Original Article

IN-HOSPITAL OUT-COME OF CARDIOGENIC SHOCK AFTER ACUTE MYOCARDIAL INFARCTION

Muhammad Ibrahim, Nadeem Hayat Mallick, Shahid Abbas, Abdul Rehman Abid

ABSTRACT:

Objective: *To study the in-hospital outcome of cardiogenic shock (CS) after acute myocardial Infarction (AMI).*

Materials and Methods: *This descriptive study was conducted at the Punjab Institute of Cardiology Lahore, from May to November 2009. After fulfilling the inclusion criteria 230 consecutive patients presenting with cardiogenic shock after acute myocardial infarction were studied. Group I was the largest group which consisted of 110(47.82%) patients; these were the patients who had CS with ST segment elevation myocardial infarction (STEMI). Group II consisted of 100(43.47%) patients these were the patients who had CS with Non STEMI, Group III 20(8.69%); these were the patients who had Acute left bundle branch block (LBBB) in the setting of CS.*

Results: *The mean age of the study population was 57.5±27.5 years. Total number of males in the study population was 150(65.21%) while female patients were 80(34.78%). In-hospital mortality was 65(59%) in Group I, 90(90%) in Group II and 10(50%) in Group III.*

Conclusion: *Patients with cardiogenic shock after an AMI suffer from increased mortality during their stay in the hospital. This is because of presence of more risk factors in this subset of patients.*

Key words: *Acute myocardial infarction, cardiogenic shock, in-hospital mortality, left bundle branch block.*

(J Cardiovasc Dis 2012;10(2):54-57)

INTRODUCTION

In spite of impressive advances and manage ment over the past four decades, ST elevation myocardial infarction (STEMI) is a major pub lic health problem in the industrialized world.[1] In the United States, nearly one million patients in a year suffer from an acute myocardial infarction (AMI).[2] Mortality from STEMI has declined steadily in several population groups since 1960.[3,4] Cardiogenic shock (CS) occurs when more than 40% of the myocardium is irreversibly damaged (particularly the anterior wall myocardial infarction).[5] In patients with cardiogenic shock, about 80% have severe left ventricle dysfunction, while 20% have mechanical defects such as ventricular septal defect, mitral regurgitation and electrical complications.[6,7] CS occurs in 8.6% of patients with STEMI. It occurs in 2% with non STEMI.[5] The overall in-hospital survival rate is 30% and the mortality rate is 70% when extensive intervention is not attempted.[5] Rationale of the study was that patients with CS are an important population group because of their poor prognosis and the availability of several medical treatments able to improve their survival. CS accounts for the majority of deaths following AMI.[5]

Little data is available in previous literature published in Pakistan regarding the outcome of CS after AMI,[8] so this study was designed to evaluate the in-hospital outcome of CS after AMI.

Correspondence address:
Muhammad Ibrahim, MBBS
Punjab Institute of Cardiology,
Lahore.

MATERIALS AND METHODS

This descriptive study was conducted at the Punjab Institute of Cardiology Lahore, from May to November 2009. After fulfilling the inclusion criteria, 230 consecutive patients presenting with CS after AMI were studied. Group I was the largest group which consisted of 110(47.82%) patients having CS with STEMI. Group II consisted of 100(43.47%) patients having CS with Non STEMI and Group III 20(8.69%) presenting with acute left bundle branch block (LBBB) in the setting of CS.

Inclusion criteria were, all patients who are suffering from cardiogenic shock with the following characteristics included in the study.

1) Patients presenting with acute myocardial infarction diagnosed on the basis of presence of

any two of the following criteria[9].

a) Chest pain consistent with AMI.

b) Electrocardiographic changes i.e. ST-Segment elevation ≥0.2 mv in at least two contiguous chest leads or ≥0.1 mv in at least two contiguous limb leads.

c) New or presumably new left bundle branch block on electrocardiogram.

d) Raised cardiac enzymes.

2. Patients who were managed conservatively in the wards.

Exclusion criteria were CS occurring due to causes other than AMI. Patients of CS managed with interventional treatment were excluded.

Cardiogenic Shock was defined as sustained hypotension (systolic blood pressure less than 90 mm Hg) lasting for more than 30 minutes with evidence of tissue hypopurfusion (extremities colder than core) with adequate LV filling pressure.

DATA COLLECTION AND FOLLOW UP

Study was conducted at the Emergency Department, Coronary Care Units, Cardiology Ward and Jillani Block of the Punjab Institute of Cardiology Lahore. A full history was taken particularly age, sex, history of smoking, diabetes mellitus, hypertension, ischemic heart disease and family history of ischemic heart disease. Acute MI was defined by World Health Organization criteria and was classified as related or not related to ST-segment elevation on the basis of the presence or absence of at least 1 mm of ST-segment elevation in two or more contiguous leads on initial electrocardiography. Location of acute MI was classified as STEMI, Non STEMI, and Acute LBBB. Time of initial presentation was defined as the time of arrival at the hospital. Primary reperfusion therapy was defined as use of intravenous fibrinolytic therapy. The use of adjunctive therapy during hospitalization was recorded. Smoking status (current or ever use of tobacco) was also determined. Death was classified as in-hospital (death before discharge during a patient's admission to a critical care unit). All patients were treated according to the treatment protocol of the Cardiology Unit. Patients were followed up daily and pulse, blood pressure temperature, respiratory rate; ECG changes were monitored till death or discharge of the patients for up to 04 days.

STATISTICAL ANALYSIS

All data was analyzed by SPSS (Statistical Package for Social Sciences) Version11.0 for Windows. Age of the patients was presented by calculating mean and standard deviation. Gender and investigations (pulse, blood pressure, temperature, respiratory rate, ECG changes, thrombolysis) were expressed as frequency distribution for 1st, 2nd, 3rd, 4th day. Survival and death at the end of 4th day was presented by calculating frequencies and percentages and stratified for diabetes mellitus, hypertension, smoking, previous history of ischemic heart disease, dyslipidemias, family history of ischemic heart disease to address effect modifiers.

RESULTS

Baseline Characteristics:

The mean age of the study population was 57.5±27.5 years. Mean age of Group I patients was 50±20 years, Group II patients was 62.5±22.5 years, Group III patients was 70±10 years.

Total number of males in the study population were 161(70%) while female patients were 69(30%). Group I consisted of 70(63.67) males and 40(36.36%) females, Group II 80(80%) males and 20(20%) females, Group III 11(55%) males and 9(45%) females. (Table 2).

Total number of diabetic patients in study population were 120(52%), 30(25%) in group I, 80(66.66%) in group II, and 10(8.33%) in group III. Total number of hypertensive patients in the study population were 100(43.47%). Among these 30(30%) were in Group I, 55(55%) in Group II and 15(15%) in Group III. Smokers in the study were 140(60%); 70(50%, 60(42.85%) and 10(7.14%) in Group I, II and III respectively. Hyperlipidemic patients were 200(86.95%); 120(60%), 70(35%) and10 (5%) in Group I, II and III respectively. Family history of IHD was present in 69(30%). Previous history of IHD was present 115(50%) patients. (Table 2)

Treatment Strategies

Streptokinase therapy was used frequently in patients with acute STEMI and LBBB and was not used in patients with Non STEMI .Inotropic support, diuretics and other necessary measures were taken as per protocol of cardiology unit.

Outcome Data

Overall 165(71.73%) patients died and 65(28.26%) survived in the study population. In-hospital mortality was 70(42.42%) patients in Group I, 80(48.48%) in group II and 15(9%) in group III.

Predictors of Survival

Predictors of in-hospital mortality were in decreasing frequency elderly aged, very low blood

Table 1.Presentations of Study Population

Variables	Numbers(Percentages) n=230
CS+STEMI	110(47.82%)
CS+Non-STEMI	100(43.47%)
CS+Acute LBBB	20(8.69%)

LBBB=left bundle branch block; CS=cardiogenic shock; STEMI=ST segment elevation myocardial infarction.

Table 2. Baseline Characteristics of Study Population

Characteristics	Numbers (Percentages) n=230
Age	30-85Years
Sex	
Male	161(70%)
Female	69(30%)
DM	120(52%)
Hypertension	100(43.47%)
Smokers	140(60.86%)
Hyperlipidemias	200(86.95%)
Previous H/O IHD	115(50%)

DM=Diabetes Mellitus; H/O IHD=History of ischemic heart disease

pressure, higher Killip class and extensive MI.

DISCUSSION

Coronary artery disease is the leading cause of death wordwide.[1] An estimated 13.2 million American suffer from CAD. Not everyone who has a heart attack develops CS.In fact, <10% of people who have a heart attack develop CS. But when it occurs it's very dangerous. For people who die from a heart attack in a hospital, CS is the most common cause. We have seen in our current study that the CS has poor out come. Acute myocardial infarction is a major cause of death in the modern world. CS most commonly occurs as a complication of AMI. Patients with CS have an increased risk of cardiovascular death and morbidity during an AMI. Patients with CS on inotropic support with other necessary supportive measures have markedly increased mortality after AMI compared with other patients who are not having CS.

The observations of the current report are consistent with previously published reports demonstrating increased mortality of cardiogenic shock after acute MI.[9,10] The work done by Beattie et al[10] demonstrates that CS is the leading cause of death in AMI.Mortality rate is 70-90%. Previous work has demonstrated the influence of advanced age, sex, congestive heart failure, and diabetes as important predictors of survival in patients with cardiogenic shock with acute MI.[5,6] We confirm those observations and demonstrate the association of other co-morbid conditions with survival. Conservative management is not sufficient to decrease the mortality rate further. In the past almost no one survived from CS. Our findings further highlight the need to understand the reasons for less aggressive management in such patients and to develop improved strategies for treatment of acute MI or for better primary and secondary coronary prevention

Smoking, dyslipidaemia and obesity are strong risk factors for STEMI. Infarction of anterior site is more frequent. Among diabetics, chances of STEMI are almost equal in male and female, while among non-diabetics male to female ratio is 1:6.

A recent study showed that among patients with CS who survive for 30 days after an ST-segment elevation myocardial infarction, annual mortality rates of 2% to 4% are approximately the same as those for patients without shock.

Better prevention of coronary events may affect the global burden of CS and CS-associated mortality.

CONCLUSION

In-hospital outcome of cardiogenic shock after acute myocardial infarction is high when these patients are managed conservatively. We also have seen that there is strong association of co morbid conditions with outcome of cardiogenic shock after acute myocardial infarction.

REFERENCES

1 Yusuf S, Vaz M, Pais P. Tackling the challenge of cardiovas cular disease burden in developing countries. Am Heart J 2004; 01:148.

2. American heart association: Heart disese and stroke sta tistics 2007;69:115.

3. Goldberg RJ, Glatefelter K, Burbank-Schmidt E. Trends in community mortality due to coronary heart disese. Am Heart J 2006;501:151.

4. Kamalesh M, Subramanian U, Ariana A. Similar decline in post-myocardial infarction mortality among subjects with and with out diabetes.Am J Med Sci 2005;228-329.

5. BrandlerES, Sinert R. Shock cardiogenic. www.emedicine.medscape.com Accessed on Aug 19, 2008.

6. Holman DR Jr. Cardiogenic Shock a lethal combination of Acute Myocardial Infarction. Rev Cardiovasc Med 2003; 4:131-135.

7. Okuda M. A multidisciplinary overview of Cardioigenic Shock, The SHOCK trial. J AM Coll Cardiol 2003;

42:1380-1386.
8. Hochman JS. Cardiognic shock complicating acute myo cardial infarction. Circulation 2003;107:2998-3002.
9. Tipoo FA, Qureshi AR, Najaf SM. Outcome Cardiogenic shock complicating acute MI. J Coll Physcians Surg Pak 2004;14(1):6-9.
10. Luca G, Savonitto S, Greco D. Cardiogenic shock devel opment in the CCU in patients with STEMI. J cardiovasc Med (Hagerstown)2008;04:1023-1029.
11. Boon NA, Colledge NR, Walker BR, Hunter JAA (2006). Davidson's Principles & Practice of Medicine, 20th Edi tion. Churchill Livingstone
12. Rezkalla SH, Kloner RA. "Cocaine-induced acute myocar dial infarction". Clin Med Res 2007;5(3): 172–6.
13. Beattie JN, Soman SS, Sandberg KR, Yee J, Borzak S, Garg M, et al. Determinants of mortality after myocardial inf arction in patients with advanced renal dysfunction. Am J Kidney Dis 2001;37:1191-200.