Frequency of Left Ventricular Thrombus after Acute Anterior Wall Myocardial Infarction

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ABSTRACT

Background: Acute myocardial infarction (MI) is one of the leading causes of mortality and morbidity associated with cardiovascular diseases. Left ventricular thrombus (LVT) is one of the important complications of myocardial infarction. LVT significantly increases the morbidity and mortality associated with MI. The embolic complications of LVT include stroke, vital organs infarct and limb ischemia. In this study we tried to find out the frequency of LVT in our population at 48 hours and at 1 week after acute MI. This would help us in better understanding of this potential life threatening complication of MI in our population.

Objective: The objective of the study is to determine the frequency of left ventricular thrombus after acute anterior wall myocardial infarction at 48 hours after MI and at 1 week in those patients that didn’t have LV thrombus at initial assessment at 48 hours.

Study Design: It was a descriptive case series.

Setting: The Study was conducted in CCU, cardiology department Jinnah Hospital Lahore.

Sample Selection: All patients of both genders with age range of 25-85 years, of acute anterior wall ST-elevation myocardial infarction (excluding old infarct patients, patients already having thrombus, contraindications to thrombolytic therapy) from May 2013 to Sep 2013 were selected.

Results: LVT was seen in 25 patients (19.2%) out of the total 130 patients included in the study. LVT was seen in 7 (5.4%) patients at 48 hours and 18 new cases of LVT (13.8% of total 130 patients and 14.63% of 123 patients without LVT at 48 hours) were seen at 1 week.

Conclusion: The overall frequency of LVT after acute MI was 19.2%. More number of patients with LVT was diagnosed at 1 week than at 48 hours. If LVT is not seen in patients after acute anterior wall MI at 48 hours, then repeat echocardiography at 1 week can be helpful in diagnosing this life threatening complication of acute MI among high risk patients.

Key Words:

INTRODUCTION

Myocardial infarction continues to be a major public health problem in the industrialized world and is becoming an increasingly important problem in developing countries. In the United States; nearly 1 million patients a year suffer from an acute myocardial infarction (MI). More than 1 million patients with suspected acute MI are admitted yearly to coronary care units in the United States.

The development of left ventricular (LV) thrombus is one of the common complications of acute myocardial infarction. In a study performed on 153 patients with acute anterior wall myocardial infarction, the left ventricular thrombus was detected in 23.5% of the patients. In another study the frequency of LV thrombus was reported up to 42.8%.

The LV thrombus adheres to the endocardium overlying the infarcted myocardium. The likelihood of developing a LV thrombus after an acute myocardial infarction (MI) varies with infarct location and size. Left ventricular thrombus is most often seen in patients with large anterior ST elevation infarctions. The incidence is lower with smaller infarctions and those involving other regions of the myocardium.

The other factors that are associated with formation of left ventricular thrombi include severe global or regional left ventricular systolic dysfunction, presence of congestive heart failure, left ventricular dilatation and/or aneurysm formation.

Left ventricular thrombi are important clinically because they can lead to serious systemic embolic complications, including stroke. Left ventricular...
thrombi are the major sources of embolic stroke after ST segment elevation myocardial infarction. Two dimensional echocardiography has become an investigation of choice for evaluating the patients for left ventricular thrombus. It has the specificity of 85-90% and sensitivity of 90-95% for the assessment of LV thrombus. The echocardiographic criteria for LV thrombus includes an echo dense mass with definite margins contagious but distinct from the endocardium adjacent to an area of hypo or akinetic myocardium and identifiable throughout the cardiac cycle.

In a case series of 70 patients with acute anterior wall myocardial infarction LV thrombus was identified in 30 patients (42.8 %). The 16.66% (5 of the 30) patients with thrombus, i.e. 7.14% of total patients with acute anterior wall MI, were identified at 48 hours whereas 80 % (24) cases of thrombus were seen at 1 week after acute myocardial infarction.

In our study we will determine the frequency of the LV thrombus at 48 hrs after MI and then those patients that did not initially have the thrombus at 48hrs will be assessed at 1 week for LV thrombus.

Our Study would help us to emphasize the importance of repeat echocardiography in the patients of acute anterior wall MI that didn’t have LV thrombi 48 hours and to make it a routine practice in our setup for the patients of acute anterior wall MI at risk of developing LV thrombus. So that prompt medical treatment can be started in time to help decrease the morbidity and mortality associated with embolization of clot.

MATERIAL AND METHODS
It was a case descriptive series study and 130 patients of both genders with age range of 25-85 years having acute anterior wall myocardial infarction, treated with thrombolytic or conservatively with following exceptions:

a) Previous myocardial infarction.(assessed by history)
b) Previous left ventricular thrombus (assessed by history)
c) Patients with moderate to severe chronic kidney disease (assessed by history, serum creatinine level >2mg/dl(normal 0.4-1.2mg/dl), ultrasound showing renal parenchymal disease ).Patients with chronic liver disease ( assessed by history,ultrasound showing cirrhosis and changes of decompensation e.g; spleenomegaly, ascites)
d) Cardiomyopathy(assessed by history, TTE)
e) Rheumatic heart disease ( assessed by history, TTE)
f) Cardiomyopathy or rheumatic heart disease (history, TTE). were selected from CCU Jinnah Hospital Lahore after taking Informed consent, these effect modifiers were controlled by stratification. Demographic profile was obtained from the patients. A transthoracic echocardiogram by single echocardiographer was done at 48 hours and then at 1 week after admission day. All the information was collected through a specially designed Performa. Data was computed on statistical package for social sciences (SPSS), version 13. Qualitative variables like gender and left ventricular thrombus at 48 hours and at 1 week were described in frequencies and percentage. Quantitative variables like age were presented by mean ± standard deviation.

RESULTS
130 patients, suffering from acute anterior wall MI that fulfilled the inclusion criteria, were included in the study. 28 patients were females that made up 21.5% of total patients and 102 patients were males that made up 78.5% of the total patients. The mean age of the male patients was 53.20 ± 13.01 and the mean age of female patients was 58.71 ± 12.44. 110 patients (84.6%) out of 130 patients received thrombolytic therapy i.e IV streptokinase and 20 patients (15.4%) did not receive any thrombolytic and were managed conservatively.

Total number of patients with LVT was 25 out of 130 patients included in study. So, the overall incidence of LVT after acute anterior wall MI was 19.2% in patients included in study. 7 patients developed LVT at 48 hours which contributes to 5.4% of the total study population. 123 patients were without LVT at 48 hours. 18 more patients developed LVT at 1 week which makes up 13.8% of the total patients. These 18 patients are 14.63% of the 123 patients that did not develop LVT at 48 hours.

With regards to gender distribution, out of 102 male patients included in study, LVT was seen in 19 patients which contributes to 18.6 % of all the male population. Among 28 females, LVT was seen in 6 females which makes 21.4% of the total female patients.

Among the 110 patients, that received thrombolytic therapy, LVT was seen in 17 patients
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which is 15.5% of the total patients with thrombolysis. 8 patients developed LVT in the group of 20 patients that did not receive any thrombolysis. So, the frequency of LVT in patients without thrombolysis was 40%.

TTE is the investigation that is easily available and has sensitivity of 90-95% and specificity of 80-85% for the diagnosis of LVT. Majority of the studies, such as by Kalra A et al and Neskovic AN et al used this diagnostic tool for the determination of LVT in patients with MI. In my study, I also have used TTE for diagnosing LVT. However, sometime if the echocardiographic window is poor, the diagnosis of LVT becomes difficult. In such patients, the use of contrast echocardiography is very helpful in delineating LVT form endocardium.

The risk factors for LVT include infarct in anterior location, large size of infarct and poor LV systolic function. LVT is found in areas adjacent to severe hypokinesia, akinesia or dyskinesia. LVT adds to the morbidity and mortality associated with acute MI because of its embolic potential. The embolic event can result in stroke, or any other organ ischemia and even limb ischemia. The documented incidence of ischemic stroke in patients with LVT is 6%.

In our study majority of the patients were males (79.3%). This variation of gender distribution is in accordance with some of the previous studies of LVT after acute MI. In a GISSI II connected study on LVT in acute anterior wall MI after thrombolysis, by Vecchio C et al, the total number of patients were 180 and 78.9% of the patients were males. The average age of the patients in our study was 53.20±13.01 for males and 58.71±12.44 for females. Similarly, in a study by Waseem T et al, the average age of the males was 51.79±13.86 years and females was 54.83±10.15 years and 80% of patients were males.

The documented incidence of LVT in the setting of acute MI is variable. In a study by Osherov AB et al, the incidence of LVT after acute anterior wall MI was 6.2%. In a study by Kalra A et al the incidence of LVT in patients with acute anterior wall MI was documented to be 10%. In another study by Rathi NL the incidence of LVT after acute MI was 17.86%. On the other hand, in a study by Rabbani LE et al, LVT was seen in 35% of the patients with acute MI after they underwent primary PCI. In our study LVT was after acute anterior wall MI was seen in 19.2% of the patients.

In my study, the incidence of LVT was 40% in patients that did not receive thrombolytic therapy

DISCUSSION

LVT formation after acute myocardial infarction is a known complication of MI. The documented incidence of LVT after acute MI is variable ranging from less than 5% to more than 40% in different studies. LVT is found more frequently in patients with anterior wall MI than at other locations. In a study by Rathi NL et al, LVT was seen in 50 patients. Out of these, 45 patients (90%) had anterior wall MI.

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In my study, the incidence of LVT was 40% in patients that did not receive thrombolytic therapy
and 15.5% among patients that received thrombolytic therapy. Hence, there was significantly more number of LVT cases were seen in patients that did not receive thrombolytic therapy. This finding is supported by a few other studies.

In a study by Lupi G et al, LVT was seen in 21% of the patients that received thrombolytic therapy and in 52% of the patients that did not receive any thrombolytic therapy and were managed conservatively.\(^1\)

In study by Natarajan D et al, LVT was seen in 44.4% of the patients that did not receive thrombolytic therapy.\(^1\) In another study by Rathi NL et al, LVT was seen in 11.45% of patients in thrombolysed group and 27.19% among the patients that did not receive thrombolytic therapy.\(^5\) Less number of patients with LVT were seen in patients who received thrombolytic therapy. Similarly, in study by Pizzetti G et al, documented that the incidence of LVT was lower in patients receiving thrombolytic therapy than those that did not receive it.\(^1\)

In our study, LVT was found in 7 patients (5.4%) at 48 hours and 18 new patients (13.8% of the total study patients and 14.63% of 123 patients without LVT at 48 hours) with LVT were seen at 1 week. In a study by Okuyan E et al, 5 cases (7.14% of total patients) with LVT were diagnosed at 48 hours.\(^3\) This frequency is close to the findings in our study at 48 hours.

**CONCLUSION**

In our study, LVT was seen in 19.2% of the patients. LVT was seen in 7 (5.4%) patients at 48 hours and 18 new cases of LVT (13.8% of total patients and 14.63% of 123 patients without LVT at 48 hours) were seen at 1 week. Thrombolytic therapy was associated with less number of LVT cases. So, if the initial echocardiography done in 48 hours after acute anterior wall MI shows no LVT, repeat echocardiography can be helpful in high risk patients to diagnose this life threatening complication of MI. More studies elaborating the different risk factors, the effect of primary PCI on LVT after acute MI in our setup and longer follow up can be helpful in better management of this complication of MI.

**REFERENCES**

11. Neskovic AN, Marin kovic J, Bojic M, et el. Predictors of left ventricular thrombus formation and disappearance after anterior wall