

EDITORIAL

The 2024 ESVS Guidelines on Lower Limb Peripheral Arterial Disease: A Step Forward

Peripheral vascular disease, particularly intermittent claudication, is one of the most frequent conditions encountered in vascular clinics. These clinics are often conducted by junior doctors, hopefully with the appropriate supervision. We are delighted to now have an evidence based, fully comprehensive document on the management of asymptomatic peripheral vascular disease and intermittent claudication,¹ a valuable aid to all of us consulting this group of patients. The carefully and well documented stepwise approach in the management of intermittent claudication should be carefully read and implemented to limit unnecessary surgery and potential harm for these patients.¹

Although most recommendations are supported by the available literature, 19 of the 89 recommendations (21.3%) were made by expert consensus.¹ We wonder whether this may be related to the fact that peripheral arterial disease has not received the massive industry driven research funding and support we have seen in other clinical entities in vascular surgery (e.g., abdominal aortic aneurysm), which have been more extensively investigated.

For historical reasons, the diagnosis of asymptomatic peripheral vascular disease in the guidelines and the recommendations are based on the ankle brachial systolic pressure ratio (i.e., the ankle brachial pressure index [ABPI]). However, modern ultrasound techniques enable the prevalence of atherosclerotic plaque to be more accurately determined than with the ABPI. The presence of common femoral plaque was identified using ultrasound in a random sample of 784 subjects in UK men and women aged 56–77 years;² almost two thirds of the study participants (502 of 784, 64%) demonstrated atherosclerotic plaque.² In the Progression of Early Subclinical Atherosclerosis (PESA) study, 3 860 individuals (age 45.8 ± 4.3 years; 63% men) underwent bilateral three dimensional carotid and femoral vascular ultrasound (3DVUS) to determine the number of affected plaques and territories, and to quantify global plaque burden defined as the sum of all plaque volumes.³ It was concluded that plaque burden strongly correlates with traditional cardiovascular risk factors, especially at femoral level.³ In addition, it seems that this technology has the potential to become a key large scale screening tool for identifying at risk individuals and perhaps for selecting individuals who should be started on lipid lowering therapy. The concept of ultrasonic biopsy of four large superficial

arterial bifurcations (femoral and carotid) in order to predict cardiovascular risk was first introduced by Belcaro *et al.* in 1991 and has stood the test of time.⁴ We believe that the diagnosis and secondary prevention of asymptomatic peripheral vascular disease will radically change in the next few years.

A non-invasive technique in the management of intermittent claudication that should be added to the variety of techniques described in the 2024 European Society for Vascular Surgery (ESVS) guidelines¹ is the use of intermittent pneumatic compression technology. In a small randomised control study, we compared the effect of unsupervised exercise, supervised exercise, and intermittent pneumatic foot and calf compression (IPC) on the claudication distance, lower limb arterial haemodynamics, and quality of life of patients with stable intermittent claudication.⁵ Compared with unsupervised exercise, both IPC and supervised exercise increased the initial claudication distance and the absolute claudication distance up to 2.83 times.⁵ Intermittent pneumatic foot and calf compression increased arterial inflow ($p < .05$ at six weeks) and ABPI.⁵ Supervised exercise decreased arterial inflow and increased ABPI ($p < .05$ at six months).⁵ Unsupervised exercise had no effect on arterial inflow or ABPI. Intermittent pneumatic foot and calf compression significantly improved the Intermittent Claudication Questionnaire score and the speed score of the walking impairment questionnaire (WIQ), while supervised exercise improved the WIQ claudication severity score.⁵ At one year, the clinical effectiveness of supervised exercise and IPC was largely preserved. Thus, by augmenting leg perfusion, IPC achieved improvement in walking distance comparable to supervised exercise;⁵ similar results have been shown by others.⁶

We have demonstrated through an international online survey among vascular surgeons ($n = 378$) that supervised exercise programmes (SEPs) are underused, with 30% of them having access to SEPs.⁷ We hope that the current guidelines¹ will increase the awareness of their benefit and help in the improvement of their availability.⁷

We welcome recommendation 47, which states: when SEPs are not available, structured home based exercise programmes should be considered. There has been increased interest in such programmes with wearable technology during the coronavirus pandemic. A key element of their success is the feedback that is provided, such as duration of exercise, speed, elevation gain, calories consumed, etc. This information can be saved and may help the claudicant to set a new target to achieve every few

weeks. As mobile phones are widely available, this technology can bypass funding problems for SEPs and address the difficulties that patients have in finding time and communicating with the provider of the SEPs. There is a need for more randomised studies in this field to evaluate potential benefits.

A cautious approach to pharmacotherapy is presented in recommendation 51 of the guidelines.¹ However, it should be remembered that the patient may not be interested in the numerical increase in claudication distance, but how this translates to an improvement in quality of life.

Figure 10 of the ESVS guidelines provides an excellent summary of the principal factors that need to be considered and carefully evaluated before considering a revascularisation procedure for intermittent claudication.¹ In addition, a word of caution on the use of new and emerging revascularisation concepts for the invasive management of intermittent claudication (recommendation 53)¹ should be applauded in an era where there is a lot of pressure for fast track implementation of any innovation in this field.

Moving further in the document to the invasive techniques for the management of intermittent claudication, we all agree that endovascular revascularisation has lower morbidity, but this should be counterbalanced with a decreased medium and long term patency compared with bypass procedures. The dilemma is whether a repeat endovascular intervention or whether lower extremity bypass should be offered for failed endovascular intervention. A study from Texas compared the outcomes of superficial femoral artery (SFA) angioplasty with bypass in patients requiring a repeat intervention for SFA re-stenosis following an initial endovascular treatment.⁸ Overall, 735 limbs in 631 patients underwent endovascular treatment for symptomatic SFA disease (61% for lifestyle limiting claudication).⁸ The re-stenosis rate at five years was 16% ± 3% ($n = 222$ patients). Of these, 58 remained asymptomatic, whereas 164 underwent repeat interventions, either repeat endovascular intervention ($n = 96$ patients) or a bypass procedure ($n = 68$ patients).⁸ The five year freedom from recurrent symptoms was superior in the bypass group compared with the repeat endovascular group (80% ± 7% vs. 63% ± 9%, respectively; $p = .03$).⁸ Furthermore, the bypass group had higher immediate symptom relief (resolving in 60% and improving in 35% of the patients) compared with the repeat endovascular intervention (28% and 28%, respectively; $p < .001$).⁸ On the other hand, repeat endovascular intervention was associated with lower morbidity rates compared with bypass (16% vs. 28%, respectively; $p = .04$).⁸

Failure of endovascular procedures may result in the thrombus extending beyond the level of the initial stenosis into a segment of previously patent artery. This makes a bypass procedure more complex, as a more distal bypass has to be performed. An earlier study from South Carolina looked into the outcomes of 276 patients who underwent endovascular SFA intervention.⁹ Early failure was noted in 24 limbs. The distal bypass site was altered in six limbs (28.6%): four limbs from the popliteal to the tibial level and

another two from the above to below knee popliteal.⁹ A more distal bypass has lower patency rates and is a more complex and lengthy procedure.¹⁰ Therefore, in relatively young and low to intermediate risk patients, it appears that open surgery should be the method of choice for failed endovascular procedures.¹⁰

The evidence based recommendations for the use of antiplatelet agents following revascularisation procedures¹ are a very useful summary of what should be done post-intervention to optimise the efficacy of the procedure and reduce the risk of systemic vascular complications. Recommendation 82 states: In patients with intermittent claudication who have undergone infra-inguinal bypass surgery with autologous vein and without increased bleeding risk, vitamin K antagonists may be considered to improve graft patency. We await with interest for further randomised trials with direct oral anticoagulants that may demonstrate their non-inferiority or superiority in improving graft patency.

The document closes with an excellent plain language summary and information for patients that will also be used by patient support groups for lower limb peripheral arterial disease.¹ The authors should be commended on this scholarly quality work and the guidelines committee for including this topic in the ESVS guidelines.¹

CONFLICT OF INTEREST

None.

REFERENCES

- Nordanstig J, Behrendt C-A, Baumgartner I, Belch J, Back M, Fitridge R, et al. Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Asymptomatic Lower Limb Peripheral Arterial Disease and Intermittent Claudication. *Eur J Vasc Endovasc Surg* 2024;67:9–96.
- Leng GC, Papacosta O, Whincup P, Wannamethee G, Walker M, Ebrahim S, et al. Femoral atherosclerosis in an older British population: prevalence and risk factors. *Atherosclerosis* 2000;152:167–74.
- López-Melgar B, Fernández-Friera L, Oliva B, García-Ruiz JM, Peñalvo JL, Gómez-Talavera S, et al. Subclinical atherosclerosis burden by 3D ultrasound in mid-life: the PESA study. *J Am Coll Cardiol* 2017;70:301–13.
- Belcaro G, Barsotti A, Nicolaidis AN. “Ultrasonic biopsy”—a non-invasive screening technique to evaluate the cardiovascular risk and to follow up the progression and the regression of arteriosclerosis. *Vasa* 1991;20:40–50.
- Kakkos SK, Geroulakos G, Nicolaidis AN. Improvement of the walking ability in intermittent claudication due to superficial femoral artery occlusion with supervised exercise and pneumatic foot and calf compression: a randomised controlled trial. *Eur J Vasc Endovasc Surg* 2005;30:164–75.
- Delis KT, Nicolaidis AN. Effect of intermittent pneumatic compression of foot and calf on walking distance, hemodynamics, and quality of life in patients with arterial claudication: a prospective randomized controlled study with 1-year follow-up. *Ann Surg* 2005;241:431–41.
- Makris GC, Lattimer CR, Lavidia A, Geroulakos G. Availability of supervised exercise programs and the role of structured home-based exercise in peripheral arterial disease. *Eur J Vasc Endovasc Surg* 2012;44:569–75.
- Davies MG, Bismuth J, Saad WE, Naoum JJ, Peden EK, Lumsden AB. Outcomes of reintervention for recurrent disease

after percutaneous iliac angioplasty and stenting. *J Endovasc Ther* 2011;**18**:169–80.

- 9 Joels CS, York JW, Kalbaugh CA, Cull DL, Langan 3rd EM, Taylor SM. Surgical implications of early failed endovascular intervention of the superficial femoral artery. *J Vasc Surg* 2008;**47**: 562–5.
- 10 Paraskevas KI, Geroulakos G. Repeat endovascular intervention versus lower extremity bypass for failed previous endovascular intervention. *Angiology* 2019;**70**:477–8.

George Geroulakos*

Department of Vascular Surgery, 'Attikon' University Hospital, National and Kapodistrian University of Athens, Athens, Greece

Kosmas I. Paraskevas

Department of Vascular Surgery, Central Clinic of Athens, Athens, Greece

*Corresponding author. Department of Vascular Surgery, 'Attikon' University Hospital, 1, Rimini street, Chaidari 12462, Athens, Greece.
E-mail address: ggeroulakos@med.uoa.gr (George Geroulakos)