The Mobility and Impact of Frailty in the Intensive Care Unit

Bellal Joseph, MD*, Faisal S. Jehan, MD

KEYWORDS

• Mobility • Frailty • Critically ill patients • ICU

KEY POINTS

- Early mobilization and rehabilitation in ICU patients can reduce the incidence and duration of delirium, shorten ICU and hospital LOS, and lower hospital costs.
- Frailty can significantly compromise and impede the early mobilization of patients in the ICU and thus worsen the ICU course.
- Frailty refers to an increased vulnerability to stressors caused by the lack of physiologic reserves resulting from the age-associated accumulation of deficits in multiple organ systems combined with genetic, environmental, and physical insults.
- Early identification of frail patients and timely resource allocation and interventions to mobilize patient early in their ICU course help improve clinical outcomes and the quality of life.

INTRODUCTION

In the United States, the geriatric population has significantly increased by 21% since 1980.[1] This is because of aging Baby Boomers and increased life expectancy rooted in advances in the standard of living and medical health services. In the United States, those older than the age of 65 now account for 14.5% (46.2 million) of the total population and by 2040, this percentage is expected to increase to approximately 20% (72.1 million).[2] Indeed, geriatric population is the fastest growing subset of the total population. Although the total US population has grown by 39% over the past 30 years, those segments older than 65 and 85 years have grown by almost 89% and 232%, respectively.[3]

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Division of Trauma, Critical Care, Emergency Surgery, and Burns, Department of Surgery, University of Arizona, College of Medicine, 1501 North Campbell Avenue, Room 5334B, PO Box 245063, Tucson, AZ 85724-5063, USA
* Corresponding author.
E-mail address: bjoseph@surgery.arizona.edu

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This rapid increase in the elderly population has a significant impact on the US health care system. In 2009 to 2010, for example, persons aged 65 and older made a total of 19.6 million emergency department visits. Their visit rate was 511 per 1000 persons and it increased with age.[4] As a result, older adults will most likely account for an increasing share of hospital and intensive care unit (ICU) use and costs in the coming years.[5] Because increasing age is associated with decreased physiologic reserves and frailty, this will result in admission of more frail patients to the ICU.[6] Premorbid frailty seems to be an independent but potentially modifiable factor associated with less favorable outcomes and greater health services use.[7] Moreover, critical illness leads to a catabolic state that further diminishes body reserves and contributes to frailty independent of age and prehospital functional status. Impairment of mobility is a common manifestation of illness in the frail individual and is therefore a sensitive marker of acute disease. It is one of the major components of frailty and channels the adverse events. Because early mobilization of patients in the ICU results in accelerated recovery and improvement in the functional status and quality of life, frailty can severely affect the mobility and ultimately impede the recovery. It is imperative, therefore, that health care professionals thoroughly understand the particular physiology of this population and the association of frailty and its impact on mobility in the ICU to properly care for them and improve clinical outcomes.

CHALLENGES IN THE CRITICAL CARE OF ELDERLY PATIENTS

For several reasons, the management and care for critically ill elderly patients is far more challenging than their younger counterparts. With advancing age, the response of the body to any stress is diminished and a decline in the functional reserve limits the ability of elderly patients to recover from critical illness. Likewise, increasing age coincides with several comorbidities that can further complicate the primary problem. Furthermore, the immune and inflammatory responses are blunted in the elderly, which results in unreliable signs and symptoms, which can delay the diagnosis and management. Polypharmacy is also commonly encountered in the elderly populations and these drug interactions and masking of symptoms also pose a significant problem.

Similarly, treatment goals for elderly patients may be different than those for younger ones. It is necessary, therefore, for health providers to bear these things in mind throughout the care of such patients. Moreover, elderly patients display great heterogeneity because of each individual's particular physiologic reserve, which is, in turn, determined by several intrinsic host factors (ie, genetics, age, sex, dietary and environmental exposures, long-term patterns of physical activity, hormonal balance, and any pre-existing medical conditions).[8] In short, all of these factors contribute to the frail status of an individual, which increases morbidity and mortality after stressful events.

In the past two decades, as the general paradigm in medicine has shifted to the quality of health care services, it is clear that a better understanding of outcomes in frail and elderly patients admitted to the ICU can advance evidence-based health care and guide patients in making informed decisions about life and death.

AGING AND THE IMPACT OF COMORBIDITES

The process of aging is characterized by the progressive and inevitable loss of function and functional reserve of organ systems and a diminished response of the body in times of physiologic and metabolic stress. This leads to a diminished capability of the body to adapt to changes and vulnerability to several chronic health problems and

pathologic processes.[9] With advancing age, the decrease in physiologic reserves, chronic disease, and other health problems collectively complicate the health of an individual and the quality of life. According to the US Census Bureau's American Community Survey, some type of disability (ie, difficulty in hearing, vision, cognition, ambulation, self-care, or independent living) was reported by 36% of people age 65 and older in 2014. Although the gradual decline in function and physiologic reserve somewhat correlates with the increase in age, it also differs from person to person and from one organ-systems to another.[10] Moreover, in geriatric patients, it is challenging to predict who will have an optimal recovery following a stress (surgery or disease) and who will develop a complication that can trigger a cascade of events that may lead to permanent disability or even unexpected death.

INTENSIVE CARE UNIT CARE OF ELDERLY PATIENTS

With the continuous increase in the proportion of the elderly in the general population, the number of elderly patients being admitted to an ICU is also increasing.[11–14] In developed countries, for instance, the proportion of patients older than 80 years has been estimated to be up to 25% of the total ICU admissions.[15–17] This important transformation demands pragmatic decisions regarding appropriate levels of care and the nature of discussions with patients and families about the optimal goals of care. ICU admission can be beneficial to a patient under the following circumstances: the underlying cause of the danger to life is temporary, the patient requires close monitoring, and the patient has the capacity to benefit from an aggressive intervention. However, sometimes it may not be a fruitful decision because it may prolong the dying process, increase the amount of suffering by the patient, and separate the dying patient from his or her family. Risk factors of death in elderly ICU patients include the following:

- Age
- Underlying diagnosis
- Severity of acute illness
- Multiple organ dysfunctions
- Surgical versus nonsurgical diagnosis
- Chronic comorbidities
- Premorbid functional status
- Frail versus nonfrail

MOBILITY IN THE INTENSIVE CARE UNIT

ICU early mobility is a preventive form of physical and cognitive rehabilitation that engages the critically ill patient in activities that assist in the recovery of the cardiopulmonary system, prevent muscle deterioration and joint contractures, and begin the restoration of the patient's autonomy. The term "early" refers to mobilization and rehabilitation that begins immediately after the stabilization of physiologic derangements, often before patients are liberated from mechanical ventilation and low-dose vasopressor infusions. Studies from medical, surgical, and trauma ICUs have reported that almost half of critically ill patients are not able to return to their preillness level of functioning or work. Any critical illness is a complex pathologic state of catabolism and depletion of the body's reserves, often characterized by rapidly developing weakness and fatigue that can last for several years. A prolonged ICU stay and the effects of multiple sedatives can also cause delirium and cognitive changes for most patients. When combined with minimal or no sedation from the start of an ICU stay, mobility

is protective and preventative, an essential part of reducing pain, agitation, delirium, and weakness in ICU patients.

Early and progressive mobility and initiation of rehabilitation is safe for ICU patients. It can reduce the incidence and duration of delirium, shorten ICU and hospital length of stay (LOS), and lower hospital costs. Still, developing an ICU system and culture to achieve these benefits is challenging.

Barriers to Early Mobility in the Intensive Care Unit

Several potential barriers can impede implementation of an early mobilization and rehabilitation program in the ICU. A multidisciplinary change in ICU culture to support early mobility and rehabilitation, accompanied by the appropriate required resources, is an essential step to overcome these barriers.[18,19]

- Safety issues
- Frailty status of patient
- Lack of leadership
- Lack of staffing and equipment
- Lack of knowledge and training
- Oversedation
- Delirium
- Fractures or other disabilities
- Patient hemodynamic tolerance and activity
- Patient's attachment to intravenous lines and monitors

Benefits of Early Mobility in the Intensive Care Unit

Mobilizing patients in the ICU can be a cumbersome and labor-intensive process, but the early initiation of daily activities, preferably at the beginning of a patient's ICU stay, can lead to physical independence for patients after discharge.[12,20–22] Some of the benefits of early mobility in the ICU are briefly discussed next.

- Functional mobility and muscle strength: Up to 25% to 50% of ICU patients can develop neuromuscular weakness in the ICU, which can last for years after hospital discharge. Early mobilization therapy is the evidence-based intervention recommended to prevent or ameliorate ICU-acquired weakness. Early mobility and rehabilitation in the ICU improves muscle strength and functional mobility.[21–24] A randomized trial that compared the early institution of physical and occupational therapies with the usual care found that patients who underwent early physical therapies had a higher likelihood of achieving independent functional status, less ICU-acquired weakness, and a greater unassisted walking distance at hospital discharge.[21] Another clinical trial that studied 90 critically ill patients randomized to early bed-cycle ergometer or no intervention found that early exercise in ICU patients enhanced recovery of the functional exercise capacity, self-perceived functional status, and muscle force at hospital discharge.[22] Correspondingly, a quality improvement prospective study at the medical ICU at the Johns Hopkins Hospital showed that early physical therapy, along with reducing heavy sedation, led to marked improvement in physical rehabilitation and functional mobility.[25]
- Quality of life: Early initiation of physical therapy and exercise in the ICU results in improved muscle strength and functional mobility, which leads to physical independence and improved quality of life.[26]

- ICU and hospital LOS and ventilator days: Early initiation of rehabilitation and mobilization in the ICU leads to a faster recovery and early discharge to the floor, which results in a decrease in ventilator days and ICU and hospital LOS.[21,23,27]
- ICU complications: Mobilization early on during the ICU stay also decreases complications, including atelectasis, aspiration and pneumonia, and joint contractures and muscle wasting. Additionally, it decreases the incidence and duration of delirium in the ICU.[28]
- Discharge: Patients who undergo mobilization and rehabilitation early on in the ICU achieve functional mobility and adequate muscle strength. They also have a greater chance to be discharged to home rather than to a skilled nursing facility.
- Readmissions: Early mobilization in the ICU also leads to improved long-term outcomes and decreases the readmission rate. A study that followed patients with acute respiratory failure admitted to the ICU for 1 year found that patients who lacked early ICU mobility had a higher 1-year readmission rate.[29]

Selection of Patient

- Safety: Does the patient have any exclusion criteria?
  - Patient requires significant doses of vasopressors for hemodynamic stability (maintain mean arterial pressure >60 mm Hg)
  - Mechanically ventilated patient who requires fraction of inspired oxygen greater than 0.8 and/or positive end-expiratory pressure greater than 12 mm Hg, or who has acutely worsening respiratory failure
  - Patient maintained on neuromuscular blocking agents
  - Patient in an acute neurologic event (cerebrovascular accident, subarachnoid hemorrhage, intracranial hemorrhage) with reassessment for mobility every 24 hours
  - Patient needs transfer to another hospital
  - Patient unresponsive to verbal stimuli
  - Patient with unstable spine or extremity fractures
  - Patient with a grave prognosis, transferring to comfort care
  - Patient with an open abdomen (risk for dehiscence)

If one of the previously listed factors is present, evaluation of the patient by the physician is required to determine if participation in physical activity is safe before initiation.

- Assessment of the patient's prior activity level
  - Determine the patient's level of activity in the past 2 hours and before the admission
- Assessment of the patient's strength
  - Grossly determine if the patient can lift his or her legs off the bed or bear weight on his or her legs
- Assessment of ability to engage the patient
  - Determine how well the patient can follow commands and if he or she can be engaged in activity

Mobilizing the Patient in the Intensive Care Unit

- Follow a stepwise increase if the patient can tolerate the following:
  - Untangle and secure the lines; connect the portable monitor, if possible
  - Initiate bed exercise; keep monitoring patient, monitor and watch the lines
  - Sit patient on the edge of the bed, if possible; assess for pain and orthostatic blood pressure

- Assist seated patient in standing
- Initiate walking; keep a chair close to the patient; use aides, volunteers, and students to push chair and intravenous poles
- Seat and rest the patient as needed

- Stop and rest the patient if the following occur:
  - Unresponsive
  - Fatigued or becoming pale
  - Respiratory rate consistently greater than 10 beats/min greater than baseline
  - Muscle recruitment decreased
  - Losing balance
  - Weight-bearing ability decreased
  - Diaphoresis present
  - Chest pain
  - Dizzy

FRAILTY

There is no consensus on a single precise and complete definition of frailty.[30] Numerous authors and investigators offer multiple definitions based on their understanding and interpretation of the concept. From a clinical perspective, frailty is defined as a syndrome of decreased physiologic reserve (physical and cognitive) and a decline in the resistance to stressors, which ultimately result in increased vulnerability to poor health outcomes, worsening mobility and disability, hospitalization, and death.[31–33] Alternatively, it is defined as a geriatric syndrome of increased vulnerability to environmental stressors with underlying inherent pathophysiologic mechanisms related to hormonal changes and sarcopenia and nutritional deficiencies.[34] Multiple attempts have also been made to identify the different components and criteria for the diagnosis of frailty. Fried and colleagues[35] defined frailty as the presence of three or more of the following: unintentional weight loss (10 lb in the past year), self-reported exhaustion, weakness (assessed by grip strength), slow walking speed, and low physical activity. Somewhat differently, the Rockwood frailty index uses weight loss, exhaustion or a low level of physical activity, weakness, a low energy and endurance level, and slowness to calculate frailty.[36,37] In addition to physical function, some authors also advocate for including several different other characteristics and domains in the definition of frailty, such as nutrition, psychological characteristics, and psychosocial factors. Although the exact and precise definition and components of frailty are yet to be agreed on by all, there is no doubt that the presence of frailty correlates with poor outcomes. Equally important, it is an indispensable tool for hospital resource allocation and clinical decision-making and family discussions about the goals of care and discharge disposition.

Superiority of Frailty as Compared with Age

Aging and frailty are not synonymous, but frailty becomes increasingly common with advancing age. Although some literature shows that age is an important predictor of worse outcomes, the effect of advanced age on outcomes independent of all the other measured and unmeasured factors (eg, the presence of comorbidities and baseline poor organ function) is not yet well characterized. Indeed, the risk factors for poor outcomes in the elderly are the same as those for younger patients, including comorbidities and prior baseline functional status.[38] Although these factors are more prevalent in the elderly population, they are not uniformly distributed across this population. Consequently, this varied distribution has led to the conception of “heterogeneity of

aging," which means that organ function and a decrease in physiologic reserve vary greatly between individuals, and that the age at which these changes begin and the rate of decline also varies. Each organ system experiences a decrease in physiologic reserve at a different rate. Thus, each patient should be approached on a case-by-case basis. Because of these differences, chronologic age cannot accurately predict physiologic reserves. In addition, the commonly used tools to predict complications fail to take into account the physiologic reserves of elderly patients because they are mostly subjective.[39]

In contrast, the "frailty syndrome" refers to an increased vulnerability to stressors caused by the lack of physiologic reserves resulting from the age-associated accumulation of deficits in multiple organ systems combined with genetic, environmental, and physical insults. The advantage of this metric is that it takes into account each patient's physiologic, cognitive, social, and psychological deficits, ultimately leading to more patient-centered decisions resulting in improved outcomes and quality of life. An emerging body of literature suggests the superiority of frailty measurements over chronologic age alone in predicting outcomes.[40–43] Even individual mortality risk, which can be seen as the ultimate outcome of age and frailty,[44] is better predicted by frailty than by chronologic age.[45] Nonetheless, a chronologic age-based criterion is often used to select the geriatric population to determine the risks of any intervention or to predict the hospital course, complications, or mortality. Clearly, however, age alone may not be the best selection criterion because it is not the best predictor of poor outcomes of interventions and treatments.[46–49] Using the concept of decreased physiologic reserve measured by frailty as the criterion to select older persons at risk for interventions may, therefore, be a better tool than selecting geriatric patients based on their chronologic age alone.

Frailty in Intensive Care Unit Patients

The prevalence of frailty in the older population may be as high as 43%.[50,51] Because there is a trend of increased use of ICU resources by older people, the prevalence of pre-existing frailty in patients admitted to the ICU is also increasing.[14] The relevance of frailty in ICU patients, however, is not limited to the admission demographics (age). The development of critical illness may also lead to frailty in vulnerable or prefrail patients. It may also be an important factor impeding recovery and functional independence and autonomy in those already considered frail.[52] Whether it is the premorbid decreased physiologic reserves or the accelerated depletion of reserves as a result of an acute illness, the critically ill patient is vulnerable to adverse clinical outcomes, which may require an increase in the degree of life support, without which such a patient would not survive. In addition, deficits associated with frailty, which typically take years to accumulate in the outpatient geriatric population, rapidly develop in a large proportion of critically ill patients independent of age and illness severity. This may include sarcopenia and clinically significant weakness and poor functional status following discharge from the ICU.[53,54] A study that looked at the functional status immediately after discharge from an ICU showed that reduced grip strength and diminished mobility were correlated with poor functional status shortly after discharge from the ICU.[54] Because critically ill patients share many of the clinical features and characteristics of old, frail patients, the role of frailty has substantial clinical, psychosocial, and economic implications regarding the management of critically ill patients admitted to the ICU. Evaluation of frailty in critically ill patients admitted to the ICU provides information about the prognosis and outcomes. Tailored targeted intervention in these areas may help to improve outcomes and the quality of life.

Impact of Frailty on Mobility

Mobility is one of the major components of many frailty definitions.[36,55] Changes in different health states, such as transitions between different states of mobility, disability, and function, are of great clinical and public health interest. There is a growing consensus that markers of frailty include age-associated declines in lean body mass, muscle mass (sarcopenia), strength, endurance, balance, walking performance, and low activity.[56–59] Multiple of these components must be present clinically to constitute frailty. Frailty may be a precedent stage to disability. A study of 5317 patients aged 65 or more showed that 72% of frail patients reported difficulty in mobility, whereas 60% had difficulty in instrumental activities of daily living.[35] In addition, there was a step-wise increase in disability with increasing frailty status. Similarly, the results of the famous French three-city study showed that frail patients had 2.68 times higher odds of having mobility limitations as compared with the non-frail patients.[60] A novel wearable technology for assessing frailty showed that it can reliably predict and calculate frailty using 20-second trial of elbow flexion, within which patients repetitively flex and extend their dominant elbow to full flexion and extension as quickly as possible.[61] The measurement of frailty using the speed (slowness), power (weakness), and speed reduction (exhaustion) from this wearable technology provides evidence for the strong correlation between frailty and mobility.

Early and progressive mobility in the ICU improve outcomes and quality of life. Critical illness by itself is debilitating and leads to restricted mobility, low energy, and early fatigue. In addition, if the patient is frail or prefail to begin with, the burden of acute illness can significantly compromise the early ICU mobility of patients and thus further worsen the ICU course.

Measurement of Frailty

At least 25 different scales are available to measure frailty. However, there is no consensus on a single scale and the burden of data collection versus reliability/validity of each scale continues to be a consistent problem. The most comprehensive of these measurement tools is the Rockwood frailty model, which uses a judgment-based seven-point Clinical Frailty Scale to measure frailty based on 70 variables that assess the cognitive, physiologic, physical, and social well-being of the individual (**Table 1**).[50] More recently, a modified 50-variable Rockwood frailty index has been shown to reliably predict morbidity in patients undergoing emergency general surgery.[62] A 15-variable Trauma-Specific Frailty Index has also been validated by Joseph and colleagues[63] in geriatric trauma patients (**Table 2**). Another widely used tool is the operational definition described by Fried and colleagues,[35] presented in **Box 1**. All these scores reliably calculate frailty and identify elderly patients at risk of outcomes; however, none of these tests have been used on other subsets of the population to date.[64,65]

Prognostic Implications of Frailty

The modern health care system is evolving and there is a change of focus from health outcomes alone to the quality of health care delivered. In keeping with this aim, frailty is a valuable metric and a major determinant for predicting mortality, hospitalization, discharge disposition, and the quality of life in geriatric patients and is by far superior to the chronologic age alone.[42,45,66] Because frailty deals with physiologic reserves and the ability of the body to respond to stressful conditions, it may also serve as a surrogate for many of the otherwise unmeasurable aspects of a patient's health before the illness. Evidence suggests that physiologic reserve, along with the preillness baseline functional status and the presence of pre-existing comorbidities, may be an important determinant of outcomes and have prognostic value in critically ill patients.[67–70]

Table 1
Clinical Frailty Score

Score	Status	Description
1	Very fit	People who are robust, active, energetic, and motivated. These people commonly exercise regularly. They are among the fittest for their age.
2	Well	People who have no active disease symptoms but are less fit than those of category 1. Often, they exercise or are active occasionally (that is, seasonally).
3	Managing well	People whose medical problems are well controlled, but are not regularly active beyond routinely walking.
4	Vulnerable	Although not dependent on others for daily help, symptoms often limit activities. A common complaint is being slowed up, and/or being tired during the day.
5	Mildly frail	These people often have more evident slowing, and need help in high-order independent activities of daily living (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, and housework.
6	Moderately frail	People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.
7	Severely frail	Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 mo)
8	Very severely frail	Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.
9	Terminally ill	Approaching the end of life. This category applies to people with a life expectancy <6 mo, who are not otherwise evidently frail.

There are several available scoring systems (based on the acute derangement of hemostasis and vital parameters at admission) to guide decision making, management, and prognostication concerning ICU patients. They include the Acute Physiology and Chronic Health Evaluation II score,[67] the Sequential Organ Failure Assessment score,[71] and the Simplified Acute Physiology Score II. These scoring systems evaluate the severity of the illness to estimate the probability of adverse outcomes and survival[12,72,73]; however, they mostly fail to incorporate the sociodemographic characteristics, prehospital function status, and the presence and severity of other comorbidities and the disability. These limitations are even more relevant when considering quality of life and long-term outcomes following discharge from the ICU. Increasing availability of data on poor, intermediate, and long-term outcomes after critical illness (which comprises not only mortality, but also functional status, disposition to a facility center, and quality of life), coupled with the huge financial cost of critical care therapy, demands the development of better tools to predict those patients who will benefit most from critical care treatment.[74] Currently, however, there is no tool to measure the healing capacity of a patient or to determine his or her physiologic reserves directly; therefore, frailty serves as an invaluable surrogate for these factors in critically ill patients.

A prospective multicenter study in four ICUs showed that frailty was independently associated with increased ICU and 6-month mortalities.[75] It also showed that the

Table 2
Trauma-Specific Frailty Index

Fifteen-variable Trauma-Specific Frailty Index			
Comorbidities			
Cancer history	Yes (1)	No (0)	PCI (0.5)
Coronary heart disease	MI (1) Medication (0.25)	CABG (0.75) None (0)	
Dementia	Severe (1) No (0)	Moderate (0.5)	Mild (0.25)
Daily activities			
Help with grooming	Yes (1)	No (0)	
Help managing money	Yes (1)	No (0)	
Help doing housework	Yes (1)	No (0)	
Help toileting	Yes (1)	No (0)	
Help walking	Wheelchair (1) No (0)	Walker (0.75)	Cane (0.5)
Health attitude			
Feel less useful	Most time (1)	Sometimes (0.5)	Never (0)
Feel sad	Most time (1)	Sometimes (0.5)	Never (0)
Feel effort to do everything	Most time (1)	Sometimes (0.5)	Never (0)
Falls	Within last month (1)	Present not in last month (0.5)	None (0)
Feel lonely	Most time (1)	Sometimes (0.5)	Never (0)
Function			
Sexual active	Yes (0)	No (1)	
Nutrition			
Albumin	<3 (1)	>3 (0)	

Abbreviations: CABG, coronary artery bypass graft; MI, myocardial infarction; PCI, percutaneous coronary intervention.

Clinical Frailty Score predicts outcomes more effectively than the commonly used ICU illness scores. Another study of 421 critically ill adult patients from six hospitals demonstrated that frail patients had an increased risk of an adverse event, mortality, and hospital LOS, and were less likely to be discharged home.[6] Similarly, the

Box 1
Phenotypes of frailty

Criteria:
1. Decreased grip strength
2. Self-reported exhaustion
3. Unintentional weight loss of more than 4.5 kg over the past year
4. Slow walking speed
5. Low physical activity

Definition:
Positive for frail phenotype: $\geq$3 criteria present
Intermediate/prefrail: one or two criteria present
Nonfrail: no criteria present

readmission rate was also higher in frail patients. Correspondingly, Heyland and colleagues[76] showed that a low frailty index correlated with improved physical recovery and a return to baseline levels of physical function at 1 year in patients aged 80 years or older.

CLINICAL APPLICATIONS OF THIS KNOWLEDGE

Routine assessment of baseline physical function and frailty status could aid in prognostication and informed decision-making for all the critically ill patients, especially the elderly. The measurement and diagnosis of frailty could translate into better-informed decision-making for patients, their families, and clinicians concerning issues related to the provision of advanced life support and designation of the goals of care.

- Informed triage decisions: Knowledge about the frailty status and vulnerability of patients helps to identify patients who are at risk of adverse complications and who would benefit from ICU admission.
- Informed ICU decision-making: It also helps to set realistic goals of care and enhance the discussion with the patient and his or her family about survival, morbidity, disability, being able to be transferred to home versus a skilled nursing facility, the possibility of readmission, and the subsequent quality of life.
- Interventions: The ability to recognize a frail and vulnerable patient on admission augments resource allocation and fosters a focus on maximizing physical recovery, thus limiting the disability. Additionally, an overall effort should also be made to improve the patient's cognitive, psychosocial, and emotional recovery.
- Transition of care: Currently, there is a large body of evidence that demonstrates the existence of serious quality problems for patients undergoing transitions across sites of care. The frailty status of a patient may help in the coordination and continuity of health care during a transfer from one health care setting to another (or to home) and between health care practitioners and settings as the patient's condition and care needs change during the course of acute illness.
- Hospital resources: Frailty is also an important and reliable metric in predicating costs. Increased hospital and ICU LOS among frail patients, for instance, correspond to higher hospital costs.
- Failure to rescue: Failure to rescue (FTR) is defined as death after a major complication. It is an important benchmark of patient safety and health care quality. As a common index of the quality of health care delivery, it shows how well hospitals perform after a patient develops a complication. Several prior studies have found that the in-hospital mortality rate is significantly affected with variation in the management of complications.[41,77] Frailty may also be a valuable patient-level factor that contributes to FTR after a complication. Therefore, the early identification of patients experiencing physical decline and subsequent, appropriate interventions may decrease FTR. Although, there is a paucity of data on the usefulness of frailty in predicting FTR, there is a growing consensus in geriatrics regarding the correlation between the two. There is a solid justification for assessing the impact of frailty on FTR.[78,79]
- End-of-life decision: In patients with a preillness diminished physiologic reserve, the burden of acute illness further dampens the ability to have a meaningful recovery. Therefore, patient preference, the possibility of prolonged measures of life support and extensive rehabilitation, loss of independence, and the quality of life should be discussed with the patient and his or her family to help them make an informed decision and meaningfully participate in the setting up of short- and long-term goals.

SUMMARY

Frailty is a multisystem syndrome reflecting a poor physiologic and functional reserve that also predicts several adverse outcomes. This is especially relevant because the number of frail individuals using ICU resources is increasing with the large, aging Baby Boomer population. Furthermore, a poor frailty syndrome is further exacerbated by the effects of critical illness, which may also be a key factor impeding recovery and functional autonomy in those already considered to be frail. Generally, early and progressive mobility in the ICU assists in the recovery of the patient, prevents muscle deterioration, and improves the quality of life. Frailty can, however, significantly compromise the early ICU mobility of patients and thus further worsen the ICU course. Clearly, therefore, early identification of frail patients and timely resource allocation and interventions help improve clinical outcomes and the quality of life in ICU patients.

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