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RESEARCH ARTICLE

THE DIFFERENCE IN THE FREQUENCY OF RISK FACTORS AND IN-HOSPITAL MORTALITY AMONG HYPERTENSIVE AND NORMOTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION IN DURRES POPULATION

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ABSTRACT

Background: The patients suffering from hypertension demonstrate a higher risk development of CHD. Arterial hypertension (AH) is one of the main factors to cardiovascular diseases (CVD) and general mortality.

Aim: The objective of this study was to determine the difference in the frequency of risk factors and in-hospital outcome in hypertensive and normotensive patients with AMI in Durres population, Albania.

Methods: The study included 454 patients with acute myocardial infarction (AMI) admitted to in the Cardiology Department, Regional Hospital of Durres, Albania between January 2009 to October 2012. In hypertensive and normotensive patients with AMI were analysed risk factors (cigarette smoking, age, gender, hypertension and blood lipids, diabetes, obesity, family history, previous MI, AMI localization)

Results: Of 454 pts, 327(72.03%) were male and 127 (27.97%) were women. 264 (58.1%) patients were hypertensive. Comparing to men, women presented less frequently with hypertension (64.39% vs 35.61% to women respectively). Hypertensive pts were younger than normotensive pts (61.93±11.21 vs 64.81±10.85, p 0.005). We did not find significant differences in age among females or males in both groups (hypertensive vs normotensive). According to the age group a statistically significant difference was recorded only in the age group from 45-54 years. (12.1% vs 21.1% in normotensive (p 0.008). Hypertensive patients had obesity (p=0.017; RR:1.59; CI95%: 1.093-2.325) and dislipidemia (p<0.001, RR:4.04; CI95%: 2.651-6,161). Normotensive patients had smoking habits (p=0.002) and family history (p=0.021), No significant differences were found between hypertensive and normotensive patients with regard to other risk factors. In-hospital mortality was higher in hypertensive patients. 13(4.9%) out of 14(3.1%) patients with fatal MI were hypertensive. (p=0.005, OD: 5.73; CI95%: 1.263-7.088).

Conclusion: In hospital mortality was higher in hypertensive as compared to normotensive patients with AMI. Hypertensive patients were younger than normotensive patients. No significant differences were found between hypertensive and normotensive patients with regard to other risk factor. Women were older than men in both groups. It is not sufficient to analyze risk factors of patients with AMI stratified by hypertension status to accurately predict the early outcome.

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INTRODUCTION

Arterial Hypertension (AH) is the most common cardiovascular disease and is a major public health problem worldwide. Arterial hypertension (AH) is one of the main factors to cardiovascular diseases (CVD) and general mortality (Yusuf et al., 2004). In general, AH is asymptomatic, being determined by many factors such as genetic, age, race, gender, family history and behavioral factors smoking, obesity,

alcoholism, sedentary lifestyle, stress, and excessive salt consumption. Between risk factors for mortality, AH accounts for 40% of the deaths by CVD and 25% of those by coronary arterial disease (CAD) (The seventh report of the Joint National Committee on Prevention 2003). Recent epidemiological research has appreciated cigarette smoking, diabetes, hyperlipidemia, and hypertension as independent risk factors for Coronary Heart disease (CHD) and these factors could be treated in order to reduce the risk of future cardiac events. Epidemiologic data have shown that the frequency of reversible risk factors including smoking, obesity,

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hypercholesterolemia, and hypertension in patients suffering from AMI is up to 90% (Jefferson and Topol 2005). The differences in the morbidity and mortality of AMI in both genders may be in a way explained by a different coexistence of risk factors as well. Risk factors are more frequent in women in general, but the differences between men and women are reduced as they get older (Stampfer *et al.*, 2004; Vaccarino 2006 Simon *et al.*, 2006). Arterial chronic hypertension (HTN) is one of the main cardiovascular risk factors for development of atherosclerosis (Dzau 1990) and also any of the factors that increases the incidence of peripheral vascular disease (Murabito *et al.*, 1997), cerebrovascular disease (Lewington *et al.*, 2003), chronic renal disease (Adamczak *et al.*, 2002), and coronary artery disease. It is an important risk factor for heart failure, MI, stroke, and cardiovascular death (Richards *et al.*, 2002; Miura *et al.*, 2001). The risk related to hypertension mainly depends by the relation to the blood pressure (BP) levels and the degree of the associated target organ damage (Papademetriou 2004). In 1990 MacMahon *et al.* (MacMahon *et al.*, 1990) proved the linear connection of diastolic and systolic BP and the CHD frequency in the meta-analysis of 9 studies using the total number of 400,000 examined people. The association of antecedent hypertension and the outcome of in-hospital treatment of AMI have been researched in many studies so far (Herlitz *et al.*, 1992; Haider *et al.*, 1997; Berton *et al.*, 1998; Gustafsson *et al.*, 1998; Jonas *et al.*, 1999; Aursnes and Landmark 2000; Richards *et al.*, 2002; Majahalme *et al.*, 2003; Abrignani *et al.*, 2005; Dumaine *et al.*, 2006), and the results obtained are controversial. The aim of our study was to determine the difference in the frequency of risk factors and in-hospital outcome in hypertensive and normotensive patients treated for acute myocardial infarction in Durres population, Albania.

Patients and Methods

We prospectively analyzed 454 consecutive patients with acute myocardial infarction (AMI) admitted to in the Cardiology Department, Regional Hospital of Durres, Albania between January 2009 to October 2012. In hypertensive and normotensive patients with AMI were analysed risk factors (cigarette smoking, age, gender, hypertension and blood lipids, diabetes, obesity, family history, previous MI). Patients with a history of hypertension in their medical record, use of antihypertensive medication or with three or more successive blood pressure measurements >140/80 mmHg during hospitalization were considered hypertensive. AMI has been diagnosed according to the World Health Organization definition (29), according to which the patients proved to have at least two of the following three criteria: typical chest pain for myocardial ischemia, initial and serial electrocardiographic changes, and enzymatic evidence of myocardial necrosis. The hospital ethical committee approved the study protocol. In both normotensive and hypertensive group of patients we analyzed risk factors (age, gender, smoking habits, diabetes, blood lipids, personal history of angina pectoris, myocardial infarction, stroke and family history), localization of AMI and in-hospital outcome. Student's t-test has been used for independent group comparison (pts with and without hypertension). Numerical variables were presented as mean \pm SD. Contingency tables were analyzed by χ^2 test and 2-sided

Fisher's exact test. Values of $p < 0.05$ were considered statistically significant.

RESULTS

Patient characteristics

Of 454 pts, 327 (72.03%) were male and 127 (27.97%) were women. 264 (58.1%) patients were hypertensive. Comparing to men, women presented less frequently with hypertension (64.39% vs 35.61% to women respectively). Hypertensive patients were younger than normotensive patients (61.93 ± 11.21 vs 64.81 ± 10.85 , $p = 0.005$). Mean age in men normotensive was 60.19 ± 10.83 vs 70.00 ± 9.60 to women. $p < 0.001$. Mean age in men hypertensive was 62.02 ± 10.39 vs 69.88 ± 8.89 to women ($P < 0.001$). We did not find significant differences in age among females or males in both groups (hypertensive vs normotensive) Table 1.

According to the age group a statistically significant difference was recorded only in the age group from 45-54 years. (12.1% vs 21.1% in normotensive ($p = 0.008$). Table 2.

Hypertensive patients had more obesity ($p = 0.017$; RR (CI 95%) 1.59 (1.093-2.325) and dyslipidemi ($p < 0.001$, RR (CI 95%) 4.04 (2.651-6.161). Normotensive patients had more smoking habits ($p = 0.002$, RR (CI 95%) 0.54 (0.374-0.805) and family history ($p = 0.021$, RR (CI 95%) 0.63 (0.434-0.923). Table 3.

No significant differences were found between hypertensive and normotensive patients with regard to other risk factors including Killip class on admission. Hypertensive patients manifested more frequent anterior AMI while normotensive patients more frequent inferior AMI. $p = 0.07$. Table 4.

In-hospital mortality

Out of 454 consecutive patients with AMI 14 (3.1%) patients died. In-hospital mortality was higher in hypertensive patients. 13 (4.9%) out of 14 (3.1%) patients with fatal MI were hypertensive. ($p = 0.005$, RR (CI 95%) 5.73 (1.263- 7.088). Table 5.

DISCUSSION

The percentage of hypertensive patients in our study was ready the same with one reported by Berton *et al.* (1998) and Bertomeu *et al.* (2006), but also greater that in many other studies, in which prevalence of hypertension in patients treated for AMI varied from 23-37% (Gustafsson *et al.*, 1998; Aursnes and Landmark 2000). Our data showed that hypertension was lower (58.1%) than in the observational study by Majahalme *et al.* (30) where 64.4% of patients with acute coronary syndromes had a history of hypertension. In general, we did not find that hypertensive were older than normotensive patients as many other authors (Berton *et al.*, 1998; Gustafsson *et al.*, 1998; Richards *et al.*, 2002; Majahalme *et al.*, 2003; Bertomeu *et al.*, 2006). In our study hypertensive patients were younger than normotensive patients. AMI manifests ready

Table 1. Demographic data in the group of patients according to the presence of hypertension

Gender	Normotensive			Hypertensive			Value p Hypertensive vs normotensive
	N	Meanage ±SD (years)	Value p	N	Meanage ±SD (years)	Value p	
Female	33	70.00±9.60	<0.001	94	69.88±8.89	<0.001	0.987
Male	157	60.19±10.83		170	62.02±10.39		0.122
All	190	64.81±10.85		264	61.93±11.21		0.005

Table 2. The presence of hypertension in different age groups of patients

Age group (years)	All (n=454)	Hypertensive (n=264)	Normotensive (n=190)	P Value	RR (CI 95%)††
<45	22 (4.8%)	11 (4.2%)	11 (5.8%)	0.281*	0.70 (0.300-1.668)
45-54	72 (15.9%)	32 (12.1%)	40 (21.1%)	0.008*	0.51 (0.311-0.86)
55-64	156 (34.4%)	91 (34.5%)	65 (34.2%)	0.518*	1.01 (0.683-1.644)
65-74	131 (28.9%)	83 (31.4%)	48 (25.3%)	0.092*	1.35 (0.893-2.06)
75-85	61 (13.4%)	39 (14.8%)	22 (11.6%)	0.2*	1.32 (0.756-2.316)
85	12 (2.6%)	8 (3.0%)	4 (2.1%)	0.585†	1.45 (0.431-4.897)

* 2 test; † Fisher exact test; ††RR, risk ratio; CI, confidence interval;

Table 3. Analysis of risk factors in the group of patients according to the presence of hypertension

Risk factors	All (n=454)	Hypertensive (n=264)	Normotensive (n=190)	Vlera p*	RR (CI 95%)
Obesity	212 (46.7%)	136 (51.5%)	76 (40.0%)	0.017	1.59 (1.093-2.325)
Diabetes	162 (35.8%)	95 (36.0%)	67 (35.4%)	0.494	1.02 (0.693-1.512)
Smoking	258 (56.8%)	134 (50.8%)	124 (65.3%)	0.002	0.54 (0.374-0.805)
P F history	195 (43.0%)	101 (38.3%)	94 (49.5%)	0.021	0.63 (0.434-0.923)
Previous MI	27 (5.9%)	17 (6.4%)	10 (5.3%)	0.69	1.23 (0.554-2.769)
Dyslipidemi	180 (39.6%)	139 (52.7%)	41 (21.6%)	<0.001	4.04 (2.651-6.161)

* 2 test; RR, risk ratio; CI, confidence interval;

Table 4. Localization of AMI in the group according to the presence of hypertension

AMI location	Hypertensive 264	Normotensive 190	p value 0.07
Anterior	46.1%	36.3%	
Inferior	31.6%	45.0%	
Others	22.3%	18.7%	

Table 5. Comparison of in-hospital mortality rate in the group of patients according to the presence of HTN

Age group (years)	All (n=454)	Hypertensive (n=264)	Normotensive (n=190)	P Value	RR (CI 95%)††
Deaths	14 (3.1%)	13 (4.9%)	1 (0.5%)	0.005*	5.73 (1.263-7.088)

* 2 test;

one decade later in life among women with normal blood pressure, and 5 years later among women than among men with hypertension. Our results were similar and showed that hypertensive women were older than hypertensive men, about 7 years old and normotensive women manifests AMI 10 years later than normotensive men. Differences between hypertensive and normotensive groups in presence of different risk factors age, smoking, history of previous myocardial infarction were well known. The present study demonstrates that no significant differences were found between hypertensive and normotensive patients with regard to other risk factors and on Killip class on admission. Localization of AMI was comparable with other studies. The impact of a hypertension on prognosis during hospitalization for AMI was evaluated in several studies. The results of Herlitz's *et al.* (1992), and Dumaine's *et al.* (2006) studies showed that a history of hypertension was associated with more adverse outcomes in patients with AMI. We found that group of consecutive patients with AMI and hypertension, treated in our hospital, had higher mortality than normotensive patients. We can not clearly explain the differences between risk factors and in-hospital outcome in patients with AMI and hypertension status.

Limitations

Our study has several limitations. The diagnosis of hypertension was based on the medical records alone. We cannot rule out that a disproportionate number of men or women with AMI died before presentation to the hospital. Our study included data on in hospital mortality and no follow up data were taken. Hypertension is a chronic condition and long follow up is needed to look its adverse outcomes. Therefore, these findings should not be generalized. Our results suggest that appropriate measures are needed to reduce the high mortality rates in hypertensive patients with AMI and to increase the awareness on risk factors for patients with cardiovascular disease.

Conclusion

In hospital mortality was higher in hypertensive as compared to normotensive patients with AMI. Hypertensive patients were younger than normotensive patients. No significant differences were found between hypertensive and normotensive patients with regard to other risk factor. Women were older than men in both groups. It is not sufficient to

analyze risk factors of patients with AMI stratified by hypertension status to accurately predict the early outcome. May be most important, however, is the needs to increase the awareness on risk factors for patients with cardiovascular disease regarding hypertension, now the leading cause of mortality globally, for which the efforts to improve the control on the hypertension are an important focus of cardiovascular societies worldwide.

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