Exercise therapy for claudication: Should home-based exercise therapy be prescribed in clinical practice?

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Peripheral artery disease is a cause of morbidity and mortality in the United States. The literature suggests evidence that an exercise program can be beneficial in the treatment of patients with claudication. Supervised exercise therapy is well documented in the literature, and national guidelines recommend it as an initial conservative management. When a supervised exercise program is unavailable or not covered by insurance, an alternative to supervised exercise is vital. The purpose of this review is to examine the evidence regarding the efficacy of a home-based exercise program. Four studies were included in this review, and although the evidence supporting a home-based exercise program is limited in the literature, the findings indicate that a home-based exercise program increases claudication onset time, resulting in greater mobility and improvement in the patient's quality of life. (J Vasc Nurs 2015;33:143-149)

Peripheral artery disease (PAD) is a disorder that leads to progressive occlusion of the aorta and noncoronary arteries, including arteries of the lower extremity.[1] The most common presenting symptom of PAD is intermittent claudication, which is a reproducible discomfort in the muscles of the calf, thigh, or buttocks during exercise and is relieved with rest.[2] PAD is a global problem affecting over 202 million people with the number of individuals expected to increase by 29% in low-income countries and 13% in high-income countries.[3] In the United States, there are approximately 8.5 million Americans aged older than 40 years who are affected with PAD, which is associated with significant morbidity and mortality.[3] The highest prevalence of PAD is found among elderly, non-Hispanic blacks, and women. In the general population, only 10% of individuals with PAD have symptoms of classic intermittent claudication, 40% do not complain about leg pain, and the remaining 50% have a variety of leg symptoms different from classic claudication.[3]

Traditional risk factors for PAD include hypertension, hyperlipidemia, smoking, diabetes mellitus, and increased age.[4] In addition, black ethnicity was found to be an independent risk factor for PAD.[5] A low lifetime recreational activity level is not only a risk factor for PAD; a reduced exercise capacity is a predictor of mortality in patients with PAD.[6,7] The natural history and progression of PAD and patients with intermittent claudication treated with noninvasive management are related to limb morbidity and cardiovascular morbidity and mortality.[1] In 5 years, 70%–80% of patients with PAD will have stable claudication, 20%–30% progress to worsening claudication, and 1%–3% will progress to critical limb ischemia.[1]

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EXERCISE AS MANAGEMENT OF PAD

Current treatment guidelines for asymptomatic PAD by the Society of Vascular Surgery includes risk factor reduction with smoking cessation, antiplatelet therapy, statin therapy, exercise and limb function, and surveillance for disease progression.[2] The Society of Vascular Surgery goes on to describe noninterventional management of intermittent claudication, which is aimed at symptom relief. For patients presenting with intermittent claudication, management includes smoking cessation; administration of antiplatelet agents; pharmacotherapy for dyslipidemia, diabetes mellitus, hypertension; and pharmacotherapy to improve leg function in conjunction with exercise therapy.[2]

Exercise therapy is part of the conservative, noninvasive management of patients presenting with PAD and intermittent claudication.[2] *Exercise* is defined as an activity that is planned, structured, repetitive, and purposive for improving physical fitness.[8] The goal of an exercise program in the management of PAD is to improve walking ability, increase walking distance, and increase claudication onset time.

In a recent meta-analysis of 30 controlled randomized trials of 1,816 adults, an exercise program with varied exercises, ranging from 2 weeks to 2 years, demonstrated that exercise programs provide significant benefits. Walking time improved by about 5 minutes when compared with usual care, pain-free walking distance also improved extending to 82.29 meters, and maximal distance increased to 108.99 meters when compared with usual care.[9] Exercise was compared with placebo or usual care consisting of risk factor reductions, surgical interventions, or medications.[9]

Guidelines from the American College of Cardiology and the American Heart Association suggest a program of supervised

exercise training as an initial treatment.[10] The recommendation (level A evidence) describes supervised exercise for a minimum of 30–45 minutes at least three times per week, for a minimum of 12 weeks. A recent Cochrane review of 14 randomized trials with a total of 1,002 participants demonstrated that supervised exercise is superior to nonsupervised exercise regimens.[11] Participants in the supervised group demonstrated an increase in walking distance of 180 m more than the nonsupervised group.

A supervised exercise program occurs under the supervision of medical personnel within a hospital or health care clinic setting. The advantages associated with supervised exercise therapy include greater assurance of patient safety due to the supervised setting and improved walking distance and increased claudication onset time.[12] A program of unsupervised exercise or exercise performed in the home setting (level B) is recommended when a supervised exercise is unavailable.[2]

REVIEW QUESTION

Despite significant evidence that a program of supervised exercise is effective, there are limitations associated with the recommendations. One such limitation is the lack of reimbursement. Fokkenrood et al[13] stated that supervised exercise training is not covered by most insurance plans, so patients are expected to pay out-of-pocket for this service. Makris et al[14] found that supervised exercise programs are unavailable, inaccessible, or lacking to providers. In an international survey of 378 vascular surgeons, only 30% had access to supervised programs, 21% had no information on the existence of such a program in their hospital and of those who had access to a program, and only 18% actually made referrals to an exercise program.

There are also patient-specific barriers to supervised exercise programs. The additional cost of transportation to and from a clinic three times a week may be unmanageable for some patients. Similarly, compliance with an exercise program may also be affected by existing medical conditions that prevent participation such as angina, heart failure, chronic obstructive pulmonary disease, and arthritis.[2]

It has been suggested that alternative exercise modes might be useful when supervised walking exercise is not an option for patients.[15] Olin et al[1] recommend that providers create exercise options for patients who mirror the current guidelines. Given the lack of provider reimbursement, out-of-pocket expenses for patients, compliance issues, as well as accessibility and availability of supervised exercise programs, the review question that guides this search is: Should a home-based exercise program be prescribed for patients with PAD and claudication in clinical practice?

METHODS

Searches for related articles were conducted in PubMed, EBSCO, and Cochrane Database of Systematic Reviews. Key words in the search included intermittent claudication, peripheral arterial disease, and home-based exercise. The search identified 15 articles. The criteria for selecting reports included English language, peer-reviewed articles, and studies completed between 2009 and 2014. A more refined search focused on outcome measures such as "claudication onset time, walking distance, and quality of life" with home-based exercise therapy. A total of four articles met inclusion criteria and are included in this review (Appendix).

RESULTS

Sample and setting

The present review comprised four studies, which provided insight into the effectiveness of home-based exercise. The sample sizes of the studies ranged from 142 to 194, with study participants ranging in age from 60 to 75 years. Study populations consisted mostly of men, representing over 50% of the participants. Over 50% were white, except in one study, where over 50% were African American. In one study, the ethnicity was not reported. Across the study population, risk factors for PAD included diabetes, hypertension, coronary artery disease, hyperlipidemia, and a history of smoking. The baseline ankle-brachial index in all four trials ranged from 0.61 to 0.96. Home-based exercises were carried out in an environment of the participants choosing, with walking over ground, around neighborhoods, and walking as in daily life. The instructions for exercises were similar to that of a supervised program.

Design and intervention

Quantitative research methods were used across all studies and included one prospective randomized trial, two randomized controlled trials, and one comparative longitudinal cohort study. In all studies reviewed, an exercise prescription for home-based exercise was included, which specified frequency and duration. No specific intensity was provided. Three of the studies[16-18] promoted walking as an intervention, with specific instructions. Participants were instructed to walk to near claudication onset pain for at least three times per week for about 45–50 minutes per session. McDermott et al[19] used a group-mediated cognitive behavioral intervention with group discussions, in addition to walking instructions.

The duration of the studies was between 12 weeks and 12 months. In general, the four study aims were clearly defined; the studies assessed the benefits of home-based exercise therapy. Measurement instruments were appropriate for the intended outcomes. The primary outcome measures of all four studies measured onset claudication time or changes in walking distance. These measures were assessed at baseline and again at follow-up and were obtained from a treadmill walking test. In addition, walking behaviors and adherence to the treatment plan were either tracked with the use of step activity monitors or with an exercise logbook to record walking sessions. Secondary outcome measures focused on quality-of-life measures and walking impairment. These measures were evaluated using the vascular quality-of-life questionnaire, which focused on mobility, self-care, usual activities, pain and/or discomfort, and anxiety and/or depression.

Results across studies demonstrated an improvement from baseline in walking capacity, quality-of-life measures, and adherence rates with a home-based exercise program. Gardner et al[18] reported that adherence to the home-based program was as similar and as efficacious as that of the participants to the supervised exercise program ($P = .712$) and exceeds 80%. Although both exercise programs increased the onset of claudication time ($P < .001$) and peak walking time ($P < .01$), patients in