Prevalence of Left Atrial Thrombosis in Patients with Atrial Flutter

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Abstract

Background- Little is known about the prevalence of atrial thrombosis in atrial flutter undergoing cardioversion of rhythm. Several studies, however, have shown that patients with atrial fibrillation have a high prevalence of atrial thrombosis, strongly associated with increased risk of embolism in atrial fibrillation. Still, the incidence of atrial thrombi in patients with atrial flutter is not well established.

Methods-Transesophageal echocardiography was done in 30 consecutive non-anticoagulated patients with a mean age of 48.4 years who were admitted for cardioversion of atrial flutter. Mean left atrial size was 4.3cm and mean ejection fraction was 42%. The mean duration of flutter was more than 48 hours. Left atrial thrombus was seen in 2 patients.

Results- Two patients had left atrial thrombosis and both of them had rheumatic mitral stenosis. The other patients were free of thrombosis.

Conclusion- This study suggests that atrial thrombus is uncommon in patients with atrial flutter, and there is a low risk of thromboembolism after cardioversion, except in rheumatic mitral stenosis, which itself has a high prevalence of left atrial thrombosis ***(Iranian Heart Journal 2010; 11 (3): 24-28).***

Key words: atrial thrombosis ■ atrial flutter ■ myocardial dysfunction

Sveral studies have demonstrated a high prevalence of atrial thrombosis and spontaneous echo contrast in atrial fibrillation.[1-3] Therefore, anticoagulation is recommended for these patients; especially if they are undergoing cardioversion.[4-6] However, patients with atrial flutter have traditionally been considered at low risk for thromboembolism.[7,8] The lower risk in these patients has been attributed to the relatively preserved atrial and appendage mechanical function, which prevents blood stasis in atrial chambers.[20,21]

Recently, a few studies have shown that atrial thrombosis and spontaneous echo contrast also occur in patients with atrial flutter.[2,9,10]

Be that as it may, because of the small number of patients, the true prevalence of atrial thrombosis in atrial flutter cannot be estimated from these studies.

Therefore, we performed a prospective study of consecutive patients admitted for evaluation of atrial flutter to determine the prevalence of atrial thrombosis. We also attempted to identify clinical risk factors associated with thrombosis in atrial flutter.

Methods

All patients with atrial flutter admitted to our hospital between April 2004 and March 2006 were included.

Eighty patients with atrial flutter were scheduled, but only 30 patients were eligible for the study. Causes of exclusion were previous use of warfarin, unsuitability for transesophageal echocardiography (TEE) (unstable condition and old age), unwillingness to perform TEE, and return to normal sinus rhythm during the waiting time. Of these 30 patients, 22 were men and 8 were women.

The diagnosis of atrial flutter was made from a 12-lead electrocardiogram using the standard criteria.[11] The criteria for inclusion were non-use of anticoagulant drugs during the previous 3 weeks; pure atrial flutter; no previous history of short or long periods of atrial fibrillation; duration of atrial flutter of at least 48 hours based on clinical observations; history of persistent flutter; and stable hemodynamic findings. All the eligible patients underwent transthoracic echocardiography (TTE) and multiplane TEE with the use of the standard criteria. This study was based on case series, and all values are reported as mean ± standard deviation.

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The risk factors associated with atrial thrombosis including age, duration of atrial flutter, hypertension, left ventricular (LV) function, congestive heart failure, cerebrovascular accidents, left atrial size, and rheumatic mitral valve disease were considered.
Mean values ± SD were computed for the continuous variables and percentages were reported for the categorical variables to describe patient characteristics. For analysis of data, SPSS software was used.

Results

Patient population

The mean age of the patients was 53 years with a range of 25-80 years (SD ±17.7, median 54.5). The mean heart rate was 110 beats/min with a range of 60-150 beats/min (SD ±22). There was no history of previous embolism. Causes of admission are listed in Table I.
TEE showed left ventricular ejection fraction (LVEF) between 10-55% with a mean of 42% (42±10.2%). In 76.6% of the patients, EF was more than 40%. Left atrial size was measured with a range of 2.7-6.3 cm and mean of 4.3±1cm (Table II).

Table I. Causes of admission

Symptoms	Frequency	Percent
Palpitation	14	46.7%
Dyspnea	5	16.7%
Weakness	3	10%
Chest pain	3	10%
asymptomatic	2	6.6%
Dyspnea + palpitation	3	10%
	30	100%

Table II. LVEF, LA size and age range of patients

LVEF			LA size			Age Range	
LVEF	Frequency	Percent	LA size	Frequency	Percent	Age	Frequency
55	3	10%	2.5	2	6.7%	25-29	3
50	7	23.4%	3	2	6.7%	30-34	3
45	8	26.5%	3.5	5	16.6%	35-39	3
40	5	16.6%	4	6	20%	40-42	2
35	2	6.6%	4.5	9	30%	45-49	2
30	2	6.6%	5.5	4	13.3%	51-54	2
25	2	6.6%	6.5	2	6.7%	55-59	3
10	1	3.4%				60-64	3
						65-74	3
						75-79	4
						79-80	2

Rheumatic mitral stenosis (MS) was the only significant predictor of thrombosis in our study. There were two cases with LA thrombus.
In total, 35% of the patients had rheumatic heart disease, and 65% non-rheumatic heart disease (Table III). Of the 8 (26.6%) patients with rheumatic disease, 5 (62.5%) had severe MS, 2 (25%) had moderate MS, and one (12.5%) had moderate MS and regurgitation (MR).

Table III. Underlying causes of atrial flutter

Symptoms	Frequency	Percent
Ischemia	8	26.5%
Idiopathic	4	13%
Myocardial (Myocarditis)	1	3.5%
Congenital	6	20%
Rheumatic	8	26.5%
Cardiomyopathy	3	10.5%
	30	100%

Five (62.5%) of the rheumatic patients were women and 3 (37.5%) were men. Two (25%) patients had LA clot and 6 (75%) were free of LA clot. Of the patients with clot, one was female and one was male.

Risk factors for cardiovascular disease were smoking in 6 (20%), hypertension in 2 (6.7%), hypertension and diabetes in 2 (6.7%), and there was no risk factors in 20 (66%) patients. No medication was used by any of the patients.

Discussion

Traditionally, atrial flutter was considered a benign arrhythmia with respect to thromboembolism, but recent studies have reported that atrial flutter may confer some risk of thromboembolism. Available studies on thromboprophylaxis in atrial flutter to date are small and are done only on patients suspected of thromboembolic events, or performed on inadequate numbers.

The published evidence addressing the issues relating to antithrombotic therapy in atrial flutter has not been extensive; therefore, it has been difficult to assess the embolic risk of atrial flutter.

Corrado et al. reported atrial thrombi in 2.7% of their patients[22] and Weiss[14] et al. reported left atrial thrombosis in 7% and spontaneous echo contrast in 25% of individuals with atrial flutter prior to cardioversion. What remains uncertain is whether these features could partly be attributed to intermittent atrial fibrillation in these patients.[15]It is known that many patients with atrial flutter may eventually develope atrial fibrillation.

Overall, the data from eight studies of cardioversion in atrial flutter suggest a collective embolic risk of 2.2% among patients inadequately anticoagulated (INR<2). Black et al. reported atrial thrombosis in 14% of their patients with atrial flutter.[2] Bikkinia reported atrial thrombus in 11% of their patients,[9] but most of their patients had LVEF of less than 40% and history of hypertension and systemic embolism.

The probability of atrial thrombosis in atrial flutter is increased in congestive heart failure (CHF), previous cerebrovascular accidents, longer duration of flutter, LA size, and decreased LV function. It has been suggested that the cardioversion of atrial flutter without anticoagulation may be safe in patients at very low risk of thromboembolism (in the absence of spontaneous echo contrast, left atrial thrombus and the absence of a left atrial appendage velocity of > 25m/s).[16-18]

In one report, there was a 6% risk of thromboembolism due to atrial flutter.[12] In another report,[13] the annual risk of thromboembolism was 1.6% amongst patients with chronic atrial flutter. This figure is approximately a third of that seen in atrial fibrillation. The published evidence is again scant with regard to identifying high-risk patients with pure atrial flutter for thromboembolism, as detected by TEE prior to cardioversion.

What is the incidence of emboli after cardioversion of atrial flutter?

In a retrospective study of 122 patients who underwent the cardioversion of atrial flutter, Arnold et al.[7] found no embolic events. However, 26% of their patients were anticoagulated at the time of cardioversion. In another study,[19] from 85 patients referred for the cardioversion of chronic atrial flutter, embolism occurred in one of 39 non-anticoagulated patients compared with none of 46 on anticoagulation.

Only large randomized trials of anticoagulation therapy on pure atrial flutter would give the definitive answer regarding the role of anticoagulation in atrial flutter.

Our study is one of the largest prospective studies on the prevalence of atrial thrombus in atrial flutter, using multiplane TEE for the detection of atrial thrombus.

Conclusion

This study demonstrates that there is a low prevalence of atrial thrombosis in atrial flutter with various cardiac diseases except for rheumatic MS, which is inherently a thrombogenic condition. Nonetheless, we should always watch for the predictors of atrial thrombosis before the cardioversion and anticoagulate these patients. Rheumatic MS was the only significant predictor of thrombosis in our study (6.6% of patients). Because of the small number of the patients, the results should be viewed with caution.

Conflict of Interest

No conflicts of interest have been claimed by the authors.

References

1. Orsinelli DA, Pearson AC. Usefulness of transesophageal echocardiography to screen for left atrial thrombus before elective cardioversion for atrial fibrillation. Am J Cardiol 1993; 72: 1337-1339.

2. Black IW, Hopkins AP, Lee LCL, Walsh WF. Evaluation of transesophageal echocardiography before cardioversion of atrial fibrillation and flutter in non-anticoagulated patients. Am Heart J 1993; 126: 375-381.

3. Moreyra E, Finkelhor RS, Cebul RD. Limitations of transesophageal echocardiography in the risk assessment of patients before non-anticoagulated cardioversion from atrial fibrillation and flutter: an analysis of pooled trials. Am Heart J 1995; 129: 71-75.

4. Laupacis A, Albers G, Dunn M, Feinberg W. Antithrombotic therapy in atrial fibrillation:

third ACCP conference on antithrombotic therapy. Chest 1992; 102: 426S-433S.

5. Fatkin D, Kuchar DL, Thorburn CW, Feneley MP. Transesophageal echocardiography before and during direct current cardioversion of atrial fibrillation: evidence for atrial stunning as a mechanism of thromboembolic complications. J Am Coll Cardiol 1994; 23: 307-316. [Abstract]

6. Mancini GBJ, Goldberger AL. Cardioversion of atrial fibrillation: consideration of embolization, anticoagulation, prophylactic pacemaker, and long-term success. Am Heart J 1982; 104: 617-621.

7. Arnold AZ, Mick MJ, Mazurek RP, Loop FD, Trohman RG. Role of prophylactic anticoagulation for direct current cardioversion in patients with atrial fibrillation or atrial flutter. J Am Coll Cardiol 1992; 19: 851-855.[Abstract]

8. Kinch JW, Davidoff R. Prevention of embolic events after cardioversion of atrial fibrillation: current and evolving strategies. Arch Intern Med 1995; 155: 1353-1360.[Abstract]

9. Bikkina M, Alpert MA, Mulekar M, Shakoor A, Massey CV, Covin FA. Prevalence of intraatrial thrombus in patients with atrial flutter. Am J Cardiol 1995; 76: 186-189.

10. Santiago D, Warshofsky M, Mandri GL, Tullio MD, Coromilas J, Reiffel J, Homma S. Left atrial appendage function and thrombus formation in atrial fibrillation-flutter: a transesophageal echocardiographic study. J Am Coll Cardiol 1994; 24: 159-164.[Abstract]

11. Benditt DG, Benson DW, Dunnigan A, Gornick CC, Anderson RW. Atrial flutter, atrial fibrillation and other primary atrial tachycardias. Med Clin North Am 1984; 68: 895-919.

12. Lanzarotti CJ, Olshansky B. Thrombolism in chronic atrial flutter: is the risk underestimated? J Am Coll Cardiol 1997; 30: 1506-11.

13. Wood KA, Eisenberg SJ, Kalman JM. Risk of thromboembolism in chronic atrial flutter. Am J Cardiol 1997; 79: 1043-7.

14. Weiss R, Marcovitz P, Knight BP. Acute changes in spontaneous echo contrast and atrial function after cardioversion of persistent atrial flutter. Am J Cardiol 1998; 82: 1052-5.

15. Tunick PA, Mc Elhinney L, Mitchell T, Kronzon I. The alternation between atrial flutter and atrial fibrillation. Chest 1992; 101: 34-36.

16. Densem CG. Patients undergoing cardioversion of atrial flutter should be routinely anticoagulated. Am J Cardiol 1999; 83: 140-1.

17. Bertaglia E, D'Este D, Franceshi M, Pascotto P. Cardioversion of persistent atrial flutter in non-anticoagulated patients at low risk for thromboembolism. Ital Heart J 2000; 1: 349-53.

18. Roijer A, Eskilsson J, Olsson B. Transesophageal echocardiography-guided cardioversion of atrial fibrillation or flutter. Selection of a low-risk group for immediate cardioversion. Eur Heart J 2000; 21: 837-47.

19. Pagadala P, Gummadi SS, Olshansky B. Thromboembolic risk of chronic atrial flutter: is the risk underestimated? Circulation. 1994; 90 (suppl I): I-398. Abstract.

20. Santiago D, Warshofsky M, Li Mandri G. Left atrial appendage function and thrombus formation in atrial fibrillation-flutter: a transesophageal echocardiographic study. J Am Coll Cardiol 1994; 24: 159-64.

21. Kinch JW, Davidoff R. Prevention of embolic events after cardioversion of atrial fibrillation: cuttent and evolving strategies. Arch Intern Med 1995; 155: 1353-60.

22. Corrado G, Sgalambro A, Mantero A. Thromboembolic risk in atrial flutter; the FLASIEC multicenter study. Eur Heart J 2001; 22, 1042-1051.