ORIGINAL ARTICLE

Frequency of Pericardial Effusion among Patients with Acute St Segment Elevation Myocardial Infarction

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ABSTRACT

Aim: To determine the frequency of pericardial effusion among patients with STEMI.
Study design: Cross sectional study
Place and duration: Department of Cardiology, Bahawal Victoria Hospital, Bahawalpur from 01-03-2014 to 31-08-2014
Methods: This study included 196 patients with STEMI. All of them had 2-D echocardiography to determine the presence of PE. The main outcome variable was frequency of pericardial effusion which was described as frequency distribution table.
Results: Pericardial effusion was present among 53(27%) patients, while it was not present among 143 (73%) patients.
Conclusions: The frequency of pericardial effusion is high among patients of STEMI and should be evaluated with 2 –D echocardiography for the presence of PE whenever the facility is available.
Keywords: ST-segment elevation myocardial infarction (STEMI); pericardial effusion (PE).

INTRODUCTION

Coronary heart disease is still an important cause of death in the Western countries[1,2]. ST-Elevation Myocardial Infarction (STEMI) is a dangerous manifestation of this disease, mostly caused by an acute occlusion of a major coronary artery usually due to disruption of an atherosclerotic plaque with subsequent formation of an occluding thrombus[3]. Hospital mortality due to acute myocardial infarction is around 10.6%[4].

Pericardial effusion (PE) is not an uncommon finding on serial echocardiographic studies after acute myocardial infarction. It is considered to be associated with anterior ST-segment elevation MI (STEMI), with large infarcts, and when heart failure is present[5].

Pericardial effusion in setting of STEMI can present clinically with chest pain and can mimic another episode of myocardial infarction. Echocardiography is a useful tool for establishing the diagnosis of pericardial effusion[6].

Moderate pericardial effusion in patients with ST-elevation myocardial infarction may lead to cardiac temponade which may presents as arterial hypotension and can also produce heart failure and hence can increase morbidity and mortality (1.5%-32%)[7-9].

Previously a study was conducted on 200 patients who presented with STEMI. They underwent echocardiography on day 4 of admission. Fifteen percent patients were having detectable pericardial effusion on echocardiography[10] As pericardial effusion is associated with high mortality rate by causing cardiac temponade, we have planned this study to see the frequency of pericardial effusion in acute STEMI.

MATERIALS AND METHODS

This was a cross sectional study which was conducted in the department of Cardiology, Bahawal Victoria Hospital, Bahawalpur for a period of six months from March 2014 to August 2014. The calculated sample size with 5% margin of error, 95 % confidence interval, and anticipated frequency of Patients with pericardial effusion among patients with ST segment elevation myocardial infarction of 15% was 196 patients. Non-probability consecutive sampling technique was used. The patients were labelled to have ST elevation myocardial infarction if any two of the following criteria were present: clinical history of ischemic type chest pain lasting for more than 20 minutes, > 2 mm ST elevation in serial ECG tracings in at least two leads of a contiguous lead group (II, III, aVF for inferior, $V_1 - V_4$ for anterior and I, aVL, V_5, V_6 for lateral), and rise or fall of serum cardiac biomarkers. Pericardial effusion was considered to be present when there was accumulation of abnormal amount of fluid in between serous and parietal pericardium detected on 2–D echocardiography when the separation between two pericardial layers was present throughout the cardiac cycle. Inclusion criteria were both males and females, age 18 years and above with STEMI. Patients with

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previous history of myocardial infarction, pericardial diseases, chronic renal failure, collagen vascular diseases, post-cardiac surgery, and metastatic disease (history retrieved from previous medical record) were excluded from the study.

The study was approved from the ethical committee of the hospital. One hundred and ninety six cases fulfilling inclusion criteria were registered through the emergency department of Cardiology Unit of Bahawal Victoria Hospital, Bahawalpur. Informed written consent was taken from the patient. Demographic data (age, sex) was noted. 2 – D echocardiography was done by a fellow of Cardiology who had at least 5 years experience of performing echocardiography. Echocardiography was performed in every patient at 4th day of admission to find out the pericardial effusion. All the information was collected on a specially designed proforma.

All the collected data was analyzed with SPSS version 16. The qualitative data like demographics (sex; male or female) and the presence or absence of pericardial effusion were presented as frequency distribution tables. Quantitative data in the study like age was described as means and standard deviations. The main outcome variable was frequency of pericardial effusion which was presented as frequency distribution tables. Stratification of data was done for age and gender to see the effects on outcome i.e. pericardial effusion through chi-square test. P-value < 0.05) was taken as significant.

RESULTS

The total number of patients included in the study was 196 including both males and females. The mean age of the patients was 57.91 ± 9.51 years [range 37-83 years]. None of the patients was below 30 years of age. There were 13 patients of age range of 30–40 years, 37 patients of age range of 41-50 years, 68 patients of age range of 51-60 years, 61 patients of age range of 61–70 year, 11 patients of age range of 70–80 years and 6 patients of age range of >80 years (Table 1).

Table 1: Distribution of patients by age (n= 196)

Age (years)	n	%age
<30	0	0
30-40	13	6.6
41-50	37	18.9
51-60	68	34.7
61-70	61	31.1
71-80	11	5.6
>80	6	3.1
Mean±SD	57.91±9.51	
Range	37-73	

There were 126(64.3%) male patients, while 70(35.7%) patients were female. Male to female ration was 1.8:1 (Fig. 1). Out of the 196 patients in the study, pericardial effusion was present among 53(27%) patients (Fig. 2).

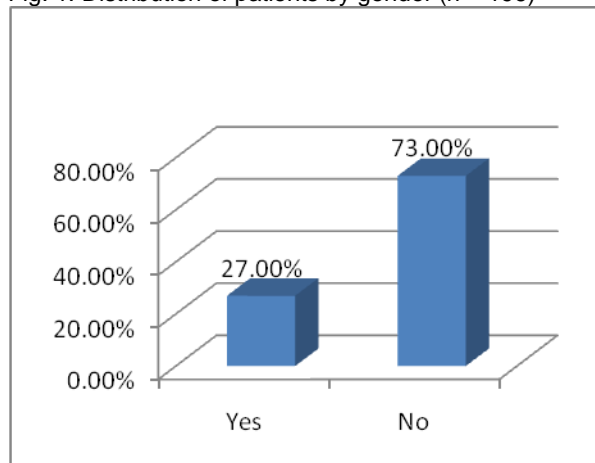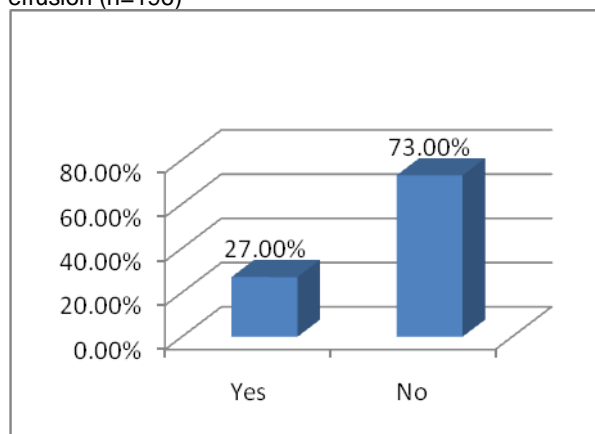Fig. 1: Distribution of patients by gender (n = 196)

Fig. 2: Distribution of patients by presence of pericardial effusion (n=196)

DISCUSSION

The results of this study showed a higher frequency (27%) of PE among our patients. Previously, Rehman H, et al.[10] performed a study on 200 patients with first acute myocardial infarction (AMI), mean age was 56±18 (28–90 years). This observation was also very close to our study i.e. mean age of the patients in our study was 57.91 $\pm$ 9.51. Majority of patients (31.5%) were in the age range of 51–60 years. Like our study, this study showed a male dominant population. Males were 65.5% and 34.5% were females. Pericardial effusion was found in 32 % patients. It was observed that PE was present in 4.5% patients on day 0, in 12.5% patients on day 2 and in 15% patients on day 4. Pierad LA, et al.[11] performed a study on 66

consecutive patients with myocardial infarction. Two-dimensional echocardiography was used to determine the PE. Pericardial effusion was observed in 26%. In a study by Ali Z, et al.[12] 100 consecutive patients with STEMI were evaluated for presence of PE. 2-D and M-mode echocardiographic examination was carried out daily and pericardial effusion (PE) was considered to be present when separation between two pericardial layers persisted throughout the cardiac cycle. Among these 100 patients, 27% patients developed PE. About 82 % patients had mild PE (only posteriorly and <10 mm). Moderate PE was detected in 18% (present all around and between 10-20 mm). None of the patients developed large PE (>20 mm). About 15 % patients who were thrombolysed and 40% who could not be thrombolysed developed PE (p < 0.01).

In a large study by Mazzoni V et al[13] there were 545 consecutive patients with STEMI were evaluated for the presence of PE. Like our study, they also used 2–D echorardiography. The results of this study showed that PW was present among 9% patients.

The frequency of PE in our study population was 27% and its was also reported as 27% by Ali, et al[12] but Belkin et al[14] reported this frequency to be 8%, because all of their patients were thrombolysed with recombinant tissue plasminogen activator, while in our study and that conducted by Ali et al. patients were given streptokinase —a less thrombin specific.

CONCLUSION

The frequency of pericardial effusion is high among patients with STEMI. So, it is recommended that patients with STEMI should be evaluated for presence of PE with 2–D echocardiography, soon after the STEMI has been diagnosed.

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