Association of time of MI and left ventricular ejection fraction

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ABSTRACT

Objective: *This study was performed to determine the association of time of MI and left ventricular ejection fraction.*

Methods and materials: *In this cross-sectional descriptive-analytical study, 306 patients with MI attending to a tertiary health care center from 2006 and 2009 in Tehran, Iran that were admitted in cardiac care unit (CCU) were enrolled.*

Results: *The mean (± standard deviation) EF in group 1 was 44.42 ± 10.36 percent and in group 2 was 42.86 ± 9.79 percent with no statistically significant difference (P > 0.05). 11 subjects (5%) in group 1 and 14 patients (7.7%) in group 2 were dead with no statistically significant difference (P > 0.05).*

Conclusions: *Finally, according to the obtained results it may be concluded that left ventricular ejection fraction and mortality rate may be similar between different diurnal times and so the quality of prepared care to patients is equal in different shifts.*

Keywords*: Association of time, MI, left ventricular ejection fraction*

INTRODUCTION

Myocardial infarction (MI) is the irreversible necrosis of heart muscle secondary to prolonged ischemia (1, 2). This usually results from an imbalance of oxygen supply and demand (3, 4). Coronary artery atherosclerosis is the principal cause of coronary artery disease (CAD) and is the single largest killer of both men and women in the worlds (5, 6).

Coronary artery atherosclerosis or CAD refers to the presence of atherosclerotic changes within the walls of the coronary arteries, which causes impairment or obstruction of normal blood flow with resultant myocardial ischemia (2). CAD is a progressive disease process that generally begins in childhood and manifests clinically in mid-to-late adulthood (1). The distribution of lipid and connective tissue and the degree of inflammation in the atherosclerotic lesions determine whether they are stable or at risk of rupture, thrombosis, and clinical squeal (3, 4).

The presence of risk factors accelerates the rate of development of atherosclerosis. Smoking increases platelet activity and catecholamine levels, alters prostaglandins, and decreases high-density lipoprotein (HDL) levels. Hypertension causes endothelial dysfunction and increases collagen, elastin, and endothelial permeability and platelet and monocyte accumulation. Diabetes causes endothelial dysfunction, decreases endothelial thrombo-resistance, and increases platelet activity, thus accelerating atherosclerosis (7, 12). In the other hand these factors may result in a worsened prognosis in post-MI phase (13, 14). Hence determination of them is necessary. One of the proposed factors is times of MI that some theories such as quality of care and also the increased release of stress hormones is the probable mechanism for it (15, 16). Regarding to the importance of issue and lack of similar studies from Iran, this

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study was conducted to determine the association of time of MI and left ventricular ejection fraction.

METHODS AND MATERIALS

In this cross-sectional descriptive-analytical study, 306 patients with MI attending to a tertiary health care center from 2006 and 2009 in Tehran, Iran that were admitted in cardiac care unit (CCU) were enrolled. Information was collected by existing data available in the center with a simple random manner and by table of random number generators.

The study was approved by medical ethics committee of Azad University of Medical Sciences, Tehran, Iran. The understudy variables included age, sex, EF, time of MI (group 1 attending from 7 at morning to 7 at night and the group 2 attending from 7 at night to 7 at morning and holidays), admission days, family and self history of MI, history of diabetes mellitus, hypertension and hyperlipidemia, location of MI, and mortality that all except EF and mortality were matched across the groups.

Data from 306 patients were analyzed using SPSS (version 13.0) software [Statistical Procedures for Social Sciences; Chicago, Illinois, USA]. Differences were tested by Independent-Sample-T and Chi-Square tests and were considered statistically significant at P values less than 0.05.

RESULTS

119 subjects (67.6%) in group 1 and 87 patients (66.9%) in group 2 were male (P > 0.05). The mean (± standard deviation) age in group 1 was 59.64 ± 12.5 years and in group 2 was 60.01 ± 11.14 years (P > 0.05). The mean EF was not differed in two groups (Figure 1).

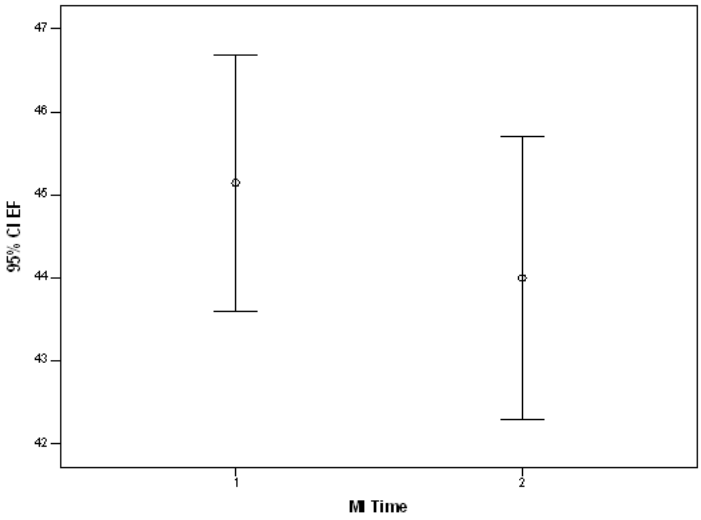

Figure 1- Frequency distribution of EF in two groups

The mean (± standard deviation) duration of admission in group 1 was 5.56 ± 1.74 days and in group 2 was 5.28 ± 1.38 days (P > 0.05). 49 subjects (27.8%) in group 1 and 49 patients (37.7%) in group 2 were diabetic (P > 0.05). 61 subjects (34.7%) in group 1 and 47 patients (36.2%) in group 2 were hypertensive (P > 0.05). 44 subjects (25%) in group 1 and 37 patients (28.5%) in group 2 had history of hyperlipidemia (P > 0.05).

46 subjects (26.1%) in group 1 and 42 patients (32.1%) in group 2 had positive family history of CAD (P > 0.05). 8 subjects (4.5%) in group 1 and 8 patients (6.2%) in group 2 had positive self history of MI (P > 0.05). In group 1, the MI location was anterior in 57 subjects (32.4%),

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inferior in 65 patients (36.9%), and extensive in 54 subjects (30.7%) and in group 2, the MI location was anterior in 30 subjects (23.1%), inferior in 37 patients (28.5%), and extensive in 63 subjects (48.5%) with no difference (P > 0.05). The mortality rate was similar across the groups (Figure 2).

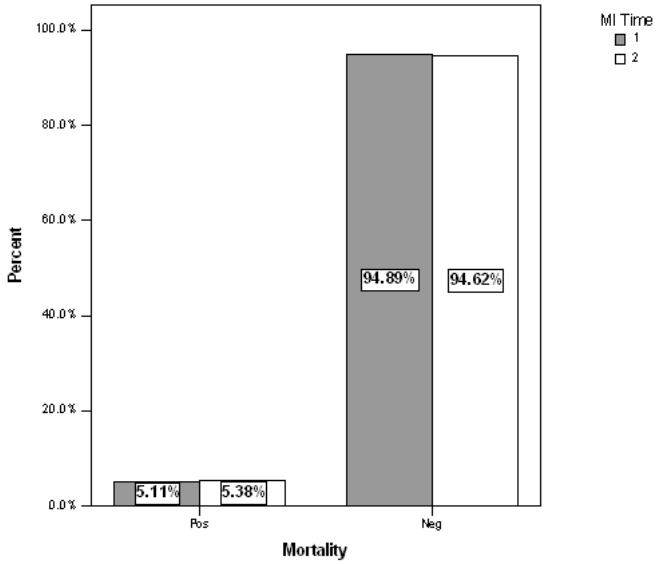

Figure 2- Frequency distribution of death in two groups

DISCUSSION

As mentioned in the previous section, the EF and the mortality were not differed across two different understudy times. It shows that the subjects working in night shifts have no change in abilities with those of morning shift and also the cathecolamines release is not differed in two different times of MI occurrence. The cause of no difference may be the lack of residence in understudy center that resulted in a direct association between masters and the medical students leading to good performance of them when the masters are not present at night shift (17, 18).

Jneid et al in a study in United Stated in 2008 showed similar results presenting no difference between night and morning times for MI that this similarity may be due to similar design in these two studies (19). The other studies, that could control confounding factors by a case-control design, showed statistically significant difference between night and daylight admissions such as those performed by Magid (United States, 2005), Zhan (Germany, 2005), Zeymer (Germany, 2005), and Bradley (United States, 2004). The mentioned authors reported the differed quality of care and cathecolamines release in different times to be the contributing factor for difference between MI occurred in night and daylight (20-23).

Finally, according to the obtained results it may be concluded that left ventricular ejection fraction and mortality rate may be similar between different diurnal times and so the quality of prepared care to patients is equal in different shifts.

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