146 - COMPARISON OF BLOOD PRESSURE AND HEART FREQUENCY AMONG WOMEN WITH AND WITHOUT CHAGAS DISEASE SUBMITTED TO PHYSICAL TRAINING

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INTRODUCTION

Patients with Chagas' disease often have high blood pressure (HBP) as the main co morbidity. As hypertension is related to the activity of the sympathetic nervous system and cardiac function and both may be affected by the infection caused by Trypanosoma cruzi, studies searching to relate these two chronic diseases have been conducted (BERTANHA et al, 2008, BOZELLI et al., 2006, GUARIENTO et al., 1998, GURGEL; ALMEIDA, 2007, IANNI et al., 1998,).

In hypertensive individuals with and without Chagas disease control of hypertension is usually medication. Currently, non-pharmacological measures of changes in lifestyle have been recommended for its prevention and control. Among these measures are highlighted exercise, reducing body weight and reducing sodium dieta (V DBHA, 2006).

According to the V Brazilian Guidelines on Hypertension Arterial dieta (V DBHA, 2006), the aerobic exercise prescribed and supervised by a specialist, lasting 30 to 60 minutes and frequency of three times per week, has been indicated as the most effective way to reduce levels blood pressure. Physical exercise can control mild hypertension and when associated with drug treatment can improve the severe and moderate hypertension (LOPES et al., 2003).

Most studies involving exercise is performed with male subjects LOPES et al., 2005). In the last decade the female population also started to be studied (REGENGA, 2000). The female has a higher perception of disease, greater tendency toward self care and search more medical attention (ALMEIDA et al., 2002, ZAITUNE et al., 2006), which indicates there may be better adherence to physical training programs by this gender.

Recently, a study realized by Mendes et al. (2007), with women with chronic Chagas disease in class I New York Heart Association (NYHA) showed that aerobic exercise performed under supervision is safe and improves tolerance to exercise (MENDES et al. 2007). This work was intended to compare blood pressure and heart frequency in women with and without Chagas disease undergoing a physical training program.

MATERIALS AND METHODS

Study population: participated in this study, 19 volunteers with blood pressure controlled by medications (calcium channel blockers, angiotensin-converting enzyme inhibitors, diuretics and beta blockers), with and without positive serology for Chagas' disease treated at the Regional Center Specialty Maringa – CRE/PR in the period January to December 2005. The participants were divided into two groups matched according to age. One (G1), containing nine subjects with Chagas' disease and the other, (G2) containing 10 participants without Chagas' disease. The allocation in each group was done randomly, according to the ability to exercise and after clinical assessment. The physical and anthropometric characteristics and functional class of the participants was not significantly different (Table 1).

Table 1. Physical and functional classification of hypertensive women with and without Chagas' disease.

Variables	With Chagas' disease (G1) n = 9	Without Chagas' disease (G2) n = 10	p
Age (years)*	61,4 ± 5,9	58,4 ± 7,8	0,3558
Height (m)*	1,58 ± 0,07	1,57 ± 0,05	0,6755
Weight in beginning (T0) (kg)*	71,5 ± 12,2	68,1 ± 10,6	0,5220
Weight after 12 weeks (kg)*	70,7 ± 12,0	67,9 ± 10,5	0,5981
BMI in beginning (T0) (Kg/m^2)*	28,74 ± 4,1	27,78 ± 4,32	0,6310
BMI after 12 weeks (Kg/m^2)*	28,39 ± 4,09	27,70 ± 4,26	0,7256
Functional class (NYHA)	I	I	

* Mean ± standard deviation; BMI – Body Mass Index; NYHA = New York Heart Association.

Inclusion Criteria: present mild hypertension (SBP 140-159 mmHg and DBP 90-99 mmHg), have or not Chagas disease, female gender, aged between 45 and 69 years, class I, New York Heart Association (NYHA) ability to exercise, availability and interest to participate in physical exercise for 12 weeks, twice a week.

Exclusion Criteria: severe hypertension, right bundle branch block, ventricular arrhythmias, premature ventricular contractions, ventricular tachycardia, atrioventricular block (second and third degree), coronary heart disease, diabetes, musculoskeletal disorders that would prevent the practice protocol, disabling lung disease, endocrine disorders and heart failure class II, III and IV, participate in physical training program less than two times per week and attend the program for a period less than ten weeks.

Variables: Systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart frequency (HF) were assessed before and after each program session, which corresponds to the pre-and post-exercise. The SBP and DBP were measured in the left arm of the patient, sitting by the indirect method and auscultators' method using a stethoscope and a sphygmomanometer calibrated BD brand. HF was measured by manual technique, by palpation of the radial artery by a single examiner. The variables were measured at T0 (baseline) and T12 (after 12 weeks).

Exercise program: Based on the clinical evaluation performed at baseline was elaborate an exercise program in accordance with the Policy of Cardiopulmonary and Metabolic Rehabilitation (2006). To implement the program participants were placed into smaller groups containing three or four participants with and without Chagas disease. The protocol lasted for twelve weeks, often twice per week on alternate days with gradual increase every session until it reaches the maximum limit of one hour, considering the patient's clinical condition. The following physical training program was performed: heating and stretching (5-10

minutes) with aerobic phase starting with 15 minutes walking and progressing to a maximum of 30 minutes, cooled for 5 minutes to recover and relax or stretch for 5 minutes. The exercise program was conducted in the morning, in an open, flat and shaded place.

Statistical analysis: was performed using the program Statistic 7.0. The nonparametric test of Wilcoxon was used to compare the variables of G1 and G2 in T0 and T12. The comparison of variables between groups G1 and G2 was performed using the nonparametric Kolmogorov-Smirnov test. The significance level was 5%.

Ethical aspect: Each participant was informed about the purpose of the study and signed a consent form approved by the Ethics Committee on Human Research of the State University of Maringa.

RESULTS

A comparison of blood pressure and heart rate of G1 and G2 at T0 and T12 can be seen in Table 2. After 12 weeks of exercise training significant differences were observed in G1 for SBP and DBP before and after effort and HR before effort and in G2 for SBP before and after effort and HF after effort.

Table 2 - Comparison of blood pressure and heart frequency between T0 (baseline) and T12 (after 12 weeks) for women with and without Chagas disease.

Variables	With Chagas' disease (G1)			Without Chagas' disease (G2)		
	T0	T12	p#	T0	T12	p#
SBP pre-effort (mmHg)*	147,8 ± 12,0	127,8 ± 4,4	0,00766	131,0 ± 9,9	124,0 ± 8,4	0,04311
SBP post-effort (mmHg)*	152,2 ± 13,0	127,8 ± 4,4	0,00768	132,0 ± 9,2	124,0 ± 8,4	0,02770
DBP pre-effort (mmHg)*	92,2 ± 8,3	80,0 ± 0,0	0,01796	87,0 ± 8,2	81,0 ± 3,2	ns
DBP post-effort (mmHg)*	90,0 ± 7,1	80,0 ± 0,0	0,01796	89,0 ± 9,9	81,0 ± 3,2	ns
HF pre-effort (bpm)*	72,7 ± 9,5	64,7 ± 6,6	0,02086	72,0 ± 5,9	67,0 ± 7,1	ns
HF post-effort (bpm)*	71,5 ± 8,8	64,9 ± 6,5	ns	77,6 ± 11,34	65,6 ± 3,9	0,00506

* mean ± standard deviation; # - Wilcoxon test, ns - not significant - p> 0.05, SBP - systolic blood pressure, DBP - diastolic blood pressure, mmHg - millimeters of mercury, HF - heart frequency, bpm - beats per minute.

The comparison between the G1 and G2 showed no significant difference (p> 0.05) for the variables at T0 and T12 in (Table 3).

Table 3 - Comparison of heart frequency and blood pressure among hypertensive women with (G1) and without (G2) Chagas' disease before and after 12 weeks of training.

Variables	G1 T0	G2 T0	p#	G1 T12	G2 T12	p#
SBP pre-effort (mmHg)*	147,8 ± 12,0	131,0 ± 9,9	ns	127,8 ± 4,4	124,0 ± 8,4	ns
SBP post-effort (mmHg)*	152,2 ± 13,0	132,0 ± 9,2	ns	127,8 ± 4,4	124,0 ± 8,4	ns
DBP pre-effort (mmHg)*	92,2 ± 8,3	87,0 ± 8,2	ns	80,0 ± 0,0	81,0 ± 3,2	ns
DBP post-effort (mmHg)*	90,0 ± 7,1	89,0 ± 9,9	ns	80,0 ± 0,0	81,0 ± 3,2	ns
HF pre-effort (bpm)*	72,7 ± 9,5	72,0 ± 5,9	ns	64,7 ± 6,6	67,0 ± 7,1	ns
HF post-effort (bpm)*	71,5 ± 8,8	77,6 ± 11,34	ns	64,9 ± 6,5	65,6 ± 3,9	ns

*sd = standard deviation # - Kolmogorov-Smirnov test, ns - not significant - p> 0.05, SBP - systolic blood pressure, DBP - diastolic blood pressure, mmHg - millimeters of mercury, HF - heart frequency, bpm - beats per minute.

DISCUSSION

Hypertension is the most frequent co-morbidity among individuals with Chagas' diseas (BOZELLI et al., 2006, GUARIENTO et al., 1998, GURGEL; ALMEIDA, 2007, IANNI et al., 1998,). However, studies involving these diseases and exercise have not been reported. In this work was performed a walking program with sessions from 30 to 60 minutes twice a week for 12 weeks in hypertensive women with (G1) and without (G2) Chagas' disease. Significant improvement in systolic and diastolic blood pressure of participants was observed after 12 weeks of physical training. When the participants in each group were compared after this training period, five variables were statistically different in G1 and three G2. The comparison between groups showed no significant differences for all variables T0 to T12.

The results observed with 12 weeks in participants of G1 and G2 are in agreement with other authors who performed the training program with the same time duration (SILVA et al., 2002) or with 18 to 24 weeks (FARINATTI et al., 2005, KRINSKI et al., 2006, NUNES et al., 2006). The significant reduction in SBP and DBP in G1 and only in SBP to G2 shows that exercise had a beneficial effect more evident in participants with Chagas (G1). Ciolac and Guimarães (2004), reported that reductions of only 2 mmHg for DBP can substantially reduce the risk of illness and death associated with hypertension, demonstrating that physical exercise is an important health benefit of hypertension. This result may be related to the fact that participants in G1 have shown a greater motivation to perform physical exercise and greater concern for their health due have Chagas' disease associated with hypertension. Here must highlight the importance of clearing up and giving support to patients with this disease as recommended by the Program ACHEI (2000). The results also indicate that the fact of participants of G1 have a diagnosis of Chagas disease is not limiting to perform physical exercise, helping to change the stigma that patients with this disease have regarding their diagnosis (ACHEI 2000, MOTA et al. 2006), and to help control SH. Mendes et al. (2006), also observed that the aerobic training of small duration, easy execution and with supervision can be safely performed by women with chronic Chagas disease in class I NYHA.

Twelve weeks of exercise had a different effect on HF in G1 and G2. In G1, a significant difference was observed in HF pre-effort and G2 in the HF post-effort. Although participants with Chagas' disease have responded positively to physical exercise in pre-effort, this response did not occur in post-effort. This result may be related to the fact that patients with heart failure due to Chagas' disease show a significantly lower mean HF than did patients without Chagas' disease, even after adjusting drug therapy, which may reflect the higher frequency of sinus node dysfunction between Chagas' disease patients (BRAGA et al., 2006). Moreover, it is known that patients with heart failure have an increased sympathetic activity due to elevated levels of circulating catecholamine, which seems to be associated with desensitization, reduced β-adrenergic receptors and down regulation of cardiac receptor and response inotropic and chronotropic depressed (BRAGA et al., 2006).

Significant differences between G1 and G2 were not observed for the variables studied, indicating that regardless of have or not Chagas' disease, exercise has the same effect. These results reinforce the fact that the participants who have Chagas disease can perform physical exercise safely, when supervised by a professional, reducing blood pressure and increasing exercise tolerance. These results also indicate that the coexistence of hypertension and Chagas disease did not alter the natural history of both diseases as reported by Gurgel et al. (2007) and that the interaction between them does not influence the effect of alternative intervention, such as physical exercise.

The effectiveness of a program of physical exercise on blood pressure reduction is well established, even in individuals who are on medication for hypertension, as individuals who participated in this study and others (GRAVINA et al., 2007, KRINSKI et al., 2006, LATERZA et al., 2007, MONTEIRO et al., 2007, PINTO et al., 2006, TAKATA et al., 2003, WHELTON et al., 2002).

The training of low and moderate intensity, associated with aerobic exercise, can be used as non-pharmacological treatment in hypertensive subjects, leading to dose reduction or even discontinuation of medication, reducing the side effects of drug treatment and the burden to the public health departments (GRAVINA et al., 2007, RONDON; BRUM 2003).

The hypotensive effect of physical exercise of low intensity observed in this study can be explained by the decrease in cardiac output that is associated with decreased resting heart frequency and decreased sympathetic tone in heart, because of the lower sympathetic intensification and greater vagal withdrawal (BRUM et al. 2005).

We conclude in this study, that aerobic exercise of low intensity had a beneficial effect reducing significantly SBP, DBP and HF of women with and without Chagas' disease. The results indicate that a training program simple, easy to use, inexpensive, that not requires special skills or learning, can be safely performed in patients with chronic Chagas' disease in NYHA class I and as a strategy for prevention and treatment HBP. Programs of this nature can be used as routine and included in health centers that assist low-income populations, providing improvement in the health of the hypertensive individuals and removing individuals who have chronic heart disease, such as Chagas disease of resting condition.

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COMPARISON OF BLOOD PRESSURE AND HEART FREQUENCY AMONG WOMEN WITH AND WITHOUT CHAGAS DISEASE SUBMITTED TO PHYSICAL TRAINING.

ABSTRACT

Introduction: Patients with Chagas disease often have high blood pressure (HBP) as the main co-morbidity. In hypertensive individuals with and without Chagas disease hypertension control is generally medicated. Alternative measures of intervention such as aerobic exercise have been recommended as the most effective way to reduce levels of blood pressure.

Objective: Compare blood pressure and heart frequency in women with and without Chagas disease undergoing a physical training program.

Methods: Nineteen volunteers divided in the groups G1 (nine with Chagas disease) and G2 (ten without Chagas disease) were submitted to a training program for 12 weeks, during 30 to 60 minutes twice a week. The systolic (SBP) and diastolic (DBP) blood pressure and heart frequency (HF) were compared within each group and between groups before and after the effort at the beginning (T0) and twelve (T12) weeks.

Results: After 12 weeks of exercise training significant differences were observed in G1 for SBP and DBP before and after effort and HR before effort and in G2 for SBP before and after effort and HF after effort. There was no significant difference between G1 and G2 for all variables.

Conclusion: The low-intensity exercise significantly reduces blood pressure in women with Chagas disease, can be performed safely and includes patients with this disease in routine practice of exercises.

KEY-WORDS: Blood pressure, Chagas disease, physical training, women

COMPARAISON DE LA PRESSION ARTÉRIELLE ET DE LA FRÉQUENCE CARDIAQUE CHEZ LES FEMMES AVEC ET SANS MALADIE CHAGAS SOUMIS À L'ENTRAÎNEMENT PHYSIQUE.

RÉSUMÉ

Introduction: Les patients atteints de la maladie de Chagas ont souvent L'hypertension artérielle systémique (HAS) en tant que principal co-morbidité. Chez les individus hypertendus avec et sans contrôle de la maladie de Chagas de l'hypertension est généralement de médicaments. D'autres mesures d'intervention tels que l'exercice aérobie a été recommandé comme le moyen le plus efficace pour réduire les niveaux de pression artérielle.

Objectif: Comparer la pression artérielle et de la fréquence cardiaque chez les femmes avec et sans maladie de Chagas soumise a un programme d'entraînement physique.

Méthodes: Dix-neuf volontaires divisés en deux groupes G1 (neuf avec la maladie de Chagas) et G2 (dix ans sans maladie de Chagas) a subi un programme de formation pour 12 semaines, d'une durée de 30 à 60 minutes deux fois par semaine. La pression artérielle systolique (PAS) et diastolique (PAD) et la fréquence cardiaque (FC) ont été comparées au sein de chaque groupe et entre les groupes avant et après le stress au début (T0) et après 12 (T12) semaines.

Résultats: Après 12 semaines de l'entraînement des différences significatives ont été observées: dans le G1 pour les variables PAS et PAD pré et post-exercice et pour FC pré-exercice; dans le G2 pour les variables PAS pré et post-exercice et pour FC post-exercice. Il n'y avait pas de différence significative entre les variables G1 et G2.

Conclusion: L'exercice de faible intensité réduit significativement la pression artérielle chez les femmes atteintes de la maladie de Chagas, peut être effectuée en toute sécurité et insérer les patients atteints de cette maladie à des exercices de routine.

MOTS-CLÉS: pression artérielle, maladie de Chagas, l'entraînement physique, la femme

COMPARACION DE LA PRESION ARTERIAL Y LA FRECUENCIA CARDIACA EN MUJERES CON Y SIN LA ENFERMEDAD DE CHAGAS SOMETIDAS A ENTRENAMIENTO FISICO.

RESUMEN

Introducción: Los pacientes con enfermedad de Chagas a menudo se tiene la Hipertensión Arterial Sistémica (HAS) como el principal co-morbilidad. En los individuos hipertensos con y sin control de la enfermedad de Chagas de la hipertensión es generalmente la medicación. Las medidas alternativas de intervención, tales como el ejercicio aeróbico ha sido recomendada como la forma más eficaz para reducir los niveles de presión arterial.

Objetivo: Comparar la presión arterial y la frecuencia cardíaca en mujeres con y sin enfermedad de Chagas sometidos a un programa de entrenamiento físico.

Material y métodos: Diecinueve voluntarios divididos en dos grupos G1 (nueve con la enfermedad de Chagas) y (diez sin enfermedad de Chagas) G2 se sometieron a un programa de entrenamiento durante 12 semanas, una duración de 30 a 60

minutos dos veces por semana. La presión arterial sistólica (PAS) y la diastólica (PAD) y la frecuencia cardíaca (FC) fueron comparados dentro de cada grupo y entre los grupos en el pre y post-estrés, en el inicio (T0) y después de 12 semanas (T12).

Resultados: Después de 12 semanas de entrenamiento se observaron diferencias significativas: en el G1 para las variables PAS y PAD pre y post-ejercicio y FC pre-ejercicio; en el G2 para las variables PAS pre y post-ejercicio y FC post-ejercicio. No hubo diferencias significativas entre las variables de G1 y G2.

Conclusión: El ejercicio de baja intensidad reduce significativamente la presión arterial en mujeres con la enfermedad de Chagas, se puede realizar de forma segura e insertar a los pacientes con esta enfermedad en los ejercicios de rutina.

PALABRAS CLAVE: presión arterial, mal de Chagas, entrenamiento físico, mujer

COMPARAÇÃO DA PRESSÃO ARTERIAL E FREQÜÊNCIA CARDÍACA ENTRE MULHERES COM E SEM DOENÇA DE CHAGAS SUBMETIDAS AO TREINAMENTO FÍSICO.

RESUMO

Introdução: Os portadores de doença de Chagas freqüentemente apresentam a hipertensão arterial sistêmica (HAS) como a principal co-morbidade. Em indivíduos hipertensos com e sem doença de Chagas o controle de HAS geralmente é medicamentoso. Medidas alternativas de intervenção como o exercício físico aeróbico tem sido preconizado como a maneira mais efetiva para reduzir os níveis de pressão arterial.

Objetivo: Comparar a pressão arterial e freqüência cardíaca de mulheres com e sem doença de Chagas submetidas a um programa de treinamento físico

Métodos: Dezenove voluntárias divididas nos grupos G1 (nove com doença de Chagas) e G2 (dez sem doença de Chagas) foram submetidas a um programa de treinamento de 12 semanas, com duração de 30 a 60 minutos duas vezes por semana. A pressão arterial sistólica (PAS), diastólica (PAD) e a freqüência cardíaca (FC) foram comparadas dentro de cada grupo e entre os grupos no pré e pós-esforço no início (T0) e após 12 semanas (T12).

Resultados: Após 12 semanas de treinamento físico diferenças significativas foram observadas em G1 para as variáveis PAS e PAD pré e pós-esforço e FC pré-esforço e em G2 para as variáveis PAS pré e pós-esforço e FC pós-esforço. Não houve diferença significativa entre G1 e G2 para as variáveis estudadas.

Conclusão: O exercício físico de baixa intensidade reduz significativamente a pressão arterial de mulheres com doença de Chagas, pode ser realizado com segurança e inseri os pacientes com esta enfermidade na prática rotineira de exercícios.

PALAVRAS-CHAVE: Pressão arterial, doença de Chagas, treinamento físico, mulher.