Assessment of frailty in the inpatient setting

Frailty is a common condition which results in increased risk of adverse outcomes following hospital admission. This review looks at how to identify, assess and manage frail patients in the inpatient setting.

Frailty is a condition characterized by decreased biological reserves, as a result of dysregulation of several physiological systems, which puts an individual at risk of adverse outcomes when facing minor stressors. It is associated with increased risk of falls, disability, hospitalization and death (Clegg et al, 2013). For older people in hospital, frailty is independently associated with increased risk of delirium, length of stay, discharge to a care home, and mortality (Winograd et al, 1991; Eeles et al, 2012). Frailty also identifies those at greater risk of surgical complications and poor outcomes following admission to an intensive care unit (Robinson et al, 2013; Le Maquet et al, 2014). Furthermore, older cancer patients with frailty are at greater risk of chemotherapy intolerance and cancer-related mortality compared to fit older people (Handforth et al, 2014). Degree of frailty is more predictive for many of these adverse outcomes than chronological age (Winograd et al, 1991; Robinson et al, 2013).

Frailty is best understood as a long-term condition (like diabetes, heart failure or dementia) that varies in severity across a spectrum, from those who are fit to those who have severe frailty (British Geriatrics Society, 2014).

Around one in ten people aged over 65 years have frailty, rising to between a quarter and a half of those aged over 85 years. Older people are the main users of health and adult social services in the UK so frailty is a commonly encountered problem in clinical practice (Turner and Clegg, 2014). Frailty may not be apparent unless actively sought and many older people with frailty remain invisible to health and care services until a crisis event occurs – such as a fall, delirium, or sudden immobility – as a consequence of a seemingly minor illness such as an infection, mild dehydration or a new medication (British Geriatrics Society, 2014).

Additionally, older people with frailty often have muscle weakness (sarcopenia), polypharmacy (five or more daily medications), and other impairments such as hearing loss, visual impairment or cognitive impairment, making them vulnerable to inpatient harms (Turner and Clegg, 2014). They may then also require extended discharge planning, and can be at risk of delayed transfer out of hospital.

Models of frailty

There are two main internationally established models of frailty. The first is the Cardiovascular Health Study phenotype model which identifies frailty as a clinical syndrome in which three or more of the following five criteria are present:

1. Unintentional weight loss (10 lb in the past year)
2. Self-reported exhaustion
3. Weakness (low grip strength)
4. Slow walking speed
5. Low physical activity (Fried et al, 2001).

The presence of one or two of the criteria identifies those with 'pre-frailty' who are at intermediate risk of adverse outcomes and have increased risk of developing frailty over time.

The second is the cumulative deficit model, which identifies frailty on the basis of a range of variables that include symptoms (e.g. memory problems), signs (e.g. tremor), disease states, disabilities and abnormal laboratory values, collectively referred to as deficits (Mitnitski et al, 2001). The original model was based on 92 variables, but subsequent work has shown that this can be reduced to a more manageable 30 or so without loss of predictive validity. The variables can be used to calculate a frailty index score, which is a simple calculation of the presence or absence of each variable as a proportion of the total (e.g. 20 deficits present out of a possible 92 gives a frailty index of 20/92 = 0.22). Thus frailty is defined as the cumulative effect of individual deficits – 'the more individuals have wrong with them, the more likely they are to be frail'. The frailty index has been demonstrated to be a robust frailty model with strong predictive validity for adverse outcomes (Rockwood et al, 2005).

Both models have been validated in large epidemiological studies but are less suited to day-to-day practice. A range

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Figure 1. Frailty syndromes.

Frailty may present with one of the following non-specific syndromes:

- Falls
- Immobility (including reduced mobility)
- Delirium and dementia
- Polypharmacy and increased susceptibility to medication side effects
- Incontinence
- End of life care

of methods has been developed to aid assessment of frailty in clinical practice. These include comprehensive geriatric assessment, the presence of a 'frailty syndrome' and simple tools to identify frailty. Each of these is discussed below.

Identification of frailty in clinical practice

Comprehensive geriatric assessment

The usual method of identifying frailty in clinical practice is via comprehensive geriatric assessment (Turner and Clegg, 2014). Comprehensive geriatric assessment is defined as:

> **'a multidimensional interdisciplinary diagnostic process focused on determining a frail older person's medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and long term follow up' (Rubenstein et al, 1991).**

Put more simply, comprehensive geriatric assessment is both a diagnostic and therapeutic process delivered by a multidisciplinary team.

Comprehensive geriatric assessment aims to identify, quantify and manage problems experienced by older adults. These problems are often multiple and may span several areas such as physical and mental health, functional domains, and social domains (Ellis et al, 2011a). A Cochrane review found that comprehensive geriatric assessment delivered on specialist elderly care wards offers a significant improvement in the chances of an older person being alive and living in his/her own home up to a year after an emergency hospital admission, compared to usual care on general medical wards (Ellis et al, 2011b). There was no benefit if comprehensive geriatric assessment was delivered by a visiting team to patients admitted to general wards (Ellis and Langhorne, 2005). The principles of comprehensive geriatric assessment are also embedded in orthogeriatric care, which has been demonstrated to improve outcomes for older people with hip fractures and in the emerging specialist field of perioperative care for older people, for example the Proactive Care for Older People undergoing Surgery (POPS) model (Harari et al, 2007).

One of the main features of comprehensive geriatric assessment is a holistic medical review. The holistic medical review covers the diagnosis of any medical illnesses in order to optimize treatment, review of medications (e.g. with the STOPP/START criteria (Hill-Taylor et al, 2013), which is a evidence-based checklist of medications to avoid in frailty, and medications that are commonly overlooked), and assessment of the impact of illness and symptoms on the daily life of the patient and carers. The holistic review can then be used to create an individualized, person-centred care plan.

Presence of 'frailty syndromes'

The 'Silver Book' (British Geriatrics Society, 2012) is an intercollegiate publication focussing on good care during the first 24 hours of an older person's admission to hospital. It recommends that all patients are assessed for pain, depression, skin integrity, falls and mobility, continence, safeguarding issues, delirium and dementia, nutrition and hydration, sensory loss, activities of daily living, vital signs, and end of life issues. The silver book also defines a number of 'frailty syndromes' (*Figure 1*). The presence of one or more frailty syndrome should trigger referral for full comprehensive geriatric assessment.

Simple tools to identify frailty

There are a number of simple tools available which may be used to identify frailty. With the exception of the Reported Edmonton Frail Scale, these tools have mainly been validated in the outpatient or community setting, so are less useful for identifying frailty in hospitalized older people as acute illness will affect the results. For example, an older person with pneumonia may well have a reduced walking speed compared to their usual level of function and might, therefore, be inappropriately identified as frail.

Edmonton Frail Scale and Reported Edmonton Frailty Scale

The Edmonton Frail Scale covers 10 domains giving a maximum score of 17, indicating severe frailty. It was developed and validated for use by a non-specialist in the outpatient setting and is recommended for use in primary and community care (NHS England, 2014). The British Geriatrics Society Fit for Frailty guideline suggests that the Edmonton Frail Scale may be a useful tool to identify frailty in the preoperative setting (Gordon et al, 2011). The Reported Edmonton Frailty Scale was designed to assess acutely unwell inpatients for frailty. It was adapted from the Edmonton Frailty Scale, and designed to be used by non-specialists. The scale gives a score out of a total of 18 points and groups people into categories of 'not frail', 'apparently vulnerable', 'mild frailty', 'moderate frailty' and 'severe frailty'.

Slow walking speed

Slow gait speed has been used to identify frailty, with a variety of cut-off speeds used (Castell et al, 2013). A gait speed of <0.8 m/s (taking more than 5 seconds to walk

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4 metres) has a high sensitivity (0.99) but lower specificity (0.64) for identifying frailty. The high sensitivity of the test means the 'true positive' rate is high and not many cases of frailty will be missed. The lower specificity, however, means that a large number of false positives may occur, with fit older adults being identified as frail. If the gait speed cut-off is reduced to 0.7 m/s the specificity rises but sensitivity falls (Clegg et al, 2015).

Timed-up-and-go-test

A simple bedside test that may aid in the recognition of frailty is the timed-up-and-go test (Savva et al, 2013). The timed-up-and-go test requires individuals to rise from a chair of standardized height, walk for 3 metres, turn, return to the chair, and sit back down. A timed-up-and-go test of over 10 seconds has been shown to have high sensitivity (0.93) in identifying frail adults, meaning few false negatives (Clegg et al, 2014). Again, it only has a moderate specificity meaning that fit older adults may be incorrectly labelled as frail if this test is used alone.

PRISMA

The PRISMA 7 tool is a 7-point questionnaire designed to identify disability and has been shown to identify frailty when used in community settings when a score of ≥3 is reached (Hébert et al, 2010). The sensitivity and specificity of PRISMA 7 in identifying frailty are relatively high but it has not been validated for use in hospital inpatients.

Conclusions

Frailty is a common condition that identifies older people at increased risk of a range of adverse outcomes, including hospitalization, delirium, falls and surgical complications. There are a number of simple tools to identify frailty in clinical practice, such as gait speed and the timed-up-and-go test, but they should be interpreted judiciously in hospital inpatients as acute illness can affect results. An admission to hospital with a frailty syndrome (falls, delirium, immobility, incontinence) may be a simple and useful method of identifying the possible presence of frailty in secondary care. Comprehensive geriatric assessment is the gold standard for both identification and assessment of frailty in clinical practice, and is best delivered in a dedicated inpatient area, such as a frailty unit or specialist elderly care ward. It is important that doctors are able to identify the possible presence of frailty, understand the impact of frailty on day-to-day life in older age, and help to ensure older people with frailty have access to specialist comprehensive geriatric assessment when admitted to hospital. **BJHM**

Conflict of interest: none.

KEY POINTS

- Think about the presence of frailty when admitting or reviewing older adults – it is a common condition associated with adverse outcomes following hospital admission.
- A timed-up-and-go-test >10 s or slow gait speed may be useful bedside tests to help identify the presence of frailty. Remember that they have a high sensitivity but moderate specificity so false-positive results are possible. Both tests are likely to be affected by acute illness so their use is limited in acutely unwell inpatients as walking speed is likely to be slower.
- The gold standard method for identification and assessment of frailty in clinical practice is comprehensive geriatric assessment. Older people admitted to hospital should have access to comprehensive geriatric assessment on specialist elderly care wards as it has been demonstrated to increase survival and rates of discharge home.
- Consider starting a holistic medical review for all older people admitted to hospital using the framework provided in the Silver Book. What are the current medical issues? Are there any unnecessary medications prescribed? What are the home circumstances for the patient? How are the current symptoms impacting on the individual and their carers? Could functional and mobility problems be improved by a period of rehabilitation or referral for appropriate community services?

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