

The frail patient with heart disease: an emerging and challenging issue

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Abstract

Frailty and cardiovascular disease (CVD) are two common conditions that may affect clinical outcomes in older people. Epidemiological studies suggest that CVD is one of the most important contributor to the development of frailty in the aged patient, and the latter can therefore be considered a potential CVD risk factor. Moreover, traditional CVD risk factors are also known to be important for developing frailty. This close relationship between CVD and frailty is due, in part, to the shared etiological factors, which include low-grade inflammation, cellular senescence, and endocrine dysregulation. Therefore, the early detection of frailty is important in the management of patients with CVD or in those who are at a high risk of developing CVD. In this regard, the use of a comprehensive geriatric assessment (CGA) may be considered in these patients. Unfortunately, the literature available for the use of CGA is only based on observational data, which may be biased; therefore, future studies are needed to understand the true role of CGA for detecting frailty in patients with CVD. In this article, an overview is provided of the current evidence regarding frailty, CVD, and their coexistence in terms of the underlying pathophysiology and their impact on clinical outcomes. ■ *Heart Metab.* 2018;76:4-7

Keywords: cardiovascular disease; comprehensive geriatric assessment; frailty

Introduction

Frailty has been traditionally defined as “reduced physiological reserve and increased vulnerability for poor resolution of homeostasis after a stressor event.”¹ It is a common condition in older people, affecting about one person in ten.² The prevalence of frailty in people affected by cardiovascular disease (CVD) is higher than in those without CVD,³ but increasing numbers of studies suggest that the relationship between frailty and CVD is closely intertwined, ie, frail people are at an increased risk of CVD

and vice versa.⁴ Finally, the presence of frailty in patients with CVD (and vice versa) appears to have important prognostic implications.⁵ This article provides an overview of the current evidence regarding frailty, CVD, and their coexistence in terms of the underlying pathophysiology and their impact on clinical outcomes.

Epidemiological research regarding frailty and CVD

From an epidemiological point of view, frailty and CVD are strongly associated. Traditional CVD risk

Abbreviations

CGA: comprehensive geriatric assessment; **CVD:** cardiovascular disease

factors, namely diabetes, obesity, and a sedentary lifestyle, appear to be risk factors for developing frailty.⁶⁻⁸ Moreover, it has been reported that subclinical CVD parameters (eg, the presence of atherosclerotic plaques and higher carotid intima media thickness) are more commonly observed in frail subjects when compared with nonfrail patients.⁹ Finally, recent literature has shown that CVD is one of the strongest risk factors for developing frailty⁴ and that the presence of frailty can increase the risk of developing CVD.^{10,11} When frailty coexists with CVD, the clinical implications for older people are more impactful with clinical importance. Frailty has been associated with increased morbidity, mortality, and disability in patients affected by CVD undergoing cardiac or noncardiac procedures, although most of the research data have been limited by studies using small sample sizes and by a lack of randomized trials.¹²

Common pathophysiology underlying CVD and frailty

From a pathophysiological point of view, it has been reported that there are many molecular and cellular pathways in common between frailty and CVD (*Figure 1*). First, low-grade inflammation is more common

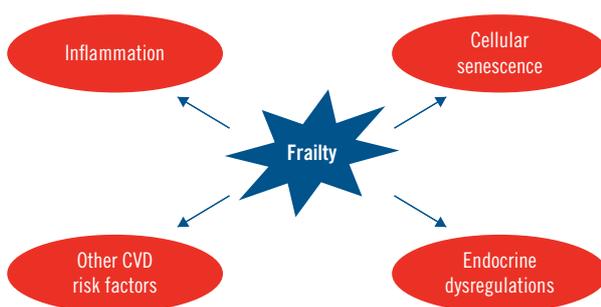


Fig. 1 Pathophysiological associations between frailty and cardiovascular disease.

in frail older patients when compared with less frail older patients,¹³ and low-grade inflammation is well-established to play a major role in the development of CVD.¹⁴ Second, frail patients are known to have cellular and intracellular alterations typical of cellular senescence (eg, marked DNA damage¹⁵ and shorter telomere length),¹⁶ the presence of which may con-

tribute to the development of CVD. Third, endocrine dysregulation that is present in frail patients (eg, lower insulin-like growth factor (IGF)-1 levels)¹⁷ can further increase the risk of CVD in patients affected by frailty. An important role may be played by insulin resistance, a key factor for developing CVD, which is more prevalent in frail patients than in less frail patients.¹⁸

Importance of frailty in the management of older people with CVD

The topic of frailty in the context of CVD is of increasing importance to both geriatric medicine and cardiology. Appropriate and early intervention may help prevent the development of frailty in patients with CVD.¹⁹ Examples of these interventions include physical exercise (particularly resistance training), nutrition, cognitive training, and medication review.²⁰

Since frailty is traditionally defined by physical performance items, particular importance is given to physical exercise. Exercise seems to have a positive effect on various measures used to determine frailty (eg, cognition, physical functioning, and psychological well-being) and some studies revealed that exercise may prevent or, at least, delay the onset of frailty.²¹ However, we do not know which type of physical exercise is best for preventing and treating frailty, since it is estimated that aerobic endurance training can improve peak oxygen consumption, but resistance training is the best way to increase muscle strength and mass.²² Probably, a combined intervention (both aerobic and resistance training) is the best way to treat frailty successfully.²²

Diet is the other intervention for treating frailty. Most studies have shown that dietary supplements or improvements in dietary intake can improve factors related to frailty, such as muscle strength, walking speed in frail or prefrail older adults.²³ However, nutritional interventions are probably not sufficient for treating/preventing frailty without physical exercise.²⁴

Several interventions used for treating frailty are useful for reducing CVD risk²⁵ and specific interventions, such as a heart transplant, are useful for reversing frailty.²⁶ Finally, frailty, particularly in its initial stages, can represent a window for appropriate interventions, specifically lifestyle interventions, that may delay the onset of CVD and consequently reduce disability, hospitalization, and mortality.²⁷

Comprehensive geriatric assessment in patients with CVD

An increasing body of literature supports the importance of a comprehensive geriatric assessment (CGA) in the management of medical conditions common in older individuals, eg, hip fractures.²⁸ Therefore, it is likely that older patients with CVD may also benefit from a global and multidimensional geriatric approach. The literature regarding this topic, which is limited to a few studies,²⁹ has shown that older adults with low CGA scores had worse short- and long-term prognoses.²⁹ To the best of our knowledge, only observational studies are available, and, although they can provide important information, they may suffer from some biases. Moreover, these studies explored only mortality as an outcome, whereas other parameters of clinical importance, such as quality of life, were not included.²⁹ CGA could be useful in the management of CVD for several reasons, particularly because interventions to prevent frailty may break the vicious cycle between frailty and CVD, which would improve global physiological reserve and consequently outcomes.³⁰

Recent guidelines recommend the early recognition of frailty in older patients to provide an estimate of prognosis and to avoid potentially ineffective and expensive medical interventions.³¹ For example, the European Society of Hypertension and the European Union Geriatric Medicine Society Working Group on the management of hypertension have suggested that, for frail subjects, therapeutic decisions should be preceded by: (i) obtaining accurate information on functional capacity and cognitive status; (ii) paying attention to multiple drug administration; (iii) stratifying the frailty status using one of the available rapid methods; and (iv) identifying and correcting factors or conditions that predispose patients to common and possibly severe adverse treatment effects.³²

Therefore, the clinical approach to older patients affected by CVD cannot be limited to a traditional, purely cardiological paradigm, but should also consider the peculiarities of these syndromes, which also include common issues in the physical, psychosocial, and cognitive domains. Complex clinical pictures and highly unstable health trajectories distinguish older ill adults, for whom a traditional clinical approach that is only based on disease-specific guidelines can be misleading with regard to prognosis, resulting in poor

quality of care and negative outcomes.³³ In this regard, physical performance assessment contributes to functional evaluation and provides important prognostic information in older patients affected by CVD.

Future directions

The research of the potential relationship between frailty and CVD is intriguing, but unfortunately, it is only based on observational data. A summary of the most important concepts are provide here:

- Frail patients with no clinical evidence of CVD: lifestyle interventions (eg, physical exercise, nutritional interventions) might reduce the onset of CVD compared with standard care. The use of other common primary prevention interventions, such as low-dose aspirin, is still debated.³⁴
- Frail patients with CVD: many of the interventions that can be used for reversing frailty are probably useful for improving CVD outcomes, but more interventional research is needed.
- Role of CGA: an integrated model of care, as has been developed for orthogeriatrics, is probably the best approach to understand the role of a geriatrician in the treatment of frailty in patients affected by CVD and vice versa.

Conclusions

Frailty and CVD are two common conditions in older people. Increasing literature reports demonstrate an important interdependence between the presence of frailty and CVD. Interventional studies are needed to obtain a better understanding of the role of treating frailty to prevent CVD. ■

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