INTERNATIONAL JOURNAL OF ADVANCES IN CASE REPORTS

IJACR

THE PREVALENCE OF RISK FACTORS IN PATIENTS WITH HEART FAILURE

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Article Info	ABSTRACT
	Chronic heart failure (HF) is a highly prevalent chronic pathological condition with high morbidity and mortality rates. The purpose of this study was to determine the common and important risk factors in patients with ischemic HF. 389 patients with HF of ischemic genesis were observed in this cross-sectional descriptive study. We established, that the most prevalent risk-factors in patients with ischemic heart failure were: previous history of myocardial infarction, comorbidities (arterial hypertension, 2 type diabetes, chronic kidney disease etc.), cigarette smoking, untargeted blood pressure and low density lipoproteins cholesterol level.

INTRODUCTION

Chronic heart failure (HF) is a highly prevalent chronic pathological condition with high morbidity and mortality rates. The prevalence of HF is 1% to 2% in the general population worldwide and at least 10% among the age group of 85 years and older [1, 2]. Mortality in HF patients is high compared to their age group [2]. High morbidity is associated with high hospital admission rates and reduced quality of life [3].

Worldwide recognition and treatment of acute myocardial infarction (MI) and infection-related heart disease, such as rheumatic heart disease, has improved over time while the epidemics of obesity, diabetes mellitus (DM), and metabolic syndrome continue to soar in magnitude, thereby setting the stage for the resultant epidemic of chronic cardiovascular disease (CVD) and HF [4]. HF is the final common pathway for most forms of CVD, and is therefore a heterogeneous syndrome and not a disease per se.

Coronary heart disease (CHD) carries the highest relative risk among conventional risk factors for HF [5]. In an analysis of 13,643 participants in the National Health and Nutrition Examination Survey (NHANES)-I

Epidemiologic Follow-up Study, the presence of CHD was the most strongly associated risk factor for HF (RR=8.11, 95% CI 6.95-9.46) [6]. It is estimated that 8% of men and 18% of women 45-64 years of age and 20% of men and 23% of women older 65 years of age who have had an MI will develop HF within 5 years [7].

The purpose of this study was to determine the common and important risk factors in patients with ischemic HF.

MATERIALS AND METHODS

This was a cross-sectional descriptive study. The study was performed in accordance with the Helsinki Declaration and Good Clinical Practice Guideline. All patients gave written informed consent and the local ethics committee approved the study protocol. 389 patients with HF of ischemic genesis were observed. The diagnosis was verified by laboratory and instrumental methods according to European Society of Cardiology recommendations (2013, 2014).

All the patients were subjected to detailed history and clinical examination. The body mass index

1

(BMI) was calculated. The office blood pressure (BP) was measured in each patients. The levels of total cholesterol (Ch), triglycerides (TG), cholesterol of low density (C-LDL) and high density lipoproteins were investigated.

Categorical variables are presented as percentages, whereas continuous variables are presented as mean (M) and standard error of mean (m) if normally distributed, or as median and interquartile range (Me [IQR]), if not. Categorical variables were compared by the χ^2 test and continuous variables by the t test or the Mann–Whitney U test. A p value of <0.05 was considered statistically significant. All tests were 2-sided. Analyses were performed with Statistical system software, version 12.0.

RESULTS AND DISCUSSION

The average age of observed patients was (68,2±11,9) years. There were 300 (77,1%) males and 89 (22,9%) females (see table 1).

Due New York Heart Association criteria the following functional classes of HF were diagnosed: II FC – in 64 patients (16,5%), III FC – in 258 patients (66,3%), IV FC – in 67 patients (17,2%).

The average period of HF was 10,0 [5,0; 15,0] years. 277 (71,2%) patients had history of myocardial infarction (MI), and 27 (6,9%) of them had recurrent MI. In 195 (50,1%) patients the second class of stable angina was verified. 107 (27,5%) patients had third functional class of angina.

Only 180 (46,3%) observed persons never smoke. Active smokers were 86 (22,1%) patients; stopped of smoking - 123 (31,6%) persons.

The more often comorbidities in observed patients with HF were: arterial hypertension (AH) – in 308 (78,9%) persons; 2 type Diabetes Mellitus – in 79 (20,3%) persons; chronic kidney disease – in 76 (19,5%) cases; atrial fibrillation – in 32 (8,2%) patients; peripheral artery disease – in 19 (4,9%) patients; history of stroke – in 34 (8,7%) persons.

The measuring of BP showed that 173 (56,4%) observed patients with concomitant AH didn't have the target systolic BP, and 108 (35,2%) patients – target diastolic BP.

The most portions of observed patients with HF were with high BMI (see table 2). 8 (3,1%) patients with HF FC III and 5 (7,5%) – with IV FC of HF were in underweight category.

The plasma levels of main lipids were similar in different functional classes of HF (see table 3). But the target levels of C-LDL for high-risk patients (< 1,8 mmol/l) were not achieved in 56 (87,5%) patients with FC II, in 192 (74,4%) patients with FC III and in 60 (89,6%) patients with FC IV.

The many of trials resulted that coronary artery disease is associated with the greatest risk of heart failure (29.1% vs. 11.86%, OR 3.05, 95% CI) followed by diabetes (18.5% vs. 7.89%, OR 2.65, 95% CI), obesity (24.5% vs.9.28%, OR 2.00, 95% CI) and hypertension (61.2% vs. 57.62%, OR 1.44, 95% CI) with the p-value of less than 0.001 for each [8].

Overweight and obesity are known risk factors for the development of HF. Analysis of 5,881 subjects in the Framingham Heart Study demonstrated a two-fold increase in the risk for HF in obese compared to those with normal-weight participants (HR 2.04, 95% CI 1.59-2.63), as well as an increased risk for HF by 4% in men (HR 1.04, 95% CI 1.00-1.07) and 7% in women (HR 1.07, 95% CI 1.04-1.10) for every 1 kg/m^2 increase in BMI, after adjustment for established risk factors [9].

Active cigarette smokers had a 49% higher risk of developing HF than non-smokers (RR 1.49, 95% CI 1.30-1.70) in the NHANES-I Epidemiologic Follow-up study [10]. In subjects with LVEF <35% enrolled in the Study Of Left Ventricular Dysfunction (SOLVD) Prevention and Intervention trials, current smoking was associated with a 39% increased risk of death or hospitalization for HF or MI (RR 1.39, 95% CI 1.23-1.57), compared to subjects who have never smoked [11]. There was no significant difference in outcomes between ex-smokers and never-smokers, suggesting a potential benefit to smoking cessation in patients with established LV systolic dysfunction.

Table 1. The main characteristics of patients with heart failure

Parameter	HF patients, n=389
Age, years (M±σ)	68,2±11,9
Males, abs. (%)	300 (77,1%)
Females, abs. (%)	89 (22,9%)
FC (NYHA), abs. (%) - II - III - IV	 64 (16,5%) 258 (66,3%) 67 (17,2%)
HF duration, years, Me [IQR]	10,0 [5,0; 15,0]
History of MI, abs. (%)	277 (71,2%)
Smoking: - Active, abs. (%) - Past, abs. (%) - Never, abs. (%)	 86 (22,1%) 123 (31,6%) 180 (46,3%)

Comorbidities:	
Arterial Hypertension, abs. (%)	308 (78,9%)
2 type Diabetes Mellitus, abs. (%)	79 (20,3%)
CKD, abs. (%)	76 (19,5%)
History of stroke, abs. (%)	34 (8,7%)
Peripheral Artery Disease, abs. (%)	19 (4,9%)
Atrial Fibrillation, abs. (%)	32 (8,2%)

Table 2. The Body Mass Index in patients with heart failure

Parameters of BMI, kg/m^2	Patients with HF		
	FC II, n=64	FC III, n=258	FC IV, n=67
< 18,5	0	8 (3,1%)	5 (7,5%)
18,5 – 24,9	8 (12,5%)	44 (17,1%)	29 (43,2%)
25,0 – 29,9	32 (50,0%)	129 (50,0%)	14 (20,9%)
30,0 – 34,9	21 (32,8%)	44 (17,1%)	5 (7,5%)
35,0 – 39,9	0	20 (7,7%)	14 (20,9%)
> 40,0	3 (4,7%)	13 (5,0%)	0

Table 3. The plasma levels of lipids in patients with heart failure

Parameters	Patients with HF		
	FC II, n=64	FC III, n=258	FC IV, n=67
Cholesterol, mmol/l, M±m	4,77±0,17	5,03±0,18 p_1>0,05	4,94±0,47 p_1>0,05 p_2>0,05
C-LDL, mmol/l, M±m	2,74±0,16	2,69±0,17 p_1>0,05	2,48±0,02 p_1>0,05 p_2>0,05
C-HDL, mmol/l, M±m	1,19±0,06	1,30±0,07 p_1>0,05	1,22±0,07 p_1>0,05 p_2>0,05
TG, mmol/l, M±m	1,76±0,22	1,72±0,14 p_1>0,05	1,11±0,18 p_1>0,05 p_2>0,05

Remarks: p_1 – significance between values FC II and III; p_2 – significance between values FC III and IV.

CONCLUSION

Thus, the most prevalent risk-factors in patients with ischemic heart failure were: previous history of myocardial infarction, comorbidities (arterial hypertension, 2 type diabetes, and chronic kidney disease etc.), cigarette smoking, untargeted blood pressure and low density lipoproteins cholesterol level.

Disclosure: none financial interests.

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3

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