19 - CORRELATION OF AEROBIC EXERCISE PERFORMED IN DIFFERENT LENGTHS WITH PRESSURE ANSWERS OF HYPERTENSIVE SUBJECTS.

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INTRODUCTION

Arterial hypertension (AH) has specific characteristics of the chronicity process, distinguished by a long natural history, multiple associated factors, long asymptomatic, slow clinical progression, and prolonged standing, besides the possibility of evolution to various other complications such as atherosclerosis, cerebrovascular disease, coronary artery disease, heart failure, chronic renal failure and vascular disease of extremities. In Brazil, the incidence rates vary from 22.3% to 44.0% and increase with age, being more prevalent in women of African descent 6,18, 19, 24, 29, 36. This phenomenon represents a serious and ubiquitous disease whose medical costs are extremely high and socioeconomic 6, 36. As mentioned, the HA is characterized by sustained for long periods of very strong pressure on vessel walls, causing the development of lesions in the same target organ and 22. It is defined as a systolic blood pressure at rest equal to or greater than 140 mmHg and diastolic blood pressure at rest less than 90 mmHg, or a combination of two situações3, 4, 22. There is evidence that after the completion of a single exercise session achieved a reduction in blood pressure (BP), and this phenomenon known as post-exercise hypotension (PEH) 6.10. Several studies have shown that acute exercise performed at moderate intensities (50 to 70% of VO2 max.) Causes a reduction in BP for up to 24 hours post exercise 2,22,23,35,37 .. For that HPE has clinical importance is needed a significant magnitude that lasts for most of those 24 hours after exercise 5.6. Physical exercise is characterized by a situation that strips the body of its homeostasis, since it implies the instantaneous increase in energy demand of the muscles exercised, and consequently of the organism as a whole. Thus, to meet the new metabolic demand, several physiological adaptations are necessary 12.37. Therefore, regular physical exercise induces the human organism to these various hemodynamic and autonomic changes also in the cardiovascular system to promote this balance metabólico27, 28.34,.

The main mechanisms proposed for the PEH include adaptations neurohumoral, vascular and structural 5.27. Reduced cardiac output, sympathetic tone and catecholamines, and total peripheral resistance, insulin sensitivity and alterations in vasodilators and vasoconstrictors are some of the explanations put forward to the antihypertensive effects of exercise 16,17,22,24,31 ..

However, these cardiovascular responses to physical training and even hypotensive response depend on some variables such as intensity, duration, type of exercise, clinical status, age, ethnicity, gender and training status 7,12,22. 2,23,32 Some authors argue that the longer duration of exercise provides a longer period of PEH, 5,12,34 while others found a similar response, regardless of duração7.

This study aims to examine the duration and magnitude of PEH in different volumes of exercise (30 and 60 minutes) on intensity of 60% of RFC (HRR) 21.

METHODS

Participants

This study selected five (5) physically active hypertensive patients aged between 42 and 54 years. The volunteers were recruited after signing a consent form containing information relating to the procedures used in the study and answer a anamnenese about your health history.

The criteria used for exclusion from the study were sedentary, orthopedic impairments, BMI ≥ 35, smoking, heart disease, beta-blockers and antihypertensive medication on the test day.

Biometric characteristics of study participants according to the mean and standard deviation (SD) for SBP, DBP and resting HR.

(N=5)	Age (years)	Weight (Kg)	Height (m)	BMI (Kg/m²)	SBP (mm/Hg)	DBP (mm/Hg)	WHR	FCR (bpm)
MEAN	50,2	70,09	1.638	25,94	123,34	84,74	0,81	78,8
SD	±5,31	±15.63	±0,071	±4,82	±10.72	±5.10	0,087	4,76

Table 1. *BMI = Body Mass Index; SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure; HR = Heart Rate.*

Drugs used by the study volunteers

Drug	Users
Blocker	2
AT_1 Receptor blocker	1
ACE inhibitor	2
Potassium-sparing	1
Dihydropyridine	1
Diuretic	1

Table 2.

Procedures

The participants had normal BP levels in three different situations - day control (DC), continuous exercise for 30 minutes (EC30) and continuous exercise for 60 minutes (EC60). The exercise was performed on a treadmill (MOVEMENT, LX 160) with constant intensity of 60% of Heart Rate Reserve (HRR) with 21 HR controlled by cardiac monitor.

Exercise sessions

After 10 min at rest and BP measurement, participants began 5 min heating in the wake due to the adjustment of target HR (60% of RFC) was determined for each individual. This intensity was maintained for 30/60 minutes and in the final step was a return to rest 5 min.

After the end of your session, each participant remained seated resting for 90 min.

Variables measured

The HR was monitored during the sessions (Polar FS2c) and PAS, DAP and MAP were measured before exercise and at 5, 15, 30, 45, 60, 75 and 90 min and 22h post-exercise recovery (Premium aneroid sphygmomanometer).

Descriptive Statistics

The data obtained in the moments of each day were presented as mean (M) and standard deviation (SD). The variables under consideration in the periods before and after exercise were compared using one-way ANOVA for repeated measures and Tukey test. Significance is $p < 0.05$. The software used was BIOESTAT 5.0.

RESULTS

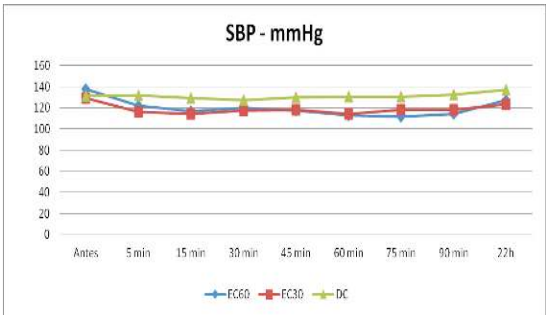


FIGURE 1 - Pattern of systolic (SBP) in the three situations (DC, EC30 and EC60) at rest before and during the recovery period.

As shown in Figure 1, SBP decreased after exercise completion in both durations, especially in periods of 5 to 90 minutes with a sharper response EC60 after 75 and 90 min., And these values after 22h were close to pre-exercise levels. Regarding the rest, the values of this reduction reached 24.4 mmHg to 15.2 mmHg for EC60 and EC30. It was also found that on days without exercise there were no significant changes.

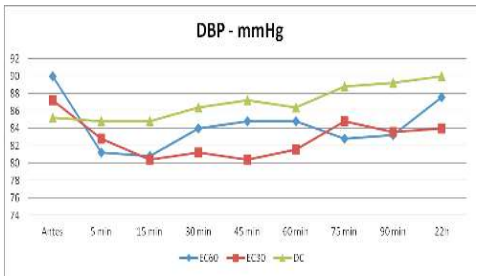


FIGURE 2 - Behavior of diastolic blood pressure (DBP) in three cases (DC, EC30 and EC60) at rest before and during the recovery period.

As for DBP reductions were less significant compared to the results of SBP in times from 50 to 90 min. After the tests, with values up to 9.2 mmHg after the EC60 and EC30 6.8 mmHg after. However, the duration of this drop was shown to be a little more durable as compared to the EC60. In the days without exercise was not observed any significant change.

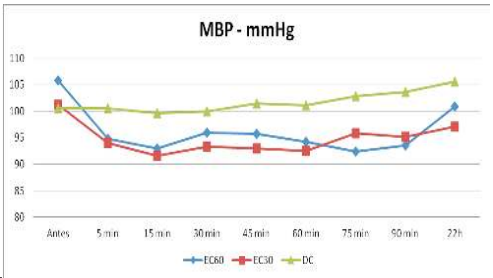


FIGURE 3 - Behavior of Mean Blood Pressure (MBP) in the three situations (DC, EC30 and EC60) at rest before and during the recovery period.

According to fig. 3 revealed a significant decrease from the 5th to the 90th minute, MAP, after the two times of year, with a variation of up to 13.5 mmHg and 9.6 mmHg EC60 to EC30. After 22h of recovery these values also came to the pre-test. On the control day happened a slight increase in these figures since the 45th min. Until the 22th hour of recovery.

DISCUSSION

This paper analyzed the pressure responses of hypertensive patients subjected to three different situations: control day (CD), continuous exercise for 30 minutes (EC30) and continuous exercise for 60 minutes (EC60). The results demonstrated PEH significantly after both the exercise sessions. It was observed that the hypotensive effect of SBP and MBP reached a greater number of times (75 and 90 min) after EC60, showing a greater magnitude compared to the EC30 for the same period. The decreases in DBP were similar EC30 and EC60 after.

According to some authors 11,13,37 after a session of aerobic exercise BP drop has already seen the first 10 minutes and being accentuated as whether to continue the minutes. Other studies also showed that in the first minutes of walking at a constant speed, it was found that there were significant falls in BP in times of 10 to 90 minutes lasting for more than 13h until 9,13,33,35. The results of this investigation are in agreement because they were already significant reductions from the first minute, and after 22h there was a relative elevation of BP, approaching the initial values.

Some studies show that longer duration of exercise enhances both the magnitude and duration of PEH 11,20,32. Our work confirms only with respect to the magnitude of BP, because as mentioned there was no additional effect on the duration of this effect, comparing with EC60 EC30, was correlated with other studies 15,25.

The values for the magnitude of PEH in this study reached 15.2 mmHg (EC30) and 24.4 mmHg (EC60) for SBP and by 6.8 mmHg after the EC30 and EC60 9.2 mmHg for DBP after the above cited in the literature 36,

There are also in the scientific literature, several studies stating that patients with higher BP values at rest are more HPE 8,13,22. The present study confirms this thesis based on measurements taken in the days before the control and exercise sessions.

CONCLUSION

In general, the results of this study indicate the importance of moderate aerobic exercise in reducing BP in hypertensive persons, whether or not the use of antihypertensive medication. Currently, the efficacy of drug therapy to control BP is unquestionable, however, there are several side effects related to its continued use 6,27,36. Therefore, aerobic training enhances the effects of drugs and, to reduce their dosage to patients. Therefore, according to data collected, it was concluded that aerobic exercise of 60 minutes enhances the magnitude of PEH in relation to 30 minutes, but provides no additional effect on its duration.

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CORRELATION OF AEROBIC EXERCISE PERFORMED IN DIFFERENT LENGTHS WITH PRESSURE ANSWERS OF HYPERTENSIVE SUBJECTS.

ABSTRACT

Preface: It is consensus in the scientific literature that physical exercise, especially aerobic, is a very effective non-drug treatment of hypertension. This study seeks to identify whether the aerobic exercise performed for a longer period of time enhances the magnitude and / or the duration of post-exercise hypotension (PEH). Materials and Methods: Five (5) hypertensive volunteers (50.2 ± 5.3 years) have been analyzed for 22h in three non-consecutive days: control (CD), after a continuous session of 30 minutes (CE30) and after a session continuous of 60 minutes (CE60). Results: In the days when the group performed the exercise there was significant PEH presented the following values: up to 15.2 mmHg (CE30) and 24.4 mmHg (EC60) for SBP and 6.8 mmHg and 9.2 after CE30 mmHg after the CE60 for DBP. Discussion: According to the results, the longer exercise session provided a higher magnitude of PEH in relation to the shorter exercise. Conclusion: Aerobic exercise per 60 minutes enhances the magnitude of the PEH compared to 30 minutes, but provides no additional effect on its duration.

KEY WORDS: Hypertension, aerobic exercise, post exercise hypotension, magnitude, length.

CORRESPONDANCE DE L'EXERCICE AÉROBIQUE À DIFFÉRENTS MOMENTS AVEC RÉPONSES PRESSIVES CHEZ LES PERSONNES HYPERTENDUES.

RÉSUMÉ

Introduction: Il existe un consensus dans la littérature scientifique que l'exercice, en particulier l'exercice aérobique, est un traitement très efficace non-pharmacologique de l'hypertension. Cette étude cherche à déterminer si l'exercice aérobie effectuée pour une plus longue période de temps augmente l'ampleur et / ou la durée de l'hypotension post-exercice (PEH). Matériels et Méthodes: Nous avons examiné cinq (5) des volontaires hypertendus (50,2 ± 5,3 ans) pour les 22h en trois jours non consécutifs: le contrôle continu (CC), après une séance en continu de 30 minutes (EC30) et après une session 60 minutes en continu (EC60). Résultats: Les jours où le groupe a réalisé l'exercice a été significative PEH a présenté les valeurs suivantes: jusqu'à 15,2 mmHg (EC30) et de 24,4 mmHg (EC60) pour la PAS et de 6,8 mmHg après 9,2 et EC30 mmHg après l'EC60 pour ADP. Discussion: Selon les résultats, la session prévue plus exercer une plus grande ampleur de PEH par rapport à la plus courte de l'exercice. Conclusion: L'exercice aérobie pendant 60 minutes augmente l'ampleur de la PEH par rapport à 30 minutes, mais ne fournit aucun effet supplémentaire sur sa durée.

MOTS-CLÉS: hypertension, l'exercice aérobique, de l'hypotension post-exercice, ampleur, la durée.

CORRELACIÓN DEL EJERCICIO AERÓBICO REALIZADO EN DIVERSAS HORAS CON RESPUESTAS COMPRESOR EN HIPERTENSOS.

RESUMEN

Introducción: Existe un consenso en la literatura científica que el ejercicio, especialmente el ejercicio aeróbico, es un tratamiento altamente efectivo no farmacológico de la hipertensión. Este estudio trata de determinar si el ejercicio aeróbico realizado durante un período más largo de tiempo aumenta la magnitud y / o la duración de la hipotensión post-ejercicio (HPE). Materiales y métodos: Se revisaron cinco (5) voluntarios hipertensos (50,2 ± 5,3 años) durante 22 horas en tres días no consecutivos: de control (DC), después de una sesión continua de 30 minutos (EC30) y después de una sesión continua de 60

minutos (EC60). Resultados: En los días cuando el grupo realizó el ejercicio fue significativa EPS presentó los siguientes valores: hasta 15,2 mmHg (EC30) y 24,4 mmHg (EC60) para la PAS y de 6,8 mmHg después de 9.2 y EC30 mmHg después de la EC60 para ADP. Discusión: De acuerdo a los resultados, la sesión de entrenamiento ya proporcionan una mayor magnitud de la EPS en relación con el ejercicio más corto. Conclusión: El ejercicio aeróbico durante 60 minutos aumenta la magnitud de la EPS en relación con los 30 minutos, pero no proporciona ningún efecto adicional sobre su duración.

PALABRAS CLAVE: hipertensión, ejercicio aeróbico, hipotensión post-ejercicio, magnitud, duración.

CORRELAÇÃO DO EXERCÍCIO AERÓBIO REALIZADO EM DIFERENTES DURAÇÕES COM AS RESPOSTAS PRESSÓRICAS DE INDIVÍDUOS HIPERTENSOS.

RESUMO

Introdução: É consenso na literatura científica que o exercício físico, principalmente o aeróbio, é uma forma bastante eficaz no tratamento não-medicamentoso da hipertensão. O presente estudo busca identificar se o exercício aeróbio realizado por um maior período de tempo potencializa a magnitude e/ou a duração da hipotensão pós-exercício (HPE). Materiais e Métodos: Foram analisados 5 (cinco) voluntários hipertensos (50,2±5,3 anos) durante 22h em três dias não-consecutivos: controle (DC), após uma sessão contínua de 30 minutos (EC30) e após uma sessão contínua de 60 minutos (EC60). Resultados: Nos dias em que o grupo realizou o exercício houve HPE significativa apresentando os seguintes valores: até 15,2 mmHg (EC30) e 24,4 mmHg (EC60) para PAS e, 6,8 mmHg após o EC30 e 9,2 mmHg após o EC60 para PAD. Discussão: Conforme os resultados, a sessão de exercício mais longa proporcionou uma maior magnitude de HPE em relação ao exercício mais curto. Conclusão: O exercício aeróbio de 60 minutos potencializa a magnitude da HPE em relação ao de 30 minutos, mas não proporciona efeito adicional em sua duração.

PALAVRAS-CHAVE: Hipertensão, Exercício aeróbio, Hipotensão pós-exercício, Magnitude, Duração.