

FREQUENCY OF LEFT VENTRICLE THROMBUS IN PATIENT WITH ACUTE ANTERIOR WALL MYOCARDIAL INFARCTION

Syed Imran Ahmed Kazmi¹, Shahid Khan², Amir Rashid Qureshi³, Muazzam Ali Shehzad¹, Syeda Anam Noor Kazmi⁴, Raheel Ahmed⁵

Abstract

Objective: This experimental and observational study was conducted to study the Frequency of left ventricular thrombus in patients with acute anterior wall myocardial infarction attending the Cardiology department, Ayub Teaching Hospital, Abbottabad during January 2020 to April 2020.

Material and Methods: In this study 203 patients diagnosed with acute anterior wall STEMI were included in the study after obtaining an informed consent. Patients were managed as per hospital protocols during their stay in the hospital. Echocardiography was performed in lateral decubitus position at a follow up visit at least 3 months following acute myocardial infarction to look for left ventricular thrombus. The written informed consent was taken from all patients before start of study. The permission of Ethical Committee was taken before collection of data and publishing in Medical Journal. The data was analyzed for result by SPSS version 20.

Results: Left ventricle thrombus was diagnosed in 17 (8.37%). No statistically significant association was found between LV thrombus and age and sex of the patients.

Conclusion: Left ventricle thrombus is a fairly common complication of acute anterior wall myocardial infarction.

Key Words: Left Ventricular Thrombus, Acute Anterior Wall Myocardial Infarction, Patients

INTRODUCTION

Cardiovascular diseases are the leading cause of death worldwide.(1) Mortality due to Acute myocardial infarction has reduced since the introduction of primary percutaneous coronary intervention (PCI).

Primary percutaneous coronary intervention (PCI) has been proved to be superior to thrombolytic therapy due to both lower mortality rates and clinically significant adverse events. (2, 3) But, complications following infarction are still causing morbidity and mortality in a significant number of patients. (4, 5) Occurrence of thromboembolic events (cerebrovascular accidents) due to left ventricular (LV) thrombus remains one of the most dangerous postinfarct complications. (6)

After sustaining acute myocardial infarction, LV thrombus formation is maximum during the first three months, but the impending risk for throwing emboli to cerebral vessels remains higher in a large number of patients with LV dysfunction. Since these thromboembolic events are usually unnoticed by warning signs and symptoms of transient cerebral ischemia, satisfactory medical approach plays a major role in proper management of such high risk patients. As the reperfusion procedures are generalized during an acute coronary event, this approach has markedly reduced the frequency of left ventricular (LV) thrombi because more myocardium can be salvaged. (7)

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1. Department of Cardiology, Women Medical College Abbottabad
 2. Health Sector Reforms Unit, Health Department Khyber Pakhtunkhwa
 3. Department of Cardiology, Abbottabad International Medical College Abbottabad
 4. Department of Gastroenterology, Women Medical College Abbottabad
 5. Department of Nephrology, Institute of Kidney Diseases Peshawar

Address for Correspondence:

Raheel Ahmed

Clinical Fellow Adult Nephrology , Division of Nephrology
University of Toronto, Canada
azo.koko@gmail.com

Several mechanical factors are involved in the formation of LV thrombus after an acute Myocardial infarction. Blood stasis due to LV regional wall motion abnormalities (akinetic and dyskinetic LV segments), prolonged ischemia leading to subendocardial damage and hypercoagulable states (i.e. Virchow's triad – blood stasis, endothelial injury and hypercoagulability) predispose a patient to the development of LV thrombus. (8) Occurrence of formation of LV thrombus post Myocardial Infarction is hard to estimate due to the fact that advanced management strategies for acute MI have rapidly advanced over the past two decades, however it is presumed to have reduced. Studies done before the introduction of thrombolytics have revealed that LV thrombus may have been present in up to 46% of individuals after acute anterior or apical MI. Widespread availability of potent antiplatelet and antithrombotic agents and rapid mechanical reperfusion following acute MI is thought to lower the incidence of LV thrombus to 5%–10%. (8) These treatment strategies are primarily aimed to prevent systemic embolization of LV thrombus. Anticoagulation with vitamin K antagonist (Warfarin) is the main treatment for LV thrombus to prevent systemic embolization. (9)

The current study has been designed with a view to determining the frequency of left ventricular thrombus in patients with acute anterior wall myocardial infarction admitted to the CCU. Since there is a paucity of literature on this topic from this region in general the results of this study will help to alert cardiologists about the possibility of left ventricular thrombus in patients with acute anterior wall myocardial infarction and initiate timely management. The results of this study could then be used as a basis for a large-scale study to confirm these observations. (10)

Material and Methods:

In this study 203 patients of both sexes diagnosed with acute anterior wall ST-elevation myocardial infarction (STEMI) were included in this study after obtaining informed consent. Patients with NSTEMI and those with inferior or posterior wall ST segment elevation myocardial infarctions were excluded. Patients were managed as per hospital protocols during their stay in the hospital. Echocardiography was performed in lateral decubitus position at a follow up visit at least 3 months following acute myocardial infarction to look for left ventricular thrombus. The follow-up was complete and no cases were dropped out. The written informed consent was taken from every patient before start of study. The permission of Ethical Committee was taken before collection of data and publishing in Medical Journal. The data was analyzed for result by SPSS version 20.

RESULTS

The frequency of left ventricle thrombus in this study was 8.37% (n=17). This study enrolled 203 adults as per operational definition and inclusion criteria outlined above. The mean±SD age of study participants was 54.44±8.37 years with a range of 41-68 yrs.

There were 103(50.74%) males and 100(49.26%) females in the study population. Mean age of all the study participants was 54.14±8.37 years. Thrombolysis was done in 148 (72.91%) patients. When the outcome i.e., left ventricle thrombus was stratified by age, gender and thrombolysis, no statistically significant association was found.

All results are presented below as table no 1 to 5.

Table 1: Frequency of left ventricle thrombus in study participants

Left Ventricle Thrombus	Frequency	Percent (%)
Present	17	8.37
Absent	186	91.63
Total	203	100.0

Table 2: Frequency of thrombolysis in study participants

Thrombolysis	Frequency	Percent (%)
Done	148	72.91
Not done	55	27.09
Total	203	100.0

Table 3: Cross tabulation of age of study participants with frequency of left ventricle thrombus in study participants

Age (years)	LV Thrombus		Total	P value
	Present	Absent		
Upto 54	9	98	107	0.98
More than 54	8	88	96	
Total	17	186	203	

p ≤ 0.05

Table 4: Cross-tabulation of Sex of study participants with the frequency of left ventricle thrombus

Sex	LV Thrombus		Total	P value
	Present	Absent		
Male	11	92	103	0.23
Female	6	94	100	
Total	17	186	203	

Table 5: Cross-tabulation of Thrombolysis in study participants with the frequency of left ventricle thrombus

Thrombolysis	LV Thrombus		Total	P value
	Present	Absent		
Done	13	135	148	0.49
Not done	4	51	55	
Total	17	186	203	

p ≤ 0.05

DISCUSSION

The frequency of left ventricle thrombus in this study was 8.37%. Varying rates of left ventricle thrombus have been reported in literature. For example, a study from Abbottabad reported that LV thrombus was present in 34.1% of patients with anterior wall myocardial infarction. Total of eighty-five (85) patients of acute anterior wall Myocardial Infarction were studied, fifty-eight (68.2%) were males and twenty-seven (31.8%) were females. The mean age for males was 58.72±12.13 years and for females it was 59.69±8.17 years. On echocardiography 29 patients had LVT (34.1%). Mean age of patients with LVT was 61.14±10.74 and those without LVT 57.93±11.05 years. Among the sixty-five ST-elevation Myocardial Infarction (STEMI) patients twenty eight (43.1%) got Left Ventricle Thrombus and in twenty non-ST-elevation Myocardial Infarction (NSTEMI) patients only one (5%) had Left Ventricle Thrombus. In 52 patients who were diagnosed within 12 hours of onset of chest pain 8 (15.4%) developed LVT. While in 33 patients whose MI was diagnosed after 12 hours of onset of chest pain 21 (63.6%) were complicated with LV Thrombus. The authors concluded that Male patients, older

than 50 years of age, suffering from STEMI may be at increased risk of post infarct LVT. Early hospitalization seems to lower the risk of LVT.

Interestingly, no statistically significant association between age, and gender and LV thrombus was noted in this study. Also, NSTEMI was an exclusion criteria in this study therefore we couldn't determine association of STEMI with LV thrombus formation. (11, 12)

Recent study from the US reported that LV thrombus was detected in 28 (1.6%) patients of acute STEMI who were treated with Percutaneous Coronary Intervention. (13) This study recruited consecutive patients who presented at Saint Luke & Mid America Heart hospital with ST elevation myocardial Infarction and were managed with percutaneous coronary intervention (PCI) and an echocardiogram. Total of 1,698 patients (1,205 men, mean age 61 ± 13 years) comprised the study group. Echocardiography was done on hospital day two, and an Ultrasound contrast Agent (UCA) was used in 1292 sick persons (76% percent). Left Ventricle thrombus was present in 28 (1.6%) patients. Thrombolysis resulted in lower Left Ventricle thrombus (odds

ratio = 0.41, 95% CI 0.16 to 1.04, p = 0.060), and preserved LVEF was associated with less Left Ventricle thrombus (odds ratio = 0.96, 95% CI 0.91 to 0.97, p = <0.001). An ultrasound contrast agent (UCA) was used in most echocardiograms, and it improves accuracy in the detection and exclusion of LV thrombus. (14,15)

A study from Lahore, Pakistan reported that left ventricular thrombus was present in 28% patients with acute anterior wall myocardial infarction. (16) In this study, 100 patients with anterior wall STEMI presenting to cardiac emergency or coronary care unit (CCU) of Cardiac complex, Gulab Devi Hospital, were selected on non-probability, purposive sampling meeting inclusion criteria, after taking written informed consent. All the patients were treated initially for management of acute STEMI, including use of thrombolytics where indicated. Echocardiography was performed during the same admission to assess presence of LV thrombus (LVT). Results: The mean age was 54.3 ± 11.4 years. (17, 18)

There were 84(84%) male patients and 16 (16%) female patients. LVT was present in 28 (28%) patients on TTE. Among those, there were 23 (82.1%) male and 5 (17.9%) female patients. However, out of 84 male patients 27.4% develop LVT and among 16 female patients this ratio was 31.3%. The LV thrombus was independent of age and gender. LV thrombus was significantly less in thrombolytic group as compared to those who were not given this therapy, i.e. p value 0.05. (19, 20) The authors concluded that patients with anterior wall acute STEMI not infrequently develop the complication of development of LV thrombus.

CONCLUSION

Formation of a left ventricle thrombus following an acute anterior wall myocardial infarction is a fairly common complication and all cardiologists should actively look for a left ventricle thrombus in patients with acute AAMI.

Authors Contribution

SIAK, MAS, ARQ; Basic Idea, Ethical approval, Questionnaire design, Data collection, Manuscript writing, Data Analysis & References, Correction of Manuscript, Review of article as biostatistical expert.

SIAK, MAS, ARQ, MQ, RA, SK ; Data collection, Literature review, Basic Manuscript writing, Data Analysis & References

SIAK, SANK, RA, SK ; Data Entry, Data Analysis & References, Manuscript writing, Proof reading of Manuscript

Conflicts of Interest Authors declare No conflict of interest.

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