

1. 何謂慢性心臟衰竭 (chronic heart failure) ? (2%) 請說明左、右心衰竭的臨床表徵與症候 (8 %)
2. 請說明慢性心臟衰竭患者運動耐力受限的病理生理因素 (15%)。
3. 試簡述物理治療對慢性心臟衰竭患者的介入治療計畫 (10%)。
4. 近年來研究趨勢提出以高強度間歇式有氧運動 (high intensity aerobic interval exercise) 做為慢性心臟衰竭患者的運動計畫，請問高強度間歇式有氧運動的運動處方為何 (5%)。
5. 下表是 Haykowsky 等人所發表有關高強度間歇式有氧運動 (INT) 與傳統有氧運動 (MCT) 對慢性心臟衰竭病患訓練效果的統合分析結果，請以文字簡單描述此研究的結果 (5%)，並說明你認為該訓練較有效的可能機轉 (5%)。
(Haykowsky MJ, Timmons MP, Kruger C, et al. Meta-analysis of aerobic interval training on exercise capacity and systolic function in patients with heart failure and reduced ejection fractions. Am J Cardiol 2013;111:1466-9)

見背面

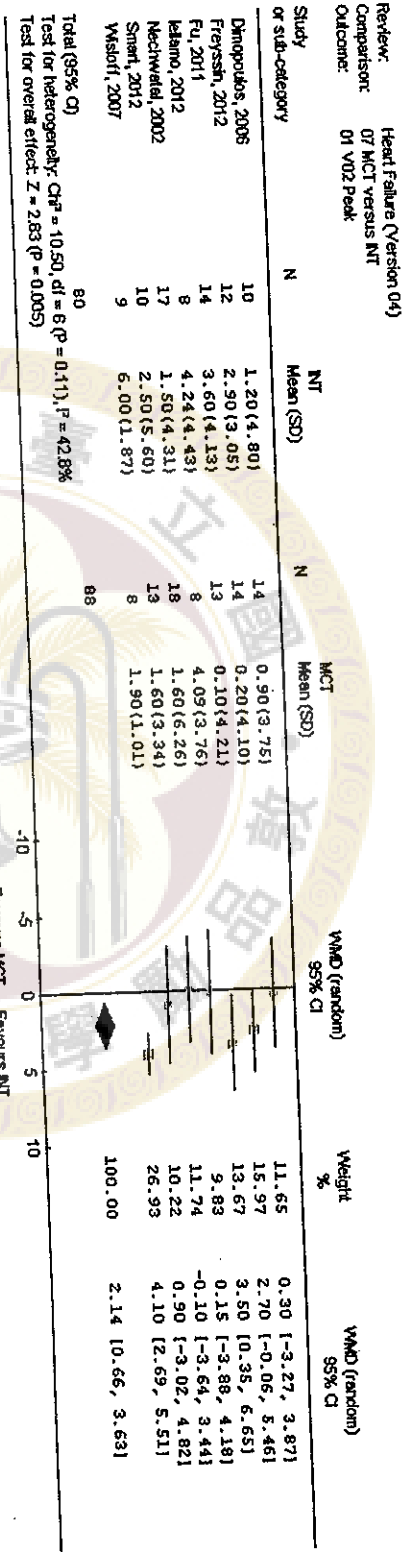


Figure 2. Effects of INT versus MCT on peak VO_2 . CI = confidence interval; WMD = weighted mean difference.

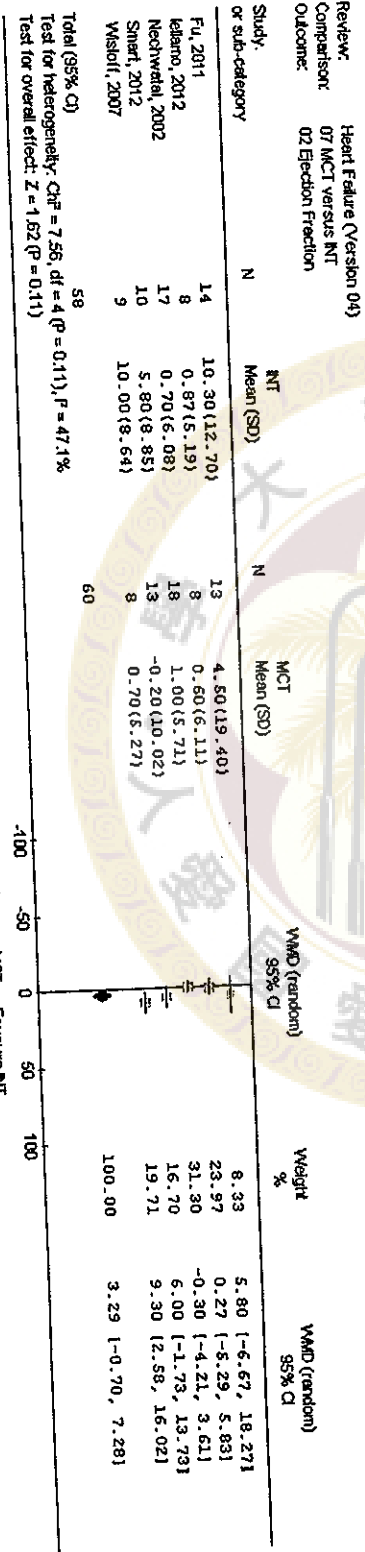


Figure 3. Effects of INT versus MCT on the LVEF at rest. CI = confidence interval; WMD = weighted mean difference.

Please read the following abstract adapted from the article "Evolution of Dyspnea during Exercise in Chronic Obstructive Pulmonary Disease" by Laveneziana P, Webb KA, Ora J, et al., in Am J Respir Crit Care Med. 2011;184:1367-73., and answer questions 6-7

Rationale: Patients with chronic obstructive pulmonary disease (COPD) primarily describe their exertional dyspnea using descriptors alluding to increased effort or work of breathing and unsatisfied inspiration or inspiratory difficulty.

Objectives: The purpose of this study was to examine the impact of changes in dynamic respiratory mechanics during incremental (INCR) and high-intensity constant work-rate (CWR) cycle exercise on the evolution of dyspnea intensity and its major qualitative dimensions in patients with moderate-to-severe COPD.

Methods: Sixteen subjects with COPD performed symptom-limited INCR and CWR cycle exercise tests. Measurements included dyspnea intensity and qualitative descriptors, breathing pattern, operating lung volumes, and esophageal pressure (Pes).

Measurements and Main Results: During both exercise tests, there was an inflection in the relation between tidal volume (VT) and ventilation. This inflection occurred significantly earlier in time during CWR versus INCR exercise but at a similar ventilation, VT, and tidal Pes swing. Beyond this inflection, there was no further change in VT despite a continued increase in ventilation and tidal Pes. During both tests, "work and effort" was the dominant dyspnea descriptor selected up to the inflection point, whereas after this point dyspnea intensity and the selection frequency of "unsatisfied inspiration" rose sharply.

Conclusions: Regardless of the exercise test protocol, the inflection (or plateau) in the VT response marked the point where dyspnea intensity rose abruptly and there was a transition in the dominant qualitative descriptor choice from "work and effort" to "unsatisfied inspiration." Intensity and quality of dyspnea evolve separately and are strongly influenced by mechanical constraints on VT expansion during exercise in COPD.

6. 依據摘要所提供的資料，試畫出兩種不同運動測試下 ventilation (X 軸，單位 L/min) 和 VT (Y 軸，L) 的圖形 (10%)
7. 依據摘要所提供的資料，試畫出兩種不同運動測試下 VT (X 軸，單位 L) 和 dyspnea (Y 軸，Borg scale) (10%)

見背面

Please read the following paragraphs adapted from the article "ERS/ESTS clinical guidelines on fitness for radical therapy in lung cancer patients (surgery and chemo-radiotherapy)" by Brunelli A, Charloux A, Bolliger CT, et al., in Eur Respir J. 2009;34:17-41., and answer questions 8-9

Low-technology exercise: stair, 6-min walk distance or shuttle?

Aside from pulmonary function tests, other measures of cardiopulmonary fitness have been shown to be useful for pre-operative risk stratification. The most widely used low-technology tests include 6-min walking, shuttle walk test and stair climbing.

Although distance walked in 6–12 min has been shown to be highly reliable in estimating VO_{2peak} in healthy subjects, COPD patients and transplant candidates, non-univocal findings have been published regarding its association with post-operative outcome after lung resection.

The shuttle walk test has been reported to be more reproducible and more highly correlated with VO_{2peak} . It has been estimated by regression analysis that 25 shuttles on the shuttle walk test indicate a VO_{2peak} of 10 mL/kg/min and, therefore, this cut-off value has been suggested in the functional algorithm proposed by the British Thoracic Society.

However, Win and co-workers found no statistically significant difference in shuttle walk distance between patients with and without complications after lung resection. They also found that this test tends to underestimate exercise capacity at the lower range compared with VO_{2peak} , concluding that it should not be used alone to exclude patients from operation, contrary to current recommendations. The same authors found that all patients who walked >400m at shuttle walk test had a $VO_{2peak} > 15$ mL/kg/min.

Several papers have shown the effectiveness of the stair climbing test to predict major cardiopulmonary complications after lung resection. In a more recent study, Brunelli et al. confirmed his previous findings in a series of 640 patients submitted to major lung resection. Patients climbing <12m had two-fold and 13-fold higher rates of complications and mortality compared to those climbing >22m (<1% mortality rate). In this latter paper, they found that, even in patients with ppo-FEV₁ (post-operative FEV₁) and/or ppo-DLCO (post-operative DLCO) <40%, the mortality rate in those climbing >22m was zero.

Although exercise oximetry has been proposed to be a useful tool in the pre-operative functional evaluation of lung resection candidates, the role of exercise oxygen desaturation (EOD) in risk stratification has not been defined regarding its definition and its association with early outcome after lung resection.

Two studies found that EOD was a better discriminant of post-operative respiratory failure, need for intensive care unit (ICU) admission, prolonged hospital stay and home oxygen requirement with respect to spirometry. However, Varela et al. found that oxygen desaturation $<90\%$ during standardised incremental cycle ergometry was not a significant predictor of post-operative cardiopulmonary morbidity. Recently, Brunelli et al. found that a desaturation $>4\%$ was significantly associated with post-operative complications, even after adjusting its effect for other factors with regression analysis.

8. 依以上證據，shuttle walk test 的距離是不是一個用來預測病人術後是否會發生併發症的可信賴指標？若用來當作篩選病人是否可以接受手術，臨界值 (cut-off values) 的選擇建議以什麼為佳？(12%)
9. 以上提供資料中，以哪一種的測試用來預測手術致死率最佳？及這種測試的最佳篩顯臨界值 (cut-off values) 為？何種指標用來預測是否術後會發生呼吸衰竭的併發症最為 sensitive？及其臨界值 (cut-off values) 為？(18%)



試題隨卷繳回