Evaluation of Acute myocardial infarction size in Winter and Summer

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Abstract: Introduction: The higher occurrence of cardiovascular diseases in winter is well known, and several explanatory mechanisms have been suggested based on increased blood pressure, hematological changes and respiratory infections. Exposure to cold causes a vasoconstriction and a tachycardia, both resulting in a rise of blood pressure and cardiac work and that increase risk of AMI. The aim of this study was Evaluation of Acute myocardial infarction size in Winter and Summer. **Methods:** In a cross-Sectional and descriptive-analytical study that performed in Tabriz University of Medical Sciences, 150 patients with AMI that admitted and were under treatment in the duration 2014 to 2016 at Emam Reza hospital selected and evaluated. Necessary information such as age, sex, clinical sign, history of disease and smoking, echo cardiographs finding, angiography, mortality, admitted season (Winter and Summer) collected and evaluated. Patients divided in 2 groups in the base of season. **Results:** 94 of patient were male and 56 of patients were female. Mean of age in male patients was 59.77±12.88 years. And in female patients was 63.17±13.25 year. Mean of age in female patients was significantly higher (P=0.007). Significant different was not found between mean of CPK in patients of 4 groups. Significant difference was not round between mean of CK-MB in patients of 2 groups. Significant difference was not found between mean of CTNI. Significant difference was not found in 2 groups. **Conclusion:** In this study Significant difference between 2 groups of patients. AMI have season of uniform season distribution. Mortality of AMI in the patients studied was 31 cases (20.7%) (16 males and 15 females) (P=0.236), that 17 of them were from the summer group and 14 from the winter group, which shows no significant difference between the rate of MI-induced mortality during hospitalization among patients of the two groups of summer and winter (P=0.633).

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1. Introduction

Myocardial infarction is one of the most common diagnoses in hospitalized patients in western countries. Myocardial infarction mortality rate is almost 30%, more than half of which occur before reaching the hospital (1). The mortality rate has decreased by 30% after hospital admission, although in about one out of 25 patients who were discharged from the hospital die within the first year after infarction (1, 2, 3). Epidemiological studies have revealed the various factors involved in the development and progression of atherosclerosis. High age, sex, and genetic predisposition are unchangeable risk factors. Although male sex is considered as an important risk factor. Coronary heart disease is a major problem in women and the leading cause of mortality in women over 50 years old. On average, demonstration of symptoms in women is 10 years later than men. The risk of coronary heart disease increases with using oral contraceptives and menopause (1 and 2). High incidence of cardiovascular diseases in winter is well known and various mechanisms have been mentioned for it, including increased blood pressure, blood changes and respiratory infection (4). Previous studies have shown that mortality increases by 1% for every 1 ° C reduction in temperature (4).

Exposure to cold air causes vascular spasm and tachycardia which leads to patient's increased blood pressure and heart activity. Increased heart activity increases the heart's need for oxygen and it leads to increasing risk of coronary attacks (5).

Statistical evaluations based on data obtained show that coronary attacks and problems in winter was higher than in other seasons; these changes are weather-dependent (6).

The aim of this study is to responded to this hypothesis, whether infarct size varies according to different seasons and if yes, which seasons of the year have the lowest and the highest change rate.

2. Material and Methods

In a cross-Sectional and descriptive-analytical study that performed in Tabriz University of Medical Sciences, 150 patients with AMI that admitted and were under treatment in the duration 2014 to 2016 at Emam Reza hospital selected and evaluated. Necessary information such as age, sex, clinical sign, history of disease and smoking, echo cardiographs finding, angiography, mortality, admitted season (Winter and Summer) collected and evaluated. Patients divided in 2 groups in the base of season. Variables studied included: sex, age, season of incidence of MI (summer and winter), the region of incidence of MI, Chest pain at referring, history of smoking, current smoking, history of mellitus diabetes, history of hypertension, history of hyperlipidemia, history of previous ischemic disease, peak of CPK, peak of CK-MB, peak of CTNI, results of echocardiography, results of angiography, and mortality were extracted from the patients' medical records. Infarct size was calculated based on peak of CPK, peak of CK-MB, and peak of CTNI.

Information obtained were analyzed by SPSS ver11.5 statistical software, statistical tests of variance analysis, T-test and Chi-Square, and the results achieved were expressed as percentages and mean ± SD, with significance level of $P<0.05$.

3. Results

In this study, 150 patients with myocardial infarction were studied, 94 of whom were male and 56 were female. The mean of age in male patients was 59.77±12.88 years. And in female patients was 63.17±13.25 year. Mean of age in female patients was significantly higher (P=0.007). No significant differences in terms of the incidence of myocardial infarction per sex was observed between the patients of the two groups (P=0.736)

136 Patients had chest pain upon referring, out of which, 63 patients were from Summer group and 73 patients were from Winter group experiencing chest pain. The number of patients who have suffered MI in the summer were significantly lower (P=0.005).

54 patients (46 males and 8 females) had a history of smoking (P<0.001), out of which, 30 patients were from Summer group and 24 patients were from Winter group. There was no significant difference between smoking and the risk of MI among the patients (P=0.307). Mortality of AMI in the patients studied was 31 cases (20.7%) (16 males and 15 females) (P=0.236), that 17 of them were from the summer group and 14 from the winter group, which shows no significant difference between the rate of MI-induced mortality during hospitalization among patients of the two groups of summer and winter (P=0.633).

The mean age of the patients expired was 67.20±13.15 years and the mean age of patients discharged with a relative recovery was 58.36±12.67 years and the mean age of the patients expired was significantly higher than the mean age of the patients recovered (P=0.001).

4. Discussions

In a study by Spancen et al. on 259,891 MI patients, found that the maximum number of AMI was in winter and the least number of patients were in summer and there is a gradual increase in the number of patients from summer to winter and then a gradual reduction in the number of patients from spring to summer. and the highest rate of hospital mortality was in the winter (7).

In a study by the Ornato et al., they expressed that the number of reported cases of AMI in winter is about 10% more than in other seasons (8).

In a study by Moschos et al. examining the AMI patients based on the season, they found that the highest number of references by 30.1% were the winter patients and this percentage was 24.5% for the spring cases, 23.2% for the summer cases and 21.6% for the Autumn cases (9).

In a study by Shath et al. at the department of cardiology of Hamilton Hospital associated to MC Master University, Ontario, Canada, evaluating the seasonal distribution of patients with MI, they expressed that there was no significant difference among the different seasons in the seasonal distribution of MI and MI-induced mortality in patients less than 65 years (10).

In this study examining 150 AMI patients, there was no significant difference between patients in summer and winter in the rate of mortality due to AMI, similar to the results obtained in the above-mentioned study. In this study, no significant difference was observed among the different seasons in terms of myocardial infarct size (P> 0.05).

In a study by KU et al. at Army Hospital 802, Kaoh Siung City, Taiwan, there was no significant difference in the seasonal distribution of various patients during one year, and there was no significant difference in the rate of mortality among seasons (11).

In this study, there was no significant difference among the patients of Summer and Winter in the

myocardial infarct size based on experimental parameters conducted (P> 0.05).

In a study by Li et al. at the hospital of Shenyang, China, they expressed that the stroke attacks were more prevalent in the summer and further said that the MI attacks have a positive linear relationship with temperature and as the air temperature elevates, the number of attacks increases, and a positive linear relationship was seen between the attacks and humidity (12). The study by MC Kee et al. suggests that the incidence of strokes and cardiac and pulmonary diseases increases during winter (13).

A study by the Gonzalez Hernandez on AMI patients showed that the incidence of heart attacks indicates an increase during the winter and a decrease during the summer (14).

In this study, there was no significant difference in terms of mortality between patients in summer and winter groups.

In the above-mentioned study, there was no significant difference in terms of AMI-induced mortality rate in different seasons of year (14).

In this study, as well as the results of the above-mentioned study, there was no significant difference in the clinical or paraclinical outcomes of AMI patients.

In a study by Robert et al., there was a significant difference in myocardial infarct size of patients in different seasons; however, these results were not confirmed in subsequent studies (15).

In this study, despite the above-mentioned study, there was no significant difference in myocardial infarct size in patients of summer and winter groups that does not confirm the results of that study, as well as other studies.

Conclusion

AMI is a disease dependent on various factors and variables, that the interactions among these factors are involved in the patients' prognosis. One of the major factors in mortality rate and incidence of this disease are the environmental and time factors, which may increase the risk of AMI due to the effect of temperature and weather on heart rate, blood pressure, and heart function. In this study, there was no significant difference between clinical-laboratory parameters of patients and the mortality rate among patients in summer group, and based on laboratory parameters, there was no significant difference in myocardial infarct size among the different seasons.

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