

CARDIOGENIC SHOCK IN ADULT PATIENTS WITH NON-ST ELEVATION MYOCARDIAL INFARCTION

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ABSTRACT

OBJECTIVE: To study the frequency of cardiogenic shock in patients with non-ST elevation myocardial infarction (Non-STEMI).

METHODOLOGY: This descriptive cross-sectional study was conducted from May 2011 to October 2011, at Cardiology Department of Hayatabad Medical Complex, Peshawar. Sample size was calculated using WHO sample size as 600 patients. Consecutive non probability sampling technique was used. All patients with diagnosed Non-STEMI, meeting the inclusion criteria were enrolled in the study after taking informed consent. All patients were admitted in the cardiology unit and were evaluated for cardiogenic shock on the basis of operational definitions and were managed as per ward and unit protocols. All relevant information was recorded in a predesigned proforma.

RESULTS: Out of 600 patients, 408(68%) patients were male and 192(32%) patients were female. Mean age of the patients was 60 ± 1.26 years and majority (n=246; 41%) of patients were in age range 61-70 years. Overall 30 (5%) patients with Non-STEMI developed cardiogenic shock. Out of 30 patients, 6 (20%) patients were in age range 51-60 years, 8 (26.7%) patients were in age range 61-70 years and 16 (53.3%) patients were above 70 years of age. Mean time interval from onset of chest pain and ECG diagnosis of myocardial infarction was 8 ± 2.71 hours. In patients with cardiogenic shock, 16 (53.3%) and 10 (33.3%) patients had time interval of 4-8 hours and >8-16 hours respectively.

CONCLUSION: Cardiogenic shock occurs in 5% patients with Non-STEMI in our set up and is more common in patients above 70 years of age.

KEY WORDS: Shock, Cardiogenic, Non ST elevation Myocardial infarction, Non-STEMI, Myocardial Infarction.

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rise in developing countries. Suggested factors in promoting such an increase in prevalence of coronary events seem to be decreased tendency for outdoor activities. The most important problem in south Asian population is that the people affected by CAD are much younger (52.5 ± 10.8 years) than those in western countries⁵. There has not been much research to yield comprehensive data on characteristics and type of MI in Pakistan. However depending on the studies available the fraction of patient having non-ST elevation myocardial infarction (Non-STEMI) is around 16.5% for patients presenting as acute coronary syndrome⁶.

Cardiogenic shock is the state of poor end organ perfusion due to malfunction of cardiac contractility, and is one of the deadly complications of myocardial infarction.⁷ Cardiogenic shock is usually considered a result of ST-segment elevation myocardial infarction (STEMI) but can occur in high risk patients having Non-STEMI, in about 2.5% cases. Cardiogenic shock need to be identified early and treated with appropriate invasive strategy using coronary angiography and angioplasty.⁸ Cardiogenic shock in the event of Non-STEMI is usually less aggressively treated and so is associated with more risk of death when compared to STEMI.⁹ There are limited published data regarding the incidence and significance of cardiogenic shock in Non-STEMI patients in Pakistani population.⁷

The objective of this currently designed study to determine the frequency of cardiogenic shock in the setting of

INTRODUCTION

Coronary artery disease (CAD) is one of the leading causes of death worldwide.¹ The problem of CAD is predicted to be increasing rapidly in South Asia than other regions of the world². Myocardial ischemia resulting from CAD is a major cause of death in developing

countries accounting for one third of all deaths in people over 35 years age.² Myocardial Infarction (MI) has been found to be more prevalent in middle aged males and females.³

Acute MI is the leading cause of death in the western countries⁴. Risk of developing ischemic heart disease is on the

acute Non-STEMI. As mentioned earlier, the morbidity and mortality of cardiogenic shock in acute STEMI is high and it should be aggressively treated, this leaves cardiogenic shock among patients with Non-STEMI and it can be equally deadly when compared to STEMI. That is the reason why it is often left undiagnosed and routine screening is not done in patients with acute Non-STEMI. In our study if the frequency of cardiogenic shock even if found to be slightly higher as compared to previous studies, then it would be clearly recommended to all cardiologists to routinely screen all patients with Non-STEMI for cardiogenic shock because it is equally fatal and early diagnosis and early treatment can render safe discharges and prolonged survival rate of all patients with acute Non-STEMI.

METHODOLOGY

Patients

Total of 600 patients with Non-STEMI were enrolled in the study after obtaining consent.

Procedures

The study was conducted after approval from hospital ethical and research committee. All patients with Non ST elevation Myocardial Infarction diagnosed by having characteristic chest pain with raised troponin levels of greater than 0.1ng/dl and standard 12 lead ECG showing ST segment depression of > 0.5 mm, meeting the inclusion criteria was enrolled in the study through OPD or ER department. A written informed consent was obtained after explaining the purpose and benefits of the study.

All patients were admitted in the cardiology unit of the hospital for further evaluation. A detailed history was taken followed by complete examination and routine set of investigations was done.

All patients included in the study was evaluated for cardiogenic shock on the basis of operational definitions and if found was managed as per ward and unit protocols. All the above mentioned information including name, age and sex were recorded in a predesigned proforma.

RESULTS

Out of 600 patients presenting with Non-STEMI, 408 (68%) patients were male and 192 (32%) patients were female. Mean age of the patients was 60 ± 1.26 years. Regarding age distribution among 600 patients, 24(4%) patients were ranging in age from 40-50 years, 132 (22%) patients were in age range of 51-60 years, 246 (41%) patients in age range of 61-70 years and 198 (33%) patients were above 70 years of age.

Mean time interval between onset of chest pain and ECG diagnosis of MI was 8 ± 2.71 hours and 108(18%) patients had onset time interval less than 4 hours, 288(48%) patients had onset time interval of 4-8 hours and 204(34%) patients had onset time interval >8-16 hours.

Overall 30 (5%) patients with Non-STEMI developed cardiogenic shock while 570(95%) patients didn't have cardiogenic shock.

Table I is showing that there was no significant association of gender, age distribution and time interval between onset of chest pain and ECG diagnosis of MI with cardiogenic shock in patients with NSTEMI. Out of 30 patients with cardiogenic shock, 19 (63.3) were males and 11 (36.7%) were females. More than half of patients with cardiogenic shock were >70 years of age and majority (53.3%) of patients with cardiogenic shock had 4-8 hours' time interval between onset of chest pain and ECG diagnosis of MI.

DISCUSSION

The relative importance of coronary heart disease varies across regions and from country to country⁸. The disease is very common in westernized populations, affecting the majority of adults over the age of 60 years, but it is on rise in developing countries as well. The mean age of the patients in this study was 60 ± 1.26

TABLE I: ASSOCIATION OF GENDER, AGE DISTRIBUTION AND TIME INTERVAL BETWEEN ONSET OF CHEST PAIN AND ECG DIAGNOSIS OF MI WITH CARDIOGENIC SHOCK IN PATIENTS WITH NSTEMI

Characteristics		Cardiogenic Shock				Total (n=600)	P value (Chi Square test)
		Yes		No			
		Frequency (n = 30)	%age	Frequency (n = 570)	%age		
Gender distribution	Male	19	63.3	389	68.2	408	0.27
	Female	11	36.7	181	31.8	192	
Age distribution (years)	40-50	0	0	24	4.2	24	0.21
	51-60	6	20	126	22.1	132	
	61-70	8	26.7	238	41.8	246	
	>70 years	16	53.3	182	31.9	198	
Time interval onset of chest pain and ECG diagnosis of MI	< 4 hours	4	13.3	104	18.2	108	0.23
	4-8 hours	16	53.3	272	47.7	288	
	>8-16 hours	10	33.3	194	34.1	204	

MI: myocardial infarction; NSTEMI: Non ST elevation myocardial infarction

years as compared to 52 ± 5.8 years in a study reported by Maqbool Jafary et al⁷ and 62 ± 5 years in COURAGE trial conducted in USA⁹.

In this study most of the patients 41% patients were in age range 61-70 years followed by 33% patients were above 70 years of age similar results were found in study done by Saleheen D et al¹ in which most of the patients 50% patients were in age range 61-70 years followed by 42% patients were above 70 years of age. More over in this study, 68% patients were male while 32% patients were female. Similar results were given in a study conducted by Saleheen D et al¹ in which 65% patients were male and 35% patients were female.

This signifies that Pakistani patients are relatively younger as compared to the West. Gender differences in coronary heart disease risk are also important. Middle-aged men have a 2 to 5 time's higher risk than women, but this risk ratio differs between populations⁷.

This study shows that the incidence of cardiogenic shock in adult patients with non-STEMI was 5%. Among those 5% patients it was analyzed that the incidence of cardiogenic shock is most common in age group 50 and above as in this study 14 patients were in age range 50 years and above. Similar results found in study done by Rosamond W et al³ in which most of the patients with non ST elevation myocardial infarction were 6% in which most of the patients were above 50 years of age. In study done by Jafary MH et al⁷ the incidence of cardiogenic shock in patients with non-STEMI was 5% in which most of the patients were above 50 years of age. However, Holmes DR Jr, et al¹⁰ and Jacobs AK, et al¹¹, reported cardiogenic shock in 2.5% of patients with Non-STEMI. Frequency of cardiogenic shock in STEMI is 7.5%.^{12,13} According to Jacobs AK, et al, patients of Non-STEMI with cardiogenic shock

have a greater risk profile than similar patients with STEMI although there is no difference in in-hospital mortality.¹¹ In Pakistan, in-hospital mortality rate of 55% has been reported for cardiogenic shock in myocardial infarction.¹⁴

Our results show that the incidence of cardiogenic shock in patients with non-ST elevation myocardial infarction is more in male (63.3%) patients as compare to female patients (36.7%). More over most of the cases were recorded at 9-16 hours of onset time. Similar results were found in study done by Jafary MH et al⁷ in which incidence of cardiogenic shock in non-ST elevation myocardial infarction was more in male as compare to female patients. More patients were recorded in on set time of 9-16 hours.

Similar findings were also observed other study done by Polonsk L et al¹⁵ and Reynolds HR et al⁸ in which the same concept was as explained. There was a clear male preponderance (68%), which is in agreement with previous studies, suggesting that it is predominantly a disease of men. Females represented only 22% of patients. Although this is a much higher frequency compared with data from India i.e. 5%. Most of the reported data show that smoking is the commonest risk factor encountered in patients with acute myocardial infarction. In his study is not an exception, as smoking was indeed the leading risk factor present in 46% of the patients. The male preponderance and smoking being the major risk factors has been well documented in many local studies. All the patients were allocated to appropriate treatment strategy after received in the referral centre from peripheral hospitals and managed in accordance with guidelines for AHA, discussion of which is beyond scope of this paper.

CONCLUSION

Cardiogenic shock occurs in 5% patients with Non-STEMI in our set up

and is more common in patients above 70 years of age. Cardiogenic shock in Non-STEMI is relatively more common in our community than internationally reported in literature. We conclude that invasive strategy for treating Non-STEMI is more often a choice in our setup, which lacks local nearby centres for treatment in-time to the seriously ill.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

- SA:** Conception and design, acquisition and analysis of data, drafting the manuscript, final approval of the version to be published
- AS:** Critical revision & drafting the manuscript, final approval of the version to be published

CONFLICT OF INTEREST

Author declares no conflict of interest

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