99%, respectively.¹³ Though it is known that thrombi are common in patients with MS and AF, until recently only small studies have documented the exact frequency of occurrence of these thrombi. In a small group of 50 patients with MS and AF, Hwang et al.⁸ observed an LA thrombus in 28 patients (56%) by TEE. In another small study of 22 patients with MS and AF, Karatasakis et al.¹⁴ observed an LA thrombus in 12 patients (54%).

However, recently Srimannarayana et al.¹⁵ studied 490 patients with severe MS and AF and observed LA thrombi in 163 (33.5%) patients. We found LA thrombus in 44% patients in a group of consecutive patients. Considering the size of the study group though the number of patients in our study group is little less for the frequency of LA thrombi in patients with severe MS and AF but the results were comparable. Thus, it can be stated that 1 out of every 3 patients with severe MS and AF will have an LA thrombus.

Our study showed that LA size is relevant with the presence of LA thrombus (63.53 ± 15.79 mm versus 55.55 ± 10.94 mm, $P = 0.004$). This means that larger the atrial size greater the chances of presence of LA thrombus in patients with severe MS and AF. While describing clinical risk factors for thrombus formation among patients with severe MS Goswami *et al.*¹⁶ documented the same finding. Apart from LA diameter he found that longer duration of symptoms and more frequent atrial fibrillation with spontaneous echo contrast were independent risk factors for LA thrombus formation. Goswami et al.¹⁷ observed LASEC in 53.5% of cases in their study but they enrolled all the patients with severe MS irrespective of having AF. This may be the reason of difference in our finding. However, at least it can be said that larger LA diameter is an alarming sign and one has to carefully look for LA thrombus in these patients.

In our study 50 patients studied. There were 20 males and 30 females, TTE was done of all patients and a LA clot were deducted in 10 patients (20% of total) and TEE were performed in remaining 40 patients (80% of total) and additional

12 patients (24% of total) with clot in LAA were detected. Therefore total of 44% of patients had LA clot. Among them 4% had clot in LA body and 40% had in LA appendage. LA dimension was found to be relevant (P value = 0.004) with the presence of clot in patients of severe MS with AF. LA spontaneous echo contrast (LASEC) was found in all patients. LA clot was present in 44% patients with tight MS and AF. Larger LA diameter in a strong predictor- of presence of LA clots in severe MS with AF.

In our study it has been seen that TTE could only detect 20% clot in LA specially in LA body and additional 24% of clot in LA specially in LAA were detected by TEE that showed the importance, indication, significance, sensitivity and specificity of TEE. The important difference in our study is LASEC was found in all patients. This means LASEC is a strong predictor of LA clot. The detection of LA clot in appendage is relatively difficult with TTE but if we are able to detect on TTE then TEE should not be performed in every patient.

Goswami¹⁸ addressed the same issue in another study and concluded that sensitivity of TTE in visualizing the clot in LA appendage in Southeast Asian patients is not very bad as reported in west. In our part of the world patients are generally younger, have lesser body weight and thinner chest walls resulting in better transthoracic echogenicity. Due to these factors we did not perform TEE in those patients in whom LA thrombi were already detected with TTE. It would be unethical if TEE was performed unnecessarily, as it is comparatively an invasive procedure. In our study, LASEC was noted in every patient. Therefore, every patient is on warfarin to prevent clot formation and thromboembolism.

STUDY LIMITATIONS

According to selection criteria, we excluded the patients with severe MS and AF in who left ventricular dysfunction was also present. TEE was also not performed in patients in whom LA thrombus had been detected by TTE. Although possibility of LA myxoma in patients with severe MS is extremely rare but there are some case reports

of having LA myxoma in patients with MS. Differentiating LA thrombus from myxoma is a challenge and it is difficult merely on TTE and hence TEE should be performed.

CONCLUSION

The proportion of patients with LA thrombi in patients suffering from severe MS and AF observed in this study was 44%. Therefore it can be stated that more than one third of the patients with severe rheumatic MS and AF will have LA thrombi. Larger LA diameter was observed statistically significant as far as the presence of LA thrombus was concerned. Therefore, larger the LA size in patients with severe MS and AF greater the frequency of having LA thrombus is expected. Hence, it is prudent to anticoagulate this high-risk group of patients to prevent them from serious implications of systemic thromboembolism.

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