

1. 請說明心衰竭的最新分類標準 (10 分)。
2. 請描述各種骨骼肌質量的評估方式，並比較其優缺點 (15 分)。
3. 請閱讀下列節錄文章後，說明慢性心衰竭患者合併衰弱的可能機轉 (25 分)。

The high burden of frailty in patients with chronic HF is likely related to a coordinated multisystem dysfunction that is precipitated by the systemic nature of HF, including systemic inflammation, high comorbidity burden, older age, and chronic skeletal muscle abnormalities. Chronic HF accelerates the aging-associated decline in muscle mass with relative preservation or accumulation of adipose, leading to higher rates of sarcopenic obesity than with aging alone. Chronic HF is also associated with abnormal muscle composition (i.e., high levels of intermuscular adipose tissue, shift in fiber type, reduced capillary density) that contributes to impaired mitochondrial function in skeletal muscle, reduced exercise capacity, and physical frailty. The accelerated changes in muscle composition and associated physical frailty in chronic HF are likely the result of an upregulation of a proinflammatory state causing metabolic impairment, especially insulin resistance.

Comorbidities common in older patients with chronic HF are also pro-inflammatory and associated with insulin resistance, further accelerating adverse changes in muscle composition, size, and performance. Furthermore, hemodynamic abnormalities associated with HF can lead to tissue hypoxia, cellular apoptosis, and inflammation. Chronic congestion, volume overload, and hypoperfusion can also contribute to gut ischemia, translocation of gut microbiome, and upregulation of inflammatory pathways. Moreover, activation of neurohormonal pathways in chronic HF can also contribute to the pro-inflammatory state. The pro-inflammatory state and associated metabolic impairment, coupled with chronic hypoperfusion in HF, lead to structural and functional abnormalities in other organ systems and contribute to global decreases in physiological reserve and a state of heightened vulnerability.

The relation between frailty and HF is bidirectional: higher frailty contributes to worse physical functional status, cognitive impairment, and quality of life in patients with HF through upregulation of pro-inflammatory pathways and lower tolerance to physiological stressors. Furthermore, these chronic processes may be exacerbated by an acute rise in inflammatory cytokines and worsened insulin resistance and further compounded by profound hospital-associated inactivity. These acute factors promote muscle loss as well as adipocyte proliferation and lipid accumulation, which may further impair muscle function and recovery and contribute to sustained, prolonged global decline in functional status through local and systemic inflammatory and metabolic pathways. This may contribute to hospital-associated functional decline and a “posthospital syndrome” such that even after resolution of decompensated HF, patients continue to have marked impairments in physical function and a higher burden of frailty. (以上摘要修改自 Pandey A, et al. *Frailty is intertwined with heart failure: mechanisms, prevalence, prognosis, assessment, and management. JACC Heart Fail.* 2019;7(12):1001–1011.)

見背面

4. 試述以運動來作為一種 airway clearance techniques (ACT) 方式的原理、優點、及缺點 (20 分)。

閱讀下列文章段落回答問題 5-6

5. 請問 ELTGOL 所提出的概念基礎為何？ (15 分)
6. 若要知道 ELTGOL 與 active cycle breathing (ACT) 效果何者較佳，可以選用那些參數 (outcome measures) 來觀察？ (15 分)

Slow expiration with the glottis opened in the lateral posture (ELTGOL) is an ACT whose effect is based on increasing airflow resistance and air flow–mucus interaction by reducing the diameter of the peripheral airways of the inferolateral lung. This reduction in diameter results from the weight of the superolateral lung and mediastine, from inferolateral hemidiaphragm displacement in a cephalad direction due to compression of the viscera, and from slow and prolonged expiration, which confers the added benefit of avoiding airway collapse.

(摘自 Muñoz G, de Gracia J, Buxó M, Alvarez A, Vendrell M. Long-term benefits of airway clearance in bronchiectasis: a randomised placebo-controlled trial. *European Respiratory Journal*. 2018;51(1):1701926)

試題隨卷繳回