

THERAPEUTIC STRATEGIES IN THE CHRONIC OBSTRUCTIVE ARTERIAL DISEASE OF THE LOWER EXTREMITIES

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ABSTRACT

The treatment of peripheral arterial obstructive disease (PAOD) is complex, involving multidisciplinary participation, using drugs and invasive procedures, depending on its evolutive stage.

Patients with intermittent claudication can use physical exercise in association with treatment of known risk factors and well-known medication. In the absence of a favorable response the patients undergo revascularisation by endovascular techniques and only a few have surgical indication.

The treatment of patients with critical ischaemia includes treatment of risk factors, treatment of comorbidities, pain treatment and care of trophic lesions; medical treatment is effective in this stage and surgical revascularisation in most cases, the succession of these measures is not mandatory.

Key Words: intermittent claudication, critical ischaemia, pharmacotherapy, invasive procedures.

INTRODUCTION

Peripheral arterial obstructive disease (PAOD) of the lower extremities represents important problem. Arterial diseases of the aorto-iliac, femoral, popliteal or distal axes, together with coronary or cerebral arterial diseases, are the most frequent locations of atherosclerosis (ATS) and constitute the most frequent cause of morbidity and mortality.

I. Therapeutic algorithm in patients with intermittent claudication (IC)

The patient's history followed by a complete clinical examination are the first steps in the approach of a patient with arterial disease. History aims to obtain a complete description of the symptoms of the disease and especially to rule out other causes of pain at the level of the lower extremities.

These data will be confronted with the findings of the physical examination and the results of non-invasive tests. The only important clinical examination for the diagnosis is the palpation of the pulse in all the focal points of both lower limbs.

Among the non-invasive tests the most used is the determination of the ankle-wrist pressure index (Winsor).¹

The assessment of the disease severity and prognosis must take into account the cardiovascular risk factors, which are in fact also risk factors for the occurrence of IC: smoking, arterial hypertension (AHT), diabetes mellitus, hyperlipidemia, hyperfibrinogenemia, hypercoagulation, hyperhomocysteinemia (Fig. 1).

Therapeutic algorithm in patients with IC

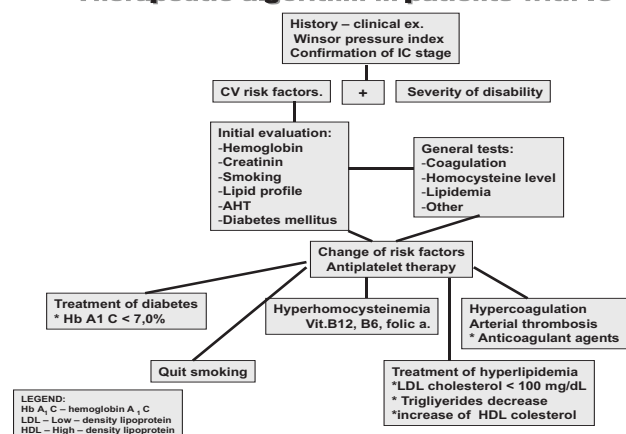


Figure 1. Therapeutic algorithm in patients with IC depending on cardiovascular risk factors

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The most valuable measure in PAOD is prevention. The treatment of the patients at the stage of IC is complex, and it is represented by: modification of risk factors, drug therapy and invasive therapy (endovascular, surgical).

Change of the risk factors refers to: ²⁻⁴

1. Quitting smoking
2. Normalization of blood glucose in diabetes mellitus, aiming at a preprandial glucose level between 80 and 120 mg/dl, and postprandial levels of less than 180 mg/dl, with a hemoglobin A_{1c} less than 7%.
3. Treatment of hyperlipidemia aims at maintaining LDL cholesterol < 100 mg/dl, reduction of triglycerides and increase in HDL cholesterol.
4. High homocystein levels, an independent risk factor of ATS, are restored by vitamins B₆, B₁₂ and folic acid administration
5. Correction of hypercoagulation prevents arterial thrombosis.

Antiplatelet treatment decreases is associated with the modification of risk factors, decreasing the risk of myocardial infarction or stroke (Fig. 1).⁵

Once IC is confirmed, the next step is the assessment of the severity will follow (Fig. 2).

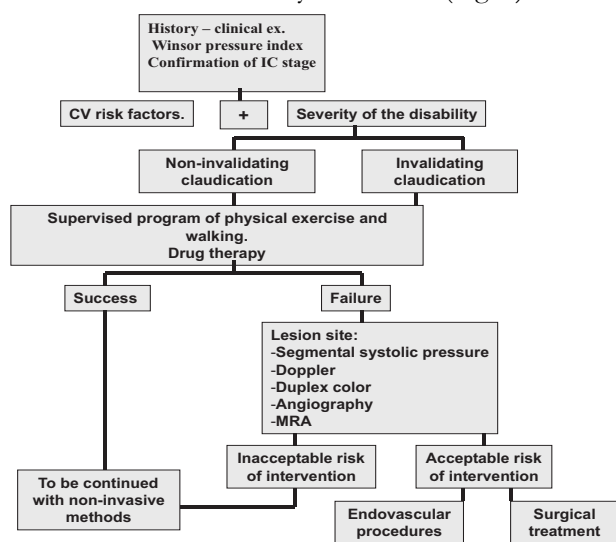


Figure 2. Diagnostic and therapeutic algorithm in IC depending on severity of disability

At these stages of disability a program of physical exercises is initiated to improve walking. Walking exercises may be performed unsupervised, at the physician's indication, or supervised (preferably), on the treadmill.^{6,7} These exercises improve the claudication index.

Drug therapy includes the administration of drugs with proven good results: Pentoxifilin, Buflomedil, Cilostazol, Naftidrofuryl etc., drugs with minimal results: antiplatelet agents, drugs with direct vasodilator effects: alpha-blockers, beta2-antagonists or Ca-channel blockers, as well as drugs with potentially good

results:carnitine, prostaglandins PGE₁, growth factor of the vascular endothelium.⁸

If all these noninvasive measures are successful, the therapy is continued. If results are unsatisfactory, after the exact localization of the lesions by paraclinical examinations, such as Doppler, aorto-arteriography, magnetical resonance angiography (MRA), the risk of the intervention will then be assessed.

In case of unacceptable risk of the intervention, noninvasive measures will be continued, but when the risk of the intervention is acceptable the initiation of invasive methods become possible.

A. Endovascular procedures have the advantage of revascularizing a distal ischemic territory by a minimal aggressive technique. Percutaneous transluminal angioplasty (PTA) and stenting are included here. These procedures are recommended on the stage of the disease, according to TransAtlantic Inter-Society Consensus (TASC).⁹

1) Percutaneous transluminal angioplasty (PTA) addresses the aorto-iliac, femoro-popliteal or infrapopliteal areas.¹⁰⁻¹²

Aorto-iliac PTA is indicated in type A lesions with uni- or bilateral stenoses smaller than 3 cm of the common iliac artery (CIA) or external iliac artery (EIA), or in type B lesions, with isolated 3-10 cm stenoses, two stenoses < 5 cm of the CIA or EIA, unilateral obstruction of the CIA without the involvement of the common femoral artery (CFA).

Femoro-popliteal PTA also addresses types A and B lesions, using the morphological classification of lesions into 4 stages.¹³

Infrapopliteal PTA is used either in isolation or combined with the femoro-popliteal PTA or bypass. Its results are questionable (Fig. 3).

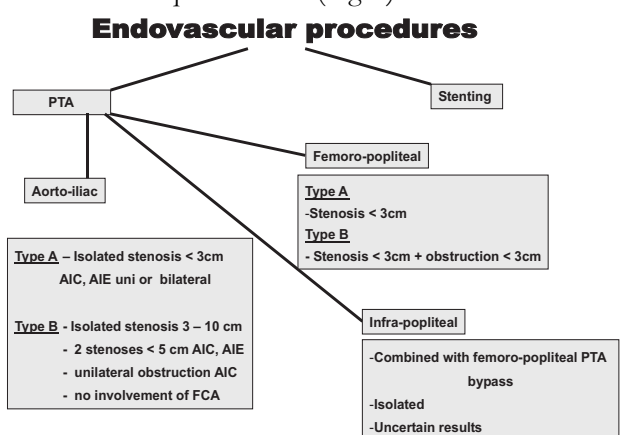


Figure 3. Percutaneous transluminal angioplasty - therapeutic method in patients with IC

2) Stenting is an endovascular procedure relatively recently introduced.¹⁴⁻¹⁶ The decision of performing this procedure is made based on angiographic, angioscopic +/- endovascular ultrasound examinations.

In patients with IC stenting is indicated in aorto-iliac and femoro-popliteal locations of the ATS lesions.

Aorto-iliac stenting has as indications failure of PTA, ulcerative thrombosis of ATS plaque, complex lesions (Fig. 4).

Femoro-popliteal stenting is indicated when PTA at this level may not be performed because of the elastic distention of the arterial wall or if PTA fails because of the formation of obstructive intimal flaps by extensive intimal dissection (Fig. 4).¹⁷

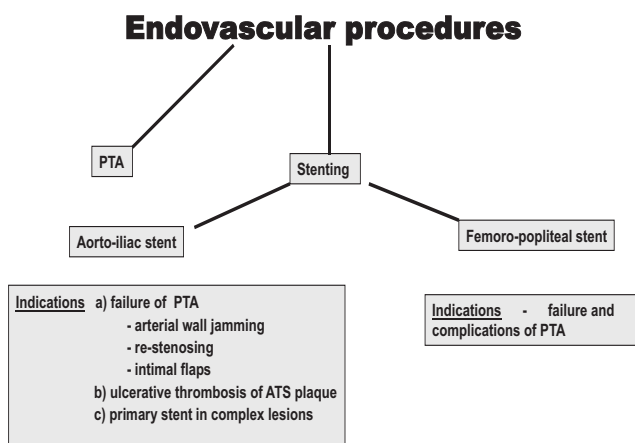


Figure 4. Stenting - endovascular procedure for treatment in patients with IC

PTA, stenting and lysis therapy form a true trilogy of the catheter in the endovascular therapy of PAOD.

B. Conventional surgical treatment has limited indications in types B and C of the morphological classification of ATS lesions, with aorto-iliac and femoro-popliteal locations and in cases where noninvasive and endovascular methods have failed (Fig. 5).

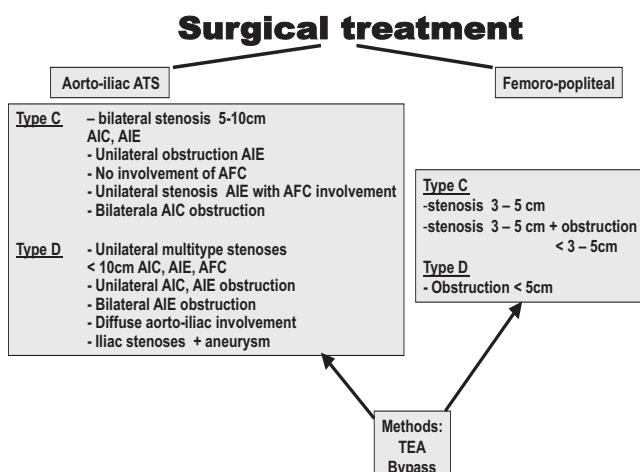


Figure 5. Indications of surgical treatment in patients with IC

In aorto-iliac locations of the lesions, the most common surgical operation is uni- or bilateral aorto-femoral bypass with synthetic grafts.

In femoro-popliteal locations the common surgical

intervention is femoro-popliteal bypass or, more rarely, the infrapopliteal bypass with synthetic or autologous grafts of the internal saphenous vein.¹⁸ Thrombendarterectomy (TEA) is a technique frequently associated with bypass.

II. Therapeutic algorithm in patients with critical ischemia (CI).

The patient with CI is defined by the presence of rest pain and distal trophic alterations (ulceration or gangrene).

Therapeutic measures in patients with CI aim at the reduction of risk factors, treatment of comorbidities, treatment of pain, and care of the trophic injuries.¹⁹ These are completed by drug or invasive therapy (surgical or endovascular).²⁰ The endovascular procedures can be combined with conventional surgical treatment from increased of inflow or outflow level in the bypass.²¹

There is no established pattern of the order in which these measures should be applied. They must be adapted to each case individually. A leg that cannot be saved may require primary amputation, while a leg that can be saved may benefit from a succession of the above-mentioned methods, following an accurate paraclinical evaluation (Fig. 6).

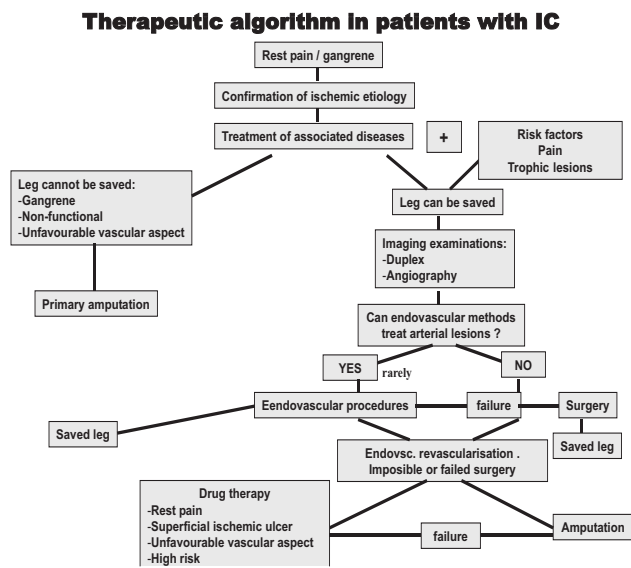


Figure 6. Therapeutic algorithm in patients with CI

Unlike in patients with IC, the invasive treatment performed for revascularization is mostly surgical; endovascular procedures alone are used more rarely.

The rate of utilization of therapeutical measures have pluricausal dependence. The percentage of patients that will benefit from this treatments vary greatly depending on the stage of illness, technical resources available and surgical skills of the operator, as well as on the patients' acceptance.

CONCLUSIONS

1. This paper discusses the therapeutic algorithms in obstructive arterial disease in stages of intermittent claudication and critical ischemia respectively.

2. In case of intermittent claudication the reduction of risk factors, supervised physical exercise and drug therapy based on efficacy assessment represent first intention therapeutic methods.

3. The absence of a favourable response together with angiographic findings will indicate endovascular and surgical methods.

4. In patients with critical ischemia risk factors will be reduced, coexisting diseases will be treated, as well as pain and trophic lesions, drug therapy will be administered.

5. Long-term treatment of pain and the trophic lesions involves revascularization, mostly by surgical methods.

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