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Short Communication

Frailty in Perioperative Care -

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INTRODUCTION

Frailty is characterised by a loss of physiological reserves and, inability to maintain homeostasis to combat a disease or injury because of this loss [1].

A frail person appears fatigued, weak, has weight loss, low level of activity, slow motor performance and has cognitive loss.

The Frailty syndrome represents a multi-dimensional state of depleted physiologic and psychological reserve and clinical vulnerability that is related to advancing age [2].

Frailty increases with age and its prevalence is 26% in those above 85 years of age [3]. The importance of frailty in perioperative care has been recognised only since the past few years.

Instruments for Measuring Frailty and Feasibility of Various Frailty Scales

Several tools exist for the assessment of frailty; to name a few including-gait speed, grip strength, comprehensive assessment of frailty score, Edmonton frail scale, and Frailty index (FI) [4]. Comprehensive Geriatric Assessment (CGA) is a gold standard test based on identification of a frail elderly person's medical, psychological and functional capability. It helps in the development of a coordinated and integrated plan for treatment and long-term follow-up [5]. CGA is a method for evaluating and optimising physical, psychological, functional and social issues in elderly patients in order to improve their long term outcomes [6]. Frailty scores form an important domain in CGA.

Primarily, two dominant models of frailty have emerged, demonstrated by Fried et al. and the Frailty index [1,7]. However, there is a spectrum of other functional and theoretical definitions between these approaches [8].

In due course, the Survey of Health Aging and Retirement In Europe (SHARE) has adapted frailty instrument based on performance measurement, that is handgrip strength and patient survey for the identification of the five domains demarcated by Fried [9]. However, the validation of this methodology in the peri-operative locales still does not exist.

On the contrary, there is a multidimensional risk state measurement of the deficit's quantity (accumulated by an individual) that can be represented by the FI. It assimilates 30-70 dichotomised deficits including activities of daily living (ADL), comorbidities, and signs from neurological and physical examination [10]. FI is adept of predicting dynamic changes in the frailty state, due to its continuous measurement. This methodology can also be easily translated for utilisation in retrospective research. The simplified 11-item version of FI, the Modified Frailty Index (mFI) can be used for risk stratification in the geriatric surgical patients [11]. Short- and long-term mortality and morbidity have been affected by fragility [12]. Thereby, the idealistic frailty assessment tool should succour in risk stratification and identification of associated modified risk factors. Each assessment tool has different components and items, and variable validity and reliability in the prediction of clinical outcomes. (Tables1,2) Nonetheless, there is no consensus yet on the standard tool for screening frailty in routine clinical practice.

Tools like the Clinical Frailty Scale and Frailty index have been proposed to screen and stratify frailty in the settings of coronavirus disease (COVID)-19, but some authors have highlighted that their use has not been validated in these situations [13].

Role of Frailty in the Pre-Operative Evaluation of Elderly Patients

Several studies have concluded that frail and pre-frail elderly patients have the highest rate of postoperative complications, regardless of age, surgical discipline and surgical risk [17]. Preoperatively frail patients are more likely to require admission to an Intensive Care Unit (ICU) following emergency general surgery.

Table: 1

Frailty tool	Components	Items	Clinical outcome
Frail Index	Exhaustion, cognition, activities of daily living, physical function, social vulnerability, nutritional status, comorbidity	21-70	Predict mortality. Increased level of frailty is directly proportional to deficits.
Frail Scale	fatigue, resistance, ambulation, unintentional weight loss, and illnesses	0-5	Interview-based instrument, no need of physical performance measurement and required less time.Robust (0 points), prefrail (1 to 2 points), or frail (> 3 points).
Modified Frailty Index(mFI-11)	Diabetes mellitus, functional status, COPD, congestive cardiac failure, myocardial infarction, previous angina or percutaneous procedure, hypertension, peripheral vascular disease, impaired sensorium, cerebrovascular accident,neurological deficit	11-item index	Predictive of increased risk for postoperative morbidity and mortality undergoing elective and emergent surgery.
Edmonton Frail Scale (EFS)	Cognition; general health status: self-reported health: functional independence: social support; polypharmacy; mood; continence; and functional performance.	Scored out of 17, and contains nine components:	Valid and reliable measurement tool for the identification of frailty in the hospital setting . Not frail (0-5); apparently vulnerable (6-7); mildly frail (8-9); moderately frail (10-11) and severely frailty (12-17)
Clinical Frailty Scale (CFS) [14]	Comorbidity, function, and cognition	1-9	It is scored on a scale from 1 (very fit) to 9 (terminally ill) and is based on clinical judgement . A score ≥5 is considered to be frail . The CFS has been validated as an adverse outcome predictor in hospitalised older people

Table: 2

Other Single Frailty tools requiring less than one minute	
Gait speed	Time taken to walk 15 feet: slowest 20% (by sex, height)
Gait strength	Lowest 20% (by sex, body mass index)
Slow walking speed	Quantification by the timed up- and-go test Significant predictor of mortality and morbidity
History of one or more than one falls, 6 months prior to surgery	Strong association with operative complications
Biomarkers identified as predictors of frailty.[15,16]	vitamin D, Dehydroepiandrosterone Sulfate (DHEAS), elevated White Cell Counts (WCC), C-Reactive Protein (CRP), Interleukin-6 (IL-6), and C-glycosyl tryptophan.

Makary, et al. [18] illustrated that frailty was associated with a substantial increase in postoperative critical event (odds ratio and institutionalization (OR = 2.54 and OR = 20.48 respectively), in 594 patients posted for elective surgery. These findings and findings of other researchers have further evinced increased mortality and morbidity in elderly patients who are frail after surgery [18,19]. These findings have been replicated in various surgical milieu, including general surgery, urology and others [8,20].

The demand for organised and evidence-based preoperative assessment and risk stratification among geriatric older patients is increasing nowadays [21,22]. Current literature recommends that preoperative routine assessment of frailty can help in improving patient outcomes. Frailty is considered as an essential tool in the preoperative period because of its capacity to predict infirmity, vulnerability and reduced physiological reserve [23,24].

Frailty assessment before surgical interventions can guide patients, their families and the perioperative team in shared decision making, and to make appropriate perioperative plans that can avoid the predicted perioperative adverse events thereby decreasing the risk and improving perioperative outcomes. The perioperative management plan should be customised to the individual deficits and likely surgical complications in the frail patient. For highly frail patients, the option for non-operative management of the surgical condition is given and many a times, these patients may opt for this kind of option [25]. Also, once frailty is identified, prehabilitation of the patient can be done to reduce disability and restore function before surgery [26].

Tools for Preoperative Frailty Assessment

Several tools have been used for the preoperative assessment of frailty in different surgical populations. These include the 'Brief Frailty Instrument', 'Deficit Accumulation Index', 'Groningen Frailty Indicator', 'Physical Frailty Phenotype', 'Vulnerable Elders Survey', 'Clinical Frailty Scale', 'FRAIL scale', 'Edmonton Frail Scale', ' John Hopkins Adjusted Clinical Groups', 'Modified Frailty Index (mFI)', 'Clinical Risk Analysis (RAI-C)', 'Montreal Cognitive Assessment (MoCA)', 'Mini-Cog', eyeballing technique [27,28].

The most important point to be kept in mind when choosing a tool for the preoperative evaluation of frailty is the length of time required to conduct the frailty assessment in a busy preanaesthesia clinic. Also, the preoperative frailty assessment tool should have a cognitive screening component and if it is not there, an additional cognitive screening measure needs to be added to the assessment. Validity and reliability of the tool, patient participation, convenience of performance, the need for specialised equipment and staff training for standardised assessment are other factors that can influence the tool selection. Newer tools which can complete assessment in less time eg-the MoCA which can be completed in 10 minutes and the Mini-Cog including three-word recall and clock drawing test which takes less than 2.5minutes have now come up [28].

Intraoperative and Postoperative Implications of Frailty

Aging, frailty and anaesthesia are interrelated. Physiological changes and decline in organ function can occur with aging in various systems like the cardiovascular system, respiratory system, central nervous system and in the body composition, drug pharmacokinetics and pharmacodynamics. All this can lead to blood pressure lability, prolonged hypotension after anaesthesia, delayed metabolism of anaesthetic agents and delayed recovery after general anaesthesia. Frail patients are more likely to develop postoperative cognitive dysfunction, postoperative delirium and postoperative pulmonary complications [5]. This in turn can influence the choice of anaesthesia techniques. Regional anaesthesia is a better choice in the frail patients as it avoids exposure to opioids and is associated with less airway and pulmonary complications [29]; however, it is accompanied by other complications like hypotension, post dural puncture headache and epidural haematoma [30]. Frail patients are very susceptible to physiological perioperative changes. Hence, Bispectral Index (BIS) monitoring and Intra-Arterial Blood Pressure (IABP) monitoring have to be done in very frail patients. A low BIS, low volatile anaesthetic minimum alveolar concentration equivalent and low mean arterial pressure (triple low state) have been found to lead to increased risk of postoperative mortality in frail patients. Ultrasonography guided peripheral nerve blocks especially for orthopaedic surgeries like hip fractures are an attractive option in the frail population. Drugs like benzodiazepines can produce over-sedation and falls and are to be used cautiously perioperatively [31].

Future Research in Frailty

There is still no proper consensus on how to integrate frailty indices into perioperative management. Research is currently underway on the comparative accuracy between different frailty instruments [32] Randomised controlled trials on the optimal type of prehabilitation for frail patients need to be conducted. There is a need for the development of rapid frailty assessment tools with high negative predictive values especially for preoperative use. Studies comparing preoperative frailty assessment tools with traditional surgical risk assessment tools or a combination of both are needed.

CONCLUSION

The elderly population is currently increasing and we are encountering more and more frail patients in the perioperative setting, both elective and emergency. The assessment of frailty is an important and useful aspect of perioperative and critical care in the elderly patient because frailty affects patient outcomes in these settings. Currently, not all anaesthesiologists and surgeons look for frailty preoperatively .There is a need for increased awareness about frailty amongst perioperative physicians, anaesthesiologists and surgeons.

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