

Original Research Article

Factors responsible for left atrial clot formation in patients with mitral stenosis and normal sinus rhythm

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ABSTRACT

Background: The objective of the study was to investigate the factors responsible for left atrial (LA) clot formation in patients with mitral valve stenosis in normal sinus rhythm.

Methods: 79 patients (43 males and 36 females) were included in the study. 9 patients with mitral stenosis in normal sinus rhythm had LA clot or LA smoke in echocardiography included in Group A and rest of 70 patients in Group B. LA size, gradient across mitral valve and mitral valve surface area was studied and compared in patients with or without LA clot/smoke.

Results: Mean LA size was 4.8 (± 0.5) and 4.6 (± 0.7) in group A and B respectively with ($p=0.304$) and mean valve gradient was 11.6 (± 2.8) and 10.6 (± 3.5) in group A and B respectively with ($p=0.507$), the difference was not significant in both. Mean mitral valve area was 1.01 (± 0.3) and 1.12 (± 0.5) in group A and B ($p=0.36$), the difference was not significant.

Conclusions: Study concluded that there was no significant difference in LA size, valve gradient and mitral valve area in patients with or without LA clot having mitral valve stenosis in normal sinus rhythm. Patients with LA clot warrant measures to prevent thromboembolic episodes.

Keywords: LA clot, LA size, Mitral valve, Mitral valve area

INTRODUCTION

The predominant cause of mitral stenosis (MS) is rheumatic fever, with rheumatic changes present in 99% of stenotic mitral valves excised at the time of mitral valve replacement. Systemic embolism in patients with MS is caused by LA thrombus formation. Although systemic embolization most often occurs in patients of MS with AF, 20% of patients with MS and a systemic embolic event are in sinus rhythm. When embolization occurs in patients in sinus rhythm, the possibility of transient AF or underlying infective endocarditis should be considered.¹

Various studies have mentioned the factors responsible for the formation of a clot inside the left atrium, including atrial fibrillation (AF) rhythm, left atrial size, LA smoke in echo, gradient across mitral valve, mitral valve area, advanced age, and severity of MS. Furthermore, mitral regurgitation (MR) in conjunction with MS has been mentioned as a factor which reduces the risk of left atrial clot formation.²⁻⁴

The study was performed to determine the factors responsible for left atrial clot in a group of patients with mitral valve stenosis who remained in normal sinus rhythm (NSR).

METHODS

This is descriptive, analytical (observational) study, carried out in Department of CTVS, GIPMER, New Delhi, India. In this study, 79 patients with mitral stenosis in normal sinus rhythm, who presented to the department for mitral valve surgery from January 2019 to December 2019, were included. Patients with AF are not included in the study. Patients with LA smoke or spontaneous echo contrast also included in the study.

All patients underwent transthoracic and some patients underwent transoesophageal echocardiography. The results were recorded and analyzed. Patients with AF are not included in the study. Patients with LA smoke/spontaneous echo contrast also included in the study.

The data was analyzed by SPSS version 16. The measurable (quantitative) variables such as age, LA size, 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. As this is observational study, ethical approval not needed.

RESULTS

In this study, 43 patients were males and 36 females. Among 79 patients, 42 patients had only MS, 21 patients had MS with MR, 16 patients had MS with valvular lesions (aortic and tricuspid). In Table 1, total 9 (11.3%), (Group A) patients had LA clot or spontaneous echo contrast or LA smoke (5 males and 4 females) and 70 patients (Group B) (38 males and 32 females) was not having LA clot or spontaneous echo contrast/LA smoke. 2 patients in group A had LA smoke which intraoperatively found to have LA clot included in Group A.

Table 1: Demographic and echocardiographic findings in patients with MS in NSR with LA/LAA clot.

	MS in NSR with LA/LAA clot/LA smoke (n=9) Group A	MS in NSR without LA clot/LA smoke (n=70) Group B	P value
Age in years	36.7 (9.1)	38.8 (13.1)	0.549
LA size	4.8 (0.5)	4.6 (0.7)	0.304
Valve gradient	11.3 (2.8)	10.6 (3.5)	0.507
Mitral valve surface area.	1.01 (0.3)	1.12 (0.5)	0.36

In patients with MS in NSR, mean LA size in group A was 4.8 (\pm 0.5) and 4.6 (\pm 0.7) in group B. The difference was not significant ($p=0.304$). Mean valve gradient in group A was 11.3 (\pm 2.8) and 10.6 (\pm 3.5) in group B. The difference was not significant ($p=0.507$). Mean mitral valve surface area was 1.01 (\pm 0.3) in group A and 1.12 (\pm 0.5) in group B. The difference was though not significant ($p=0.36$) (Table 1).

DISCUSSION

Factors responsible for LA clot formation in patients with Mitral stenosis and Normal sinus rhythm has been studied. In this study, there was no significant difference in LA size in patients with or without LA clot. Study published by Li et al revealed obstruction to mitral flow and altered LA appendage contractile function, not the LA size, are likely to be more important factors for the development of LA and LA appendage spontaneous echo contrast in patients with rheumatic mitral valve disease (predominant mitral stenosis) who are in sinus rhythm.³

Studies by Agarwal et al and Acarturk et al, shows LA size as independent risk factor for LA clot formation.^{4,5} There was no significant difference in mitral valve area in present study. Studies by Gonzalez et al and Bernstein revealed smaller mitral valve area and higher gradient are associated with increased risk for spontaneous echo contrast and LA clot formation.^{6,7}

Saidi et al reported similar finding in their study with no significant difference in LA size, valve gradient and mitral valve area in patients with or without clot in NSR.⁸ The left atrial size, mitral valve score and valve gradient, obtained values were significantly higher in the AF group compared to the group in NSR.

CONCLUSION

Patients with MS in AF have higher risk of LA clot compared to patients in NSR. Although risk is lower compared to patients in AF, patients with MS with LA clot in NSR warrant measures to prevent risk of thromboembolic episodes.

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