EFEITO DA RESPIRAÇÃO ABDOMINAL LENTA NA FREQUÊNCIA CARDÍACA E NA PRESSÃO ARTERIAL EM IDOSOS

EFFECT OF ABDOMINAL BREATHING TECHNIQUE ON HEART RATE AND BLOOD PRESSURE IN ELDERLY

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RESUMO

A respiração lenta aumenta a sensitividade barorreflexa em adultos maduros e idosos (Gerritsen et al., 2000). Frequências respiratórias (FR) de 4 e 6 ciclos por minuto resultam numa redução significativa da frequência cardíaca (FC) comparativamente com a verificada a uma FR de 14 ciclos por minuto (Song & Lehrer, 2003). O objetivo deste estudo foi verificar como idosos (N=8, 81.0±8.88 anos de idade, 5 mulheres) responderiam em termos de FC e pressão arterial sistólica (PAS) e diastólica (PAD) quando aprenderam respiração predominantemente abdominal e lenta (RA), sem imposição de FR, que no entanto se revelou significativamente inferior (Z=2.758, p<0,01) na RA (7.94±1,06) comparativamente com a em repouso (8.94±0.93). Os participantes reduziram significativamente (Z=16.118, p<0.0001) a FC na RA (76.81±6.57) comparativamente com a em repouso (79.88±7.38), bem como a PAS (Z=2.349, p<0.02) na RA (141.03±19.73) comparativamente com a em repouso (144.66±21.06), tendo ainda aumentado significativamente a PAD (Z=2.546, p<0.02) na RA (69.16 ± 7.54) comparativamente com a em repouso (66.63 ± 7.64), o que teve como consequência uma redução significativa do intervalo PAS-PAD (Z=2.844, p<0.005) na RA (71.88±18.01) comparativamente com a em repouso (78.03±19.48). Os resultados deste estudo exploratório revelam que uma FR entre 6 e 8 ciclos por minuto, predominantemente abdominal, tem efeitos benéficos na PA e na FC em idosos com hipertensão sistólica isolada moderada (cf., Reyes Del Paso et al., 2006).

Palavras-chave: Técnica de Respiração; Idosos; Frequência Cardíaca; Hipertensão.

ABSTRACT

Slow breathing increases baroreflex sensitivity in older adults and elderly (Gerritsen et al., 2000). Respiratory frequency (RF) at 4 and 6 cycles per minute result in a significant reduction in heart rate (HR) compared to a verified RF of 14 cycles per minute (Song & Lehrer, 2003). The purpose of this exploratory study was to investigate how elderly (N = 8, 81.0 ± 8.88 years old, 5 women) respond in terms of HR and systolic (SBP) and diastolic blood pressure (DBP) when they learned predominantly abdominal and slow breathing (AB), without imposition of RF, which however proved to be significantly lower (Z = 2.758, $p<0.01$) in AB (7.94 ± 1.06) compared to resting condition (8.94 ± 0.93). Results revealed that participants significantly reduced (Z = 16.118, $p<0.0001$) HR in AB (76.81 ± 6.57) compared to resting condition (79.88 ± 7.38), as well as SBP (Z = 2.349, $p<0.02$) in AB (141.03 ± 19.73) compared to resting condition (144.66 ± 21.06), and significantly increased DBP (Z = 2.546, $p<0.02$) in AB (69.16 ± 7.54) compared with resting condition (66.63 ± 7.64), which resulted in a significant reduction in the SBP-DBP interval (Z = 2.844, p<0,005) in AB (71.88 ± 18.01) compared with resting condition (78.03 ± 19.48). The results of this exploratory study show that a RF between 6 and 8 cycles per minute, predominantly abdominal, has beneficial effects on BP and HR in the elderly (cf., Reyes Del Paso et al., 2006).

Keywords: Breathing Technique; Elderly; Heart Rate; Blood Pressure.

INTRODUCTION

Slow breathing increases baroreflex sensitivity in older adults and elderly (Gerritsen et al., 2000). Respiratory frequency (RF) at 4 and 6 cycles per minute result in a significant reduction in heart rate (HR) compared to a verified RF of 14 cycles per minute (Song & Lehrer, 2003).

The purpose of this exploratory study was to analyze the acute effects of a brief diaphragmatic slow breathing training in normotensives as well as in systolic isolated hypertension elderly.

Sample

Participants were 8 elderly (81.0 ± 8.88 years old, 5 women), 4 elderly were identified as normotensive, 2 as with isolated systolic mild hypertension and 2 with isolated systolic moderate hypertension. Participants were recruited from a local center for elderly, and informed consent was obtained. Criteria for definition of hypertensive subjects followed Mandia et al. (2007) guidelines. Subjects taking β-blockers agents or with cardiovascular complications were excluded from the study (cf., Reyes del Paso et al., 1996).

PROCEDURES AND DATA COLLECTING

Systolic and diastolic blood pressure were measured from the arm, each minute, during heart rate measurement. Subjects were lying down on their backs, with a low pillow under their knees. Respiratory rates per minute (RR) were recorded through direct observation of thoracic or abdominal movements. The physiological data acquisition and recording were carried out through a digital sphygmomanometer PIC Universal and a cardiofrequencimeter Polar R31.

The experimental session was structured according to the following sequence: 5 min of rest with normal breath, taken as baseline, and 5 mn abdominal breathing technique. In a previous training period, of about 10 to 15 mn, participants were instructed relative to abdominal breathing technique, as follows: (1) put one hand on your chest and the other on your belly, (2) breath only through your nose, (3) fill your belly with air, and then let it go out slowly. No pace of breathing was imposed. Based on clinical history, ambulatory and successive experimental blood pressure registrations, no signs of white coat effect or masked hypertension were detected.

DATA TREATMENT

Data were statistically treated with statistical program IBM-SPSS, version 20. Wicoxon test was used to compare conditions. Effect size *r* was calculated.

RESULTS

Frequency of predominantly abdominal and slow breathing (AB), proved to be significantly lower in AB (7.94 ± 1.06, *Md* = 8) compared to resting condition (8.94 ± 0.93, *Md* = 9) (Z = 2.758, p<0.01), with an almost large size (*r* = .49). Notice that AB mean frequency didn´t achieve a 6 RF (see, Song & Lehrer, 2003).

Participants also significantly reduced HR in AB (76.81 ± 6.57, *Md* = 75) compared to resting condition (79.88 ± 7.38, *Md* = 79) (Z = 16.118, p<0.0001), with a large effect size (r = .73) (in fact, individually, all of them reduced HR when in AB); as well as SBP in AB (141.03 ± 19.73, *Md* = 143) compared to resting condition (144.66 ± 21.06, *Md* = 144) (Z = 2.349, p<0.02), with an almost medium size (r = .29); and, significantly increased DBP in AB (69.16 ± 7.54, *Md* = 68) compared with resting condition (66.63 ± 7.64, *Md* = 66.5) (Z = 2.546, p<0.02), with a medium effect size (r = .32); which resulted in a significant reduction in the SBP-DBP interval in AB (71.88 ± 18.01, *Md* = 70) compared with resting condition (78.03 ± 19.48, *Md* = 74.5) (Z = 2.844, p<0,005), with a medium effect size (r = .36). Also notice that compared to resting condition, AB afforded a smaller standard deviation, meaning that participants became a more homogeneous group relative to these physiological indicators.

DISCUSSION

With simple instructions, the elderly reduced their breathing rate, heart rate, systolic pressure, and, pulse pressure (systolic minus diastolic), and elevated their diastolic pressure, even without reaching 6 respiratory cycles per minute. For these participants, breathing at 8 cycles per minute (0.13Hz) may have produced a resonance phenomenon (cf., Bertiniery et al., 1987; Eckberg & Sleight, 1992; Sleight, 1997; Lehrer et al., 2000).

The reduction of pulse pressure is a stimulating result, because in elderly's hypertension with cardiovascular risk factor or associated clinical conditions, the pulse pressure showed a strong predictive value for cardiovascular events (Darne et al., 1989; Benetos et al., 1997; Gasowski et al., 2002; Blacher et al., 2000).

Conclusion

With a short period of instructions and training, there was an acute effect of the breathing technique on heart rate and blood pressure (see also, Cea et al., 2005). The results of this exploratory study showed that a brief, and of low-cost, respiratory training intervention can be used to benefit cardiovascular functions in elderly's normotensive and with isolated systolic hypertension (cf., Cea et al., 2005; Meles et al., 2004; Parati et al., 2003; Viskoper et al., 2003). Our preliminary results support the hypothesis that slow breathing rate can be used as complementary and non-pharmacological treatment for hypertension.

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