成人氣喘患者心率變異度之探討

A study of Heart Rate Variability in Adult With Asthma

中文摘要

論文摘要
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本研究主要目的在探討成人氣喘患者與健康成人在休息狀態與運動狀態下心率變異度之差異，並探討身體活動量對成人氣喘患者在休息狀態下心率變異度之影響。本研究採橫斷式研究設計、立意取樣，於北部某醫學中心胸腔科門診及肺部復健室進行個案篩選及資料收集，時間爲 94 年 3 月至 94 年 6 月，共獲得 54 位符合條件的個案參與本研究。研究工具包括七日身體活動量回憶量表、體脂肪夾、心率變異度測量儀器及運動腳踏車，所得資料以卡方檢定、t 檢定、單因子變異分析及皮爾森基差相關進行統計分析。

研究結果顯示，(一)在休息狀態下，氣喘患者各個心率變異度之參數值包括 Total Power、mean、stand deviation、Low Frequency（ms2）、Low Frequency（nu）及 LF/HF（nu）均小於健康成人，並達顯著差異；在運動狀態下，氣喘患者心率變異度參數之 TP、LF（ms2）、LF（nu）及 LF/HF（nu）亦小於健康成人，並達顯著差異，唯獨 HF（nu），氣喘患者所測得之數值不論是休息或運動狀態下均高於健康成人(50.47 ± 19.4 vs 34.25 ± 11, p= .001 & 52.03 ± 18.8 vs 28.35 ± 12.8, p<.0001)，顯示氣喘患者之整體心變異度較健康成人差，而副交感神經活性不論是在休息或運動狀態下均較健康成人高。（二）不論是健康成人或氣喘患者，年齡均與 LF（ms2）及 HF（ms2）成顯著負相關，即年齡愈低其數值愈高；對於氣喘患者而言，有合併慢性病者其 TP（ms2）（t= -2.51，p= .019）、mean（t= -3.476，p= .002）、sdr（t= -2.284，p=0.031）及 LF（ms2）（t = -2.205，p= .037）則顯著低於無合併慢性病者，顯示年齡及有無合併慢性病是影響心率變異度之重要因素。此外，瘦肉組織比例與氣喘患者之 HF（ms2）成顯著負相關（r = -.459，p= .016），即瘦肉組織比例愈低其 HF（ms2）數值則愈高。（三）不論是健康成人或氣喘患者，其高活動組之 TP（ms2），mean，sdr 數值均大於低、中度活動組，氣喘患者高活動組（Ⅵ）之心率變異度數值則接近健康成人之低活動組（Ⅰ），其中 HF（nu）隨著活動量增加而數?逐漸下降，高活動組（Ⅵ）之 HF（nu）數值並接近健康成人之低活動組（Ⅰ）（36.95 ± 20.7 vs 32.54 ± 8.1），且 LF/HF（nu）亦接近健康成人之低活動組（Ⅰ）（1.78 ± 1.6 vs 1.6 ± 0.6）。

本研究結果支持適量提升氣喘患者中等程度以上之身體活動量，對氣喘患者之自主神經調控功能有正向之幫助，可提供臨床醫護人員參考及運用。
關鍵字；氣喘、身體活動量、心率變異度。

英文摘要

Abstract

The purpose of this study were to investigate the difference of heart rate variability (HRV) in asthmatic and control adult under rest and exercise state as well as the influence of physical activity level on heart rate variability among asthmatic subjects under rest state. A cross-sectional research design was conducted from March to June 2005 in the chest outpatient department and chest rehabilitation unit at a medical center of north Taiwan. Fifty-four subjects were enrolled in this study. The instruments including 7-day physical activity recall, skin fold caliper, measurement of heart rate variability and cycle ergometer. Data were analyzed through chi-square test、t-test、one way ANOVA and pearson correlation.

The result revealed, (1) Under the rest state, the parameter values of heart rate variability including of Total Power (TP), mean, sdr, Low Frequency (LF) (ms2), LF (nu) and LF/HF (nu) were significantly decreased in asthmatic subjects than in healthy subjects. Under exercise state, the TP, LF (ms2), LF (nu) and LF/HF (nu) also significantly decreased in asthmatic subjects than in healthy subjects except HF (nu), which was significantly increased in asthmatic subjects than in healthy subjects regardless of rest or exercise state (50.47 ± 19.4 vs 34.25 ± 11, $p = .001$ & 52.03 ± 18.8 vs 28.35 ± 12.8, $p < .0001$). These data suggest that, in contrast with healthy subjects, the parasympathetic activity was increased and the balance of sympathetic to parasympathetic cardiac modulation decreased in asthmatic subjects regardless of rest or exercise state. (2) No matter healthy subjects or asthmatic subjects, there were significantly negative correlation between age and LF (ms2) 、HF (ms2). Namely the age lowers its value to be higher. As far as asthmatic subjects were concerned, the values of TP (ms2) ($t = -2.51$, $p = .019$)、mean ($t = -3.476$，$p = .002$)、sdr ($t = -2.284$，$p = .031$) and LF (ms2) ($t = -2.205$，$p = .037$) were lower in combined with chronic disease than those who without it. The result revealed that age and whether combined with chronic disease were important factors to influence heart rate variability. In addition, there were significantly negative correlation ($r = -0.459$, $p = .016$) between the percentage of lean body mass and HF (ms2) in asthmatic subjects, namely the percentage of lean body mass lower the value of HF (ms2) to be higher. (3) No matter healthy subjects or asthmatic subjects, the values of TP (ms2), mean, sdr in high activity group were greater than the lower and moderate group. The value of heart rate variability in the

high activity group (VI) of asthmatic subjects were approach to the low activity group (I) in healthy subjects. HF(ms2) falls gradually as the activities amount increases. The HF(ms2) (36.95 ± 20.7 vs 32.54 ± 8.1) and the LF/HF (nu) (1.78 ± 1.6 v.s. 1.6 ± 0.6) in high activity group (VI) approach to the low activity group (I). This study supports that the effectiveness of autonomic nerve regulation function in asthmatic subjects as improved of moderate physical activity. The results of the study provide a useful information in clinical care.
key words: asthma、physical activity、heart rate variability.