

WILLINGNESS TO PARTICIPATE IN SUPERVISED EXERCISE TRAINING FOR SECONDARY PREVENTION OF PERIPHERAL ARTERIAL DISEASE IN POLAND?

Arkadiusz Kazimierczak^{1(A,C,E,F)}, Mariusz Stępień^{2(B,C)}, Piotr Gutowski^{1(G,D)}, Marcin Śledź^{1(C,D)}, Miłosław Cnotliwy^{1(D)}

¹ Vascular Surgery Department of Pomeranian Medical University in Szczecin, Szczecin, Poland

² Student of Pomeranian Medical University in Szczecin, Szczecin, Poland

Abstract

Background: The walking interval training is routinely performed in the primary and secondary prevention of intermittent claudication.

Aim: To investigate the idea/notion concerning the benefits of exercise among vascular patients and the assessment of the percentage of the patients willing to enter the supervised training.

Materials and methods: A questionnaire study of 86 patients treated for Chronic lower Limb Ischemia at the Vascular Surgery Department of Pomeranian Medical University in Szczecin.

Results: Around 30% of the patients claimed to have a sedentary lifestyle. Only 40% were aware to some extent of the health advantages of the walking exercise (mainly from the family doctors). Over 70% showed an interest in participating in such an exercise program after their operation. However, only 36% wanted to pay for the program (50% only up to 100 zł). Furthermore only a mere 17% (15/86) were absolutely certain about the necessity of the training and were willing to bear the full costs. Hardly any condition that lead to patients wanting to exercise were found besides two, firstly younger age (about five years), and secondly male gender (26% v 49%, NS).

Conclusion: Vascular patients needs more effective advancement service by better personal interaction with family doctors and widely spreading written or visual information from the public media. 35% of the patients are suitable and happy to undertake supervised exercise in secondary prevention.

Key words: Supervised exercise, intermittent claudication, peripheral artery disease, cardio-respiratory fitness

Introduction

Physical exercise is commonly used in the prevention of various types of primary and secondary artery disease [1-3]. These include peripheral artery disease, coronary artery disease, circulatory insufficiency, arrhythmias as well as some heart valve diseases. These include hypertension, diabetes, stroke and depression [2, 4-6]. According to current guidelines used in vascular surgery (based on the TASC II recommendations - Trans Atlantic Intersociety Consensus), every patient with chronic limb ischemia who is suffering from intermittent claudication and all patients after vascular reconstructive procedures should begin a supervised treadmill training program [7, 8]. Unfortunately, this is not happening in any Polish site. It seems to be not only a lack of awareness of these particular recommendations, or an aversion to the physical effort, but mainly lack of the systemic resolutions in Polish, reflect in the absence of supervised exercise programs. Moreover, Polish Health Service (NFZ) has not even any register of patients designed to such a program, no mentioned financial plan. These factors limit the number of the patients that use exercise training as a basis of their treatment. Knowledge of the potential number of patients entitled to the supervised training

is a base for further negotiation with NFZ. This study seems to be the first in Poland to complete lacking data. And maybe is the first step to start Supervised Exercise Program in Poland.

Aim

To assess the knowledge about the profits from walking exercise and willingness of the patients with chronic limb ischaemia to participate in the supervised treadmill training.

Materials and methods

The study was conducted during three months period. All (172 patients) referred for PTA or by-pass surgery due to chronic limb ischemia were selected consecutively. To select the questionnaire study (86 patients) we have to exclude patient with impaired communicative and walking abilities. Exclusion criteria contains: severe circulatory insufficiency (NYHA III/IV), clinically significant walking impairment /aphasia after the previous stroke, severe dyspnea, patients in III or IV stage of Fontain classification and patients after mayor amputation. Question have been asked by the doctor for every patients before the treatment procedure in the first day of hospitalization (no

self completed). We do not attempt ethical committee to achieve any allowance for this study. There was not necessary due to the lack of the influence on the medical treatment. Each patient give written informed consent for participation in this study.

Data and Statistical Analyses

Clinical and questionnaire data was analyzed retrospectively. The statistical analysis was conducted on the basis of the Statistical Desktop Application (Statistica PL, StatSoft, Inc. USA). Pearson's chi-square test was utilized for the analysis of the categorical variable if the expected sample number was more than 10. However, if the expected sample number was less than 5 the chi-square test with Yates' correction for continuity was used.

Results

Three month study allows to collect data for 172 cases with chronic limb ischemia. Based on exclusion criteria only half of them appears to be suitable to supervised exercise program. See table 1. Questionnaire study was conducted in 86 cases. In the selected group response rate was 100%, because no patient qualified to the study refuse answer to the person responsible for perform questionnaire.

Number of the therapeutic procedures are present in table 2. There were 23 female and 63 males who had been referred to by-pass surgery in 50 cases, and to endo-vascular procedures in 36 cases.

Out of the 86 patients only 40 considered themselves as being active individuals. It was these patients who reported to be physically active on a daily basis.

Table 1. *Epidemiological data in the group of 172 patients with chronic limb ischemia (3 months of the study)*

Demographic data	Number or mean value ($\pm$ SD)
Age	65.20 (SD-11.35)
Obesity (BMI>25)	14
Hemoglobin	13.4 (SD-1.57)
GFR<60ml/min/1.73mkw	52
GFR<30ml/min/1,73mkw	10
Gender	55 (female) / 117 (male)
ASA>II	88
ASA>III	49
Mild/moderate circulatory insufficiency (NYHA I/II)	46
Severe circulatory insufficiency (NYHA III/IV)	7
Continuous atrial fibrillation	12
Arteria hypertention	114
Myocard infarction in past medical history	33
Coronary artery disease	46
Clinically significant walking impairment /aphasia	21
Stroke/aphasia /other reason without clinically significant mobility impairment	6
Smoking	74
COPD	12
Severe dyspnea	2
Moderate limb ischemia (Fontain II)	134
Severe chronic limb ischemia (Fontain III and IV)	38
Past major limb amputation	18
Vascular operation in the past	46
Liver function abnormality (ALAT>100 u/l)	2
Diabetes	23
Cancer disease	9
Gastric ulcer disease	11
Deep vein thrombosis	4
Thyroid gland abnormality	5

Comments to table 1. From all the group of 172 patients treated during three months due to chronic limb ischemia we have excluded 86 (50%) patients. Seven cases due to severe circulatory insufficiency (NYHA III/IV), twenty one due to clinically significant walking impairment /aphasia after the previous stroke, two due to severe dyspnea, 38 due to rest pain of the legs and eighteen due to mayor amputation (see exclusion criteria).

Table 2. *Type of the treatment during three months of the study*

Treatment	All group (172)	Questionnaire group (86)
By-pass surgery	119	50
Angioplasty (PTA)	53	36

Table 3. *Answers to the questionnaire according to the knowledge about exercise profits and willingness to enter the supervised exercise training program*

Variable	Number	% of the group
PHYSICAL ACTIVITY / SELF ASSESSMENT		
Very active (self assessment)	24	28%
Moderate active (self assessment)	16	18%
Rather active	6	8%
No active (self assessment)	23	27%
Unable to self assessed own activity	17	19%
KNOWLEDGE ABOUT THE BENEFITS FROM THE EXERCISE		
Not aware	50	58.14%
Aware	36	41.86%
From family doctor	27	
From the Internet	2	
From paper / TV	7	
WILLINGNESS TO ENTER THE SUPERVISED EXERCISE TRAINING		
Interested	61	70.93%
Not interested	25	29.07%
AGREEMENT FOR PAYMENT 1		
No free	52	62.65%
Fee acceptable	31	37.35%
Less than 100zł	16	18.60%
No matter the price	15	17.44%

1. Five patients refuse to answer this question

They followed unsupervised walking exercise despite suffering from some discomfort due to their disease. The details concerning the degree of the patients who are aware of the benefits of the walking exercise, and who are happy to participate in the supervised treadmill training are seen in table 3.

The conditions that are suspected of having an influence on the patients' eagerness to take part in the supervised treadmill walking training are seen in table 4. More of the illness and condition present in table 4 does not have any influence on patient willingness to exercise.

Discussion

It was unexpectedly found that 50 per cent of the patients considered themselves as active and only 40 per cent reported some understanding of the necessity of exercise as a method of basic treatment for their disease. Although the percentage of patients that were initially aware of the advantages of the walking exer-

cise was quite low, it nonetheless increased following a consultation with the doctor during the study. After which a further 30 per cent of patients seemed interested in the supervised training after their operation. Despite the fact that 70 per cent of the group expressed a desire to be involved in the treadmill exercise, only 37 per cent were willing to pay for themselves for this kind of rehabilitation. Furthermore, only a mere 17% in total (15/86) were interested in bearing the full costs of this program. All the other patients were only prepared to pay less than they would for their monthly supply of cigarettes (less than 100 Polish zlotys). This fact suggests a strong need for national supervised exercise program sponsored by the Health System, because only a small number of patients can effort the full cost of rehabilitation. The question is which number of patients treated due to chronic limb ischemia should be realistically considered as a target for the treadmill exercise? According to our study from the all 172 patients, referred to the vascular treatment

Table 4. *Conditions suspected to have an influence on the patients willingness to participate in the supervised exercise training*

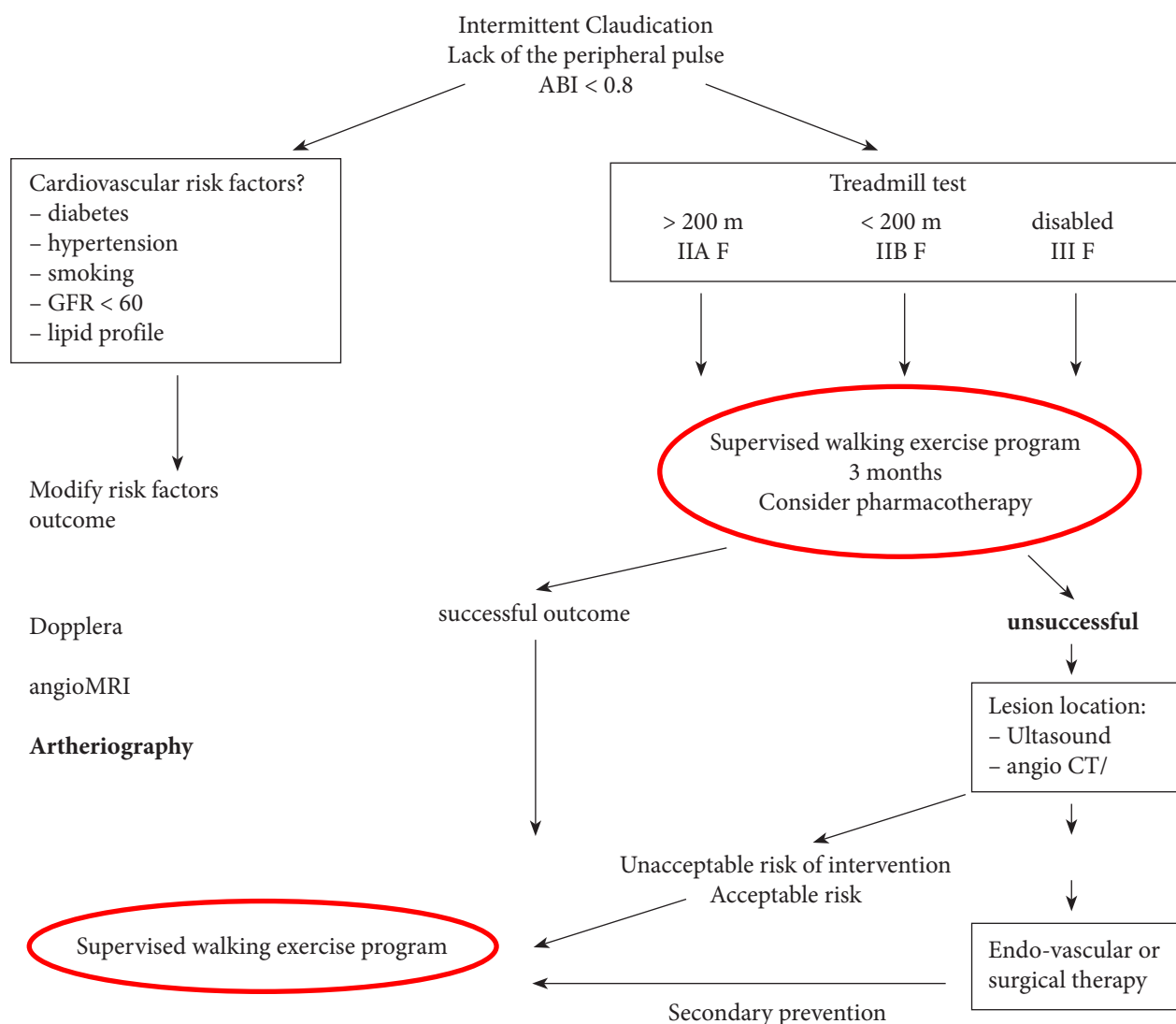
Variable	Number	Want to attempt (61) number (%) (mean)	Not interested (25) number (%) (mean)	P
Vascular operation In the past	37	26 (42.62%)	11 (44%)	0.906
Male	63	31 (49.21%)	32 (50.79%)	0.055
Female	23	6 (26.09%)	17 (73.91%)	
Age	64.2	62.8	67.7	0.051538
Acceptable payment for attempt	31	31 (100%)	0	0.00001
Active (self assessment)	56	41 (73.21)	10 (33.33%)	0.543
Heavy smokers	43	30 (49.18%)	13 (52%)	0.81
Not aware of the benefits from exercise	50	36 (72%)	14 (28%)	0.796
Obesity	4	3	1	0.860
Hemoglobin	13.4 (SD $\pm$ 1.57)	13.2 (SD $\pm$ 1.49)	13.5 (SD $\pm$ 1.23)	0.923
GFR<60ml/min/1.73mkw	26	17	9	0.597
GFR<30ml/min/1,73mkw	6	4	2	0.824
ASA>II	50	34	16	0.846
ASA>III	24	16	8	0.687
Mild/moderate circulatory insufficiency (NYHA I/II)	23	15	8	0.615
Continuous atrial fibrillation	5	3	2	0.609
Arteria hypertention	55	32	13	0.983
Myocard infarction in past medical history	12	8	4	0.762
Coronary artery disease	17	11	6	0.601
Stroke/aphasia /other reason without clinically significant mobility impairment	3	2	1	0.873
COPD	8	5	3	0.618
Liver function abnormality (ALAT>100 u/l)	1	0	1	0.123
Diabetes	14	7	7	0.119
Cancer disease	4	3	1	0.867
Gastric ulcer disease	7	4	3	0.352
Deep vein thrombosis	2	1	1	0.521
Thyroid gland abnormality	3	1	2	0.163

only 61 (35%) are first suitable and second happy to enter the exercise program. Despite willingness, the other important condition reduce the number of the patients drastically. Considering only the exclusion criteria, we observe physical elimination half of the potential participants. (See comments to table 1).

Unfortunately the aforementioned condition does nothing more than confirm the ambulatory experience regarding the reluctance among vascular patients to see the value of secondary prophylaxis. This fact is reflected in the worsening of the long term outcomes. One of the main problems with vascular patients is the high number of reoperations due to occlusion of the

by-passes. In our material over 40 per cent of patients have got previously some vascular operations. Vascular surgery in the past should effect in having dipper knowledge about prophylaxis and profits from exercise among those patients. In practice it is not observed. This situation reflect bad quality of health promotion in Polish population.

The problem of intermittent claudication is very much part and parcel of modern life in so far as it is often worsened by an inactive lifestyle that seems to be fairly widespread these days. Indeed it has been observed in 3% of people over the age of 50 living a sedentary lifestyle. On the other hand exercise is a



Abbreviation:

ABI – Ankle Brachial Index

IIA F – Grade IIA in Fontain scale

IIB F – Grade IIB in Fontain scale

IIIF – Grade III in Fontain scale

GFR – Glomerular Filtration Rate w ml/min/1,73msq

AngioCT – Computer Tomography of the arteries

Fig. 1. Management Algorithm for Intermittent Claudication

physical activity which is the first and the most important step in the treatment strategy for peripheral artery disease [6-13].

According to the most recent recommendations it is supervised training that must be advised for such patients during the first visit in the doctors office [7]. (TASC II) What is more, the treadmill exercise is more important than pharmacotherapy and indeed any other invasive or non-invasive examination of the vascular system [7].

It has been verified that the supervised treadmill exercise yields benefits for the group of patients suffering from claudication. These exercises have assisted in extending more than 100 per cent the walking distance

of the patients. No such effects have been noticed with the use of any medications [7, 11].

The minimal period of training for patients consisted of a one hour class, three times a week during a period of three months [2, 6, 7, 10, 11]. Within this program the aerobic exercise was recommended. The treadmill walk should be continued until the patient is able to bear a 10 minute walk. Indeed if patients are able to walk for more than 10 minutes, the load should be increased (higher speed and grade of slope) [2, 7, 10, 11].

An important thing to remember is the great role and influence TASC II recommendations have on the economy of the treatment. This strategy (first exercise,

then examination followed by medication) allows for the saving of twice as much money than that of the method of pharmacotherapy and indeed ten times more money than surgical procedures [6, 10, 13].

Moreover, conservative treatment that includes the treadmill exercise reduces significantly the risk of the patient having to have his or her leg amputated in comparison to surgical procedures where the risk is higher. The risk of leg amputation while having conservative therapy for intermittent claudication is as little as less than 1 per cent a year and such treatment might be successfully used as it poses little or no danger to the patient. [14].

However, on the other hand unsupervised exercise which patients claim to do is not effective at all. The lack of the effectiveness of such a kind of training in the treatment of intermittent claudications is a proven fact [7, 11]. Indeed only the supervised treadmill exercise program is recommended to avoid or postpone surgical procedures, which always run a much higher risk of complications than that of conservative therapy [7].

The introduction of nationwide exercise programs for the secondary prevention of peripheral artery disease in Poland should lead to the improvement of the effectiveness of treatment as well as decreasing treatment costs.

Despite the fact that there is conclusive evidence for the effectiveness of the exercise program (in the treatment of claudication) as well as there being official recommendation from various vascular surgery societies the number of patients actually willing to be involved in the walking program nevertheless remains unknown.

Although there is strong evidence that points to the effectiveness of exercise supervised training in the treatment of claudication as well as it being officially recommended by vascular surgery societies the number of patients willing to participate in the program remains unknown.

Why is this so? This is due to the fact that there is a wide divergence between what the patients claim they might want to do and what indeed is done in practice. Naturally it becomes difficult then to assess what are the needs of the population regarding this matter. The lack of forecasts or indeed any financial plans compounds the problem further. At present then the Polish National Foundation of Health / National Insurance Company (NFZ) is not prepared to pay for the introduction of the National Supervised Exercise Training Program for Primary and Secondary Prevention of Intermittent Claudication.

In such a context, it seems curious to find that this fact either correlated or did not with the patients willingness to begin the supervised training program. An attempt was made in this study to find specific conditions as to why this was so but without any success. No conditions that could lead to a willingness to participate

in the exercise program were found. It was seen that in only two cases: females were less keen to exercise (26% v 49%, NS) than males. It was also found that the patients who were ready to take part in the training program were five years younger than the others (See table 4).

In accordance with our results real knowledge and the interest of the patients to undertake supervised exercise is frustratingly low. A simple advertisement program might be effective in improving this knowledge (in our material 30 per cent changed their mind towards exercise after a simple conversation with the doctor). Perhaps family doctors need to change their current practice to achieve stronger influence on their patients lifestyle. At the moment it is naive to believe that there would necessarily be a wide public interest in supervised exercise programs even if the benefits of exercise were widely acknowledged in medical environment. There is a need for better practice of family doctors, and for spreading knowledge in this matter in whole population with the use of media (papers, TV and NFZ sponsored information programs).

Conclusions

1. Vascular patients need more effective advancement service by better personal interaction with family doctors and widely spreading written or visual information from the public media.
2. 35 % of the patients are suitable and happy to undertake supervised exercise in secondary prevention.

References

1. Brochu M, Poehlman E, Savage P, et al. Coronary risk profiles in men with coronary artery disease: effects of body composition, fat distribution, age and fitness. *Coron Artery Dis* 2000; 11(2): 137-44.
2. Gerald F, Fletcher M, Chair M, et al. Exercise Standards for Testing and Training. *Circulation* 2001; 104: 1694.
3. Mannarino E, Pasqualini L, Menna M, et al. Effects of physical training on peripheral vascular disease: a controlled study. *Angiology* 1989; 40: 5-10.
4. Brochu M, Poehlman E, Savage P, et al. Modest effects of exercise training alone on coronary risk factors and body composition in coronary patients. *J Cardiopulm Rehabil* 2000; 20(3): 180-8.
5. Carnethon M, Gidding S, Nehgme R, et al. Cardiorespiratory fitness in young adulthood and the development of cardiovascular disease risk factors. *JAMA* 2003; 290(23): 3092-100.
6. Dugmore L, Tipson R, Phillips M, et al. Changes in cardiorespiratory fitness, psychological well being, quality of life, and vocational status following a 12 month cardiac exercise rehabilitation programme. *Heart* 1999; 81: 359-66.
7. Adam DJ, Bradbury AW. TASC II Document on the Management of Peripheral Arterial Disease. *Eur J Vasc Endovasc Surg* 2007; 33(1): 1-2.
8. Dahllof A, Bjorntorp P, Holm J, et al. Metabolic activity of skeletal muscle in patients with peripheral arterial insufficiency. *Eur J Clin Invest* 1974; 4: 9-15.
9. Birkenstock WE, Louw JH, Terblanche J, et al. Smoking and other factors affecting the conservative management of peripheral vascular disease. *S Afr Med J* 1975; 49: 1129-32.
10. Clifford PC, Davies PW, Hayne JA, et al. Intermittent claudication: is a supervised exercise class worthwhile? *Br Med J* 1980; 280: 1503-5.

11. Gardner AW, Poehlman ET. Exercise rehabilitation programs for the treatment of claudication pain: a meta-analysis. *JAMA* 1995; 274: 975-80.
12. Kannel WB, Skinner JJ Jr, Schwartz MJ, et al. Intermittent claudication: incidence in the Framingham Study. *Circulation* 1970; 41: 875-83.
13. Dahllof A, Holm J, Schersten T, et al. Peripheral arterial insufficiency. Effect of physical training on walking tolerance, calf blood flow, and blood flow resistance. *Scand J Rehabil Med* 1976; 8: 19-26.
14. Barletta G, Perna S, Sabba C, et al. Quality of life in patient with intermittent claudication: relationship with laboratory exercise performance. *Vasc Med* 1996; 1: 1-3.

Received: March 11, 2010
Accepted: October 30, 2010
Published: November 10, 2010

Address for correspondence:
Arkadiusz Kazimierczak;
72-005 Przecław 49a/5,
Mobile: 697 114 805; Fax: 091 466 11 57
mail: kazim@sci.pam.szczecin.pl

Mariusz Stępień: mariuszstepien@tlen.pl
Marcin Śledź: m_sledz@wp.pl
Piotr Gutowski: piotr_gutowski@poczta.onet.pl
Miłosław Cnotliwy: mcnotliwy@wp.pl