Original Article

Risk of a sudden death in young women during urban trail walk with an extra load

RICARDO MACEDO, ROBELIUS DE BORTOLI

Physical Education Department, Sergipe Federal University, BRASIL

Published online: May 31, 2017

(Accepted for publication May 15, 2017)

DOI:10.7752/jpes.2017.s2072

Abstract:

This case study reviewed the records of heart rate and blood pressure during a urban trail walk in two young woman participants of a physical activity program. This study assessed the blood pressure and heart rate of two young women during a one-hour walk in an urban trail. A woman carrying extra overload on the walk showed high pressure in times of climbing. Therefore, this case raises the need to investigate the effect of the extra overload carried by a person in the cardiovascular system during a light walk in leisure places such as public parks.

Key Words: - Sudden Death, Exercise risk, Women, Physical Activity.

Introduction

The search for a healthy lifestyle has been driving people to the practice of physical activities. In addition, the World Health Organization (2011) recommends the practice of moderate physical activity (30 min/day, 5 days/week), as a risk protection factor for many diseases. On the other hand, exercises practiced without following the recommendations of health professionals have deleterious effects (Goodman et al., 2013). Thus, the sporadic vigorous exercise associated with a complex system of heart disease (regardless the diagnosis) potentially increases the risk of sudden cardiac death (Siscovick, 1997; Bronzatto et al., 2001). However, sudden death can also occur in physically active individuals who showed no cardiovascular disease in the first evaluations because the individual may develop a heart disease later in life that would limit the practice of exercise (Poussel et al., 2012). That is why the medical associations recommend a periodical and pre-participation evaluation to check if there is any heart condition that limits or precludes the practice of physical activity (Riebe et al., 2015).

In young individuals (up to 30 years old) the first demonstration of the existence of a cardiac pathology is in the event of a sudden death because on this age group the diseases are usually anatomical and asymptomatic, and therefore, difficult to detect (Poussel et al., 2012). Thus, the promotion of physical activity without a prior medical evaluation may be a risk even for young people. Meanwhile, the promotion of physical activity without supervision in recreational areas such as parks has been increasing. In these places individuals encounter obstacles and carry extra weight (backpacks with food and water) which increase the intensity of the exercise, even during a stroll. That is why this case study analysed the records of heart rate and blood pressure during a walk held in an urban trail by women participating in a physical activity program.

Material & methods

Our research group has been following the growth of the encouragement for the practice of physical activity outdoors. Consequently, we decided to analyze the data of one of the incentive programs for these activities. In this study, we evaluated the records of two young women who had a one-hour walk in an urban track at *Parque da Cidade* (Aracaju, Brazil). This park holds various altitude from 21 to 85 meters above sea level and it has an uneven terrain with ascents and steep slopes. The relative humidity in the day was 70% and the temperature ranged from 27° to 30 ° C. Thus, in order to make this journey with tranquillity some people have the habit or guidance to carry groceries in a backpack, like water, snacks and sunscreen. Regarding the data collected by the program, all participants used a heart rate monitor that recorded the heart rate at rest and every 10 minutes throughout the journey (Figure 1a). In addition, the coordinator of the group took 3 digital blood pressure monitors with which the blood pressure at rest and every 10 minutes' walk was measured (Figure 1b and 1c). The route presented two moments of ascent, after 20 minutes and at the end of the walk.

Participants were natural women, living in Aracaju, Sergipe, Brazil. They were physically active with no medical history of cardiovascular disease and no family history of death from cardiovascular disease. They

also had resting blood pressure within the normal range, they were not taking any medication, they slept at least 6 hours and they were out of their menstrual period.

Results

The first participant was 21 years old and she carried a backpack with groceries that accounted for 13% of her body mass. The performance of the heart rate showed a 29% increase in the beginning of the exercise. Then there was a variation of 20 heartbeats throughout the exercise (Figure 1a). Systolic blood pressure rose 14% above the value measured at rest while walking on flat ground and showed a hypertension of 55% above the pre-exercise value during both moments of ascent (Figure 1b). On the other hand, the diastolic blood pressure throughout the route showed a 15% rise compared to the pre-exercise record. Only during the first ascent there was a hypertension of 40% above the resting value (Figure 1c).

The second participant was 21 years old and she had a walk without extra weight. The performance of the heart rate showed a 33% increase in the beginning of the exercise. Then there was a variation of 20 heartbeats throughout the exercise (Figure 1a). Systolic blood pressure remained around 7% above the value measured at rest throughout the walk, and showed an increase of 22% above the pre-exercise value in the first ascent (Figure 1b). On the other hand, the diastolic blood pressure throughout the trail was 4.5% above pre-exercise record (Figure 1c).

Figura 1. Gráfico dos registros da Frequência Cardíaca (a), Pressão Arterial Sistólica (b) e Diastólica (c) a cada 10 minutos das participantes 1 com sobrecarga (linha) e 2 sem sobrecarga (pontilhado).

Dicussion

Literature states that the practice of regular physical activity has benefits reducing the risk of cardiovascular disease and sudden death⁷. Furthermore, the scientific community has shown that the practice of walking constantly presents benefits to the health. Nevertheless, when the practice is done sporadically and intensively, associated with a cardiovascular disease, this exercise can behold a risk of sudden death (Goodman et al., 2013). Therefore, it is recommended that people make periodic cardiovascular examinations before taking part in exercise programs and in these programs they follow the guidance of a professional (Riebe et al., 2015).

The normal response to the progressive exercise in an asymptomatic individual is the decrease in the parasympathetic activity and the increase in the sympathetic one as the intensity heightens. Therewith, there is a progressive increase in heart rate and in systolic blood pressure, while there is a stabilization of the diastolic blood pressure. The responses in the cardiovascular system during the exercise will vary according to the intensity and volume applied. The first one can be applied using resistance, uplands, speed, etc. While the volume is managed through the duration of the activity, repetitions, sets, etc. Therefore, the choice of the activity must be tailored to the need and to the taste of the practitioner, since literature presents the benefits to the health in various possibilities of strength and volume.

In this line, the media and the scientific community promote that people should be more active practicing mild physical activity in parks and public squares. These activities constitute most of the time in low-intensity walks that minimally alters the heart rate and blood pressure above resting values regardless of the unevenness presented on the track. For in this case the intensity of the steepness is offset by the low speed.

However, in the case presented in this study an excessive elevation of systolic blood pressure in relation to the resting value in times of ascension occurred with one of the practitioners. While the other participant remained with systolic blood pressure without oscillation of the values at the same moments. The only difference between them was the overweight load carried by the first practitioner.

This extra resistance is recommended by health professionals to be utilised when practicing healthy physical activity. However, in this case the activity was set to be from mild to moderate and it became vigorous. This occurring with an individual with prior and asymptomatic cardiovascular disease as well as physically inactive, may present a risk of sudden death. This occurs because sporadic vigorous activities associated with a pre-existing disease are responsible for the increase of the risk of sudden death (Goodman et al., 2013).

Conclusions

Therefore, this case study raised questions about the promotion of physical activity. Does it present a risk of sudden death for individuals who are not regular practitioners and have cardiovascular disease? Can the extra weight carried by the individual increase the risk of a cardiovascular event during or after the physical activity? So, this case raises the need to investigate the effect of the extra burdens borne by a person in his/her cardiovascular system during a light walk in recreational places such as public parks.

Conflicts of interest

The authors declare no competing interests.

References

- Bronzatto HA, Silva R; Stein R. Morte súbita relacionada ao exercício, 2001, Revista Brasileira de Medicina do Esporte, **7**, pp. 163-69.
- Goodman J, Thomas S, Burr JF. Cardiovascular risks of physical activity in apparently health individuals, 2013 Canadian Family Physician, **59**, pp. 46-59.
- Poussel M, Djaballah K, Laroppe J, Brembilla-Perrot B, Marie P, Chenuel B. Left ventricle fibrosis associated with nosustained ventricular tachycardia in a elite athlete: is exercise responsible? A case report, 2012, Journal Athletic Training, **47**, pp. 224-27.
- Riebe D, Franklin BA, Thompson PD, Garber CE, Whitfield PG, Magal M, Pescatello LS. Updating ACMS's recommendations for exercise preparticipation health screening, 2015, Medicine & Science in Sports Exercise, **47**(11), pp. 2473-9.
- Siscovick DS. Exercise and its role in sudden cardiac death, 1997, Cardiology Clinics, **15**, pp. 467-72.
- Warburton DER, Bredin SSD. Reflection on physical activity and health: what should we recommend? 2016, Canadian Journal of Cardiology, **32**, pp. 495-504.
- World Health Organization. Global recommendations on physical activity for health. 2011.