

Epidemiological Aspects of Atherosclerosis in Patients Treated for Acute Atherothrombosis of Extremity Arteries

Nedžad Rustempasic¹, Dragan Totic¹, Muhamed Djedovic¹, Medzida Rustempasic², Nada Malesic¹

Clinic for vascular surgery, Clinical Center of University of Sarajevo, Sarajevo, Bosnia and Herzegovina¹
Clinic for lung diseases and tuberculosis „Podhrastovi“, Clinical Center of University of Sarajevo, Sarajevo, Bosnia and Herzegovina²

Corresponding author: Nedžad Rustempasic, MD. Clinic for vascular surgery Sarajevo, Cekalusa 88, Sarajevo. Phone: +38733561400. E mail: nrustempasic@yahoo.com.

ABSTRACT

Introduction: Risk factors for development of extremity artery atherosclerosis are the same as for coronary and cerebrovascular atherosclerosis namely, diabetes mellitus, hyperlipidemia, arterial hypertension, age and smoking. Atherosclerosis is polyarterial disease that clinically manifests itself most frequently in the form coronary, cerebrovascular or peripheral arterial disease (PAD). All of them have common, ominous and final pathologic step – atherosclerotic plaque rupture that might eventually lead to atherothrombosis and signs of ischemia. There are few studies of risk factor for peripheral artery disease (PAD). Aim of study: To identify prevalence of known risk factors for atherosclerosis in patients treated for acute atherothrombosis of extremity arteries. **Patients and methods:** Eighty patient were analyzed with regard to the prevalence of five risk factors for atherosclerosis (diabetes mellitus, smoking, hypertension, hyperlipidemia and age). 80 patients were divided into two groups (Group A and B) depending on country i.e. hospital where they received treatment for acute atherothrombosis of extremity artery. Group A consisted of patients treated at Clinic for vascular surgery in Sarajevo, while patients in Group B were treated in Trollhattan in Sweden at NAL hospital. This study was clinical, comparative, retrospective-prospective. **Results:** In group A, 20% of patients had diabetes mellitus while in group B prevalence of diabetics was lower (12,5%) but difference was not statistically significant $p>0.05$. Sixty percent of patients (60%) in group A were smokers. In Sweden, habit of smoking is not as common as in Balkan countries and consequently only 22,5% of patients were smokers in Group B, difference was statistically significant, $p<0.05$. In patients assigned to group A, 42.5% of them had diagnosis of hypertension while in Group B, 35% of patients were hypertensive. Difference was not statistically significant, $p>0.05$. 37.5% of patients in group A and 20% of patients in group B had hyperlipidemia. Difference was not statistically significant, $p>0.05$. In Group A mean age of patients was 67.85 years while mean age in Group B was 73.63. Age difference was statistically significant, $p<0.05$. **Conclusion:** Prevalence of risk factors of atherosclerosis in peripheral artery disease were evaluated in this study. Significant difference in prevalence of two risk factors were determined namely, smoking and mean age of occurrence of atherothrombosis. Quitting smoking and adopting healthier life habits may lead to reduction of prevalence PAD in younger patients in Bosnia and Herzegovina.

Key words: extremity arteries, atherosclerosis, acute atherothrombosis.

1. INTRODUCTION

Atherosclerosis is polyarterial disease clinically manifesting itself most frequently in the form coronary, cerebrovascular or peripheral arterial disease (PAD). All of them have common, ominous and final pathologic step - atherosclerotic plaque rupture that might eventually lead to atherothrombosis and signs of ischemia (1). Many epidemiological and autopsy-based studies have shown that atherosclerosis is influenced by cardiovascular risk factors. Risk factors for the development of peripheral atherosclerosis are the same as for coronary and cerebrovascular atherosclerosis namely diabetes mellitus, hyperlipidemia, arterial hypertension, and smoking. As there are few studies of risk factor for peripheral arterial occlusive disease (PAD), treatment recommendations are often

based on studies in patients with coronary or cerebrovascular atherosclerosis (2). Cigarette smoking and hypercholesteremia are most important risk factors in coronary artery disease while arterial hypertension and diabetes mellitus are more frequently present among patients with cerebrovascular disease. Lower extremity atherosclerosis is considered to be strongly related to smoking and diabetes mellitus (3). Between 50 –70% of patients with PAD have symptoms or electrocardiographic signs of ischaemic heart disease. Patients with symptomatic PAD have at least a 30% risk of increased mortality within 5 years rising almost to 50% within 10 years, resulting primarily from myocardial infarction or stroke. Together these events are responsible for 60 % and 12% of total mortality rate, respectively (4, 5, 6).

2. AIM OF STUDY

Aim of this study was to identify prevalence of known risk factors for atherosclerosis in patient treated for acute atherothrombosis of extremity arteries at the Clinic for vascular surgery in Sarajevo and to compare them with prevalence of risk factors for the same subset of patients that were treated in NAL hospital in Sweden.

3. PATIENTS AND METHOD

Eighty patients were analyzed with regard to the prevalence of five risk factors for atherosclerosis (diabetes mellitus, smoking, hypertension, hyperlipidemia and age). Patients were divided into two groups depending on country i.e. hospital where they received treatment for acute atherothrombosis of extremity artery. They had ischemia that was classified as IIA Rutherford category. Group A consisted of 40 patients treated surgically for atherothrombosis at the Clinic for vascular surgery in Sarajevo from 2005-2009. In group B 40 patients received endovascular treatment for acute atherothrombosis in NAL hospital in Sweden. They were treated during period 2007-2012. This study was clinical, comparative, retrospective-prospective. All data were obtained from history of patient illness and laboratory findings. All subjects were interviewed and examined by a vascular surgeon and the following parameters were recorded: age, smoking habits (patients that used to smoke more than 10 cigarettes per day were included in study), history of hypertension (RR>130/90), diabetes mellitus, and history of hyperlipidemia. Statistical analysis was based on 5% level of statistical significance. Parametric t test along with Fisher exact test was used and calculated from SPSS version 19.0

4. RESULTS

Results are presented on tables 1-5.

In group A, 20% of patients had diabetes mellitus while in group B prevalence of diabetics was lower (12,5%) but difference was not however statistically significant $p>0.05$ (Table 1). Diabetes mellitus is an important risk factor for PAD and it influences the prognosis of the disease. In the United Kingdom Prospective Diabetes Study (UKPDS) of patients with type 2 diabetes, 1% increase in HbA1c was associated with a 28% increase of the risk for development of PAD in the next 6 years of follow-up period (7). Diabetes is an independent risk factor for increase in postoperative amputation rate and complications (8). In some studies it has been found to predict hospital and long term mortality (9).

Sixty percent of patients (60%) in group A were smokers. In Sweden, habit of smoking is not as common as in Balkan countries and consequently only 22.5% of patients were smokers in Group B, (Table 2). This difference had statistical significance, $p<0.05$. Smoking is a major risk factor for both occurrence and progression of PAD as well as critical limb ischemia.¹⁰ All efforts should be made by health care workers to persuade a patient to quit smoking and all available forms of nicotine replacement therapy (transdermal patch, nasal spray, inhaler and sublingual tablets) have shown in a meta-analysis to increase the odds of

success in quitting smoking approximately 1.5 to 2 folds regardless of any additional support provided to the patient (11). Furthermore a sustained release formulation of antidepressant bupropion can help relieve nicotine abstinence symptoms (11). Even after leg revascularization, continued smoking negatively affects both patency rates and survival (12).

In European primary care patients with both symptomatic and non-symptomatic PAD and among American patients undergoing interventions for PAD, prevalence of arterial hypertension in 65–78% of patients has been presented (13, 14, 15). In patients assigned to group A, 42,5% of them had diagnosis of hypertension while in Group B, 35% of patients were hypertensive. The difference between analyzed groups was not statistically significant $p>0.05$, (Table 3). In a Cochrane review, reduction in systolic blood pressure of 10mmHg was associated with a 13% reduction in risk of micro vascular events and an 11% reduction for myocardial infarction.¹⁶ In UKPDS, reductions in risks of macro and micro vascular complications in the group assigned to tight blood pressure control (achieved 144/82) compared with the group assigned to less tight blood pressure control (achieved 154/87) were significant; reductions of 32% in deaths related to diabetes ($p=0.019$), 44% in strokes ($p=0.013$) and 37% in micro vascular endpoints ($p=0.0092$) after mean follow-up of 8.4 years (17, 18).

From total amount 37.5% of patients in group A and 20% of patients in group B had hyperlipidemia. This difference was not statistically significant, (Table 4). Although hyperlipidemia has received considerably less attention as a risk factor in PAD than in coronary heart disease, there

Group	Patients with diabetes	T test	p value	Mean difference	Std. error difference
Group A	N=8, 20%	T=0,902	p=0,370	0,075	0,083
Group B	N=5, 12,5%		>0.05		

Table 1. Prevalence of patients with diabetes mellitus in analyzed groups

Group	Smokers	T test	p value	Mean difference	Std. error difference
Group A	N=24, 60%	T=3.638	p=0,000	0,378	0,103
Group B	N=9, 22,5%		<0.05		

Table 2. Prevalence of smokers between in groups

Group	Patients with hypertension	T test	p value	Mean difference	Std. error difference
Group A	N=17, 42,5%	T=0,682	p=0,497	0,075	0,110
Group B	N=14, 35%		>0.05		

Table 3. Prevalence of patients with hypertension in analyzed groups

Group	Patients with hyperlipidemia	T test	p value	Mean difference	Std. error difference
Group A	N=15, 37,5%	T=1,740	p=0,086	0,175	0,101
Group B	N=8, 20%		>0.05		

Table 4. Prevalence of patients with hyperlipidemia in analyzed groups

Group	Mean age	T test	p value	Mean difference	Std. error difference
Group A	67,85	0,026	P=0,026	-5,775	2,542
Group B	73,63		<0,05		

Table 5. Mean age of patients in analyzed groups

are several indications of unfavorable effects of hyperlipidemia on PAD.

5. DISCUSSION

Hypertriglyceridemia independently increases the risk for progression of intermittent claudication to critical limb ischemia. In a meta-analysis of randomized controlled trials, lipid lowering drug treatment was at least as effective in diabetic patients as in non-diabetic patients. For primary prevention, the risk reduction for major coronary events was 21% (95% CI 11%–30%) and 23% (12%–33%) in patients with and without diabetes respectively (19). European recommendations propose targets for lipid lowering treatment in subjects with established arterial disease, including PAD, of total cholesterol <4.5mmol/l and LDL cholesterol <2.5mmol/l (20).

The prevalence of intermittent claudication would appear to increase from about 3% in patients aged 40 to 6% in patients aged 60 years. Therefore, atherosclerotic burden is independently associated with age. Group A had average age of 67.85 years while mean age in Group B was 73.63 years. Age difference is statistically significant, $p < 0.05$ (Table 5). It is evident that atherosclerosis inflicts its morbidity at an earlier age in Bosnia and Herzegovina partly because of increased prevalence of cigarette smoking among population. Other factors such as eating habits, lack of daily exercise may also play a significant role but were not evaluated in this study.

6. CONCLUSION

Prevalence of five risk factors of atherosclerosis in peripheral artery disease was evaluated in this study. Significant difference in prevalence of two risk factors was determined namely, cigarette smoking habit and age of occurrence of PAD. Acute atherothrombosis affect peripheral arteries at younger age in group of patients treated in Bosnia and Herzegovina as compared to group of patients that were analyzed in Sweden. Smoking as risk factor is more prevalent in Bosnia and Herzegovina and may be regarded as one of factors responsible for occurrence of PAD in our population at younger age as compared to control group. Quitting smoking and adopting healthier life habits may lead to reduction of prevalence PAD in younger patients in Bosnia and Herzegovina.

CONFLICT OF INTEREST: NONE DECLARED.

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