

Prevalence of Left Ventricular (LV) Thrombus after Acute Myocardial Infarction (MI) at Shaikh Zayed Hospital, Lahore

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ABSTRACT

Aim: To examine the prevalence of left ventricular thrombus after acute myocardial infarction in our hospital.

Study design: Descriptive study

Place & duration: Department of Cardiology, Sh. Zayed Hospital, Lahore from 1st July 2017 to 30th June 2018.

Methods: In this study, 80 patients of both genders with anterior wall ST-segment elevation acute myocardial infarction were included. Patient's ages were ranging from 30 to 80 years. Patient's demographical detail was examined after taking informed consent from all the patients. For acute myocardial infarction initial treatment was given to all the patients. 2D transthoracic echocardiography was performed to diagnose left ventricular thrombus.

Results: There were 67 (83.75%) patients were men and 13 (16.25%) patients were women. Eight 8 (10%) patients had ages 30 to 44 years, 48 (60%) patients were ages between 45 to 60 years and 24 (30%) patients were ages >60 years. 26 (32.5%) patients found to had Left ventricular thrombus. Out of 26 (100%), left ventricular thrombus (LVT) patients diagnoses by transthoracic echocardiography, 22 (84.62%) patients were men and 4 (15.38%) patients were women. Left ventricular thrombus rate was less in those patients whom had treated with thrombolytic therapy as compared to non-thrombolytic patients with P-value <0.05.

Conclusion: There was a high risk of development of left ventricular thrombus in patients having anterior wall ST-segment elevation acute myocardial infarction. Moreover, thrombolytic therapy was the essential treatment for reducing the rate of LV thrombus.

Keywords: Myocardial infarction, Left Ventricular Thrombus, Prevalence, Thrombolytic Therapy

INTRODUCTION

Globally, acute myocardial infarction is the most important cause of mortality and it is one of the most common cause of morbidity in patients admitted health care centers¹. The mortality ratio is high in acute myocardial infarction effected patients and rated 35% to 40%². However, this morbidity and mortality rate is gradually declining with the ongoing evolution in the treatment strategy for this dreadful health issue over the past 30 years including the development of the coronary care unit, fibrinolytic therapy, and catheter-based reperfusion³. The most important initiating event in the development of acute myocardial infarction (AMI) is coronary artery plaque fissuring or rupture that leads to the exposure of underlying subendothelial matrix to formed elements of blood. That further leads to cascade of events resulting in activation of platelets and thrombin generation leading to formation of thrombus. The development of occlusive thrombus within the lumen of coronary artery in the absence of collateral blood vessels most often results in the development of acute ST-segment elevation myocardial infarction (STEMI)⁴.

Left ventricular (LV) thrombus formation is not an uncommon complication developing in patients suffering from AMI. While reviewing most of the past research articles, the incidence of LV thrombus complicating the AMI have been found to be 20-40%, and in some of these studies as high as 50-60% with large anterior wall MI. However, the incidence of this complication in patients with non-anterior wall MI the incidence was close to 5%^{5,6}.

The pathophysiologic mechanism for LV thrombus formation can be explained by so called "Virchow's triad" that is commonly found in patients suffering from AMI. The three components of this triad are stasis of blood, endocardial injury or dysfunction and a hypercoagulable state. The LV thrombus generally develops within 1 to 2 weeks of development of AMI^{5,6}.

Among many factors that are associated with a higher risk of LV thrombus formation after acute anterior wall MI, more commonly seen are large infarct size and extent, presence of congestive cardiac failure, severe global and regional LV systolic dysfunction, elevated end-systolic volume, LV dilatation or aneurysm formation, presence of spontaneous contrast on echocardiogram and abnormal flow patterns visible within the left ventricle.^{7,8} Increased level of C-reactive protein⁹ and advanced age¹⁰ at the time of AMI have also been found to be related to increased risk. There is about 10% risk of embolization after development of thrombi. Factors that increase the risk of embolization are mobility, protrusion into the LV cavity and central echolucency of the clot.

Transthoracic echocardiography (TTE) is the most commonly used imaging modality to make a diagnosis of LV thrombus and has a sensitivity of 90%-95% and specificity of 85%-90%. Multiple echocardiographic criteria have been devised for detection of LV thrombus that include an echodense mass within the LV cavity that is although contiguous with underlying myocardium, yet quite distinct from this layer. This mass should be seen throughout the cardiac cycle and visualized in at least two orthogonal views. Other important associated findings are underlying region of severe wall motion abnormality, usually severe hypokinesis, akinesis, dyskinesis, and/or

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aneurysmal dilatation^{11,12}. Left ventricular thrombus can rarely develop in association with stunned myocardium that regains its normal motility at the time of detection of thrombus. During multiple research studies, thrombolytic drugs have been found to reduce the overall morbidity and mortality in patients with AMI¹³⁻¹⁵.

This study was conducted to examine the prevalence of left ventricular thrombus in patients with anterior wall ST-segment elevation acute myocardial infarction and to provide the early and better treatment to reduce the morbidity and mortality rate.

MATERIALS AND METHODS

This study was conducted at Department of Cardiology, Shaikh Zayed Hospital, Lahore from 1st July 2017 to 30th June 2018. Permission was sought from the Ethical Committee. Eighty patients of both genders with anterior wall ST-segment elevation acute myocardial infarction were included. Patient’s ages were ranging from 30 to 80 years. Patient’s demographical detail was examined after taking informed consent from all the patients. Patients having history of already treatment for myocardial infarction, patients with cardiomyopathy, myocarditis, acute pericarditis and those having chronic kidney disease and liver disease were excluded from this study. For acute myocardial infarction initial treatment was given to all the patients, i.e. thrombolytic therapy. 2D transthoracic echocardiography was performed to diagnose the left ventricular thrombus. All the statistical data was analyzed by SPSS 19.0. P-value <0.05 was significantly considered.

RESULTS

Sixty seven (83.75%) patients were men and 13(16.25%) patients were women. There were 8(10%) patients had ages 30 to 44 years, 48(60%) patients were ages between 45 to 60 years and 24(30%) patients were ages >60 years. 26(32.5%) patients found to had Left ventricular Thrombus. Out of 26 (100%) LVT patients diagnoses by transthoracic echocardiography, 22(84.62%) patients were men and 4(15.38%) patients were women (Tables 1-2).

Table 1: Gender-wise distribution of all the patients

Gender	No.	%
Men	67	83.75
Women	13	16.25

Table 2: Age-wise distribution of patients

Age (years)	No.	%
30 -44	8	10.0
45 - 60	48	60.0
>60	24	30.0

Table 3: Prevalence of LVT after acute myocardial infarction

Prevalence	No.	%
Found	26	32.50
Not Found	54	67.50%

Table 4: Frequency of LVT after thrombolytic therapy

Characteristics	Thrombolytic (n=50)	Non-Thrombolytic (n=30)
LVT Found	10 (20%)	16 (53.33%)
LVT Not Found	40 (80%)	14 (46.67%)

Fifty patients were treated with thrombolytic therapy, in which LVT found in 10(20%) while 40(80%) had not found LVT. 30(100%) patients with non-thrombolytic group, in which 16 (53.33%) patients had LVT while 14 had not found Left Ventricular Thrombus. Left Ventricular Thrombus rate was less in those patients whom had treated with thrombolytic therapy as compared to non-thrombolytic patients with P-value <0.05 (Tables 3-4).

DISCUSSION

Acute myocardial infarction is the world most frequent cause of mortality and morbidity in hospitalized patients. Left Ventricular Thrombus is the most common developed complication in anterior wall ST-segment elevation acute myocardial infarction effected patients.¹⁶In our study, we found 26(32.50%) patients had Left ventricular thrombus after acute myocardial infarction. Many of previous studies regarding LVT reported that the frequency rate of left ventricular thrombus rate was 22 to 45%¹⁷ and some other studies shows 50 to 60% of LVT in patients after anterior wall ST-segment elevation acute myocardial infarction¹⁸.

Occasionally, the causes of left ventricular thrombus development after MI includes segmental dysfunction of the infarcted myocardium resulting in stasis of blood, endocardial tissue inflammation¹⁹. Many of some other studies reported that development of Left ventricular thrombus happens quickly after acute myocardial infarction.²⁰ In this study 80 patients of acute myocardial infarction was included, in which 67(83.75%) patients were men and 13(16.25%) patients were women. A study conducted regarding prevalence of LVT reported that males patients population was high as compared to females and rated 70 to 90% of male patients population^{21,22}.

In our study, we found were 8(10%) patients had ages 30 to 44 years, 48 (60%) patients were ages between 45 to 60 years and 24(30%) patients were ages >60 years. These results shows similarity to some other studies in which maximum patients were ages ranging from 40 to 60 years^{23,24}. In this study, we observed that Out of 26 (100%) LVT patients diagnoses by transthoracic echocardiography, 22(84.62%) patients were men and 4(15.38%) patients were women.

Fifty patients were treated with thrombolytic therapy, in which LVT found in 10(20%) while 40(80%) had not found LVT. 30(100%) patients with non-thrombolytic group, in which 16(53.33%) patients had LVT while 14 had not found left ventricular thrombus. Left ventricular thrombus rate was less in those patients whom had treated with thrombolytic therapy as compared to non-thrombolytic patients with P-value <0.05. These results shows similarity to some other studies in which prevalence of LVT rate was high in men patients population as compared to women and thrombolytic therapy shows significant better result as compared to non thrombolytic patients²⁵.

CONCLUSION

LV thrombus is one of the most common causes of mortality in health care centers. In our study, we concluded that there was a high risk of development of left ventricular thrombus in patients having anterior wall ST-segment

elevation acute myocardial infarction. Moreover, thrombolytic therapy was the essential treatment for reducing the rate of LV thrombus.

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