

# The frail patient with heart disease: please handle with care!



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Improvements in life expectancy in our aging society have resulted in an increased prevalence of frailty in patients with ischemic heart disease (IHD), heart failure (HF), and cardiac valve disease. Frailty, which has been defined as a state of increased vulnerability to external stressors and decreased physiological reserve, has important implications on the management of these conditions in elderly patients – in particular, its presence is known to be predictive of worse clinical outcomes. In this issue of *Heart and Metabolism*, strategies for improving the detection and management of frail patients with cardiovascular disease (CVD) are discussed.

In the opening article, Dr Nicola Veronese explores the challenges facing the detection and management of the frail patient with CVD. The close interplay between frailty and CVD is highlighted, with frailty being a risk factor for developing CVD and vice versa. This can be explained in part by the shared etiological factors between these two conditions, including low-grade inflammation, cellular senescence, and endocrine dysregulation, among others. In the next article, Dr Ken Shinmura explores the triangular relationship between frailty, HF, and cognitive impairment. In at least one-quarter of elderly patients, HF is complicated by both physical frailty and cognitive impairment. The pathophysiology underlying HF directly contributes to frailty by reducing exercise capacity and skeletal muscle function. Furthermore, patients with HF are more susceptible to cognitive impairment, which

accelerates the development of physical frailty and HF, resulting in a vicious cycle. Crucially, there are no standardized screening tools for cognitive impairment in patients with HF, and there is an incomplete understanding of the complex relationships between frailty, HF, and cognitive impairment. Strategies that increase cardiac output, such as exercise have been shown to increase cognitive function and may be used as a therapeutic intervention in frail patients with HF.

Transcatheter aortic valve implantation (TAVI) is an increasingly common intervention for older patients with aortic stenosis who are at risk of complications from major cardiac surgery. The challenge has been to have objective and reproducible physical frailty measures that can be used to identify patients at the very highest risk of early mortality or worsening disability after TAVI. In their article, Drs Atul Anand and Nicholas L. Mills, discuss several frailty measures that may be used to help assess risk in older patients with aortic stenosis and guide patient selection for TAVI in order to maximize the benefit of treatment. In the following article, Drs Li Ying Koh and Nian Chih Hwang provide an anesthetists' perspective on managing frail patients with coronary artery disease undergoing cardiac surgery who are at risk of experiencing worse clinical outcomes postsurgery. Conventional preoperative risk scores do not take into account the increased physiological vulnerability of the frail patient; therefore, frailty-specific risk scores are needed

to improve preoperative risk assessment in this setting. The issue of cardiovascular pharmacotherapy in frail patients with IHD is addressed in the article by Drs Cristiana Vitale, Massimo Fini, and Giuseppe Rosano. Certain cardiovascular drugs are known to impair quality of life and functional capacity in frail patients with CVD. In this regard,  $\beta$ -blockers are associated with an increased risk of cognitive decline and a reduced ability to independently perform activities of daily living, and ivabradine, which is well tolerated in frail elderly patients, may provide an alternative therapy. Conversely, drugs known to have a positive effect on functional capacity and quality of life in frail patients can be considered. For example, the antianginal agent trimetazidine has been shown to improve myocardial ischemia, exercise capacity, quality of life, and prognosis in elderly patients.

Frailty has been associated with worse clinical outcomes following acute coronary syndrome and PCI. Therefore, frailty status should be taken into careful consideration when treatment strategies are planned. In this issue's case report, Dr Luciano Candilio describes the case of an 87-year-old patient undergoing PCI for non-ST-segment elevation myocardial infarction and evidence of multivessel coronary artery disease, who had significant comorbidities, including chronic kidney impairment, peripheral artery disease, and chronic obstructive pulmonary disease. His frailty status was carefully evaluated and the risks and benefits of potential management strategies were taken into account by his heart team. He underwent a successful staged PCI to his left main stem and right

coronary artery with chronic total occlusion, and he reported no symptoms on a subsequent follow-up and a significantly improved quality of life.

In the refresher corner, Dr Gary D. Lopaschuk reviews the changes in cardiac metabolism in the aged heart, and, subsequently, how these alterations in energy production can compromise the ability of the heart to adapt to stresses requiring an increase in energy demand. Therefore, improving both cardiac energy production and the efficiency of energy production may be a novel therapeutic strategy to lessen cardiac disease in the elderly.

Finally, in the hot topics article, Drs Shane Nanayakkara and David M. Kaye review the role of diet and exercise as potential strategies for improving health outcomes in frail patients with CVD. In HF patients with frailty, it has been shown that exercise reduces rehospitalization rates, improves quality of life, and is a cost-effective intervention. Although frailty and nutritional status are closely linked, the evidence for dietary modification, such as increased protein intake or vitamin supplementation, has produced mixed results. Further studies are needed to investigate the efficacy of therapeutic strategies for improving health outcomes in frail patients with CVD.

In summary, this issue of Heart and Metabolism highlights the challenges in detecting and managing frail patients with IHD, HF, and cardiac valve disease. Much more work is needed to improve frailty-specific risk assessment so management can be personalized to aged patients in order to improve health outcomes in this increasingly important patient group. ■