FREQUENCY OF LEFT ATRIAL AND APPENDAGE CLOT IN PATIENTS WITH SEVERE MITRAL STENOSIS

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Background: Left atrial thrombus is common in patients with mitral stenosis and atrial fibrillation; but how frequent it is in our population? The objective of study was to see the frequency of left atrial and appendage clot on trans-oesophageal echocardiography in symptomatic patients with severe mitral stenosis planned for PTMC. **Methods:** Trans-oesophageal echocardiographic data retrieved from computer database Cardiology department, Lady Reading Hospital, Peshawar from August 1998 to Mach 2008. Patients admitted for PTMC under went trans-oesophageal echocardiography for detection of left atrial and appendage clot and quantification of mitral regurgitation. Data was analyzed on SPSS. **Results:** Out of 1544 patients, 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±12.6 years. Minimum age was 8 years and maximum was 76 years. The mean LA size was 43.82±2.12mm.Atrial fibrillation was observed in 289 (18.7%).Overall clot was seen in 224 (14.5%) patients. Left atrial appendage clot seen in 202 (89.73%).LA clot seen in 9 (4.02%). LAA/LA clot seen in 14 (6.25%). No significant difference was observed for clot among the gender distribution (p=0.42). Significant correlation was observed for clot in patients with AF and LA size ≥45 mm, (p>0.001). **Conclusion:** The frequency of left atrial and appendage clots on trans-oesophageal echocardiography in patients with severe mitral stenosis is common and more frequent in patients with AF and LA size ≥45 mm.

Keywords: LA, LAA, CLOT, TEE, PTMC

INTRODUCTION

Thrombus formation and embolisation is common in patients with mitral stenosis. Systemic embolisation may be the first clinical manifestation of mitral stenosis.[1] Emboli are often fatal in patients with mitral stenosis and significant numbers of deaths are due to thromboembolism.[2] Patients under undergoing mitral valvulplasty, 18% had definite history of systemic embolisation prior to surgery.[3]

Left atrial thrombus is common in patients with mitral stenosis and atrial fibrillation. The objective of the study was to collect data on frequency of left atrial (LA) and appendage (LAA) clot in patients with severe mitral stenosis.

MATERIAL AND METHODS

All patients who were diagnosed cases of severe mitral stenosis and confirmed by 2D echo with CW Doppler, who were having no evidence of clot in LA were subjected to trans-oesophageal echocardiographic.[4] Patients with clot on trans-thoracic echocardiography were excluded from the study. Data was retrieved from computer database from cardiology department, Lady Reading Hospital Peshawar from August 1998 to January 2008. Written informed consent was taken from patients under going trans-oesophageal echocardiography for detection of left atrial and appendage clot and quantification of mitral regurgitation one day prior to percutaneous trans-venous mitral commissurotomy.

TEE was performed after TTE in all cases.[4] Twelve lead ECG along with long lead II was recorded in all patients. A 5-MHz transducer multiplane probe was used. All patients were given local pharyngeal anaesthesia (1% lidocaine gargles). TEE probe was introduced with the patient lying supine in left lateral position. The LA was scanned in short axis view and bicaval view. With a counter-clockwise rotation of the probe at the level of aortic valve, the LA appendage was visualized. LA thrombus was diagnosed by the presence of well defined echogenic mass with an echo texture different from that of underlying endocardium by qualified Cardiologist. LA spontaneous echo contrast was diagnosed by the presence of smoke like echoes in the LA cavity and LA appendage with swirling motion. After completion of TEE, patients were observed. Data was analyzed on SPSS version 13. Quantitative variables were presented by percentage and means. Difference for clot among gender, AF and LA size was analysed by chi-square and ANOVA. A p-value of ≤0.05 considered significant.

RESUTS

This is consecutive patient's data that were planned for PTMC. This is country largest single centre data. Data retrieved from computer data base at Government Lady Reading Hospital Peshawar from August 1998 to March 2008.

Total numbers of patient were 1544. 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 female was 31.02 ±12.6 years. Minimum age

was 8 years and maximum was 76 years. The mean left atrial size was 43.82 ± 2.12 mm. Arial fibrillation was observed in 289 (18.7%). Overall clot was seen in 224 (14.5%) patients. Left atrial appendage clot was seen in 201 (89.73%). LA clot seen in 9 (4.02%). A and LA clot was seen in 14 (6.25%) (Table-1).

Table-1: Base line characteristics of 1544 Patients:

Variables	Results
Age(years)	30.84±12.6
Male	30.56±13.1
Female	31.02±12.6
Minimum	8
Maximum	76
Male	608 (39.4%)
Female	936 (60.6)
MVA 2D	0.89±0.22 cm^2
Pre PTMC Mitral Valve Gradient	17±4.04 mmHg
Mitral Regurgitation	
0	548 (35.49%)
Mild	965 (62.51%)
Moderate	31 (2.00%)
L A size (mm)	43.82 ± 2.1
A F	289 (18.7%)
No CLOT	1320 (85.5%)
CLOT	224 (14.5%)
LAA clot	201 (89.73%)
LA clot	9 (4.02%)
LAA/LA clot	14 (6.25%)

No significant difference was observed for clot among the gender distribution (p=0.42). Among patients who had clot 224 (14.6%), more number of patients were in atrial fibrillation 161(10.4%) as compare to 128 (8.3%) (p=0.001) who were in sinus rhythm. Significant correlation was observed for clots among patients having left atrial size approaching 45.9±3.8 mm (*p*=0.001) in patient with atrial fibrillation (Table-2). Overall linear correlation was observed among larger LA size and frequency of clot 46±3mm vs. 43±3 mm (*p*=0.001) Figure-1, Table-3.

Table-2: Clot Among 289 (18.7%) with AF

Variable	AF	No AF	p
Clot (224)	161(10.4%)	128(8.3%)	0.001
LA size mm (mean)	45.9±3.8	43.3±0.9	0.001

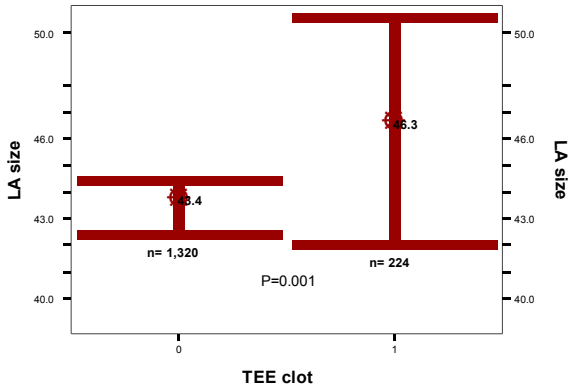

Figure-1: LA size vs. clot

Table-3: Mean LA size Vs Clot

Variable	No clot(1320)	Clot(224)	*p*-value
LA size (mm)	43±3	46±3	0.001

DISCUSSION

Rheumatic mitral stenosis with atrial fibrillation is a common health problem in our part of the world and associated with increased morbidity and mortality accounting for embolic events which is greater in affected groups.[5] The increasing severity of mitral stenosis is significantly correlated with increased incidence of thrombus in the LA and LA appendage.[6] Fifty percent of LA thrombi in patients with rheumatic valvular disease, and nearly 90% of LA thrombi in patients with non valvular AF are limited to the LA appendage. TEE is superior to TTE in the evaluation of LA thrombi. TEE is superior to TTE in the evaluation of LA thrombi. TTE does not demonstrate the majority of LA appendage thrombi, since the appendage is frequently not well seen on transthoracic echo. TEE, on the other hand, is a very sensitive tool for detection of LA thrombi.[7]

In our study we evaluated 1544 patients of severe mitral stenosis for presence of thrombi in LA and LAA. Our patient population was younger and majority was in sinus rhythm. The incidence of thrombus was 14.5% in our study. In earlier studies, the incidence has varied from 26–33%. Goswami *et al* studied 200 consecutive patients of severe mitral stenosis. In their study the patients with AF had higher incidence of thrombus as compared to the patients with normal sinus rhythm. Patients with thrombus were older, had longer duration of symptoms, there was more frequent occurrence of AF and spontaneous echo contrast and larger LA diameter as compared to patients without thrombus. In their study, AF and LA diameter were independent predictors of LA thrombus formation. This study supports our findings as we observed more frequent occurrence of LA thrombus in patients with AF patients as compared to patients in sinus rhythm.[8]

Ahmad *et al* in a prospective study of 26 patients of mitral stenosis with LA thrombus observed that 18 (70%) patients were in AF. They observed that TEE is superior in detecting thrombi in LA appendage, however 26 of their cases had thrombi clearly visible in LA cavity on TTE and TEE was not needed in those cases for the purpose of study.[9] In our study we performed TTE and if no clot is visible than routine TEE for all patients. It was observed that TEE is more significantly associated with detection of LA thrombus.

Srimannarayana *et al* reported in their study that out of 490 patients undergoing TEE noted that LA thrombi were present in 163 (33.2%). Isolated LA appendage thrombi were found in 88 (18%) patients.

Isolated LA body thrombi or LA appendage thrombi extending into the LA body were found in 75 (15.3%) patients. [6] Our study showed that thrombus was present in 89.37% in LA appendage, 7.02% patients had thrombi in LA and 6.25% patient had thrombi in both LA and LA appendage. Our results are almost similar to those reported by Ali *et al* from Lahore.[10]

Our result showed that left atrial size is relevant for presence of let atrial thrombus 46.3±3 vs. 43.4±3 (p=0.001). (Figure-1) There are few reports on the prevalence of LA body and LA appendage thrombi in patients with severe mitral stenosis and AF. In a small group of 50 patients with mitral stenosis and AF, Hwang *et al* observed an LA thrombus in 28 patients (56%) by TEE.[11] In another small study of 22 patients with mitral stenosis and AF Karatasakis *et al* observed LA thrombus in 12 patients (54%).[12] In the study of Srimannarayana *et al* the prevalence was 33.5%.[13] Considering the size of study group, this can be considered a representative figure for the prevalence of LA thrombi in patients with severe mitral stenosis and AF. Thus it can be stated that 1 out of every three patients with severe mitral stenosis and AF will have an LA thrombus. In our study the thrombus was detected in even smaller left atrial size in patient with AF as compared to in sinus rhythm (45.9±3.8 mm vs. 46.3±3 mm).It means lager the left atrial size greater the chances of the presence of left atrial thrombus in patient with severe mitral stenosis with atrial fibrillation. Goswami *et al* described atrial fibrillation independent risk factor for thrombus formation.[8]

CONCLUSION

TEE is better than conventional TTE in detecting left atrial clot in patients with severe mitral stenosis. Patients with rheumatic mitral stenosis having atrial fibrillation, large left atrial size are more prone to develop LA clot. TEE should be performed in all patients with mitral stenosis in whom a thrombus in LA is suspected or needs to be excluded regardless of rhythm. Because of the potential risk of embolization, TEE is recommended in all candidates for balloon mitral valvuloplasty.

LIMITATION OF THE STUDY

We excluded all those patients who were having clots visible on transthoracic echocardiography. We did not include other clinical variables such as age, duration of atrial fibrillation as risk factor for the formation of thrombus in the study. Hence a prospective study with more clinical risk factors for thrombus formation is required.

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