

1. In ACSM's Guidelines for Exercise Testing and Prescription, it stated "The primary exercise mode for persons with dyslipidemia should be aerobic physical activities. As part of a balanced exercise program, resistance training exercise should be incorporated". (1) 試為這類病人擬一運動訓練計畫，(2) 預期會有那些成效？(15分)
2. 請閱讀下列文獻之部分摘要，並回答問題(1)本研究之實驗設計為何？(2) 試寫出支持本研究結論的重要研究結果(含數字)。(10分)  
*Kouidi EJ, Grekas DM, Deligiannis AP. Effects of exercise training on noninvasive cardiac measures in patients undergoing long-term hemodialysis. Am J Kidney Dis. 2009 Sep;54(3):511-21.*  
SETTING & PARTICIPANTS: 59 HD patients were randomly assigned to an exercise training group (group A; 30 patients) or control group (group B; 29 patients). INTERVENTION: Group A participated in a 10-month supervised exercise training program during the HD sessions (3 times weekly).  
OUTCOMES: Each risk factor separately and the composite risk score. Patients were considered high risk according to the criteria (aerobic capacity: peak oxygen consumption [ $VO_{2peak}$ ]  $\leq 14$  mL/kg/min, left ventricular ejection fraction  $\leq 30\%$ , SD of normal RR intervals [SDNN]  $\leq 70$  milliseconds, positive T-wave alternans, or positive late potentials). Statistical analysis included a 2-group comparison of change scores and analysis of covariance adjusting for baseline. MEASUREMENTS: At entry and end of the study,  $VO_{2peak}$  and left ventricular ejection fraction were estimated, heart rate variability was calculated (measurement of SDNN, mean RR intervals), and the ratio between low- (LF) to high-frequency (HF) components (LF/HF) and late potentials and T-wave alternans were detected. RESULTS: Baseline measurements were similar between the 2 groups. At follow-up, 9 patients from group A and 20 from group B ( $P = 0.003$ ) were considered high risk. The change in number of risk markers over time was significantly different between groups ( $-0.5 \pm 0.7$  in group A versus  $0.07 \pm 0.3$  in group B;  $P < 0.001$ ). Additionally, the change in  $VO_{2peak}$  over time was  $3.5 \pm 3.2$  in group A and  $-0.2 \pm 3.5$  mL/kg/min in group B ( $P < 0.001$ ), left ventricular ejection fractions were  $3.4\% \pm 3.9\%$  and  $0.2\% \pm 7.7\%$  ( $P < 0.05$ ), SDNNs were  $12.6 \pm 16.3$  and  $-1.1 \pm 10.2$  milliseconds ( $P < 0.001$ ), and LF/HF ratios were  $0.3 \pm 0.4$  and  $-0.1 \pm 0.3$  ( $P < 0.001$ ), respectively. LIMITATIONS: Clinical outcomes, including survival, were not assessed. CONCLUSIONS: Exercise training improves aerobic capacity and ameliorates some indicators of risk of sudden cardiac death in HD patients.
3. 請閱讀下列文獻之部分摘要，並回答問題(1)簡述本研究之目的為何？(2)

見背面

試描述本研究之受試者和分組方式。(3) 就本研究的重要結果，加以討論。

(15分)

Anaya SA, Church TS, Blair SN, Myers JN, Earnest CP. Exercise dose-response of the  $\dot{V}_E/\dot{V}CO_2$  slope in postmenopausal women. *Med Sci Sports Exerc.* 2009;41(5):971-6.

**PURPOSE:** Being overweight/obese, having hypertension, and being postmenopausal are risk factors for the development of congestive heart failure (CHF). A characteristic of CHF is an abnormal  $\dot{V}_E/\dot{V}CO_2$  slope, which is predictive of mortality in patients with CHF. Although the  $\dot{V}_E/\dot{V}CO_2$  slope is well established in CHF patients, little is known regarding interventions for "at-risk" populations. **METHODS:** We examined the  $\dot{V}_E/\dot{V}CO_2$  slope in 401 sedentary, overweight, moderately hypertensive women randomized to 6 m of nonexercise (control) or 4 kcal  $\times$  kg<sup>-1</sup>  $\times$  wk<sup>-1</sup> (KKW), 8 KKW, or 12 KKW of exercise at an intensity corresponding to 50% of baseline  $\dot{V}O_{2max}$ . We examined trends in exercise treatment dose versus change in mean  $\dot{V}_E/\dot{V}CO_2$  slope using a linear regression model (KKW vs  $\dot{V}_E/\dot{V}CO_2$  slope) and a linear mixed model.

**RESULTS:** Regression analysis showed a significant trend for a reduction in the  $\dot{V}_E/\dot{V}CO_2$  slope from baseline (mean  $\pm$  SD: 32.6  $\pm$  6.3;  $P < 0.004$ ). When expressed as mean change (95% confidence interval (CI)) from baseline, we observed significant reductions in the  $\dot{V}_E/\dot{V}CO_2$  slope for the 8-KKW (-1.14; 95% CI, -1.5 to -0.2) and 12-KKW (-1.67; 95% CI, -2.3 to -0.3) groups. No significant effect was noted for the 4-KKW (-0.4; 95% CI, -1.2 to 0.15) group.

**CONCLUSION:** Moderate-intensity aerobic exercise at doses of 8 KKW or greater seems to present an adequate dose of exercise to promote small but significant reductions in the  $\dot{V}_E/\dot{V}CO_2$  slope in postmenopausal women who exhibit risk factors associated with the development of CHF.

4. 依據你對代謝症候群危險因子的瞭解，若你要進行『Exercise decreases the risk of metabolic syndrome in elderly females』的研究計劃，請說明你的研究方法，包括受試者選取標準，評估項目，以及運動介入內容。(20分)
5. 試述身體活動對老年人非心血管系統結果的效果 (effects of physical activity on noncardiovascular outcomes in older adults)。(10分)

閱讀完下面兩段短文，回答 6-9 題

(Adapted from Bott et al., 2009. Guidelines for the physiotherapy management of the adult, medical, spontaneously breathing patient.)

Many patients with COPD adopt a rapid, shallow breathing pattern, frequently with chest wall and abdominal asynchrony. In patients with hyperinflated lungs and an

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increased expiratory reserve volume (ERV), the inspiratory muscles are in a permanently shortened position which creates a poor length-tension relationship. Despite some adaptation of the muscles to this shortening, inspiration may need to be augmented by the accessory muscles of respiration, requiring fixation of the shoulder girdle. Although by fixing the shoulder girdle thoracic volume can be increased and ventilation improved, respiratory muscle oxygen consumption is increased. Patients therefore need to be taught how to fix the shoulder girdle and reduce ERV without increasing oxygen consumption.

6. 簡述本文的重點。(8分)

7. 本文所提及的胸腔物理治療技術要如何教導患者在休息及走路狀態下進行?(7分)

Diaphragmatic breathing is when outward motion of the abdominal wall, with minimal chest wall motion, is encouraged during inspiration, commonly by the placement of the therapist's or the patient's hand on the abdomen. This may be problematic for those with hyperinflation. Oxygen consumption ( $\dot{V}O_2$ ) and respiratory rate (RR) were compared in 30 stable COPD subjects at rest, during usual breathing, and during pursed lips breathing, diaphragmatic breathing and a combination of the two.  $\dot{V}O_2$  and RR were lower during all three breathing techniques compared with usual breathing ( $p < 0.05$ ), suggesting that these techniques may be beneficial. Both Vitacca et al and Gosselink et al, however, showed that diaphragmatic breathing in severe COPD patients was associated with an increased sensation of dyspnea. Although there were improvements in ABGs with diaphragmatic breathing, it was at the cost of greater inspiratory loading and poorer mechanical efficiency than usual breathing. A review of breathing exercises in COPD concluded that the evidence for diaphragmatic breathing was not sufficient to include its use in the management of patients with severe COPD.

8. 可以改善 hyperinflation 的呼吸方式為?原理為?(8分)

9. 教導 severe COPD 患者 diaphragmatic breathing 是否合適?理由為何?(7分)

試題隨卷繳回