

Evolution of Left Atrial Thrombus with Anticoagulant Therapy—Follow-up by Transesophageal Echocardiography

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Objectives: Atrial fibrillation is an important risk factor for systemic embolism. A number of clinical studies demonstrated the beneficial effect of anticoagulant therapy for the prevention of embolism. But there has been no study on the fate of left atrial thrombus demonstrated by transesophageal echocardiography in the course of anticoagulation therapy.

Methods: Thirteen patients, demonstrated to have left atrial thrombus by transesophageal echocardiography were followed with anticoagulation therapy. Repeated transesophageal echocardiography was done 15 months after 1st study.

Results: Among 9 patients with adequate anticoagulation effect (INR > 2.0), left atrial thrombus disappeared in 3 patients. The size of thrombus decreased from 2.2 ± 0.8 cm to 0.9 ± 1.0 cm ($p < 0.05$ by paired Student's *t*-test).

Conclusions: Left atrial thrombus could dissolve or decrease in size with adequate anticoagulation.

Key Words: LA thrombus, Anticoagulation, Embolism

INTRODUCTION

Left atrial thrombus (LAT) is a very important predisposing condition for systemic embolism. In most cases, atrial fibrillation is an underlying abnormality^{1,2}. A number of randomized trials have demonstrated a significant reduction in thrombotic stroke by warfarin therapy in patients with atrial fibrillation³⁻⁷.

Since transesophageal echocardiography (TEE) was introduced, TEE was known to have high sensitivity and specificity for the detection of LAT⁸. In clinical practice, it is sometimes very difficult to know how to manage the patients with LAT who have minimal symptom or no structural heart disease. Anticoagulation may be the main therapeutic choice in a majority of these cases. But there has been no study about how LAT would evolve with anticoagulation.

The authors performed follow-up TEE after anticoagulation in patients who showed LAT on TEE. The purposes of this study are 1) to show the evolutionary change of LAT with anticoagulation and 2) to make the rationale for empirical therapy in these patients.

METHODS

1. Study Patients

Thirteen patients (male: 4, female: 9) were included after LAT was detected by TEE. The underlying diseases were mitral valve diseases in 8 patients and combined mitral and aortic valve diseases in 2 patients. Three patients showed no structural heart diseases. Three patients had experienced cerebral embolism in the past. Eleven patients had atrial fibrillations. Two patients had normal sinus rhythms.

2. Transesophageal Echocardiography

After-midnight fasting, TEE was performed in the left lateral decubitus position. The oropharynx was anesthetized with lidocaine gurgling and spray. Biplane 5.0 MHz probe (Aloka, Japan) was used. All data was recorded on videotape for fu-

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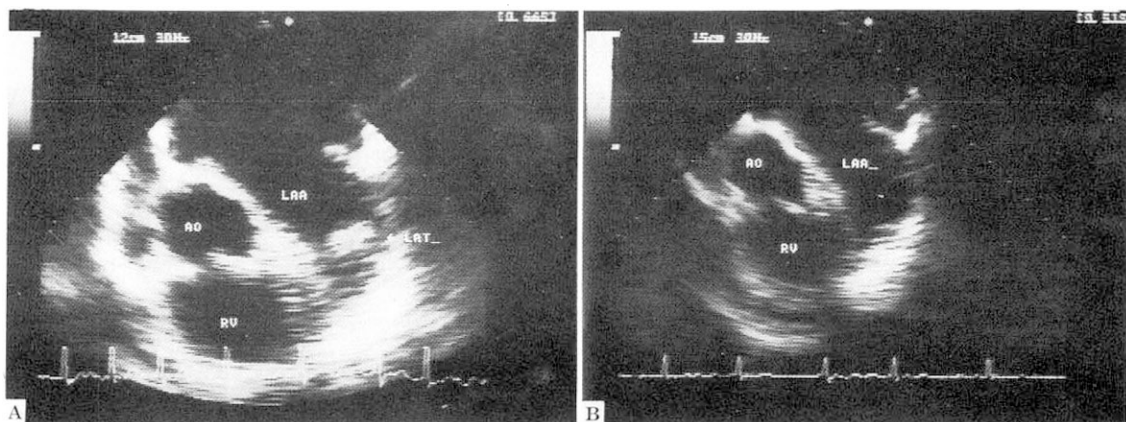


Fig. 1. A thrombus in LA appendage was detected by TEE(a) and disappeared after anticoagulation for 11 months(b).

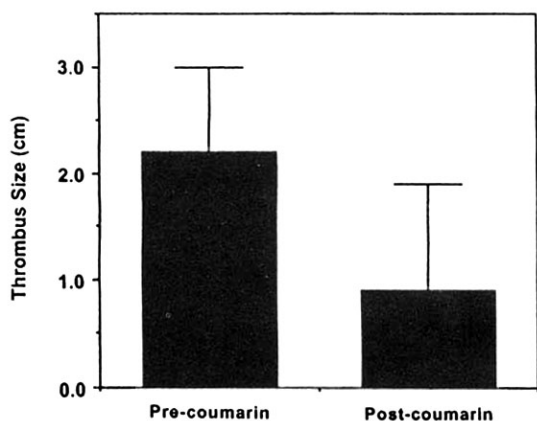


Fig. 2. The size of LAT in group I was significantly decreased after anticoagulation.(from 2.2 ± 0.8 cm at 1st TEE to 0.9 ± 1.0 cm at 2nd TEE)

ture playback. The data was interpreted by two experienced cardiologists. The size of LAT was measured by the longest length of the thrombus because LAT was sometimes of oval shape.

3. Protocol

After LAT was demonstrated, warfarin was prescribed and patients were followed with monitoring of the prothrombin time every monthly visit at the outpatients clinic. Mean interval between 1st and 2nd TEE was 15 months and ranged from 2 months to 34 months.

RESULTS

During follow-up period, the average dose of

warfarin was 3.2 mg per day. In 9 patients, anticoagulation therapy was effective with adequate prolongation of prothrombin time (International Normalized Ratio; $INR > 2.0$) (Group I), but 4 patients showed inadequate responses due to poor compliance (Group II). Systemic embolism developed in 2 patients in group II (50%), but no embolic event was noted in group I. In Group I, the average INR was 2.20 ± 0.09 .

At follow-up TEE, LAT disappeared in 3 patients in group I (33%) (Fig. 1) and in one patient in group II after systemic embolism. The size of LAT in group I was 2.2 ± 0.8 cm (mean \pm S.D.) at 1st TEE and LAT decreased significantly to the size of 0.9 ± 1.0 cm at 2nd TEE (Fig. 2, $p < 0.05$ by paired Student's *t*-test).

DISCUSSION

There have been a number of clinical studies regarding the efficacy of warfarin in reducing the future embolic events in patients with atrial fibrillation. But there was no direct demonstration of the decrease in size of LAT with anticoagulation. To our knowledge, this seems to be the first report about the evolution of LAT with anticoagulation.

The efficacy of anticoagulation was very high in patients with adequate prolongation of prothrombin time with warfarin, and this supports the previous clinical observation of the beneficial effect of warfarin in preventing the systemic embolism. Also, the high incidence of systemic embolism, in patients with inadequate prolongation of prothrombin time, highlights the impor-

tance of anticoagulation in the prevention of systemic embolism. There has been much debate about the adequate level of anticoagulation in patients with atrial fibrillation⁹⁻¹². In valvular heart disease, the adequate anticoagulation has been recommended as INR 3.0-4.5. But this level of anticoagulation increases the incidence of bleeding complication. From our data, adequate level of anticoagulation seems to be more than 2.0 in INR. This finding supports the recommendation by the European Heart Journal¹³.

The mechanism of resolution in some cases seems to be the natural thrombolytic activity. The anticoagulation can promote the thrombolysis by preventing the thrombogenicity. Systemic embolism cannot be ascribed completely to the presence of LAT because it develops in the absence of LAT. Spontaneous echo contrast (SEC) can be the predisposing factor to systemic embolism. But in our study population, patients with LAT were included without regard to the presence or absence of SEC.

In conclusion, this study demonstrated the effectiveness of oral anticoagulation not only in preventing the systemic embolism but also in decreasing the size of LAT in patients with LAT.

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