

E/Ea For The Prediction of Left Atrial Appendage Thrombi in Patients with Atrial Fibrillation and Severe Mitral Stenosis

Atoosheh Rohani, Hoorak Poorzand, Mohammad R Arefifar

Mashad University of medical sciences, Mashad, Iran.

Abstract

Atrial fibrillation (AF), left atrial appendage thrombi (LAAT) and subsequent embolic stroke are the most frequent complications of mitral stenosis. E/Ea is used traditionally for the assessment of left atrium pressure, and besides AF and dilated LA size which promotes stasis of blood in LA, high LA pressure also play a role to clot formation in LA. The receiver operator characteristics (ROC) curve point-coordinates identified an E:e' value of ≥ 36.5 to have 57.14% sensitivity and 90.91% specificity for LAAT; We find this ratio relatively specific for prediction of LAAT, independent of MVA and LA volume, however it needs to be externally validated.

Introduction

It is possible that impaired diastolic function also plays a role to form a clot in LAA,¹ however enlargement of the left atrium secondary to severe mitral stenosis, longer duration of symptoms, presence of spontaneous echo contrast and advanced age lead to left atrial stasis and increased risk of clot formation. Prior reports suggest that in patients with severe mitral stenosis, besides atrial fibrillation, depressed LAA function and small mitral valve area had a higher risk of LAAT formation. In this investigation, we sought to determine whether E:e' is predictive of LAAT formation in patients with severe MS and AF.

Methods

In this descriptive study, 30 patients with severe MS, who referred to our echo lab for percutaneous mitral valvuloplasty or mitral valve surgery, were included. We excluded patients with mitral regurgitation or aortic regurgitation greater than 2+ in severity and LVEF <50%. Two board-certified (NBE) echocardiologist, who were blinded to the TTE and clinical data, reviewed all TEE images to determine the presence or absence of LAAT [LAAT(+) group A and LAAT(-) group B]. The Doppler measurements were obtained by averaging data from 5 consecutive beats. The left ventricular systolic and diastolic volumes and LVEF were measured using the biplane

Simpson's method. A 1-mm to 3-mm sample volume is placed between the mitral leaflet tips during diastole to record E velocity. To measure Ea, the sample volume is placed in the ventricular myocardium immediately adjacent to the mitral annulus. All patients underwent transthoracic and transoesophageal echocardiography and the results were recorded and analyzed. A two-tailed P value ≤ 0.05 was considered statistically significant in all analyses. PASW-18 software (SPSS, Inc. - Chicago, IL) was used for all data analyses with the exception of the comparisons between ROC curves for which STATA-11 (College Station, TX) was used.

Results

Nine patients (30%) were male. Median age was 44.8 ± 12.3 years. 8 patients (26.6%) had a clot in the LAA and the remainder had no clot. The average mitral valve Wilkins score was 8.3 ± 1.9 in group A and 7.9 ± 1.5 in group B; the difference was not significant ($p = 0.431$).

The mean E:e' among LAAT(+) patients was significantly higher than those who were LAAT(-) [38.08 ± 24.45 vs. 25.17 ± 14.76 , respectively; $P = 0.01$]. The receiver operator characteristics (ROC) curve point-coordinates identified an E:e' value of ≥ 36.5 to have 57.14% sensitivity and 90.91% specificity for LAAT; The size of the left atrium was 74.67 ± 13.17 cc in the LAAT (+) group and 89.1 ± 45.72 cc in the LAAT(-); the difference was not significant ($p = 0.458$).

Mitral valve area in group A was 0.47 ± 0.12 vs 0.67 ± 0.23 cm² in group B. which is not statistically significant ($P = 0.5$).

Discussion

E/Ea is used traditionally for the assessment of left atrium pressure, and besides AF and dilated LA size which promotes stasis of blood in LA, high LA pressure also play a role to clot formation in LA because of diminished atrial emptying, leading to more atrial blood

Key Words:

Left Atrial Appendage Thrombi, Atrial Fibrillation, Mitral Stenosis.

Disclosures:

None.

Corresponding Author:

Hoorak Poorzand,
Mashad University of medical sciences,
Mashad 97551,
Iran.

stasis and thrombus formation. We find this ratio relatively specific for prediction of LAAT, independent of MVA and LA volume, however it needs to be externally validated. Our investigation confirms previous findings by Iwakura et al.² demonstrated that E:e' is associated with LAAT independent of other echocardiographic parameters. Small sample size constitutes a limitation in our study.

References

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