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LEFT VENTRICULAR THROMBUS IN ACUTE ST SEGMENT ELEVATED MYOCARDIAL INFARCTION

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ABSTRACT

Objectives: To determine the frequency of left ventricular thrombus in acute ST segment elevation myocardial infarction, relation of left ventricular thrombus to degree of left ventricular-dysfunction, and effects of adjuvant therapy on left ventricular thrombus formation.

Material & Methods: It was a descriptive cross sectional study conducted at Cardiology Department, Hayatabad Medical Complex, PGMI, Peshawar. One hundred ninteen patients, having acute myocardial infarction were included in the study. Main outcome measure, presence or absence of LV Thrombus ,was ascertained in ST Elevation Myocardial Infarction (STEMI) patients.

Results: Total 119 patients were included in the study. There were 36(30.2%) female patients and 83(69.7%) male patients. The mean age of presentation was 59.5 ± 11.0 years. Left ventricular thrombus was found in 9(7.5%) of STEMI patients, 6 out of 9 patients had anterior wall STEMI.

Conclusion: LVT is important complication of acute myocardial infarction and require timely diagnosis and treatment in form of anticoagulation so that its potential to embolize can be minimized.

Key Words: Myocardial infarction, Left ventricular thrombus. Echocardiography.

INTRODUCTION

The occurrence of left ventricular thrombus (LVT) after acute myocardial infarction (AMI) carries a significant prognosis implication. LV thrombi are the major sources of embolic stroke after ST segment elevation myocardial infarction (MI)[1].

The likelihood of developing LV thrombus after an acute MI varies with infarct location and size. LV thrombus is most often seen in patients with large anterior ST elevation infarctions with anteroapical aneurysm formation and akinesis or dyskinesis; the incidence is lower with smaller infarctions and those involving other myocardial regions[2,3]. Serial transthoracic echocardiographic (TTE) studies were performed, most thrombi develop within the first two weeks (median five to six days) after infarction[4,5].

The echocardiographic features suggesting most likely embolization of a thrombus are (1) Increased mobility, (2) Protrusion of thrombi into ventricular cavity, (3) When the thrombus is visualized in multiple views and continuous zones of akinesia and hypokinesia of left ventricular wall. Myocardial infarction is not the sole cause of left ventricular thrombus. There are many other causes like dilated Cardiomyopathy, endomyocardial fibrosis, Loeffler's disease, eosinophilic leukemia's and myocarditis. The most concerning aspect regarding left ventricular thrombus is not its mere presence but its potential to systemic embolization.

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MATERIAL AND METHODS

This was a 6 month descriptive cross-sectional study, conducted in coronary care unit Postgraduate Medical Institute Hayatabad Medical Complex, Peshawar. Approval of ethical committee of PGMI and informed written consent of the patient admitted through OPD and emergency with acute ST segment elevation MI was taken. A total of 119 patients of all ages from both sexes presenting with typical chest pain lasting for more than 30 minutes with acute ST segment elevation myocardial infarction were included in this study. In addition Troponin T and rise in CK. MB level were considered as diagnostic of acute myocardial infarction. Patients without typical chest pain and significant ST-T wave changes were excluded.

All patients were kept in CCU for variable periods till their clinical condition permitted shifting to general cardiology ward. Detailed history of acute illness and risk factors and clinical examination were carried out to look for any complications.

Doppler echocardiographic examination was performed in each patient on admission, 3rd and 5th day before discharge. The wall motion was analyzed

according to the method devised by Shelley M. Shapiro and Leonard E Ginton[6] and left ventricular function (EF) was calculated by in built computer by PCMBO method[7].

RESULTS

119 patients with first episode of acute MI were studied; 69.7% were male and 30.3% were female. Maximum age group was 51-60 years. Left Ventricular Thrombi (LVT) was found in 09/119 patients detected by 2-D echo method (Table 1), once detected, was present during the entire echocardiographic follow up and became organized. Only 3 patients had complication of systemic embolization (Table 2), all in the CNS. LVT was seen in patients with decreased left ventricular wall motion especially anterioapical wall akinesia. Out of 119 patients, anterior myocardial infarction patients were 66 (55.5%), inferior myocardial infarction patients were 41 (34.5%) and anterolateral myocardial infarction patients were 8 (6.7%). The incidence of left ventricular thrombus was higher among anterior myocardial infarction patients 6/66 (Table 3). Other patients with left ventricular thrombus were also having anterior myocardial involvement as well i.e. 2 patients with anterolateral STEMI & 1 patient with anteroinferior STEMI. The majority of patients were male and most of the patients were suffering from anterior myocardial infarcts. The anterior myocardial infarct patients were probably the patient, who experienced significant symptoms and approached hospital.

Table 1: Frequency of LVT in sample population

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	110	92.4	92.4	92.4
	Yes, on day 1	6	5.0	5.0	5.0
	Yes, on day 5	3	2.5	2.5	2.5
	Total	119	100.0	100.0	100.0

Table 2: Presence of LVT and its relation to stroke

LVT	CVA		Total
	No	Yes	
No	107	3	110
Yes, on day 1	3	3	6
Yes, on day 5	3	0	3
Total	113	6	119

Table 3: Left Ventricular Thrombus and type of Myocardial Infarction

MI	LVT			
	No.	Yes, on day 1	Yes, on day 5	Total
Anterior	60	4	2	66
Anteroinferior	3	1	0	4
Anterolateral	6	1	1	8
Inferior	41	0	0	41
Total	110	6	3	119

DISCUSSION

In this study the incidence of left ventricular thrombus (LVT) was 7.5% (9 patients) in all acute myocardial infarct patients. The overall occurrence rate of left ventricular thrombus in many international and local studies is from 10% to 40%[8,9]. Regarding the age, most of our patients developed left ventricular thrombus in age group 51-60 years. In the study of Salehi et al the mean age of patients with LVT was 64.3 years Vs 58.2 years in non LVT patients. The age of our series suggesting that coronary artery disease present more commonly at younger age among our patients.

Among the different types of myocardial infarction, the incidence of left ventricular thrombus was highest in anterior myocardial infarction (9.9%) and 5.6% was seen in other myocardial infarction. This was also seen in study by Salehi et al, in which the percentage of left ventricular thrombus was higher in anterior myocardial infarction the reason being due to extensive myocardial damage. The study of Nihyannopoulos P shows left ventricular thrombus incidence of 40% among anterior myocardial infarction patient without evidence of systemic emobilization. In study by Kupper et al LVT incidence was 30/92 & thromboembolic complications were 60 percent[10,11] while A Shahzad et al the overall incidence of 94% of LVT.

All thrombi were detected in apical position. Our finding of apical clot is in consistency with the study of Salehi et al who found most left ventricular thrombi in apical position in their study done[12].

During formulation of this study we considered two major risk factors like diabetes and hypertension. In our study there were 43 hypertensive patients, out of which 8 had left ventricular thrombus and 3 patients had cerebrovascular accidents. In this study there were 40 diabetic patients out of which 6 developed left ventricular thrombus only 3 had cerebrovascular accident. In this study the incidence of left ventricular dysfunction (LV dysfunction) and left ventricular

thrombus is higher among diabetic patients. This finding is consistent with other studies[13,14].

In this study we have also aimed at finding the incidence of systemic embolism which was 5.04% (6/119 patients). Three out of 6 (50%) patient with thromboembolism show central nervous system (CNS) embolism. Thromboembolism due to left ventricular thrombus is a serious complication of acute myocardial infarction and is highest among patients who show echocadiographic evidence of left ventricular thrombus and left ventricular dysfunction. Anticoagulant therapy if started in such high risk patients the course of this serious complication can be modified in a favorable way.

In the study of Jugdutt and Sivaram, anti-coagulation satisfactorily reduces thromboembolism and that mobile clot is more prone to dislodgement[15]. Kupper et al advocate routine anti-coagulation because it may make left ventricular thrombus less vulnerable to embolize[16].

In our study thrombolytic therapy was given and had no significant bearing on left ventricular thrombus formation and systemic embolization (Table 3), which is also seen in study by Vecchio et al[12,17]. In our study 91 patients (76.4%) received intravenous streptokinase 1.5 mega units over one hour. All patients received 150 mg of aspirin per day. Streptokinase (SK) receiving patient were classed as group I. (28 patients) and group II (23.5%) did not receive streptokinase (SK). The incidence of left ventricular thrombus in both streptokinase (group I) and non-streptokinase (group II) is not similar and is statistically significantly different i.e. 4.3% (4/91) versus 17.8%(5/28). Significantly reduce the incidence of left ventricular thrombus formation.

Also the number of patients with systemic embolism was very small only 6 patients so no statistically significant result could be expected. Characterization of our patients with thromboembolism are older age, anterior myocardial infarction and resultant poor Left ventricular function which is also noted in literature elsewhere[18]. Studies by Bacardi L et al and A shahad[19] showed no significant reduction in left ventricular thrombus formation after streptokinase use.

Kupper et al and other studies[9] suggest that if left ventricular thrombus is of mural shape compared to pedunculated type then tendency towards emobilization is less because this type of thrombus usually do not embolize while in our patients thrombi were not of mobile and pedunculated type generally the incidence of systemic embolism is 50% in our study.

Though according to literature thrombolytic therapy generally have no great effects on systemic embolism, anti-coagulation with heparin have been reported to be effective in reducing the tendency towards thromboembolism by modifying the shape of left ventricular thrombus making it less vulnerable to embolize, it is not the case in our study.

The review of our result with thrombolytic therapy shows that thrombolytic therapy has significantly helped in preserving left ventricular function and reducing the complication of acute myocardial infarction.

CONCLUSION

As a result of study of literature and discussion and comparison of results of our study with other studies we have come to the conclusion that the incidence is highest in anterior myocardial infarction and systemic embolization is significantly higher among those patients having left ventricular thrombus, though thrombolytic therapy did not seem to affect the incidence of left ventricular thrombus formation and systemic embolization.

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