

# Frequency of Cardiogenic Shock in Patients Presented with Acute Coronary Syndrome

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## ABSTRACT

**Objective:** To find out the frequency of cardiogenic shock in patients with ACS

**Study design:** Cross sectional study

**Methodology:** A calculated sample of 240 patients presented with acute coronary syndrome confirmed clinically and/or on the basis of ECG and cardiac markers was taken. In addition to collecting basic demographic details patients were inquired about the presence of risk factors (smoking status, diabetes and hypertension). The collected data was entered and analyzed by using SPSS version 16. Quantitative variables were presented in the form of mean, range and standard deviation.

**Results:** Out of 240 patients, 33 patients (13.8%) were having cardiogenic shock and 207 patients (86.2%) were not. In the patients presented with cardiogenic shock, there were 21 (8.8%) with STEMI, 10 (4.2%) with NSTEMI and 2 (0.8%) with unstable angina. In STEMI there were 14 patients (5.8%) with anterior wall MI, 4 patients (1.7%) with inferior wall MI and 3 patients (1.2%) with lateral wall MI.

**Conclusion:** Frequency of cardiogenic shock in patients presented with ACS was 13.8%. It was more common in patients presented with ST-segment elevation MI as compared to unstable angina and NSTEMI. In STEMI, anterior wall was more involvement was more predominant.

**Keywords:** ACS, Cardiogenic shock, Unstable angina, NSTEMI, STEMI

## INTRODUCTION

Myocardial infarction (MI) involved by cardiogenic shock (CS) is linked with elevated and timely mortality while early coronary revascularization progresses survival in CS but mortality rate of 30 days about 35-45% has endured for decades despite the use of left ventricular support such as anti-thrombotic pharmacology.<sup>(1)</sup> ST-segment elevation MI (STEMI) is more harmful whereas unstable angina and non ST-segment elevation MI (NSTEMI) are intermediate form of acute coronary syndrome.<sup>(2)</sup> In general, hypoperfusion (such as urine output <30ml/h, heart rate >60bpm and cold extremities) of end organs and hypoxia associated with decreased systolic blood pressure < 90 mmHg for ≥ 30 min are associated with cardiogenic shock.<sup>(3)</sup> Some current studies showed that increasing risk factors which lead to CS were associated with high mortality rates in ageing population.<sup>(4)</sup> Myocardial infarction may be posterior, lateral, inferior or anterior walls of the left ventricle based upon the disruption of blood flow to that area.<sup>(5)</sup> Some studies have shown that patients presenting with STEMI of anterior wall of heart (AWMI) are at greater risk than patients presenting inferior wall MI (IWMI). Recent studies indicated that occurrence of cardiogenic shock is more in patients presenting with anterior wall MI than those which presenting with inferior wall MI.<sup>(6)</sup> The left ventricular (LV) dysfunction commonly occurs in AWMI is associated with reduced hemodynamic function.<sup>(7)</sup> The mortality rate decreases up to 40-50% by accomplishment of early revascularization, still cardiogenic shock remains a primary cause of death in acute myocardial infarction (AMI).<sup>(3)</sup> So the objective of this study is to find out the frequency of cardiogenic shock in patients with ACS.

## MATERIALS AND METHODS

**Design and setting:** This cross sectional study was conducted in cardiology unit of a tertiary care setting in Lahore.

**Sample Selection:** Using non probability sampling technique a calculated sample of 240 patients (considering margin of error 0.05) presented with acute coronary syndrome was taken.

**Data collection:** Patients confirmed clinically and/or on the basis of ECG and cardiac markers were taken into account for ACS. In addition to collecting basic demographic details patients were

inquired about the presence of risk factors (smoking status, diabetes and hypertension).

Patients were monitored during admission period any features suggesting development of shock were noted. Systolic blood pressure <90mmHg for 30 min and cardiac index <1.8L/min/m<sup>2</sup> without support was considering cardiogenic shock.

**Data Analysis:** Data was analyzed by using SPSS version 20.0. Quantitative variables were presented in the form of mean, range and standard deviation while frequency distribution and graphs were considered for qualitative analysis.

## RESULTS

Study consisted of 240 ACS patients in which 166 (69.2%) were male and 74 (30.8%) were female. The mean age of the patients was 55.9±1.32 years. Diabetes was present in 123 (51.2%), smoking history in 94 (39.2%), and hypertension in 142 (59.2%). Out of 240 ACS patients 13 (5.4%) presented with unstable angina, 139 (57%) with non ST-segment elevation MI, 88 (36.7%) were having STEMI.

**Table 1:** Baseline Characteristics

<b>Age (mean± S.D) in years</b>	55.9 ± 1.32
<b>Gender n(%)</b>	
Male	166 (69.2%)
Female	74 (30.8%)
<b>Pattern of ACS</b>	
Unstable angina	13 (5.4%)
NSTEMI	139 (57.9%)
STEMI	88 (36.7%)

Out of 33 cardiogenic shock patients, 2 (0.8%) were having unstable angina, 10 (4.2%) NSTEMI, and 21 (8.8%) were having STEMI. 14 (5.8%) were having cardiogenic shock with anterior wall MI (AWMI), 04 (1.7%) with inferior wall MI (IWMI), and 3 (1.2%) were having cardiogenic shock with lateral wall MI (LWMI).

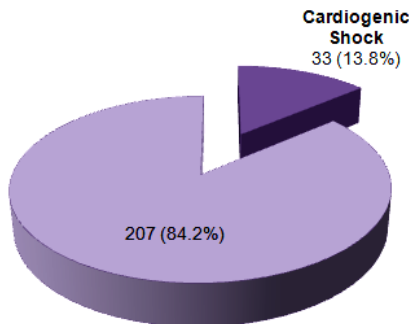
Out of 240 patients presented with ACS, cardiogenic shock was observed in 33 (13.8%) as shown in Figure.01.

**Table 2:** Frequency distribution of Cardiogenic Shock

	Frequency n (%)
<b>Pattern of cardiogenic shock in ACS</b>	
Unstable angina	02 (0.8%)
NSTEMI	10 (4.2%)
STEMI	21 (8.8%)
<b>Pattern of cardiogenic shock in STEMI</b>	
Anterior wall	14 (5.8%)
Inferior wall	04 (1.7%)
Lateral wall	03 (1.2%)

**DISCUSSION**

Coronary artery disease (CAD) in terms of acute coronary syndrome is the primary reason of mortality and morbidity equally in women and men globally. Heart muscles are incapable to work accurately when blood supply to the coronary arteries is reduced due to hypoperfusion and this is associated with acute coronary syndrome (ACS).<sup>(8)</sup>



**Figure 1:** Frequency of Cardiogenic Shock in Acute Coronary Syndrome

ACS is generally classified according to the degree of cardiac markers (e.g. CK-MB and troponin) and electrocardiography (ECG) findings on admission such as non-ST-segment elevation ACS (NSTEMI-ACS) or ST-segment elevation ACS (STEMI-ACS).<sup>(9)</sup> The severity of cardiogenic shock was about 80% in patients having ACS and around 5-15% patients with ACS developed cardiogenic shock. Normally, cardiogenic shock can take place when the acute myocardial infarction occurred through mechanical complication (e.g. free wall or ventricular septal rupture and papillary muscle) or myocardium >40% is concerned.<sup>(10)</sup>

The National Cardiovascular Data Registry (NCDR) showed that 12.2% of STEMI patients presented with CS among 2007 and 2011. STEMI complicated by CS may lead to 33.1% hospital mortality. The authors also showed that cardiogenic shock was less prevalent (4.3%) among NSTEMI patients but was linked with a higher in-hospital mortality rate of 40.8%.<sup>(11)</sup> In our study out of 240 ACS patients 33 (13.8%) were having cardiogenic shock. The patients with STEMI were at a higher rate of developing cardiogenic shock 21 (8.8%) as compared to NSTEMI 10 (4.2%) and unstable angina 2 (0.8%). Patients with anterior wall STEMI had an increased incidence of developing cardiogenic shock 14 (5.8%) whereas inferior wall and lateral wall STEMI were seen in 4 (1.7%) and 3 (1.2%) patients respectively.

**CONCLUSION**

This study indicates that cardiogenic shock occurred in ACS whether ST segment elevation or depression but it was more predominant in patients presented with STEMI. In STEMI, the anterior wall of the heart was more predominantly involved. This analysis can help to plan the implementation of primary prevention strategies in patients with ACS with the aim to reduce the incidence of cardiogenic shock.

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