



# RISK FACTORS IN PERIPHERAL ARTERY DISEASE ASSOCIATED WITH CORONARY ARTERY DISEASE

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**Abstract:** Peripheral arterial disease (PAD) is a partial or complete occlusion of one or more arteries leading to a suppression of blood flow and ischemia. In the process of stenosis, numerous processes are described, among which, the most common being atherosclerosis, affecting the arteries of the inferior and coronary limbs. In the 60 patients investigated angio-coronarographically in the Emergency County Clinical Hospital of Sibiu with PAD, the prevalence of high blood pressure (HBP) and smoking was observed, among the risk factors, and 73.3% had one or more coronary lesions. The association of diabetes mellitus (DM) with PAD has shown an increase in the number of coronary lesions. There was also a strong positive correlation between the presence of left anterior descending artery (LAD) injuries and the stage of PAD regardless of other risk factors.

## INTRODUCTION

Peripheral artery disease of the lower limbs is a pathology that refers to the acute or chronic obstruction of the arteries existing in the lower limbs. There are several causes of this obstruction, for example, embolism, thrombosis, vasculitis, diseases that generally affect the arteries, although the most common is atherosclerotic.(1)

Atherosclerotic impairment of the arteries of the lower limbs is correlated with the increased risk of development of major cardiovascular events, by depositing atheroma plaques at the level of the coronary and cerebral arteries.(2)

Atherosclerotic cardiovascular disease encompasses a large number of related pathologies, including ischemic heart disease and peripheral arterial disease. This group of diseases is the main cause of global morbidity and mortality, and its prevalence is increasing.(3)

## AIM

The present paper aims at observing the predominance of risk factors for peripheral with coronary artery disease.

## MATERIALS AND METHODS

For the study, 126 patients were admitted who were diagnosed with peripheral arterial disease in the Cardiology Clinic of the Sibiu Emergency County Clinical Hospital, between January 1, 2016 and December 31, 2018, for pain in the lower limbs, progressively accentuated, who did not require emergency intervention or surgical treatment and in whom the ankle-brachial index value is below 0.9. Of these, 60 patients were selected for angio-coronarography, according to the recommendations of the European Society of Cardiology guide, in the Invasive and Non-invasive Research Centre in the field of Cardiac and Vascular Pathology in adults, Sibiu.

The study excluded:

- patients who did not have claudication in the lower limbs,

excluding neuropathy of any kind, or post-traumatic pain;

- patients admitted with phenomena of heart failure or angina pangs;
- patients without indication of angio-coronarographic exploration.

A subjective staging, depending on the walking distance until the appearance of claudication, are those of Leriche Fontaine or Rutherford. They also offer relative prognostic value.

**Table no. 1. Leriche-Fontaine classification for PAD (4,5)**

Stage	Symptoms
I	Asymptomatic
IIa	Claudication at more than 200 m walking distance
IIb	Claudication occurs in less than 200m walk
III	Pain in the limbs at rest
IV	Ischemic lesions appear, such as gangrene, necrosis etc.

For data collection and documentation, a prospective analysis of all clinical observation records was used, with the notation of the different characteristics. For the elaboration of a baseline data, the age of the patients, gender, environment of origin, degree of peripheral arterial disease according to Leriche Fontaine classification at the time of admission were noted, known risk factors for atherosclerosis (smoking, high blood pressure, elevated cholesterol levels), and low HDL cholesterol, diabetes).

For statistical analysis, Microsoft Excel from Microsoft Office and SPSS 22 were used.

Patients were investigated angio-coronarographically and statistical correlations were performed to see if there is any connection between the stage of peripheral arterial disease and the lesions in the coronary arteries. For a significant correlation, the patients were divided into two groups, those with claudication at > 200 m or < 200m, and coronary lesions in the trunk lesion of the left coronary artery, anterior descending

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## CLINICAL ASPECTS

artery, right coronary artery or circumflex artery.

### RESULTS

For the current study, the 60 patients who were diagnosed with peripheral arterial disease and who also had angio-coronarography were taken into consideration. Of these, 78.3% were males, and thus no statistical significance research can be made for the difference between the two sexes, due to the low number of patients.

There is also an average age of 68.98 +/- 0.9 years. If the risk factors for the two pathologies are analyzed, an increased incidence of HBP is observed in 73.3% of patients. Smoking is only found in 46.7% of patients and cholesterol increased in 38.2%. Another factor studied is diabetes in 36.7% of patients.

**Table no. 2. General characteristics of the studied patients**

Characteristic		Number / percentage
Average age	68.98 ± 0.9 years	
Gender	Male	47/73.8%
	Female	13/21.7%
Environment	Rural	24/40%
	Urban	36/60%
Fontaine Stage	2A	13/21.66%
	2B	15/25%
	3	17/28.33%
	4	15/25%
Smoking		28/46.7%
Dyslipidemia		23/38.2%
Type II DM		22/36.7%
HBP		44/73.3%

By questioning the patients on the walking distance at which intermittent claudication occurs, only 21.66% appears after 200m, while in 25% it appears below 200m, and in 53.33% it is also at rest.

**Table no. 3. Correlation of peripheral arterial disease and IVA lesion**

		IVA		Total
		No	Yes	
<b>Claudication &gt;200 m</b>	Count	9	4	13
	% within PAD	69.2%	30.8%	100.0%
	% within IVA	37.5%	11.1%	21.7%
<b>Claudication &lt;200 m and in rest</b>	Count	15	32	47
	% within PAD	31.9%	68.1%	100.0%
	% within IVA	62.5%	88.9%	78.3%
<b>Total</b>	Count	24	36	60
	% within PAD	40.0%	60.0%	100.0%
	% within IVA	100.0%	100.0%	100.0%

The statistical analysis shows a strong positive correlation between the presence of IVA lesions and the PAD stage, regardless of other risk factors, but an influence of HBP is associated with smoking as aggravating factors ( $p = 0.424$ ,  $p = 0.048$ ). And in the case of DM, the advanced stage of the disease correlates with an increased number of coronary lesions ( $p = 0.548$ ,  $p = 0.008$ ).

In the studied group, it was observed that only 26.33% of the patients have no coronary lesion, while 73.33% have one or more coronary lesions.

### DISCUSSIONS

The predominance of the male sex, in the studied group coincides with the data from the literature in which we have a predominance of the peripheral pathology in the male sex. The average age in the studied group corresponds to the data from the literature, in which there is a higher incidence of

peripheral arterial disease in the second and third age, that is, with age, the atheroma plaques also appear.(6.7)

The increased incidence of high blood pressure coincides with data from the literature, when in 2014, Garg and co-workers published an article demonstrating that HBP is associated with a very high risk of PAD.(8) In 2015, Emdin and co-workers published an article in which they followed approximately 45000 patients diagnosed with events associated with peripheral arterial disease, where it was observed that a 20 mmHg increase in systolic pressure is associated with a greater risk of 63% of developing chronic obstructive peripheral arterial disease.(9)

In approximately half of the patients the association with smoking was observed. Joosten, in a study published in 2012, points out that the fraction attributed to the studied population is 44%.(10) Also in the same article, it is mentioned that the changes generated by smoking are reduced only to more than 10 years after quitting.

Increased cholesterol levels were observed only in a small number of patients, which does not correspond to the data from literature. In the same study published by Joosten in 2012 which included nearly 52,000 male patients, aged between 40-79 years, followed for 20 years, it was shown that hypercholesterolemia is associated with an increased risk and a lower degree of arterial disease.(10) Our data do not correspond to those from literature, possibly due to the recommendation of statin administration in previous examinations, or otherwise these patients were known with other pathologies that require a hypolipemic regime.

Although the association of diabetes with peripheral arterial pathology is well-known, due to the low prevalence in the population, compared with other traditional factors, it has been observed that type 2 diabetes has only a 14% incidence.(10) It has also been observed that distal artery involvement is more common in diabetic arteriopathy, compared with nondiabetic patients, and with an increased risk of amputation and gangrene.(11)

Identifying risk factors, such as smoking, high blood pressure, obesity by promoting sedentary lifestyle, dyslipidemia and conducting appropriate investigations, determines drug and/or surgical therapy. Patients may present for other conditions, which is why it is necessary to perform a minimal test, the ankle-brachial index or the palpation of the pulse in the arteries of the lower limbs.

Thus, we can conclude that HTA is the most common pathology associated with peripheral arterial disease of the lower limbs, followed by smoking. These do not fully correspond to the data from literature, because in 2013, Fokwes concluded a study that declared the association of diabetes as the most common pathology in PAD.(6)

In the data available at the time of the study, it is considered that about 30% of the patients with PAD have a history of coronary artery disease (CAD) and about 70% have univascular coronary disease at angio-coronarography.(12,13) In the CONFRIM registry the prevalence of obstructive CAD in patients with PAD was 25%, with an annual mortality of 1.6% compared to 0.7% in patients who did not have severe CAD.(14) In the REACH registry, patients with and CAD were 57%.(15)

Due to the large number of patients with CAD among those with PAD, screening for risk stratification would be necessary, as morbidity and mortality are generally cardiac, but without improvement in the prognosis and evolution of peripheral arterial pathology.

### CONCLUSIONS

- The average age of the patients of 68.98 +/- 0.9 years.

## CLINICAL ASPECTS

- Patients usually present at an advanced stage, with claudication at less than 200 m and even at rest.
- High blood pressure is the most common pathology associated with PAD, followed by smoking.
- There is a strong positive correlation between the presence of IVA lesions and the PAD stage, regardless of other risk factors, but there is an influence of HBP in association with smoking as aggravating factors ( $p = 0.424$ ,  $p = 0.048$ ).
- One quarter of the patients examined had no coronary lesions, while about 75% had coronary lesions.

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