

The Frail Elderly

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What is frailty?

Multiple definitions of frailty exist in the literature, but in general it can be thought of as a lack of physiological reserve to stressors. A human being represents a highly complex system. Aging, disease and injury reduce the adaptive response of this system to respond to stressors. The higher order functions are usually the first to be compromised, such as cognition/mentation and bi-pedalism. This is consistent with the clinical picture of frailty seen in practice.

Frailty may be the explanation for the observed discrepancy between chronological and biological age often noted in clinical practice. Frail individuals are vulnerable to external stressors (such as a medical procedure, admission to hospital, and medical complications), which would not normally result in harm to a healthy individual. Frailty is becoming increasingly recognized as an important clinical entity (or syndrome) when assessing patients for surgery.

The prevalence of frailty in the general population has been estimated at 10% and increases with age, female gender, and institutionalization.

What is the pathophysiology of frailty?

It is currently unclear what causes frailty, although there is a clinical overlap with sarcopenia, cachexia, disability and comorbidity. It does appear to be associated with inflammation and pro-coagulation, with changes noted in IL-6, TNF, TNF-alpha, CRP, Factor VIII, and d-dimer. Reduced vitamin D and testosterone have also been noted (Beggs et al.). And it shares some characteristics with critical care illness which results in a rapid onset frailty state.

Why assess frailty for surgery?

It is thought that frail patients are at increased perioperative risk of functional decline, postoperative complications, institutionalisation, and death.

Current preoperative assessment guidelines and thinking emphasizes cardiac and respiratory fitness/adequacy for the proposed surgery. This approach is likely to miss frail patients without disease in these organ systems, which in turn could lead to poor outcomes and increased hospital costs for this group.

Assessment of frailty preoperatively could allow better rationalization of who should undergo elective surgery and improve risk prediction for the patient. If frailty is identified and surgery is necessary it may allow for modification of the procedure and improved tailoring of preoperative and post-operative care to reduce harm.

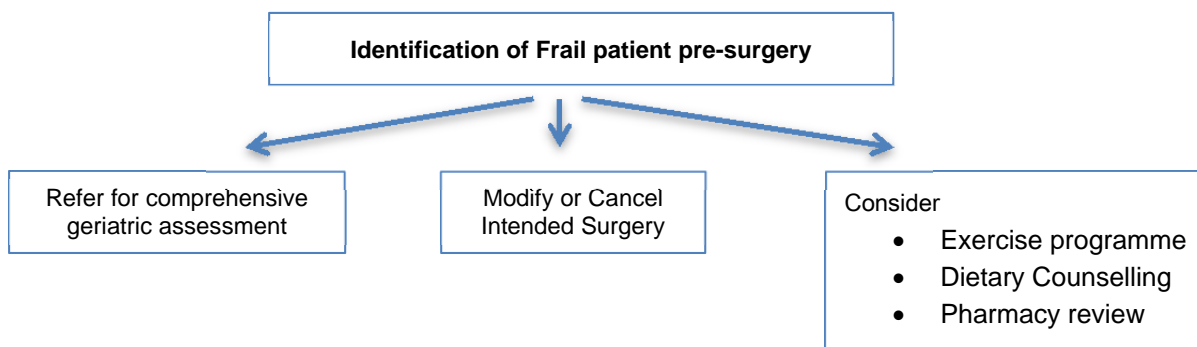


Figure 1 – adaption of algorithm from “Importance of frailty in patients with cardiovascular disease” by Singh et al.

How is frailty assessed?

Although most clinicians can identify a frail person by observation, few people use an objective method or measure to allow quantification. This makes it impossible to compare patients when discussing clinical risk. Ideally what is required is a time efficient and reproducible test for frailty, which allows clinicians to quantify frailty to assist in clinical decision making.

There are currently 2 main methods for frailty assessment:

- a) Frailty phenotyping
- b) Frailty indices or deficit accumulation models.

Frailty phenotyping is largely based around the clinical effects of sarcopenia which is the loss of skeletal muscle mass. Unfortunately, frailty phenotyping ignores deficits in cognition, mood, and functional independence.

The frailty phenotype was best defined by Fried et al.

Fried Criteria

A patient is frail if 3 out of 5 of the following criteria are met:

- Unintentional weight loss >4.5kg in the past year
- Exhaustion For at least 3 days in the week 'I felt that everything I did was an effort' or 'I could not get going'
- Weak grip Strength Measured by dynamometer
- Slow walking speed Time to walk 5 m >6 seconds
- Low physical activity No physical activity, spend most of the time sitting or rarely a short walk during the last year

Of note is that these criteria are a mixture of objective and patient reported measures.

Slow gait speed is by far the most predictive variable for frailty (Hubbard et al.). Slow gait speed is a significant predictor of falls and the 5 metre walk test has been shown to be an independent predictor for mortality and morbidity in older patients for cardiac surgery. Assessment of gait speed may be impractical for many inpatients and may be a confounder for patient undergoing orthopaedic surgery.

Deficit accumulation (or the redundancy exhaustion hypothesis) utilizes the idea that the body is essentially failing thus the higher functions are impaired. Multiple deficits are examined for across multiple domains such as nutritional status, physical activity, mobility, energy, strength, cognition, mood and psychological support (Koller et al.).

The frailty index is a measure that uses the deficit accumulation concept. It is a numerical score generated by measuring the number of deficits out of those deficits considered. Identification of specific deficits opens the door for targeted treatment to reverse frailty (Singh et al.).

The most common tools/indices used for frailty assessment are:

- FRAIL scale
- Tilburg Frailty Indicator
- Clinical Frailty Scale
- Edmonton Frail Scale
- Rockwood Clinical Frailty Scale
- Comprehensive Geriatric Assessment

It is not currently clear which tool is the best clinically to guide decision making.

Can frailty be reversed?

Frailty is thought to be a dynamic process, although the question remains as to what degree it can be reversed? Exercise based rehabilitation has demonstrated a reduction in hospital and nursing home placement in frail patients post hip fracture (Singh et al.). Dietary counseling may also play a role as protein supplementation can increase muscle mass. Polypharmacy is well recognised as a contributor to adverse clinical outcomes, and pharmacy review is a standard part of our current clinic assessment.

References (with special thanks to Drs Ralph Stewart, Nicola Broadbent, and Julie Mundy)

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