FREQUENCY OF PERICARDIAL EFFUSION IN PATIENTS WITH FIRST MYOCARDIAL INFARCTION AND ITS EFFECTS ON IN-HOSPITAL MORBIDITY AND MORTALITY

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Background: Pericardial effusion (PE) is not an uncommon finding in serial echocardiographic evaluation of patients with AMI, especially when infarction is anterior and extensive. The objective of this study was to determine the frequency of pericardial effusion after first myocardial infarction and its effects on in-hospital morbidity and mortality. **Methods:** This descriptive study was performed in the Department of Cardiology, PGMI, LRH Peshawar, from July 2007 to December 2007. Main outcome measure was frequency of pericardial effusion. **Results:** Out of 200 patients with first acute myocardial infarction (AMI), mean age was 56 ± 18 (28–90 years). Majority of patients (31.5%) were in the age range of 51–60 years. Males were 65.5% and 34.5% were females. Pericardial effusion was found in 4.5% patients on day 0, in 12.5% patients on day 2 and in 15% patients on day 4. Left ventricular failure was documented in 19 (9.5%) patients without and 42 (21%) patients with pericardial effusion ($p<0.05\%$). Cardiogenic shock was reported in 5 (2.5%) patients without and 16 (8%) in patients with pericardial effusion and mitral regurgitation was found in 3 (1.5%) patients in each group. Death was recorded in 1 (0.5%) patient without pericardial effusion and was 1.5% (n=3) in patients with pericardial effusion. **Conclusions:** Pericardial effusion was seen in one third of the patients with first acute myocardial infarction. In acute phase of myocardial infarction, the chances of development of pericardial effusion increases as the time passes. Left ventricular failure was the commonest in-hospital morbidity followed by cardiogenic shock and mitral regurgitation. In-hospital mortality was more in patients with pericardial effusion.
Keywords: Myocardial infarction, pericardial effusion, complications, diagnosis, echocardiography

INTRODUCTION

Acute Myocardial Infarction (AMI) has a major share in human mortality.[1] In year 2002 nearly one hundred thousand individuals suffered from AMI world wide.[2]

Pericardial effusion (PE) is not an uncommon finding in serial echocardiographic evaluation of patients with AMI, especially when infarction is anterior and extensive.[3] Acute pericarditis and pericardial effusion complicating AMI is associated with worse out come.[4] In hospital morbidity among patients with AMI is primarily caused by circulatory failure from severe left ventricular dysfunction or from one of the complications of AMI including pericarditis and pericardial effusion.[5]

Among 68 patients who had PE in the acute phase and underwent echocardiography one month later, PE persisted up to a month after the onset of AMI in 38% of the patients.[6] Studies have shown that, there is no difference in frequency and severity of pericardial effusion in patients whether thrombolysed or not.[7]

In our hospital setting frequency, time course and outcome of pericardial effusion after myocardial infarction are unknown. The rationale of the study was to determine the frequency of pericardial effusion after first myocardial infarction.

The objective of this study was to determine the frequency of pericardial effusion after first myocardial infarction and its effects on in-hospital morbidity and mortality.

MATERIAL AND METHODS

This descriptive case series study was performed in Cardiology department of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from July 2007 to December 2007. Total 200 patients with first acute myocardial infarction admitted to Cardiac Care Unit, Lady Reading Hospital, Peshawar were included in the study. Patients with previous myocardial infarction, pericardial disease, chronic renal failure, collagen vascular disease, post-cardiac surgery, metastatic disease were excluded from the study.

Acute myocardial infarction was defined as typical chest pain lasting more than 30 minutes, unrelieved by sublingual nitrates, and associated with typical ST segment elevation on the standard 12 lead ECG. Acute myocardial infarction was categorised as anterior if maximum ST elevation occurs in leads V_1–V_4; inferior if maximum ST elevation occurs in II, III or a VF; lateral if maximum ST elevation occurs in I, aVL,V_5 or V_6.

Pericardial effusion was considered to be present when separation between two pericardial layers

is present throughout the cardiac cycle on 2-D echocardiography.

i. Mild pericardial effusion: <5 mm
ii. Moderate pericardial effusion: 10–20 mm
iii. Large pericardial effusion: >20 mm

Patients were evaluated thoroughly after taking informed consent. All patients were monitored continuously in the coronary care unit, and all were examined by careful auscultation at least twice daily. Every patient undergone detailed echocardiographic examination on day 0 and on days 2 and 4. Images were obtained in standard parasternal long and short axis, apical and subcostal four chamber views. Echocardiographic recordings were interpreted by two experienced observers. If patients were found having pericardial effusion than frequency of pericardial effusion was made out of the 200 cases of myocardial infarction.

Data was analysed using SPSS-10. The variables were age, sex, and pericardial effusion. Data were expressed as Mean±SD and percentage.

RESULTS

A total number of 200 patients with acute myocardial infarction were included in this study. Out of 200 patients presenting with myocardial infarction, pericardial effusion was found in 9 (4.5%) patients on day 0, in 25 (12.5%) patients on day 2 and in 30 (15%) patients on day 4, (Table-1).

Out of 200 cases, there were 131 (65.5%) males and 69 (34.5%) were females, male to female ratio of 1.9: 1. Mean age was 56±18 (28–90), (Table-2).

Frequency of different types of myocardial infarctions and associated PE are given in Table-3.

Out of 200 patients 164 (82%) was successfully thrombolysed and 36 (18%) patients was not thrombolysed. Out of 164 patients who were thrombolysed 32% cases develop pericardial effusion. Same frequency of pericardial effusion was observed in patients who were not thrombolysed. There was no significant difference in the occurrence of pericardial effusion regarding type of MI and whether thrombolysed or not.

In patients with AMI, left ventricular failure was documented in 19 (9.5%) patients without and 42 (21%) patients with PE. Cardiogenic shock was present in 5 (2.5%) patients without PE and 16 (8%) patients with PE. Re-infarction occurred in 1 (0.5%) patient without PE while it was recorded as 2% (n=4) in patients with PE. Mitral regurgitation was found in 3 (1.5%) patients in each group.

Logistic regression model was used and it was concluded that mitral regurgitation and left ventricular failure were mainly responsible for in-hospital morbidity and mortality. The data reveal that the rate of left ventricular failure was five times higher in patients

with pericardial effusion than patients without PE (Odd Ratio=5.26). The data also reveal that the rate of cardiogenic shock was 93% higher in patients with PE than in patients without PE, Odd Ratio=1.93. The estimated Odd Ratio of re-infarction was 1.43 times higher in patients with PE than in patients without PE, also the frequency of mitral regurgitation was more than six times higher in patients with PE than in patients without PE, (Odd Ratio=6.18). Ventricular septal defect in patient pericardial effusion was found in 1 (0.5%) case while no case was recorded in patients without pericardial effusion.

Table-1: Frequency of pericardial effusion (n=200)

Days	Number	Percentage
Day 0	9	4.5
Day 2	25	12.5
Day 4	30	15.0

Table-2: Age-wise distribution of patients (n=200)

Age (Y)	No. of cases	Percentage
≤30	1	0.5
31–40	14	7.0
41–50	35	17.5
51–60	63	31.5
61–70	61	30.5
71–80	22	11.0
81–90	2	1.0
≥91	2	1.0
TOTAL	**200**	**100%**

Table-3: Type of myocardial infarction (n=200)

Type	Cases	%	Pericardial effusion	p
Anterior myocardial infarction	99	49.5	16.5%	
Inferior myocardial infarction	92	46.0	14%	0.5
Lateral myocardial infarction	9	4.5	15%	

DISCUSSION

Pericardial effusion (PE) is not an uncommon complication of acute myocardial infarction (AMI) and up to one third of our patients developed PE who presented with AMI, increasing the mortality especially in patients who presented in advanced stage of life.

The frequency of PE in our study population was 32% and 27% was reported by 27% by Ali et al[8] but Belkin et al[5] reported 8% because all of their patients were thrombolysed with recombinant tissue plasminogen activator, we and Ali et al[8] treated our patients with streptokinase —a less thrombin specific.

The number of patients having PE increases during in-hospital stay as 4.5% of our patients had PE at the time of admission but on day four it was 15%, same trend was reported by Toth C et al (8% on Day 0, 24% on Day 7).[9] Anterior myocardial infarction is more frequent and so is the PE[10–13], we reported 16.5%, 14% and 15% with anterior MI, inferior MI and Lateral MI, respectively. Same trend has been observed in other studies as well.[10–13]

Sugiura *et al*[7] documented PE at the time of admission as 9.5% and all of the patients were treated with primary Primary percutaneous intervention (PCI) and were more than 65 years of age, we reported 32% of PE and 82% of the patients were thrombolysed with streptokinase, mean age of 56±18 years, so it can be inferred that primary PCI decreases the occurrence of PE in spite of advanced age group. Figuaras J *et al*[6] concluded that advancing age group is associated with late occurrence of large PE and subsequent rising mortality.

This is a well-documented fact that with the presence and progression of pericardial effusion, in-hospital morbidity and mortality increases[1,4,14–16]. The major reasons for in-hospital morbidity in patients of AMI with PE were left ventricular failure (9.5% vs 24.7%)[14], cardiogenic shock (8% vs 16.7%)[17]. Re-infarction, mitral regurgitation and ventricular septal defect (*p*>0.05), were responsible for longer hospital stay. The lesser rate of complications and hospital stay in our study might be due to the thrombolysis of majority of our patients (82% were thrombolysed).

The overall mortality in our patients of AMI with PE was 1.5% against 1.3% (mild pericardial effusion)[18], 32% (large pericardial effusion)[13], and it has been established that pericardial effusion is an independent risk factor of mortality in patients of acute myocardial infarction with pericardial effusion.

CONCLUSIONS

Pericardial effusion was recorded in one third of the patients with first acute myocardial infarction. In acute phase of myocardial infarction, the chances of development of pericardial effusion increases as the time passes. Left ventricular failure was the commonest in-hospital morbidity followed by cardiogenic shock and mitral regurgitation. In-hospital mortality was more in patients with pericardial effusion.

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