https://doi.org/10.29309/TPMJ/2025.32.09.8233

The Professional Medical Journal
www.theprofesional.com
2025, Volume, 32 Issue, 09

ORIGINAL ARTICLE

Frequency of left atrial thrombus on transesophageal Echo in patients of severe mitral stenosis planned for PTMC (Percutaneous Transluminal Mitral Commissurotomy).

Muhammad Nouman Ahmad[1], Rehan Riaz[2], Naeem Hameed[3], Amna Rehan[4]

Article Citation: Ahmad MN, Riaz R, Hameed N, Rehan A. Frequency of left atrial thrombus on transesophageal echo in patients of severe mitral stenosis planned for PTMC (Percutaneous Transluminal Mitral Commissurotomy). Professional Med J 2025; 32(09):1169-1172. https://doi.org/10.29309/TPMJ/2025.32.09.8233

ABSTRACT… Objective: To find out the frequency of LA clot in patients of severe mitral stenosis. **Study Design:** Cross Sectional study. **Setting:** Faisalabad Institute of Cardiology, Faisalabad. **Period:** July 2023 to April 2024. **Methods:** Non-probability consecutive sampling, Data analysis by SPSS version 25. **Results:** In this study total 180 patients included with 39% were male and 61% female. 60% patients were in atrial fibrillation. LA clot was found in 24% patients. Out of these 24% patients 79% were in atrial fibrillation. **Conclusion:** Clot in LA is quite common entity with every fourth patient having it. Patients with higher NYHA class and without warfarin are more prone to develop LA clot.

Key words: Atrial Fibrillation, Left Atrial Thrombus, Mitral Stenosis, Rheumatic Heart Disease.

INTRODUCTION

Mitral stenosis is a common disease worldwide which causes significant morbidity and mortality. In developing nations, the disease is most prevalent.[1] Rheumatic fever is the most prevalent cause of mitral stenosis. Calcification of the mitral valve leaflets and congenital heart illness are rare causes of mitral stenosis.[2] Infective endocarditis, mitral annular calcification, endomyocardial fibroelastosis, malignant carcinoid syndrome, systemic erythematosus lupus, Whipple disease, Fabry disease, and rheumatoid arthritis are other causes of mitral stenosis. Mitral stenosis usually presents many years after an episode of rheumatic fever. The onset is usually between the third and fourth decade of life.[3,4]

Mitral stenosis is evaluated using noninvasive and invasive measures. An invasive test for mitral stenosis would include a cardiac catheterization.[5,6] The echocardiogram is a very helpful method to determine the etiology, morphology, severity, and treatment of mitral stenosis.[7] Leaflet mobility and stability, leaflet thickness, leaflet calcification, subvalvular fusion, and commissure appearance should be evaluated in patients of mitral stenosis.

Treatment of mitral stenosis may be medical or interventional depending on severity of symptoms and stenosis. Interventional treatment may be either surgery or PTMC (Percutaneous transmitral commissurotomy). The advantage of PTMC may be close to that of surgery. With the exception of those with suboptimal valve morphology, percutaneous balloon valvuloplasty is the treatment of choice for patients in whom treatment is indicated, and even those patients are often treated with this procedure if surgery is not feasible or if the surgical risk is prohibitive.

If PTMC is planned for any patient, the purpose of TEE is to look for LA or LAA thrombus and severity of MR and associated valve lesion if any. As there is high probability of formation of LA thrombus due to stasis of blood in dilated LA and LA appendage, it should be evaluated before going for PTMC. In this study we will evaluate the frequency with which LA thrombus is found

1. FCPS (Cardiology), Senior Registrar Cardiology, Faisalabad Institute of Cardiology, Faisalabad.
2. FCPS (Cardiology), Associate Professor Cardiology, Faisalabad Institute of Cardiology, Faisalabad.
3. FCPS (Cardiology), Senior Registrar Cardiology, Faisalabad Institute of Cardiology, Faisalabad.
4. FCPS (Radiology), Associate Professor Radiology, Allied Hospital, Faisalabad.

Correspondence Address:
Dr. Muhammad Nouman Ahmed
Department of Cardiology
Faisalabad Institute of Cardiology, Faisalabad.
mrnouman39@hotmail.com

Article received on: 04/05/2024
Accepted for publication: 07/09/2024

so that we can predict the presence and need of anticoagulation in such patients.

METHODS

This cross-sectional study was conducted at Faisalabad institute of Cardiology between July 2023 till April 2024. After approval from ethical review committee of FIC Faisalabad (letter no. 10-2022, Dated 04/12/2022) total 180 patients were enrolled in study. Patients of severe mitral stenosis between 18 to 60 years of age with low Wilkins score (<8) from both genders were included in study. Patients with past h/o PTMC, having systemic illness were excluded from study. Data was collected in echocardiography department of FIC before and after Transesophageal echo including LA size, thrombus in LA or LAA, MR, Rhythm of patient and any associated valve lesion.

RESULTS

Total 180 patients were included in this study with 39% (n=70) male and 61% (n=110) female patients. Youngest patient was 18 years old female and elder patient which was included in study was of 60 years female. Majority of patients were in 25 to 35 years of age group. Clinical evaluation showed that 40% patients (n=72) were in NYHA class III and equal number in class II. 20% (n=36) were in NYHA class I symptoms. All patients underwent ECG, transthoracic echo and medication evaluation before proceeding for TEE. It was found that 60% (n=108) patients were in atrial fibrillation at enrollment. Rest were in sinus rhythm with few premature atrial contractions and 2 patients were in atrial flutter. One patient was found to have recurrent episodes of SVT. Transthoracic echo showed 67% (n=120) patients were having very severe MS with mitral valve area <1cm^2. Mean LA size was found to be 54±11mm.

Almost all patients had spontaneous echo contrast in LA. LA appendage velocity was reduced in 60% (n=108) patients. On transesophageal echo cardiogram we found that 24% patients (n= 43) had definite LAA thrombus. Majority of the patients who had LA thrombus was large in size with predominance of male gender 56%. Out of these 43 patients, 34 had atrial fibrillation (79%). 9 patients had rhythm in sinus. We also looked for LA posterior wall thrombus but none of the patient had layered thrombus attached to posterior wall of LA. Majority of the patients (80%) were in functional class III, Rest in FC II. None of the patient in FC I had LA thrombus. Patients taking aspirin was having thrombus quite frequently as compared to those taking warfarin. Almost all patients were already on aspirin. 35% patients with LAA clot were on warfarin also but majority were with suboptimal INR.

Age	18 to 50 Years
Gender Male Female	 70 (39.9%) 110 (60.1%)
Rhythm Sinus Atrial fibrillation	 71 (40%) 109 (60%)
Functional Class NYHA I NYHA II NYHA III	 20% 40% 40%
Mean LA Size	54±11 mm

Table-I. Demographic and clinical data

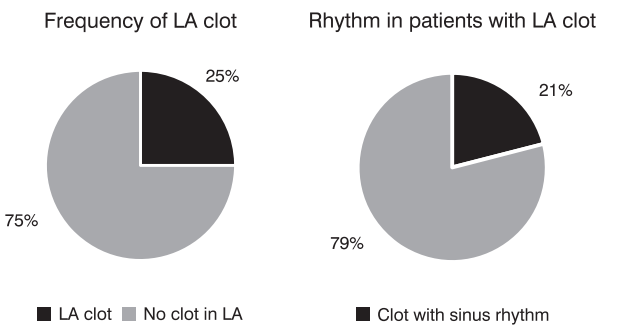

Figure-1. Pie chart showing LA clot and rhythm

DISCUSSION

Mitral stenosis being common in developing word has significant impact on morbidity and mortality. Due to limited resources and limited access to health care facilities and lack of awareness and low socioeconomic status, patients present quite late after development of symptoms. Disease severity is seen quite advanced when assessed on transthoracic echocardiography with much dilated left atrium so called gigantic Left atrium with size > 65mm[10] and many times very severe

MS and high pulmonary artery pressures. After diagnosis these patients should be treated on preference due to very severe MS and high pulmonary pressures. Dilated LA and very severe MS has high tendency to develop Clot in LA and LA appendage due to stasis of blood. Presence of clot delays or modifies treatment approach till its dissolution. Finding out its frequency will guide us about importance of its role in treatment approach modification and thus early diagnosis and timely treatment of mitral stenosis to avoid its impacts. In a study conducted in India, it was found that 33% patients had LA clot or Left atrial body clot on TEE.[11] We found its frequency to be 25%. Difference in frequency is possibly because this study was conducted 20 years back. With advancement in healthcare facilities and ease of access to healthcare facilities have played role to decrease its prevalence. But still 25% is quite high prevalence.

We must give importance to this factor that with advancement in communications and healthcare facilities, there is decrease in frequency of parameters other than disease itself to play its role in management. Frequency of LA clot is also decreased with time. This is not because LA clots are not formed as before. Rather it is due to early presentation and timely testing of its presence which has decreased its frequency. We found that majority of patients with RHD and MS were female as this disease has predominance of female gender. This was similar to a study conducted in Iran in 2012.[12] In Indian study, gender difference was not that marked. Because female have less exposure to healthcare systems. Female also have lower frequency of LA thrombus. This might be due to the fact that female develop dyspnea due to other factors as low HB is one reason, due to which they present early for testing and undergo early diagnosis of disease than male gender who tolerate symptoms for longer time and contribution of anemia did not contribute to early presentation.

In another study conducted in Pakistan[13] found that atrial fibrillation was quite common in female gender who were little elderly due to longstanding disease as compared to early presenters. As it is well documented fact that atrial fibrillation is associated with LA and LAA thrombus formation.[14] Its high frequency is indirect evidence that such patients are more likely to have larger LA size and LA thrombus. But its frequency was lower than another study conducted at Nepal.[15] Patients were taking warfarin already advised by practitioners based on atrial fibrillation on ECG. Those taking warfarin had lower frequency of LAA thrombus 65% than patients who were taking aspirin 95%. They were found to have LA thrombus in higher number. It is also found that there is increased presence of clotting factors in LA in patients having enlarged LA[16] along with increased tendency of blood trauma leading to clot formation.[17] Patients who had associated MR had lower frequency of LA thrombus. Those who were in higher functional class of NYHA had higher frequency of LA thrombus. So it should be noticed and correlated that patients in higher functional class are expected to have more LA thrombus than those in lower functional class. Mean LA size with higher frequency of LA thrombus was found to be 50-mm in M Mode. Echo dense contrast was found almost in all patients with severe MS.

CONCLUSION

Clot in LA is quite common entity with every fourth patient having it. Patients with higher NYHA class and without warfarin are more prone to develop LA clot.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Baumgartner H, Falk V, Bax JJ, De Bonis M, Hamm C, Holm PJ, Iung B, et al. **ESC Scientific Document Group. 2017 ESC/EACTS Guidelines for the management of valvular heart disease.** Eur Heart J. 2017 Sep 21; 38(36):2739-91. doi: 10.1093/eurheartj/ehx391. PMID: 28886619.

2. Iwataki M, Takeuchi M, Otani K, Kuwaki H, Yoshitani H, Abe H, et al. **Calcific extension towards the mitral valve causes non-rheumatic mitral stenosis in degenerative aortic stenosis: Real-time 3D transoesophageal echocardiography study.** Open Heart. 2014 Sep 15; 1(1):e000136. doi: 10.1136/openhrt-2014-000136. PMID: 25332828; PMCID: PMC4189318.

3. Del Rio JM, Grecu L, Nicoara A. **Right ventricular function in left heart disease.** Semin Cardiothorac Vasc Anesth. 2019 Mar; 23(1):88-107.

4. Rodrigues I, Branco L, Patrício L, Bernardes L, Abreu J, Cacela D, et al. **Long-Term follow up after successful percutaneous balloon mitral valvuloplasty.** J Heart Valve Dis. 2017 Nov; 26(6):659-66.

5. Blanken CPS, Farag ES, Boekholdt SM, Leiner T, Kluin J, Nederveen AJ, et al. **Advanced cardiac MRI techniques for evaluation of left-sided valvular heart disease.** J Magn Reson Imaging. 2018 Aug; 48(2):318-329.

6. Wunderlich NC, Beigel R, Ho SY, Nietlispach F, Cheng R, Agricola E, et al. **Imaging for mitral interventions: Methods and efficacy.** JACC Cardiovasc Imaging. 2018 Jun; 11(6):872-901.

7. Henri C, Pierard LA, Lancellotti P, Mongeon FP, Pibarot P, Basmadjian AJ. **Exercise testing and stress imaging in valvular heart disease.** Can J Cardiol. 2014 Sep; 30(9):1012-26.

8. Kawamoto N, Fujita T, Fukushima S, Shimahara Y, Kume Y, Matsumoto Y, et al. **Late onset of atrial fibrillation in patients undergoing mitral valve repair for type II dysfunction.** J Cardiol. 2018 Apr; 71(4):346-51. doi: 10.1016/j.jjcc.2017.11.010. Epub 2017 Dec 21. PMID: 29275952.

9. Pradhan RR, Jha A, Nepal G, Sharma M. **Rheumatic heart diseasewith multiple systemic emboli: A rare occurrence in a single subject.** Cureus. 2018 Jul 11; 10(7):e2964.

10. Hodzic E, Granov N. **Gigantic thrombus of the left atrium in mitral stenosis.** Med Arch. 2017 Dec; 71(6):449-52. doi: 10.5455/medarh.2017.71.449-452. PMID: 29416208; PMCID: PMC5788510.

11. Srimannarayana J, Varma RS, Satheesh S, Anilkumar R, Balachander J. **Prevalence of left atrial thrombus in rheumatic mitral stenosis with atrial fibrillation and its response to anticoagulation: A transesophageal echocardiographic study.** Indian Heart J. 2003 Jul-Aug; 55(4):358-61. PMID: 14686666.

12. Sadeghian H, Salarifar M, Rezvanfard M, Nematipour E, Lotfi Tokaldany M, Safir Mardanloo A. **Percutaneous transvenous mitral commissurotomy: Significance of echocardiographic assessment in prediction of immediate result.** Arch Iran Med. 2012 Oct; 15(10):629-34. PMID: 23020539.

13. Ali SN, Akram M, Zareef A. **Comparison of frequencies of left atrial thrombus in patients of severe mitral stenosis with and without atrial fibrillation undergoing Transesophageal echocardiography for percutaneous Transv-septal mitral Commissurotomy.** PJMHS. Oct–Dec 2015; 9(4):1166-69.

14. Segan L, Nanayakkara S, Spear E, Shirwaiker A, Chieng D, Prabhu S, et al. **Identifying patients at high risk of left atrial appendage thrombus before cardioversion: The CLOTS-AF Score.** J Am Heart Assoc. 2023 Jun 20; 12(12):e029259. doi: 10.1161/JAHA.122.029259. Epub 2023 Jun 10. PMID: 37301743; PMCID: PMC10356043.

15. Shah SP, Sah RP, Panthi S, Shah RK, Acharya R, Neupane D, et al. **Atrial fibrillation among patients admitted to the department of internal medicine in a Tertiary Care Centre: A descriptive cross-sectional study.** JNMA J Nepal Med Assoc. 2022 Sep 1; 60(253):756-60. doi:10.31729/jnma.7858. PMID:36705122; PMCID:PMC9794939.

16. Ates M, Sensoz Y, Abay G, Akcar M. **Giant left atrium with rheumatic mitral stenosis.** Tex Heart Inst J. 2006; 33(3):389-91.

17. Sanfalippo A, Abascal V, Sheehan M, Oertel LB, Harrigan P, Hughes RA, et al. **Atrial enlargement as a consequence of atrial fibrillation.** Circulation. 1990; 82:792-7. doi:10.1161/01.CIR.82.3.792.

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Muhammad Nouman Ahmad:** Data collection, article writing.
2	**Rehan Riaz:** Proof reading.
3	**Naeem Hameed:** Data analysis, proof reading.
4	**Amna Rehan:** Proof reading.