

COMPARISON OF TRANSTHORACIC AND TRANSESOPHAGEAL ECHOCARDIOGRAPHY FOR THE DETECTION OF LEFT ATRIAL THROMBUS IN RHEUMATIC MITRAL VALVULAR DISEASE

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ABSTRACT

Transesophageal echocardiography (TEE) was performed in 114 patients with rheumatic mitral valvular disease and its results were compared with those of transthoracic echocardiography (TTE). Of 114 patients, LA thrombus was detected in 32 patients by TEE whereas TTE could detect LA thrombus in only 4 of them. Out of 32 cases, thrombus was located in left atrial appendage (LAA) in 20 (62%). TTE could detect LAA thrombus in only one patient. The procedure of TEE was well tolerated and there was no complication. We conclude that TEE is superior to TTE in detection of LA cavity and LA appendage thrombus. Hence, TEE should be a routine procedure to detect LA thrombus in patients with rheumatic mitral valvular disease prior to any surgical intervention.

Key Words: *Left atrial appendage (LAA), Transthoracic echocardiography (TTE), Transesophageal echocardiography (TEE).*

INTRODUCTION

Detection of left atrial thrombus in patients with rheumatic mitral valvular disease is very important. It can cause recurrent systemic embolism which sometimes can be fatal and thus associated with grave prognostic significance.^{1,2} Presence of LA thrombus in patients with mitral stenosis precludes closed mitral commissurotomy (CMC) or percutaneous transvenous mitral commissurotomy (PTMC). The incidence of LA thrombi in the setting of mitral valvular disease as reported in surgical data or autopsy studies, is quite significant.^{3,4} Before the advent of echocardiography, left atrial angiography was the only method available for detection of left atrial thrombi. But transseptal atrial septostomy used for left atrial angiography was associated with significant risk to the patients.⁵

Transthoracic two dimensional echocardiography is the diagnostic technique of choice for assessment of intraatrial masses including thrombi, yet there are limitations to this approach.^{6,7} Although relatively large thrombi within the body of the atrium are usually evident on technically adequate thoracic images, major limitations exist in the delineation of left atrial appendage.^{6,7,8} Where about 50% of LA thrombi occur.^{9,10} Transesophageal echocardiography has helped to overcome this problem, as structure in and about left atrium, including LAA., may be readily assessed with this technique. This study describes our experience with both TTE and TEE in detection of thrombi in LA cavity and LA appendage in 114 patients with rheumatic mitral valvular disease. This is the first study of such kind carried out in Nepal.

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MATERIALS AND METHODS

The study group consisted of 114 consecutive patients with rheumatic mitral valve disease, who presented at Shahid Gangalal National Heart Centre between June 2001 and Jan 2003. Most of them had moderate to severe mitral stenosis. Their age ranged from 15-55 years (mean age 36 years). There were 74 female and 40 male patients. All the patients had transthoracic echocardiography followed by transesophageal echocardiography.

The left side of the heart in transthoracic echocardiography was imaged in apical four chamber and two chamber views as well as in parasternal long and short axis views. Modified short axis parasternal cross-sectional views at the aortic valve level were also used. The cardiac images on transesophageal echocardiography were obtained by transducer position as recommended by ASE/SCA guidelines for performing a comprehensive multiplane transesophageal examination.¹⁵ 5 MHz multiplane TEE probes (Aloka SSD 2200 & 5500) were used for the study. The common views used were mid esophagus four chamber, two chamber, modified SAX at aortic valve level. A thrombus was defined as a mass of irregular, usually non-mobile laminated echo within the atrial cavity with a broad base attached to the wall

RESULTS

Among 114 patients studied, LA cavity and /or LAA thrombi were detected in 32 patients by TEE, whereas TTE could detect

LA thrombus in only 4 of them. Among 32 patients, 20 (62.5%) had LAA thrombus, 8 (25%) had thrombus in LA body cavity and 4 (12.5%) had thrombi both in LAA and LA body. TTE could detect LAA thrombus in 1 patients and LA body thrombus in 3 patients. The largest thrombus was 2.6cm and the smallest one was 0.9 cm. The results and clinical data of the patients having LA/LAA thrombi are summarized in the tables below.

DISCUSSION

Although two dimensional echocardiography is considered diagnostic method of choice for detection of intracavitary masses, it has been frequently reported that this technique may fail to detect thrombi located within left atrial appendage.¹¹ In our study, LAA thrombus could be detected in only one patient by TTE whereas TEE was able to detect LAA thrombus in 24 patients. Even 5 patients with LA cavity thrombus could not be detected by TTE and later picked by TEE. TEE could detect LA thrombus in 32 patients whereas TTE could detect thrombus only in 4 of them. In 75% of cases (24/32) thrombus was located in LAA. Hence visualization of LAA is very important. It was reported that 22% to 46% of all left atrial thrombi were confined to the appendage at the time of mitral valve surgery.^{8,9} Despite the use of goal directed parasternal basal short axis imaging planes, transthoracic visualization of the left atrial appendage to diagnose or exclude a thrombus is possible in only 3% to 19% of patients.⁹ In a study of 21 patients undergoing mitral valve replacement, TEE was 100% sensitive and specific for the diagnosis of left atrial appendage

Table I : Clinical data of 32 patients with LA thrombus

Age	Range	15-53
	Mean	35
Sex	Male	7
	Female	25
Cardiac Rhythm	Sinus	2
	Atrial Fibrillation	30
Valve Lesion	MS	28
	MS/MR	2
	MR	1
	MS/MR/AR	1

Table II : Comparative results of TTE and TEE studies

	No. of Patients	
	TTE	TEE
Study group	114	114
Thrombus in LA appendage	1	20
Thrombus in LA cavity	3	8
Thrombus in both LA cavity and LAA	-	4

thrombus. None of these thrombi were detected by transthoracic echocardiography.¹² In a series of 2000 consecutive patients undergoing TEE for a wide variety of clinical indications, the incidence of left atrial thrombus was 3.8%; all of these were undetected by transthoracic echocardiography. Thrombus within LA appendage was detected in 100% of patients by TEE and missed in all patients by transthoracic study.^{13,14} Majority of the patients in our study had moderate to severe mitral stenosis and were in atrial fibrillation. Atrial fibrillation is a known predisposing factor for left atrial appendage thrombus formation.

LIMITATIONS

This is a small study comprising 114 patients only. Only 9 patients had open heart surgery and thrombus was verified in all these patients. Rest of the patients with LA thrombus are on oral anticoagulation with periodic follow up.

CONCLUSION

Because of the immediate proximate anatomic relation of the left atrium to the esophagus, TEE allows outstanding high resolution delineation of the body and appendage of the left atrium. By providing high resolution images in multiple planes, TEE is far superior to transthoracic echocardiography in detection of LA cavity/ LA appendage thrombus. Hence, TEE should be a routine procedure to detect LA appendage clot in patients with rheumatic mitral valve disease, especially in dominant mitral stenosis, prior to PTMC or CMC.

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