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Rehabilitation of Patients with Peripheral Arterial Disease in IIA Stage According To Leriche-Fontaine

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Abstract

In the world, a million adults have peripheral artery disease (PAD), a number that is likely to escalate as the population ages. Lower-extremity PAD is a component of systemic atherosclerosis and confers a markedly heightened risk of cardiovascular morbidity and mortality.

Material and Methods: Recruited 48 patients Exercise therapy combined with Nordic Walking and cyclette program in patients with PAD second IIA Stage Leriche Fontaine scale stable for at least six months, with interval free running (IML) between 200 and 300 meters.

Result: In Group A the free shift range test (IML) 137 ± 12 meters in T0, resulting in statistically significant post processing T1 222 ± 10 ($p < 0.05$). In Group B T0 138 ± 6 meters in T1 IML 212 ± 10 meters ($p < 0.05$). The results obtained in this study showed that the two types of exercise, at least after a short training period, are similar in terms of increasing the autonomy of the way and improving the quality of life (QoL).

Conclusion: The benefits of regular physical activity and comprehensive secondary prevention have the potential to benefit patients with PAD by preserving or improving functional capacity and reducing cardiovascular events.

Keywords: Peripheral arterial disease; Rehabilitation; Claudication intermittent; Treadmill; Stationary bike

Introduction

The benefits of regular physical activity in patients with Peripheral Arterial Disease (AOP) to stage IIA according to Leriche Fontaine are widely validated by literature; although they remain in part to define the mechanisms, the mechanisms by which it determines the increased autonomy in the journey free [1,2]. In the different training modes, the most widely used by researchers is probably the path running on the treadmill, which allows better control of the workload carried by the patient [3,4], the walking brisk or Nordic Walking. The journey in subjects suffering from intermittent, age progresses and the concomitant diseases can represent a contraindication to exercise, advise against this kind of training [5]. The use of stationary bikes, most widespread and affordable device than the treadmill, could help patients by allowing you to train even the subjects in which the presence of other diseases or functional limitations that make problematic the exercise activities. It was considered interesting to compare your workout on an exercise bike can be a valid alternative to the treadmill in the efficacy of the autonomy and increasing quality of life (QoL) in a group of patients with AOP to stage IIA according to Leriche Fontaine.

Materials and Methods

Recruited 48 patients (34 males and 14 females), with average age 69 years (range 59-75 years), with AOP to stage IIA according to Leriche Fontaine stable for at least 6 months, with walking free range between 200 and 300 meters (IML). All patients were in antiplatelet therapy (ASA 100 mg/day), and cardio-respiratory diseases severe and free of sufficient magnitude to contraindicate physical activities; It was not provided indications necessary to change lifestyle. After patients gave their consent in the study were randomized into two groups (Table 1).

Group A (mt)				Group B (mt)			
T0	sd	T1	sd	T0	sd	T1	sd
137	12	222*	10	233	17	401*	16
138	6	212*	10	231	6	368*	24
(* p value < 0.05)							

Table 1: Modification of basal (T0) and post treatment (T1) of the two training groups.

The first group (Group A) carried out training on a treadmill with constant load (3.2 km/h, slope 12%) by 90% of the way to the IML,

then a 1 min stop and subsequent repetitions until a total of 30 min of work performed twice a day for 5 days a week for 4 weeks times. The second group (Group B) performed exercise on stationary bicycles with sessions of 30 min twice a day for 5 days a week for 4 weeks, sometimes riding at 90% of maximum load, given increasing resistance from 30W in increments of 2 min 10W each, until the pain in the lower limbs. Training sessions of both groups were carried out under the supervision of physiotherapist and workloads were restated on a weekly basis. At the beginning of the study (T0) and after 4 weeks of training (T1) were performed: treadmill test with constant load (3.2 km/h, slope of 12%), evaluation of ankle/arm blood pressure detection Winsor (IW), humeral (PAO) and heart rate, body weight and blood related to the main cardiovascular risk factors. Quality of life (QoL) was evaluated at T0 and T1 using MOS SF-36 questionnaire acute version. SF-36 survey was constructed to achieve two well-accepted standards of comprehensiveness: 1) representation of multidimensional health concepts; and 2) measurement of the full range of health states, including levels of well-being and personal evaluations of health. Various aspects under investigation by questionnaire, were particularly examined physical efficiency (EF), limitations caused by illness (LM), overall health (SG), social activities (AS) and mood (SU). Statistical analysis descriptive statistics were used to obtain: sample size, mean, standard deviation. Before performing the analysis, normality (Pearson test) and homogenity of variance (Leneve's test) was assessed. In the absence of an assumption of normality of data, a logarithmic transformation was applied in order to satisfy the normality assumptions of the data. In order to evaluate the differences between the Group A and Group B (between group comparison), a Student's t-test (or Welch's test) was performed. For the comparison of research before and after (within group) rehabilitation, Student's t-test for paired data was used, or when comparing before, during and after repeated measures ANOVA analysis was performed. Differences between Group A and Group B in baseline clinical characteristic were assessed using Student's t-test (in case of quantitative data). The level of statistical significance $p < 0.05$ was adopted.

Results

In Group A the free path range test (IML) 137 ± 12 meters in T0, resulting in statistically significant post processing T1 222 ± 10 ($p < 0.05$). In Group B 138 ± 6 meters in T1 T0 IML 212 ± 10 meters ($p < 0.05$). The values of hematic in Group A, glycemic index values T0 112.5 ± 5.4 in post processing T1 102.2 ± 6.2 mg/dl ($p < 0.05$). Basal total cholesterol in 215 ± 7.5 post T1, T0 195.2 ± 15.4 mg/dl ($p < 0.05$). Triglycerides T0 140.5 ± 15.4, in post processing T1 125.8 ± 15.4 mg/dl. High-density lipoprotein (HDL) at T0 51.7 ± 4.2, in post T1 127.8 ± 5.3 mg/dl ($p < 0.05$). The values of hematic in Group B, glycaemic index values T0 114.7 ± 34.2, in post T1 103.7 ± 4 mg/dl ($p < 0.05$). Total cholesterol 199 ± 21.5 in post processing T1 188.5 ± 14.2 mg/dl. Triglycerides T0 118.3 ± 13.7, in post T1 116.5 ± 12.7 mg/dl. Fibrinogen T0 359.7 ± 29.3 in post T1 422 ± 22.1 mg/dl. Low-density lipoprotein (LDL) T0 115.6 ± 20.3, 114.7 ± 13.1 mg/dl in post T1. Cardiovascular risk factors in Group A in systolic blood pressure (SBP) T0 156 ± 4.7 in the post T1 141 ± 2.5; Diastolic blood pressure T0 81± 0.6 post T1 81± 0.6; Resting heart rate (HRR) T0 76 ± 3.9, 72 ± 2.1 post T1 (Figure 1). The Body Mass Index (BMI) in T0 30.2 ± 1.5, post T1 30.4 ± 0.9. In Group B, PAS T0 145 ± 5.6 posts in T1 130 ± 4.9 ($p < 0.05$); PAD T0 77 ± 1.4, post T1 75 ± 2.1; HRR T0 67 ± 2.6, 72 ± 4.5 in T1; BMI T0 29.9 ± 1.3, in T1 28.8 ± 1.1. Quality of life (QoL) in Group A the mean T0 EF 75.11 in the post T1 64.71; SG T0 56.45, in post T1 59.95; AS T0 72.83, 74.78 post; UP T0 54.76, in post T1 65.15. In Group B the mean of the values in post 76.23 T1, T0 82.4 EF; LM T0 T1 64.89, 66.31 in the post; SG T0 T1 60.13, 62.85 post; UP T0 T1 69.13, 58.72 in the post (Table 2).

			Group A				Group B		
Parameters	**U.M.**	**T0**	**Sd**	**T1**	**Sd**	**T0**	**Sd**	**T1**	**Sd**
PAS	mmHg	156	4.7	148	2.5	145	5.6	130*	4.9
PAD	mmHg	81	0.6	81	0.6	77	1.4	75	2.1
HRR	batt/min	76	3.9	72	2.1	67	2.6	72	4.5
BMI		30.2	1.5	30.4	0.9	29.9	1.3	28.8	1.1
Glycemic Index	mg/dl	112.5	5.4	102.2*	6.2	114.7	34.2	103.7*	4
Total Cholesterol	mg/dl	215.5	7.5	195.2*	5.2	199	21.5	188.5	14.2
HDL	mg/dl	51.7	4.2	522	2.1	59.7	3.31	60.5	2.2
LDL	mg/dl	135.6	5.1	127.8*	5.3	115.6	20.3	114.7	13.1
Triglycerides	mg/dl	140.5	15.4	125.8	15.4	118.3	13.7	116.5	12.7
Fibrinogen	mg/dl	386.8	35.5	430.8	6.7	359.7	293	422	22.1

(*: p value < 0.05; Sd: standard deviations); PAS: systolic blood pressure; PAD: diastolic blood pressure; HRR: Heart Rate Rest; BMI: Body Mass Index; HDL: High-density lipoprotein LDL: Low-density lipoprotein.

Table 2: Changes in cardiovascular parameters and risk factors.

Discussion

The study not only highlighted the effect of physical exercise to reduce symptomatic manifestations aspects arising from the condition of metabolic syndrome and concomitant AOP, at the same time it is a therapy which affects causes metabolic syndrome, as the blood profile, glucose, triglycerides, LDL and HDL levels. His action has a significant secondary prevention by working with parties to the second stage, according to Leriche Fontaine; you avoid complications such as increased pain at rest, reduced ambulation province until injuries gangrenous changes which in severe cases may lead to amputation. In the literature the chronic obstructive arterial disease is distinguished according to Leriche Fontaine in four stages where the stadium I: asymptomatic patient or paucis into matico. The initial symptoms are represented by sense of weight, cold and fatigue of the extremities; in stage II: characterized by intermittent claudication: a crampy pain referred to the calf muscles and/or thigh. Depending on the appearance of pain depending on the distance travelled, is possible to split the II stage: IIA claudication appears after 200 m; IIB claudication appears before the 200 m as a result of pain the patient is forced to shut down the road for a time the longer the more serious and severe obstruction; stage III: present pain at rest with involvement primarily of fingers, foot and heel.

The pain is stronger at night, when the patient is lying. For this often keeps leaning limb out of bed or takes a few steps to relieve pain; In stage IV: appearance of lesions gangrenous changes a) limited to the forefoot b) proximal lesions [6]. The study confirms the excellent response of subjects to an exercise program, conducted in a controlled environment, improvements of the autonomy of the way. The optimal technique training programmes for patients with intermittent claudication is the treadmill and/or Nordic walking [7].

In addition to the walk, along with other training modes observed in the literature of motor activity, muscle strengthening, training on a stationary bike or stair climb-based as well as various types of exercises combined. Observing the increases autonomy of such methods were obtained free path comparable or lower than those determined on treadmill [8]. However, there is no direct comparison of the effects caused by exercise on the treadmill and those resulting from the use of stationary bikes. The results obtained in the study shows that the two types of exercise training in the short term, are similar in terms of increasing the autonomy and improvement of QoL.

The reduction in blood arterial humorous pressure (PAO), most noticeable in the group trained with exercise bike, it was a given that describes with equal intensity, would lead to an increased workload with the appearance of cardiovascular system rapidly favorable effect on blood pressure with respect to training on treadmill or nordic walking.

The significant reduction in blood sugar levels, at the end of the training period, confirms the role of exercise in improving metabolic control. As for total cholesterol triglycerides ($p < 0.05$), changes were most evident in Group A, where the initial values were also higher. It is possible that a more prolonged physical activity program can determine reductions glycometabolic worse than those observed in the present study relatively contained. Exercises not only improves the patient's free power reserve with AOP, but reduces the restriction induced by this and restore the functions of the subject, thus improving the quality and life expectancy of the arteriopatic [9] (Figure 1).

The significant efficiency improvements we observed, linked to the increased autonomy of walking, significantly influence the mood of the patient. In the other examined parameters with the questionnaire SF-36, both protocols of training resulted in increments, but not significant. An explanation can be conveyed to the fact that a period of intense workout though short like the one we conducted, determine significant changes and review favourably cardiovascular parameters, while need longer for interfering with the complex mechanisms that combine to change the QoL of a subject [10,11].

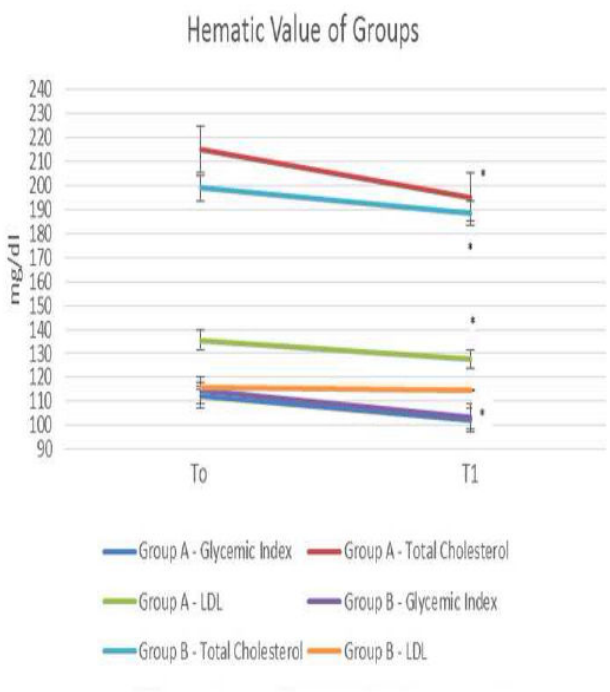

Figure 1: Haematological values of groups. *: Anova test significant $P < 0.05$.

Conclusion

The problems derived from metabolic syndrome, and in conjunction with lower limb arteriopathy in subjects with intermittent claudication have a limiting factor in the administration of the exercise. The benefits of its implementation have multifactorial aspects that affect so much motivational, functional and metabolic profile. The exercise on an exercise bike, with appropriate workload, can result in significant increases in the range of free gear and the quality of life in people where it is not possible to use the treadmill or Nordic walking. The availability of bikes as a valid method of exercise allows you to implement mechanisms to benefit from the favorable changes induced by exercise, such as muscle tone, articulation and balance in people, especially the elderly, in which the osteoarticular diseases, visual impairment, sensor neural can make use of the problematic treadmill.

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