The Rate and Prognosis of Ventricular Fibrillation Complicating Acute Myocardial Infarction

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Abstract

- **Objective:** To determine the rate of ventricular fibrillation according to the time of onset of ischemic chest pain of patients with acute myocardial infarction.

- **Design**: Prospective observational study.

- **Setting:** The only general hospital in Karballa city.

- **Patients:** 146 consecutive patients admitted to the coronary care unit with acute myocardial infarction.

- **Main outcome measures:** Time of onset of chest pain and ventricular fibrillation and survival of patient admitted with myocardial infarction. during hospitalization.

- **Results:** The rate of ventricular fibrillation in these patients was high in the first 4 hours from onset of pain (14 patients 77.8%) and decline afterward, 11.1% of patients with V.F. died during hospitalization compared with 7.8% of those without.

- **Conclusion:** Early admission to hospital of patient with acute myocardial infarction will reduce the early mortality due to ventricular fibrillation. Faster access to facilities for resuscitation must be achieved if major improvement in the persistently high mortality of patient with acute myocardial infarction. is to be made.

- **Key ward:** Ventricular fibrillation., Acute myocardial infarction, Prognosis, Karballa

Introduction

Ventricular fibrillation. a cause of sudden cardiac death in the setting of acute myocardial infarction., remains a major challenge in prevention, early detection, and treatment. Ventricular fibrillation may occur within minutes or hours after the onset of chest pain; hence its precise timing in relation to the onset of ischemia is variable. Moreover, because ventricular fibrillation usually occurs unobserved, out of hospital, and is usually lethal in the absence of intervention, its precise timing of onset is actually unknown in most patients.

The incidence of primary ventricular fibrillation in patients admitted to hospital varies from 2-19% [1] depending on the time between the onset of chest pain and time of arrival to hospitals, the shorter the time the higher the incidence of ventricular fibrillation as its incidence is highest in the first hour after the onset of chest pain and it decline gradually as hours pass on [2]. Case fatality in patients with acute myocardial infarction admitted to hospital ranges from 15-20% [3] and 45% when patients who die out of hospitals are considered [4]. Most of deaths outside the hospitals,

due to acute myocardial infarction, are likely due to ventricular fibrillation.

In our study we will try to prove that early access to expert medical care will save many lives by early detection and treatment of ventricular fibrillation complicating acute myocardial infarction.

Method

The study was conducted in Al-Hussain general hospital which is the only general hospital in Karballa city. Karballa is a holly city which contains the shrines of Imam Hussain and Imam Abaas. Karballa city has a population of nearly 500 000 and visited by millions of pilligrims each year.

The hospital capacity is 400 beds. The coronary care unit consists of 14 beds with bedside monitors and one central monitor, equipped with defibrillators and a trained staff, and patient being monitored over the 24 hours.

The study group comprised 146 patients, admitted to the coronary care unit from September 1999 to April 2000, with acute myocardial infarction. Patients were referred from causality department, other hospitals, primary health care clinics, and privet clinics.

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The diagnosis of acute myocardial infarction was based on the following criteria:

Cardiac pain lasting for 30 minutes or more, sequence electrocardiographic changes of acute myocardial infarction with ST elevation of 1mm or more in standard leads and 2mm or more in precordial leads, and elevated enzymes AST > 25 IU dl and LDH> 200 IU dl as the CK MB was not available at time of the study.　　.

Data sheet designed by the researcher includes sociodemographic data, date and time of onset of chest pain, medical history, smoking habit, physical examination findings, electrocardiographic data, cardiac enzymes.

All the patients received aspirin 100 mg. tablet chewing, morphine, nitroglycerine tablet sublingual, heparin 5000 U intravenously, and nitroglycerine drip, if there is no contraindication, starting with a dose of 0.05 ug /kg/min.

The patients were followed during their admission in the coronary care unit and in the medical ward. Their stay ranges from 5-10 days. All arrhythmias were recorded. Ventricular fibrillation was calculated from the onset of chest pain.

Results:

Patient's age ranges from 28-76 years 18(12.3%) were bellow 45 years, 104(71.2%) between 45-65 years, 24 (16.5%) were above 65 year of age

There were 106 (72.6%) male and 40 (27.4%) female.

108 patients (74%) were from urban area and 38 (26%) were from rural areas.

30 patients (20.5%) had history of hypertension, 21 patients (40.4%) had ischemic heart disease, and 24 patients (16.4%) had diabetes mellitus.

51 (35%) patients were smokers. (Table- 1)

Duration of chest pain:

61 patients (41.8%) where admitted within one hour of the onset of chest pain, 104 patients (71.2%) within 4 hours, 133 patients (91.1%) within 24 hours and 13 patients (8.9%) after 24 hours.

Rate of V.F.:

Ventricular fibrillation developed in 18 patients (12.3%), 14 of them (77.8) developed ventricular fibrillation in the first 4 hours, and 4 developed ventricular fibrillation (22.2%) after 4 hours of the onset of chest pain. (Table 2)

This means the ratio of patients who developed VF to those who did not develop ventricular fibrillation in

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patients presented within 4 hours of the onset of chest pain was 1:6.4, and for those who present after 4 hours was 1:9.5.

Prognosis:

Defibrillation was done to all patients who developed ventricular fibrillation., 16 were corrected and 2 were not with a mortality rate of 11.1% compared with 7.8% for those without ventricular fibrillation and an over all mortality for all the 146 patients of 8.2%.

Discussion

In our study all patients fulfilled the criteria of acute myocardial infarction admitted to the coronary care unit were studied. With the known difficulty to give precise time of onset of chest pain in some cases, especially when the chest pain is atypical, nearly reliable timing was obtained from our patients. The time interval in our study was short having 41.8% of patients being admitted within one hour and 71.2% being admitted within four hours of the onset of chest pain, while in London 21.7% admitted in the first hour and 74% in the first four hours [3], in Slovakia 51.6% of patients being admitted within four hours [5], and in Italy 65% of patients were admitted within 6 hours of the onset of chest pain [6]. Many factors play a role in our findings first is that Karbala governorate is small [7], second 65% of the population is urban [8], third easy access to the hospitals and medical services, good educational standard of the population [7], and lastly the small number of the sample.

The rate of ventricular fibrillation was 12.3% in our study while in London it was 9.1 % [3], and according to Multicenter investigators Group it was 5% [9], and in Spain it was 5.4% [10]. The high rate of ventricular fibrillation can be explained by the high percentage of patients who present to the hospital in the first 4 hours of the onset of chest pain and also to the limited number of patients who receive B- Blockers at presentation (6 patients) as intravenous B_ Blockers reduce the incidence of ventricular in acute myocardial infarction [11].

Mortality in our study was 8.2%, while in multi-center European hospitals it was 4 % [12], and in Slovakia it was 11.6 % [13]. Studies have shown that there is a considerable variation in mortality between hospital types, between rural and urban hospitals, patients being treated by cardiologists or general practitioners [14], and also

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according to the modality of treatment used [15].

Prognosis of patients with acute myocardial who did not develop ventricular fibrillation was better with a mortality of 7.8% versus 11.1% for patients with ventricular fibrillation , while according to A Valpi, A Maggion, et el it was 5.9% versus 10.8%. [16].

Conclusion:

Rapid access to facilities for resuscitation is of great importance if a significant reduction in the mortality of patients with acute myocardial infarction is to be achieved. Also educational programs are important to bring attention of people to the danger of delay in seeking medical help for chest pain.

Table(1) Socio- Demographic Data of Patients

Age	28-76 years	146 (100%)
	< 45 years	18 (12.3%)
	45-65 years	104 (71.2%)
	> 65 years	24 (16.5%)
Sex	Male	106 (72.6%)
	Female	40 (27.4%)
Residence	Rural	38 (26%)
	Urban	108 (74%)
Risk factors	Smoking	51 (36%)
	Hypertension	30 (20.5%)
	Ischemic heart disease	21 (14.4%)
	Diabetes mellitus	24 (16.4%)

Table (2)   Ventricular Fibrillation in relation to onset of chest pain

Time (hours) from the onset of chest pain	Patients who developed V. Fibrillation	Patients who did not develop Ventricular Fibrillation	Total
0-4	14 (13.5%)	90 (86.5%)	104
> 4	4 (9.5%)	38 (90.5%)	42
Total	18 (12.3%)	128 (87.7%)	146

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