Editorial

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Peripheral Artery Disease, Metabolic Syndrome and Endovascular Procedures

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Editorial

Peripheral arterial disease (PAD) has a great morbidity, it is estimated that PAD prevalence is 10% of the population and rising to 15-20% in people over 70 years of age. PAD causes a reduction in the blood supply and generally begins as claudication or develop into a more serious condition as critical ischemia. Critical limb ischemia (CLI) can lead to tissue loss or amputation and patient are high risk of death. We will address the role of MetS in PAD and Endovascular Procedures (EP). In this brief communication we will discuss the relationship between MetS, PAD and EP.

The current treatment of CLI has the main objective to rescue limbs and save life. Risk factors are the same for PAD and atherosclerosis. The Framingham study also showed that the chance of smokers develop PAD is twice that of developing coronary artery disease (CAD) [1,2].

Patients with PAD depending on the severity of the disease can be offered medical therapy, exercise therapy, lifestyle advice to reduce the progress of disease and surgical and endovascular interventions [1,2].

The search for papers was performed using the following databases: Pubmed (Medline), Science Direct, Scopus, Euro PubMed, Web of Science, until April 2017. The search strategy will be specific for each database according to the medical subject headings (MeSH) and free text terms for the key concepts. The search terms will be combined as follows: "MetS AND peripheral arterial disease OR PAD OR intermittent claudication OR peripheral arterial occlusive disease OR peripheral vascular disease OR PVD OR limb ischemia OR limb ischemia OR peripheral artery disease"). ABI(Ankle-brachial index) <0.9 requires close clinical surveillance because it indicates risk of cardiovascular and peripheral arterial disease, however prevention of clinical complications could not avoid the onset of symptoms, which may be gradual [3].

ABI had positive and negative associations with central obesity and MetS, respectively. Authors findings strongly suggest the inverse correlation between ABI and the MetS is likely not mediated through central obesity as one the key components of MetS [3].

Association with MetS and PAD

Half of PAD patients will have Mets with low ABI or changed C-reactive protein (CRP) [4,5]. Qadan showed with a cross-sectional study the prevalence of MetS and PAD around 95% [6].

Diabetic patients have twice the risk of PAD. Hyperinsulinemia and metabolic changes in glucose are risk factors for PAD. Moreover, the concomitance between hypertriglyceridemia and evolution of diffuse arterial atherosclerosis in its relation to the disease of the lower limbs [7,8]. When these events mentioned are present, PAD arising increases. Importantly that increased mortality in people with PAD is related with complications in the ischemic limb affecting all the cardiovascular system, possibly increasing acute myocardial infarction and stroke possibility related not only to a state of a systemic atherosclerosis, but also to a chronic pro-inflammatory state induced by ischemia of the lower limbs, generating large amounts of oxygen free radicals. **(Tables 1 and 2)** [2,9].

In developed meta-analysis carried out by the consensus Trans-Atlantic Inter-Society (TASC), they concluded that 60% of population with PAD have chance to trigger cerebrovascular

Table 1 Clinical Symptom Classification.

Fontaine Classification	Rutherford Classification	Stage	Symptoms 4 Proposed PARC Universal Data Elements 4 Grade Category Symptoms
I	Asymptomatic	0	Asymptomatic
II	Intermittent claudication/other Mild claudication/limb symptoms exertional limb symptoms (no limitation in walking)		401 Mild claudication 12 Moderate claudication
IIa	4 Moderate claudication/ limb symptoms (able to walk without stopping >2 blocks or 200 m or 4 min)		
IIb	Severe claudication/limb symptoms 4 1 3 Severe claudication (only able to walk without stopping <2 blocks or 200 m or 4 min)		
III	Ischemic rest pain 4 Ischemic rest pain (pain in the distal 4 II 4 Ischemic rest pain limb at rest felt to be due to limited arterial perfusion)		
IV	Ulceration or gangrene 4		Ischemic ulcers on distal leg 4 III 5 Ischemic ulceration
			Ischemic gangrene 4 III 6 Ischemic gangrene
4 1⁄4 comparable terms.			

Table 2 Hemodynamic Definitions for CLI.

Patients With Tissue Loss	Patients With Ischemic Rest Pain
Ankle pressure <70 mm Hg	Ankle pressure <50 mm Hg
Toe pressure <50 mm Hg	Toe pressure <30 mm Hg
TcPO2 <40 mm Hg	TcPO2 <20 mm Hg
Skin perfusion	Skin perfusion pressure <40 mm Hg pressure <30 mm Hg (23)
The PARC group provided hemodynamic support for the definition of CLI. Atypical leg symptoms are symptoms that are worsened by exertion, but that do not meet the classic definition of intermittent claudication.	
These patients should have objective/confirmed evidence of PAD by noninvasive testing.	
CLI 1⁄4 critical limb ischemia; PAD 1⁄4 peripheral arterial disease; PARC 1⁄4 Periph- eral Academic Research	
Consortium; TcPO2 1⁄4 transcutaneous oxygen pressure	

disease and CAD, while 40% of this group of patients will develop PAD. Despite the demonstration of the close relationship between these conditions, the impact of the modification of cardiovascular risk factors on the natural history of peripheral vascular disease is unknown [2,10].

Despite efforts to revascularization of ischemic limb, surgical treatment can prevent amputation but not necessarily result in ambulation and independent life, although the improvement of various revascularization techniques (percutaneous or surgical) have allowed more and more effectively deliver on the rescue the ischemic limb [10]. Regardless, even in cases of surgical success, the diffuse characteristic of arterial disease involves other co-morbidities listed above while maintaining high rates of morbidity and mortality in these serious vasculopathies [9-11].

The major cause of death in CLI is cardiovascular disease (CVD), in study 31.6% patients died at the end of the 2-year observation period [12]. Without aggressive treatment, a significant number of patients will die from this disease within 1 year and a significant number of survivors will undergo major amputation [8,9].

MetS represents a group of factors that, individually, are well-known cardiovascular risk factors: visceral obesity, dyslipidemia, hypertriglyceridemia, hyperglycemia, altered levels of high-density lipoprotein (HDL). In 1988 Reaven showed a relation between the presence of hypertension, insulin resistance, hyperglycemia, low HDL-cholesterol, and raised very low-density lipoprotein (VLDL)-triglycerides, he called it syndrome X [13-15].

Both PAD and MetS are individually related to a high prevalence of CVD occurrences, so recognition of PAD and Mets may direct to patients at increased risk of extra cardiovascular events [16].

Giving clinical benefit to the patient at high risk, we must be close of these associations, look for them, make early screening and identify their prevalence, benchmarks and parameters to reduce the risk of disease progression.

Protack et al. published that in a total of 921 patients that MetS was prevalent among patients undergoing vascular surgery. Concluded that those patients have perioperative morbidity as well as stroke compared to patients without MetS [17]. Others question if MetS may be associated with adverse outcomes in patients undergoing both cardiac and non-cardiac surgery, however those concluded that further research is needed in this field [18].

Garg et al. showed in their study in adults aged ≥ 65 years MetS is associated with the development of both a low ABI and clinical PAD. Incorporating measures of inflammation into the definition of MetS may help identify more at-risk individuals and provide additive information in predicting incident PAD [19].

People with metabolic syndrome are more likely to die from cardiovascular disease than those who do not have the disorder, and diabetes or high blood pressure increase the risk [20].

EP in the past decades have been used as option for PAD in those patients that evolve without improvement with clinical treatment, is a security alternative to open surgery when there are multiple comorbidities. Endovascular techniques are a good alternative when clinical treatment fails to improve quality of life without pain. Generally this includes intensive treatment of cardiovascular risk factors to prevent myocardial infarction and stroke in the postoperative period, which are related causes of death [9-11,20,21].

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