Heart failure 3: managing frailty in patients with heart failure

Frailty is a state of reduced physiological reserve leading to heightened vulnerability. It is highly prevalent in heart failure and patients with both conditions will have worse outcomes and prognosis. The interplay between these two conditions is complex due to an overlap in underlying mechanisms and symptoms. Assessing frailty should be part of routine care, as it helps stratify patients and supports decision-making. This article, the third in a three-part series, covers the management of frailty in patients with heart failure. Part one describes its pathophysiology, aetiology, clinical presentation and diagnostic features, while part two covers management options and the crucial role of nurses in supporting and educating patients.


Frailty is a common syndrome often found in older people, many of whom also have heart failure (HF). The conditions are linked in terms of epidemiology and pathophysiology. Distinguishing between the two may be difficult, as their clinical features overlap. It is crucial to identify frailty in HF patients because it is associated with a worse prognosis. Identifying frailty can help health professionals plan their patients’ care and determine in whom invasive cardiac interventions may be an appropriate option.

What is frailty?
Frailty is characterised by reduced physiological reserve and a “loss of functionality leading to an increased vulnerability to adverse stress and health events” (Fried et al, 2001). There is considerable variation in the degree of frailty experienced by patients. It is due to biological ageing rather than chronological age and its prev-
Frailty occurs more often in older patients with HF than in the general older population (Uchmanowicz and Gobbens, 2014) and many assessments show a relationship with adverse cardiovascular outcomes. The decline in physiological reserve occurs across the body, but the cardiovascular system is particularly vulnerable, so frailty is highly prevalent in patients with cardiac dysfunction (Nadruz et al, 2017).

**Epidemiology**

It is estimated that, by 2040, 24.2% of the UK population will be over the age of 65 (Age UK, 2017). It is estimated that the prevalence of frailty in older people ranges from 4% up to 59%. It is thought that 10% of people over the age of 65 who live independently, and 25-50% of people over the age of 85, have frailty. The syndrome is more prevalent in women than in men (Collard et al, 2012). In the UK, the prevalence rates are 8.5% in females and 4.1% in males, and it is more often seen in patients of lower socioeconomic status (Syddall et al, 2010).

The Cardiovascular Health Study identified that HF was strongly associated with frailty (Newman et al, 2001) and Boxer et al (2008) suggested that frailty was present in 25% of older people with HF.

More recently, the FRAIL-HF study showed that up to 70% of patients with HF aged over 80 years also had frailty (Vidán et al, 2014). Patients with both conditions are more likely to have other comorbidities, such as chronic obstructive pulmonary disease, chronic kidney disease, arthritis or anaemia.

**Pathophysiology of frailty**

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“Many frailty assessments show a relationship with adverse cardiovascular outcomes”

oxidative stress (Butts and Gary, 2015). This culminates in muscle inflammation and loss of muscle mass and strength (sarcopenia).

Some mechanisms in HF are similar to mechanisms described in frailty (Wohlgemuth et al, 2014). HF is associated with accelerated biological ageing and the same cytokines (for example, IL-6, TNFα) are implicated. Reduced tissue perfusion from poor cardiac output can affect muscle mass and lead to inflammation. The changes in muscle mass may put patients at further risk of cardiovascular remodelling and dysfunction, with subsequent complications.

Symptom overlap

The overlap between the HF and frailty also occurs in clinical symptoms (Fig 2). In both, reduced physical strength and exercise tolerance can complicate sarcopenia, which further reduces activity levels (Fried et al, 2001), triggering a downward spiral of increasing frailty. Overlapping symptoms include fatigue, weakness, mood disturbances and reduced activity; they also include cachexia, a generalised wasting process affecting skeletal muscles, fat tissues and bone, which is seen in up to 15% of patients with HF. Due to this overlap, differentiating between the two conditions, and identifying frailty in HF patients, can be challenging.

Implications of frailty

The clinical course of HF means patients are at risk of repeated periods of stress and vulnerability. Frailty co-existing with HF has been shown to be predictive of hospitalisation, disability and mortality (Sze et al, 2017; Cacciatore et al, 2005). The FRAIL-HF study looked at 450 acutely admitted HF patients and showed that the majority had a ‘frailty phenotype’ associated with reduced one-year survival independent of age and comorbidities (Vidán et al, 2016). Denfeld et al (2017a) showed that frailty affects half of HF patients regardless of age or New York Heart Association class (see part one for more information).

Frailty can compound other problems; for example, HF patients with frailty are more likely to have reduced cognitive function (Denfeld et al, 2017b), depression and anxiety (Denfeld et al, 2017a; Uchmanowicz and Gobbens, 2015), with consequences on quality of life scores (Buck and Riegel, 2011).

From a physiological standpoint, HF patients with frailty have worse cardiovascular indices, lower oxygen saturations in venous blood, reduced cardiac output, higher resting heart rates and lower sodium levels than those without co-existent frailty (Denfeld et al, 2017b).

Assessing frailty

There are over 25 tools for assessing frailty, which have varying levels of reliability and validity. None is considered to be the ‘gold standard’ (Bouillon et al, 2013). Frailty assessment tools are based on different conceptual models of frailty and take into account functional, nutritional and cognitive status.

Fried’s frailty criteria are based on the frailty phenotype model (Table 1). Objective tests are used, including a gait speed test to assess slowness – a measure itself associated with survival (Studenski et al, 2011). A handgrip strength test to assess weakness and questionnaires on exhaustion, physical activity and unintentional weight loss are also used (Goldwater and Altman, 2016; Ling et al, 2010).

The Frailty Index is based on the cumulative deficit model (Rockwood and Mitnitski, 2007) but it is lengthy, so possibly too cumbersome for routine clinical practice.

The Edmonton Frail Scale (EFS) attributes 0–2 points in nine domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, continence and functional independence. Frailty assessments are now part of the routine assessment of patients with HF, and a recent systematic review shows that there is no consensus on which existing tool to use (McDonagh et al, 2017). A robust and relevant frailty index for HF could act as a prognostic indicator and help guide management: this is a crucial area for future research.

Many professional societies and guidelines advocate the routine assessment of frailty (BGS, 2014; NHS England, 2014) and nurses play an important role in this screening process (Yates, 2017). The results of frailty assessments can be used to stratify HF patients according to their risk of adverse outcomes and determine the best care for those with advanced disease. Frailty assessments are now part of the process of determining which patients
should have a heart transplant (Mehra et al, 2016; Ponikowski et al, 2016) or interventions such as implantable defibrillators and left ventricular assist devices. They help identify patients in whom the risks of adverse outcomes outweigh the potential benefits of such invasive treatments (Ponikowski et al, 2016).

**Patient management**

In general, the management of frailty is aimed at preventing, delaying or reversing it, or at reducing its severity. When frailty is not reversible, interventions aim to prevent or reduce the severity of associated adverse health outcomes (Chen et al, 2014).

In advanced HF, the reversibility of frailty is unproven, but better HF control and increased activity tolerance can have positive effects on mood and self-care, potentially triggering a virtuous circle of decreasing frailty.

**Multidisciplinary support**

Older patients with HF, particularly those who also have frailty, may have poor adherence to medications, poor diet, comorbidities and cognitive impairment (Samala et al, 2011), and will benefit from an interdisciplinary approach to their management (Pulignano et al, 2010).

Once frailty has been identified, patients should enter a process of care that involves a comprehensive geriatric assessment (Table 2) undertaken by the multidisciplinary team. This focuses on determining the patient’s medical, psychological and functional capability to develop a coordinated and holistic treatment and follow-up plan (BGS, 2014; NHS England, 2014). The European Society of Cardiology recommends support from the multidisciplinary HF team alongside older age care teams and dementia support teams. Tailored self-care advice, aids such as dosette boxes and the involvement of relatives and carers are crucial (Ponikowski et al, 2016).

**Exercise**

HF patients have a 50-70% reduction in aerobic capacity, which may limit the amount of activity they can do and accelerate their physical decline (Butts and Gary, 2015). The disuse of skeletal muscles can lead to sarcopenia and further exacerbate symptoms.

For many years, rest was thought to be beneficial in HF, but it is now clear that this is not the case and that rest can lead to physical deconditioning, symptom progression and worse outcomes. Conversely, aerobic and strength exercise training can increase patients’ capacity to exercise and reduce levels of inflammatory mediators (Addison et al, 2012; O’Connor et al, 2009). Patients doing routine exercise have been shown to have lower rates of hospitalisation (De Meirelles et al, 2014). Exercise is therefore recommended in HF even when frailty is present (Chou et al, 2012; Theou et al, 2011).

Additionally, exercise can have positive effects on cognitive function: patients exercising more than three times per week have been observed to have a delay in the onset of dementia (Larson et al, 2006). These beneficial effects on cognition are thought to be due to improved cerebral perfusion from improved cardiac function (Colcombe and Kramer, 2003).

**Pharmacological and nutritional support**

There are no proven pharmacological treatments to prevent muscle wasting or reverse frailty in HF. From a nutritional standpoint, although the routine prescription of supplements may increase the weight of older patients with frailty, there is no evidence of improved physical functioning or reduced mortality. Vitamin D supplementation is advised in patients who are vitamin D-deficient, as it is associated with a reduced risk of falls and fractures (Bischoff-Ferrari et al, 2012; Murad et al, 2013).

In men, normal ageing is associated with declining levels of testosterone, which is important, for a range of factors including bone strength, muscle mass, mood and libido; testosterone deficiency is also implicated in the development of sarcopenia. Some researchers have recommended testosterone replacement therapy, highlighting benefits such as a reduction in cardiovascular risk (Rosano et al, 2015). A recent randomised trial has shown that testosterone in conjunction with a high-calorie nutritional supplement had no effect on the level of frailty in undernourished older men (Theou et al, 2016). The benefits of testosterone therapy remain unclear, both in frailty and in frailty in the context of HF.

**Conclusion**

Frailty is highly prevalent in HF and there is strong evidence that patients with coexisting HF and frailty have a worse prognosis. Assessing frailty is an important aspect of routine care for patients with HF, and it helps to stratify risk and reach clinical decisions. The fact that many HF patients also have frailty stresses the need for other specialties to get involved, alongside the multidisciplinary HF team. NT

- Part 1 of this series (nursingtimes.net/Heartfailure1) describes the pathophysiology, aetiology, clinical presentation and diagnostic features of heart failure. Part 2 (nursingtimes.net/Heartfailure2) covers pharmacological and non-pharmacological treatment options, self-care and the role of nurses.
References


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