利用吐氣末正壓面罩裝置協助改善慢性氣喘病患在休息及運動時之肺功能.

Positive Expiratory Pressure Mask(PEPM) Improves Airway Obstruction on Exercise in Patients with Chronic Asthma

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摘要

嚴重氣喘患者常因為慢性肺部結構變化導致肺內空氣滯留，造成肺氣腫。讓20位慢性氣喘患者，使用吐氣末正壓面罩裝置(Positive expiratory pressure mask , PEPmask device)；探討此裝置對於中度阻塞性肺疾之可恢復性的呼吸道阻塞的影響。PEPmask處置可明顯地改善休息及運動時之肺功能，其效果與CPAP (continuous positive airway pressure)相同，但裝置較為便宜且簡單，具有可以顯著改善呼吸道氣體流速之效果。受測者共有4位女性16位男性，在休息（PEPmask 20分鐘）及6分鐘行走測試時，分別給予6cmH2O PEPmask ，目的在改善肺內空氣滯留現象，並利用肺功能測試（流速－容積曲線圖）來比較治療前後之肺功能變化。利用paired t-test分析結果，治療後休息時第一秒最大吐氣量(FEV1)，肺活量(FVC)顯著增加($p<0.01$)和尖峰吸氣流速(PIF)值由3.37±0.28增至3.95±0.32公升，明顯意義（數據$p<0.001$)；治療後休息時流速－容積曲線圖明顯右移，肺總量以下吸氣末端容積(EIV)，肺總量以下吐氣末端容積(EEV)，位移範圍(displacement)明顯增加(以上數據$p<0.0001$)。但PEPmask於運動中的效果，只呈現動態呼吸型式的顯著右移($p<0.0001$)。表示在肺功能數據方面，不論是在休息或運動時，都有改善肺內氣體滯留現象。但在6分鐘行走測試之距離及呼吸困難指數上，較無明顯之意義。

Abstract

The most common obstructive diseases are moderate to severe asthma and chronic obstructive pulmonary disease, which consist of varying combinations of air trapping and emphysema. Twenty chronic asthmatic patients (aged 61.5 ± 1.8 years) (4 female, 16 male) with moderate to sever airway obstruction were enrolled in the study. Patients wore a PEPM with 6 cmH2O for 20 minutes at rest to improve airway flow rate, and then performed the same walking test. Maximal expiratory and inspiratory flow volume loop were

obtained before and after using the PEPM at rest and after exercise. We use the pair t-test for analysis the result. At rest, significantly increased forced vital capacity and forced expiratory volume in one second ($p<0.01$), as well as peak ispiratory flow ($p<0.001$). The flow-volume loop was shifted to the right after wearing a PEPM, suggesting that PEPM significantly increased volume below TLC to end inspiratory (EIV), volume below TLC to end expiratory (EEV)and displacement ($p<0.0001$, respectively). Wearing PEP during walking test significantly increased flow-volume loop EIV, EEV and displacement. This new device of PEPM can prevent dynamic air-trapping response on exercise in patients with chronic asthma.