PERICARDIAL EFFUSION IN MYOCARDIAL INFARCTION PATIENTS WITH AND WITHOUT THROMBOLYSIS

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ABSTRACT:

OBJECTIVES: To compare the frequency of pericardial effusion (PE) amongst those who were given thrombolytic therapy versus those who were not.

METHODS: In this comparative cross-sectional study 100 acute MI patients were enrolled. Patients of 35-70 years of age from either sex with first episode of myocardial infarction were included while patients with traumatic CPR, chronic renal failure, on hemodialysis, pericardial effusion prior to acute myocardial infarction and with collagen vascular diseases were excluded. Thrombolysis was done in emergency room with streptokinase infusion who presented within 12 hours of onset of chest pain. The patients were then divided into group I, who received thrombolysis and group II, who did not receive thrombolysis. Frequency of thrombolysed patients was noted. All the patients were followed on day to day basis upto 4 days after MI. Echocardiography was done by a cardiologist (having at least 5 year experience) on presentation (within 24 hours) and at day 2 and day 4. The primary outcome was pericardial effusion. All the data was recorded on a pre-designed proforma and analyzed by SPSS version 21.0.Chi-square test was used to compare the frequency of PE in both study groups taking p-value < 0.05 as significant.

RESULTS: Out of total 100 cases, PE was found in 28 (28%) patients. Among 28 patients who developed pericardial effusion during hospital stay, 12(16%) were from group I and 16(64%) were from group II. The difference was statistically significant (p-value < 0.0001).

CONCLUSION: The chances of developing pericardial effusion after thrombolysis with streptokinase are minimal as compared to patients in whom thrombolysis is not given

KEYWORDS: Pericardial effusion, Streptokinase, Echocardiography, Myocardial Infarction

INTRODUCTION

Myocardial infarction (MI) is a major cause of mortality and morbidity worldwide.[1] It is estimated that nearly seven million people are diagnosed with MI each year.[2] The incidence is highest in South Asia owing to the presence of various risk factors such as smoking, diabetes, hypertension and high ApoB100/Apo-I ratio.[3]

Pericardial effusion (PE) is characterized by the presence of abnormal excessive fluid in the pericardial cavity.It develops during the course of MI especially when the infarction is large and anterior[4]. Severe hemodynamic instability can be

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seen secondary to massive pericardial effusion although most of the cases are mild and usually asymptomatic[5]. Serial echocardiograms are done to evaluate the progression of PE throughout the duration of hospital stay.

The etiological factors responsible for development of PE after MI are not well understood.Bière et al[6] identified infarct size, microvascular obstruction and systolic wall stress to be significantly associated with a higher risk of developing pericardial effusion. The incidence of PE has decreased owing to the success of thrombolytics and angioplasty procedures. However, PE is still a common complication following MI in Pakistan .In fact a recent study by Hafiz-Ur-Rehman et al[7] showed that almost one third of the patients developed pericardial effusion. Other local studies by Sulehria et al[5] and Ali et al[8] reported a frequency of 23.3% and 27% respectively. These rates are much higher compared to that of the developed world(4-19%).[9] Pericardial Influsion may be due to myocardial rupture[10].

Annual mortality in Pakistan due to MI is already very high . PE is said to be associated with longer hospital stay and higher in-hospital mortality.[8] Thrombolytic therapy can help to reduce the com-

plication rate of PE as demonstrated previously by Sulehria et al[5] who reported a much lower rate of 17.4% in the thrombolytic group vs 68.6% in the non thrombolytic group. This prompted us to conduct this study with the principal objective of comparing the frequency of PE amongst thrombolytic and non thrombolytic group.

MATERIAL AND METHODS:

This comparative cross-sectional study was carried out in Department of Cardiology, Jinnah Hospital Lahore from Janurary 2017 to August 2017. The sample size was calculated using OpenEpi calculator with the statistical assumptions of 5% alpha error and 95 % confidence interval taking frequency of PE to be 17.4% in the thrombolytic group and 68.6% in the non thrombolytic group and comes out to be at least 16 patients in each group. Patients of 35-70 years of age from either sex with first episode of myocardial infarction were included while patients with traumatic CPR, chronic renal failure, on hemodialysis, pericardial effusion prior to acute myocardial infarction and with collagen vascular diseases were excluded. Non probability consecutive sampling technique was used to enroll the patients. Informed consent was taken in each case. The decision of administering streptokinase was left at the discretion of emergency doctor. Thrombolysis was done in emergency room with streptokinase infusion who presented within 12 hours of onset of chest pain. The patients were then divided into group I, who received thrombolysis and group II, who did not receive thrombolysis. Frequency of thrombolysed patients was noted. All the patients were followed on day to day basis upto 4 days after MI. Echocardiography was done by a cardiologist (having at least 5 year experience) on presentation (within 24 hours) and at day 2 and day 4. The primary outcome was pericardial effusion. It was operationally defined as presence of separation by fluid between two pericardial layers throughout the cardiac cycle on 2-D echocardiography. MI was diagnosed based on typical ECG findings and positive troponin T. MI was categorized as anterior if maximum ST elevation occurs in leads V1–V4; inferior if occurs in II, III or aVF; lateral if occurs in I,aVL,V5 or V6.

All the data was recorded on a pre-designed proforma and analyzed by SPSS version 21.0. Quantitative variables like age and pericardial space were presented in form of mean ± S.D. Qualitative variables like gender, patients thrombolysed or not thrombolysed and pericardial effusion (yes or no) were presented in form of frequency and percentage. Chi-square test was applied to compare the frequency of PE in both study groups taking p-value < 0.05 as significant.

RESULTS:

Mean age of patients was noted as 53.21±8.68 years with minimum and maximum age of 35 & 70 years respectively. Out of 100 patients, 65 were males and 35 were females. Male to female ratio was 13:7. Thrombolysis was done in 75(75%)

Table-1: Baseline Demographic Variables

Variables		
Gender	Male	65
	Female	35
Age		53.21±8.68
Pericardial Effusion in different days	0	14(14%)
	2	21(21%)
	4	28(28%)
Type of MI	Anterior	51(51%)
	Inferior	39(39%)
	Lateral	6(6%)
	Posterior	4(4%)
Thrombolysis	Yes	75(75%)
	No	25(25%)

Table-2: Frequency of pericardial effusion in Group I and II

	Pericardial effusion (%)	p-value
Group I (n=75)	12 (16%)	<0.0001
Group II (n=25)	16 (64%)	

patients (Group I) while in 25(25%) patients thrombolysis was not done (Group II). 14(14%) patients developed PE at day 0, 21(21%) patients had developed PE by day two and 28(28%) patients developed PE by day four (Table 1). Out of all 51(51%) patients had anterior wall MI, 39 (39%) had Inferior wall MI, 4(4%) had posterior wall MI and 6 (6%) had Lateral wall MI (Table 1). Among 28 patients who developed pericardial effusion during hospital stay, 12(16%) were from group I and 16(64%) were from group II. The difference was statistically significant (p-value < 0.0001) (Table 2).

DISCUSSION:

Pericardial effusion is one of the known complication of recent MI. The incidence has gone down over the past few year owing to the availability of thrombolytics and angioplasty facilities. However, about one third of the patients still develop PE as a complication of acute MI.[7]

We conducted this study to compare the frequency of PE amongst those who were given streptokinase (Group I) versus those who were not (Group II). Our study showed that 64% of the

patients developed PE in Group II as compared to just 16% in Group I (p-value <0.0001). This was consistent with the findings of Sulehria et al[5] who also concluded that chances to develop pericardial effusion after thrombolysis with streptokinase are minimal as compared to patients in whom thrombolysis is not given (68.6% in Group II vs 17.4% in Group 1)(p-value < 0.001). However Hafiz ur Rehman et al[7] found no significant difference among the two groups.Our results show an overall complication rate of 28% for PE.This was greater in comparison to the findings of Sulehria et al[5] and Hafiz ur Rehman et al[7] who reported an overall frequency of 23.3% and 15% respectively.This could be explained by the lower overall percentage of people who received thrombolytic therapy (75% in our study vs 88.3%[5] and 82%[7] respectively).Our study also demonstrated that percentage of people who developed increased progressively as time passed by.We observed PE in 14 (14%) cases on day 0 while in 21(15.7%) cases on day 2 and in 28(23.3%) cases on day 4.This was consistent with the trend observed by Sulehria et al[5] and Hafiz ur Rehman et al[7].Anterior MI was most frequently seen in our study (51%) followed by inferior (39%) then lateral (6%) and lastly posterior MI (4%). PE was most frequently seen in association with anterior wall MI (29.4%).In comparison, Hafiz ur Rehman et al demonstrated PE in 16.5% of the patients with anterior MI which is almost half compared with our results.

There were several limitations to our study with the most important one being the study design which should ideally have been a randomized controlled trial .This was not possible considering the ethical implications and the decision of administering streptokinase was left at the discretion of emergency physician.Secondly, we did not categorize the degree of PE into mild, moderate and severe. This stratification would have given greater insight into the in-hospital mortality and morbidity patterns seen due to development of PE in MI patients.

CONCLUSION:

The chances of developing pericardial effusion were significantly lower in those who received thrombolytic therapy compared to those who did not.

Author's Contribution

AI: Consultant incharge of the study.SM: Helped in conducting the study and did proof reading.MSAT: Analysis of data and helped in data collection.

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