



Original Article

IN HOSPITAL OUTCOME OF PATIENTS WITH POST MYOCARDIAL INFARCTION VENTRICULAR SEPTAL RUPTURE

Abdul Rehman, Shahid Hameed, Abdul Rehman Abid

ABSTRACT

Objectives: To determine the percentage of death or survival of patients suffering from post myocardial infarction ventricular septal rupture.

Materials and Methods: This descriptive study was conducted at the Emergency ward, coronary care units and cardiology ward of the Punjab Institute of Cardiology, Lahore from October 2009 to March 2010. A total of 45 diagnosed cases with post myocardial infarction ventricular septal defect were selected for this study. All the patients were treated according to the treatment protocols of Cardiology Department. The outcome (death/survival) was studied during one week stay in the hospital.

Results: The mean age of the patients was 61.0 ± 9.9 years. There were 21 (46.7%) male patients and 24 (53.3%) female patients. Eleven (24.4%) patients were thrombolysed. In the distribution of patients by outcome, 21 (46.7%) patients survived and remaining 24 (53.3%) patients died at the end of one week of hospital stay.

Conclusion: This study demonstrates a high percentage of mortality in patients suffering from post myocardial infarction ventricular septal rupture during their one-week stay in the hospital. Old age and female gender carried a substantially increased risk of mortality.

Key Words: Acute Myocardial infarction; ventricular septal rupture; In-hospital mortality; thrombolysis.

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INTRODUCTION

Despite revolutionary advancements in the diagnosis and management over the last few decades, acute myocardial infarction is still a major health problem all over the world.¹ Cardiogenic shock is the most severe clinical presentation of left ventricular failure (LVF) and is due to extensive damage to the left ventricular myocardium in more than 80% of ST-elevation myocardial infarction (STEMI) patients. The other 20% STEMI patients with LVF have a mechanical defect such as ventricular septal or papillary muscle rupture or predominant right ventricular infarction.²

Ventricular septal defect is rare but certainly life threatening complication of acute ST elevation myocardial infarction. The thrombolytic therapy and primary percutaneous coronary intervention have reduced the incidence of post myocardial

infarction ventricular septal defect (VSD). The size of VSD determines the magnitude of left to right shunt and extent of haemodynamic deterioration.^{1,3}

The incidence of VSD is higher (about 60%) in anterior myocardial infarction than in the inferior myocardial infarction (about 20-40%). VSD is usually associated with advanced age, female sex, anterior location of myocardial infarction and low body mass index (BMI).^{2,3,4}

The management of post MI VSD is a great challenge for both the cardiologists and cardiac surgeons. The diagnosis of post MI VSD can be made easily with transthoracic echocardiography which has the sensitivity and specificity of about 100% in the diagnosis of post MI VSD.^{5,6} It carried a very high mortality rate either with or without surgical intervention. The mortality rate among patients with septal rupture who are treated conservatively is approximately 24% in the first 24 hours, 46% at one week and 67-82% at two months.⁷ The early operative intervention is the treatment of choice according to the current guidelines of American College of Cardiology irrespective of clinical status of patient.^{7,8} Recently percutaneous VSD device closure has also been used to treat STEMI related septal rupture.⁹

Correspondence address:

Dr Abdul Rehman, MBBS
Punjab Institute of Cardiology,
Lahore



In Pakistan the mortality of acute myocardial infarction has been studied previously but little data is available about post MI VSD.^{10,11}

The rationale of the study was to know the importance of management on the survival of patients suffering from post MI VSD in a tertiary care hospital and to guide the cardiologists for early referral of such kind of patients to tertiary care hospitals to reduce mortality.

This study was designed to determine the outcome of patients suffering from post MI VSD.

MATERIAL AND METHODS

This descriptive study was conducted at the Emergency ward, coronary care units and cardiology ward of the Punjab Institute of Cardiology, Lahore from October 2009 to March 2010.

The calculated sample size was 45 cases of post MI VSD with 15% margin of error, 95% confidence level taking expected percentage of in hospital mortality to be 46% at one week stay.

Non-probability purposive sampling technique was used.

Inclusion criteria were patients of all age groups, both genders, diagnosed cases of post MI VSD (by echocardiography) and both thrombolysed and non thrombolysed patients.

Exclusion criteria were patients having acute ST elevation MI without VSD, patients having congenital VSD and follow up cases of post MI VSD.

Informed consent was taken from all the patients or their attendants. History of thrombolysis was taken from all the patients. All the patients were treated according to the treatment protocol of the Cardiology Department. The outcome (death / survival) was studied during one week stay in the hospital. All the information was collected on the specially designed proforma.

In-hospital outcome was defined as, survival or death of patients suffering from post MI VSD during their one week stay in the hospital.

Acute ST-Elevation Myocardial Infarction (STEMI) was defined as, ST segment elevation of more than 0.2 mv in at least two contiguous chest leads or more than 0.1 mv in at least two contiguous limb leads. Confirmation of the diagnosis was done by the raised levels of cardiac enzymes (CK-MB) more than double of the reference value.

Post MI VSD was defined as an acute post infarction ventricular septal defect or a perforation of the muscular ventricular septum occurring in an area of acutely infarcted myocardium.

STATISTICAL ANALYSIS

All the data was entered into SPSS version 12

and analyzed accordingly. The qualitative variables like gender, survival/death were presented as frequencies and percentages. Quantitative variable like age was calculated as mean and standard deviation. Data was stratified for age, gender and thrombolytic therapy to address effect modifiers.

RESULTS

The mean age of the patients was 61.0 ± 9.9 years. There were 2(4.5%) patients in the age range of upto 40 years, 5(11.1%) patients in the age range of 41-50 years, 14(31.1%) patients in the age range of 51-60 years, 14(31.1%) patients in the age range of 61-70 years and 10(22.2%) patients in the age range of 71-80 years (Table 1).

There were 21 (46.7%) male patients and 24 (53.3%) female patients. Only 11(24.4%) patients were thrombolysed and the remaining were not thrombolysed either due to late presentation or due to haemodynamic instability (Table 1).

In the distribution of patients by outcome, 21(46.7%) survived and 24(53.3%) patients died during hospital stay. (Table 1).

In the comparison of outcome with age, in the age group of upto 40 years, there was 1(2.2%) patient who survived and 1(2.2%) died, in the age group of 41-50 years, 4(8.9%) patients survived and 1(2.2%) died, in the age group of 51-60 years, 12(26.7%) patients survived and 2 (4.5%) died, in the age range of 61-70 years, 4 (8.9%) patients survived and 10 (22.2%) died and in the age range of 71-80 years, all 10 (22.2%) patients died (Table 2).

In the comparison of outcome with sex, in male patients, 12 (26.7%) patients survived and 9 (20%) patients died. Among female patients, there were 9 (20%) survivors and 15(33.3%) patients died (Table 2).

In the comparison of outcome with thrombolytic therapy, in patients in whom thrombolytic therapy was given, 3(6.6%) patients survived and 8(17.8%) died. In those patients not receiving thrombolytic therapy, 18(40%) patients survived and 16 (35.5%) died. (Table 2).

DISCUSSION

Rupture of the myocardium after acute myocardial infarction may involve the free wall of the left ventricle (LV), the interventricular septum, or the papillary muscles.¹² While LV free wall rupture and ventricular septal defect (VSD) are uncommon mechanical complications after AMI, they carry an extremely high mortality rate.¹² The incidence,¹³ timing of occurrence,¹⁴ prognostic factors,¹³ and



clinical features¹⁵ and outcomes¹² of AMI complicated by VSD and LV free wall rupture in both the prethrombolytic and thrombolytic therapy eras have been debated extensively. However, there are

anterior myocardial infarction than in the inferior myocardial infarction (about 20-40%). Predictors of VSD are advanced age, female sex, anterior location of myocardial infarction and low body mass index (BMI).^{2,3,4}

Table 1. Baseline characteristics of the study population.

CHARACTERISTICS	NUMBERS (PERCENTAGES) n=45
AGE MEAN YEARS	61.0±9.9
AGE GROUPS	
Less or equal to 40	2(4.5%)
41-50	5(11.1%)
51-60	14(31.1%)
61-70	14(31.1%)
71-80	10(22.2%)
MALE	21(46.7%)
FEMALE	24(53.3%)
THROMBOLYSIS GIVEN	11(24.4%)
DIED	24(53.3%)

Table 2. Comparison of outcome in the study population.

OUTCOME	DIED n=24	SURVIVED n=21
Age groups		
Less or equal to 40	1(2.2%)	1(2.2%)
41-50	1(2.2%)	4(8.9%)
51-60	2(4.5%)	12(26.7%)
61-70	10(22.2%)	4(8.9%)
71-80	10(22.2%)	0(0%)
Male	9(20%)	12(26.7%)
Female	15(33.3%)	9(20%)
Thrombolysis given	8(17.8%)	3(6.7%)

clinical features, and outcomes of these complications in patients with AMI undergoing percutaneous coronary intervention (PCI). Furthermore, previous studies^{13,17} have demonstrated that although thrombolytic therapy can reduce the incidence of cardiac rupture, this therapeutic management for patients with AMI also may accelerate early cardiac rupture.^{13,17} Whether this paradoxical effect of thrombolytic therapy also occurs in the present PCI reperfusion era remains unknown.

Ventricular septal defect is rare but certainly life threatening complication of acute ST elevation myocardial infarction. The thrombolytic therapy and primary PCI have reduced the incidence of post MI VSD. The size of VSD determines the magnitude of left to right shunt and extent of haemodynamic deterioration.^{1,3}

The incidence of VSD is higher (about 60%) in

The management of post MI VSD is a great challenge for both the cardiologists and cardiac surgeons. The diagnosis of post MI VSD can be made easily with transthoracic echocardiography which has the sensitivity and specificity of about 100% in the diagnosis of post MI VSD.^{5,6} It carried a very high mortality rate either with or without surgical intervention. The mortality rate among patients with septal rupture who are treated conservatively is approximately 24% in the first 24 hours, 46% at one week and 67-82% at two months.⁷ The early operative intervention is the treatment of choice according to the current guidelines of the American College of Cardiology irrespective of clinical status of patient.^{7,8} Recently percutaneous VSD device closure has also been used to treat STEMI related septal rupture.⁹

In our study the mean age of the patients was 61.0±9.9 years. As compared with the study of Larosa et al¹⁸ the mean age of the patients was 59.0±9.0 years, which is comparable with our study.

In our study 46.7% patients were males and 53.3% were females. While compared with the study of Chaux et al¹⁹ there were 40% male and 60% female patients.

In our study there were 24.4% patients receiving thrombolytic therapy and in 75.6% patients thrombolytic therapy was not administered due to any reason.

In our study the patients of ventricular septal rupture who were treated conservatively according to the cardiology protocol, during their one week stay in hospital, 46.7% patients survived and 53.3% died. As compared with the study of Yip et al⁷ among the patients with ventricular septal rupture treated conservatively during their one week stay in hospital, 54% patients survived and 46% died, which is comparable with our study.

In another study conducted by Poulsen et al²⁰ the patients of post myocardial infarction ventricular septal rupture treated conservatively during their stay in hospital, 48% patients survived and 62% died, which is also comparable with our study.

Ventricular septal defect is a serious complication of myocardial infarction, occurring in about 0.2% of cases. Untreated, mortality is high and early surgical repair is difficult because of friable



necrotic tissue. Percutaneous closure may be an alternative treatment option in selected patients.¹⁰

In a study conducted by Ahmad et al¹⁰ the survival rate of post myocardial infarction ventricular septal defect was 60% and death rate was 40%. While in our study the patients of ventricular septal rupture survival rate was 46.7% patients and death rate was 53.3%, which is comparable with the above study.

CONCLUSION

It is concluded from this study that there is high percentage of mortality in patients suffering from post myocardial infarction ventricular septal defect during their one-week stay in the hospital. Old age and female gender carried a substantially increased risk of mortality in cardiac rupture and thrombolytic therapy has no beneficial effect on outcome.

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