Frailty and anesthesia

Lior Shem Tov and Idit Matot

Purpose of review
This review will deliberate on contemporary concepts regarding the frailty syndrome and its association with the perioperative period. Frailty syndrome and its relevance to organ systems, scoring tools and intervention measures will be discussed in detail.

Recent findings
Frail patients have a reduced ability to respond to physical stress, similar to a decreased physiological reserve in the perioperative period. Frailty assessment is gaining popularity as a tool to guide medical interventions in the elderly population. Various measurement tools for preoperative frailty assessment were developed and show promising ability to predict perioperative morbidity, mortality and possibly to guide patient selection and intervention. Preoperative optimization for the frail patient shows mixed results.

Summary
Preoperative frailty is associated with significant morbidity and mortality. Recently, frailty assessment tools have been developed and show good ability to predict postoperative adverse events. These tools might become a preoperative routine, as they set the ground for patient's selection, guide perioperative interventions for the frail elderly population and thus may influence patient's outcome.

Keywords
elderly, frailty, geriatric anesthesia, perioperative

INTRODUCTION

Frailty is generally defined as a biological syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines of multiple physiologic systems and causing vulnerability to adverse outcomes [1▪].

In 2001, Fried *et al.* [2] identified the concept of frailty as a biological condition. Before this, the concept was synonymous with disability, comorbidity or advanced old age. The phenotype of frailty was defined by the presence of three or more of the following criteria: unintentional weight loss, weakness as measured by grip strength, self-reported exhaustion, slow walking speed and low physical activity level (Table 1) [2,3▪▪,4–13,14▪,15]. This phenotype was shown to be predictive for falls, hospitalizations, disability and death [2].

Others, such as Mitnitski *et al.* [16], define frailty as the accumulation of deficits (symptoms, signs, functional impairment and laboratory abnormalities) and use it to appraise the individual's level of illness and his proximity to death. This model regards successful aging as an efficient damage control process. Failure to do so will lead to accumulation of deficits and to increased biological age (relative to the individual's chronological age). Interestingly, each deficit has equal weight in this model (e.g. sleep disturbance and Parkinson's disease), and the total number of deficits is emphasized, rather than a specific organ system.

Frailty status was found to be a predictive tool for postoperative severe morbidity and mortality. In 2010, Makary *et al.* [4] showed that preoperative frailty using the Fried criteria was associated with an increased risk for postoperative complications. Since then, there has been an effort to measure and study frailty as a predictor of outcomes in the perioperative period. The present review updates on recent research regarding its utility. Biologic mechanisms behind the frailty phenomenon and the association between frailty and single organ systems are discussed. Finally, current information regarding perioperative optimization of the frail patient is reviewed.

Division of Anesthesiology, Pain and Intensive Care, Sackler Medical School, Tel Aviv Medical Center, Tel Aviv University, Tel Aviv, Israel

Correspondence to Lior Shem Tov, MD, Division of Anesthesiology, Pain and Intensive Care, Sackler Medical School, Tel Aviv Medical Center, Tel Aviv University, 6 Weitzman Street, Tel Aviv 6423906, Israel. Tel: +972 52 426 2560; fax: +972 3 697 3026; e-mail: liorshemt@gmail.com

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KEY POINTS

- The frail patient population suffer substantial morbidity and mortality during the perioperative period.
- Widespread of frailty assessment during the perioperative period is not common, and interventions aimed for this patient population show mixed results.
- Identification of the frail patient is clinical context dependent, and various frailty measurement tools are available with promising prediction abilities for the perioperative course.

FRAILTY, AGING AND BIOLOGIC MECHANISMS

López-Otín [17] reviewed cellular and molecular hallmarks of the aging process. These include genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, deregulated nutrient sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion and altered intercellular communication. The authors categorized these mechanisms into three categories. The first includes negative processes such as genomic instability and damage. The second includes protective mechanisms like senescence. Senescence, an arrest during the cell cycle, is a cellular checkpoint. This regulatory mechanism can help against the development of oncogenic cells. However, the accumulation of the senescence cells during aging can damage the regenerative ability of the organism. The third category includes integrative mechanisms – stem cell exhaustion and altered intercellular communication [17]. These hallmarks relate to the cellular level of aging and to some of the aging process phenotypes, nevertheless, they do not suggest cause.

Instead of viewing these processes by studying single molecule and/or biomarker, Cohen *et al.* [18▪▪] implemented an integrative view. Principal components analysis is a statistical method aimed to reduce multiple variables and find the correlation between them with the aim to define a governing process for at least some of the variables. The analysis was applied by the authors to multiple cohort studies in various populations for 43 common biomarkers (e.g. hemoglobin concentration, sodium levels, creatinine and so on). The researchers identified two important axes. The first was associated with anemia and inflammatory markers along with low levels of albumin and calcium. The second axis was associated with inflammation (like the first axis), lipid and glucose levels (suggested by them as a proxy for metabolic syndrome). As the first axis relies on several different physiological systems, the investigators suggested that it may represent an axis of physiological regulation integrating multiple systems that appear to function outside the direct regulatory control of any single molecule or pathway [19]. This approach attempts to view the aging process in a perspective different from the cellular level or distinct system, but rather considers the aging organism reduced ability for regulation. Interestingly, the first axis (anemia, inflammatory markers, low levels of albumin and calcium) was found to increase with age and predict mortality and frailty [18▪▪]. The idea that a disturbance in the regulatory mechanism across multiple physiological systems is correlated with frailty was previously suggested. A rise in the number of abnormal systems was found to be more predictive of frailty than the particular system abnormality itself [20].

FRAILTY AND ORGAN SYSTEMS

Frailty score represents summation of failures of different organ systems. It might also be applied for the evaluation and/or management of one organ. The most studied one is the frail heart. Atrial fibrillation is a common disorder in the elderly population. Currently, the main therapy for prevention of thromboembolic events is oral anticoagulants. The benefit of this intervention must be weighed against the risk of bleeding, especially in the elderly who are prone to falls. To determine the effect of frailty on the prescription of anticoagulant in octogenarians with atrial fibrillation, Lefebvre *et al.* [21] showed that lower frailty scores were associated with higher anticoagulant prescription. This is an example of how frailty is gaining popularity as a tool to guide medical interventions in the elderly population.

Frailty leaves its impression on the heart. Using transthoracic echocardiography, 257 patients underwent cardiac indices measurement. They were classified as frail, intermediately frail and nonfrail according to the Fried criteria discussed above. After adjustment for age and cardiac comorbidities, larger left atrial volumes, a lower stroke volumes index and higher pulmonary artery systolic pressures were found among frail versus nonfrail patients; whereas, other parameters such as reduced ejection fraction and cardiac indices were not found to be significantly different. Not surprisingly, the authors also found worse survival in the frail group compared with the other two groups [22].

Frailty also affects the cardiac autonomic system. In a systematic review, Parvaneh *et al.* [23] found that increased frailty levels measured by the Fried criteria were associated with a diminished heart rate response to postural change, resembling

Table 1. Selected frailty measurement tools for the perioperative period

Frailty measurement	Description	Advantages and disadvantages	Study population and surgical procedure	Outcomes
Frailty phenotype (Fried criteria) [2]	Weight loss (>10 lbs lost unintentionally over the past year), weakness (lowest 20% of population measured by hand-held dynamometer), poor endurance (self-reported exhaustion), slowness (walking time/15 feet: slowest 20%) and low physical activity	Valid and reliable; can be reproduced and reevaluated at different times; requires less than 10 min to measure; special equipment and assessor training are required [3▪▪]	Heterogeneous elective surgeries	Preoperative frailty was associated with an increased risk for postoperative complications, length of stay and discharge to a skilled facility [4]
			Elective patients older than 55 scheduled for CABG surgery	Preoperative frailty carried higher risk of postoperative delirium compared with nonfrail patients [5] (relative risk, 18.3; 95% CI, 2.1–161.8; $P=0.009$)
Modified frailty index (mFI) [6]	A condensed version of the accumulated health deficit model (see text); 11 points frailty index which includes daily functional ability, history of cardiovascular disease, lung and endocrine diseases and impaired sensorium (see text)	Can be measured retrospectively using existing data base; proven to be predictive of adverse surgical outcomes	Retrospective analysis of patients undergoing hepatectomy	Frail patients had more Clavien 4 complications (OR=40.0, 95% CI=15.2–105.0), a rise in 30-day mortality (OR=26.4, 95% CI=7.7–88.2) and extended length of stay [7]
			Retrospective analysis of women undergoing hysterectomy	A rise in frailty score predicted increased rate of wound complications, severe complications and mortality for patients with a frailty index of zero compared with those with an index of ≥ 0.5 [8]
			Retrospective analysis of patients undergoing elective total hip and knee arthroplasty	Increased 'modified frailty index' corresponded to a rise in Clavien 4 complications rate; mFI of 0.45 or higher had the strongest independent predictor of Clavien grade 4 complications compared with age, obesity and ASA class [9]
			Retrospective analysis of patients older than 60 years undergoing emergency abdominal surgery	Increased postoperative complications and mortality increased from 3.6% in patients with an mFI of 0 to 51% in patients with an mFI of 0.73 and greater [10]

Table 1 (*Continued*)

Frailty measurement	Description	Advantages and disadvantages	Study population and surgical procedure	Outcomes
The Vulnerable Elders Survey (VES-13) [11]	13 items of age, personal self-perception of health and daily living function [11]	Sensitive and specific instrument; can be used in the setting of emergency surgery. Highly subjective and based upon patients' self-perception	Prospective study of patients aged 65 years or older undergoing emergency abdominal surgery	Frailty diagnosis by VES-13 carried OR of 2.4 for postoperative morbidity and mortality [12]
Initial clinical impression - 'first minute impression' [13]	Before history taking, physical examination or viewing laboratory results, a vascular anesthetist or an experienced nurse had to responded to the question 'Is the patient in front of me fit for the proposed operation?' (fit was classified as nonfrail)	Very fast assessment; highly subjective; requires experienced assessor and has not been thoroughly validated yet	Retrospective analysis of preoperative assessment of elective vascular surgery patients	Hazard ratio of death for 'frail' of 2.14 (95% CI 1.51–3.05) compared with 'nonfrail' in the following 4 years [13]
Sarcopenia	Rectus femoris cross-sectional area by ultra sound device [14▪]	Objective measurement; can be applied retrospectively; requires special equipment and assessor training; relies on only one frailty component	Prospective analysis of surgical ICU patients older than 18 years	Sarcopenia was found to be independent risk factor for discharge to nursing facility or in-hospital death (OD 7.49; 95% CI 1.47–38.24; $P=0.015$)
	Cross-sectional areas of the left and right psoas muscles level at the L4 vertebra by CT scan [15]		Retrospective analysis of liver recipient patients	Patients with smaller total psoas area had 1.4-fold higher complication rates and 2.8-fold higher death rates compared with patients with higher TPA

ASAs, American Society of Anesthesiologists; CABG, coronary artery bypass graft; CI, confidence interval; CT, computed tomography; mFI, modified frailty index; OR, odds ratio; TPA, total psoas area.

a reduced ability of the cardiac autonomic system to respond to physical activity in the frail patient.

Frailty and heart failure often reside together – the prevalence of frailty among these patients is up to 75% [24]. Moreover, frailty and cardiovascular disease share common causes, such as activation of inflammation [25]. Hence, a consistent and feasible frailty measurement was suggested as a vital sign for adults with cardiovascular disease [25]. The authors perceive frailty as dynamic phenomenon with the need for serial measurements over time. More so, they suggest that the reasons for deterioration of the score should be sought.

Other organ systems were also studied in this context. Chowdhury *et al.* [26] reviewed the association between frailty and chronic kidney disease. Most of the studies reviewed used the Fried criteria (or modified Fried's criteria) to diagnose frailty among patients with chronic kidney disease. Six studies in this review demonstrated a rise of frailty prevalence along with a reduction of estimated glomerular filtration rate in predialysis patients. The prevalence of frailty among the predialysis patients was also shown to be a negative prognostic surviving factor compared with nonfrail patients in this group. Frailty was found as a negative factor among kidney transplant patients with increased rate of hospital readmissions per one study [27] and delayed graft function in another study [28]. Importantly, frailty scores were improved following kidney transplant [29].

FRAILTY SCORING FOR THE SURGICAL PATIENT

As discussed above, frail elderly people have a decreased physiological reserve. The perioperative period is an example of a major physical stressor. The consequence of a major stressor to the frail patient with diminished reserve is the focus of contemporary research.

Unlike the American Society of Anesthesiologists (ASA) score, frailty has not yet achieved a consensus definition.

There are more than 60 assessment tools which are in use for research and clinical purposes [30]. Every method has its own qualities and faults. For example, the Fried Frailty Phenotype mentioned above is timely efficient and simple, but requires special equipment (dynamometer, Table 1). Accumulated health deficits measurement tool has high predictive value of clinical events, but can be time-consuming [3]. This section reviews five selected methods of frailty measurement designed for the surgical patient in heterogeneous clinical situations (see also summery in Table 1).

The Fried criteria – Makary *et al.* showed that preoperative frailty using the Fried criteria was associated with an increased risk for postoperative complications [odds ratio (OR) 2.54; 95% confidence interval (CI) 1.12–5.77], length of stay (incidence rate ratio 1.69; 95% CI 1.28–2.23) and discharge to a skilled or assisted nursing facility after previously living at home (OR 20.48; 95% CI 5.54–75.68) [4]. Using the Fried criteria for patients undergoing cardiac surgery, preoperative frailty was associated with higher risk of postoperative delirium. This finding may set the ground for establishing a delirium prevention intervention for the frail cardiac surgery patient [5,31].

Modified frailty index (mFI) – Velanovich *et al.* [6] developed an mFI by condensing the accumulation of deficits frailty model (consisted of 92 items) [16] into 11 variables – the mFI.

The following points were examined for measuring the patients' frailty status: activities of daily living (ADL) capacity, diabetes mellitus, history of severe chronic obstructive pulmonary disease or current pneumonia, history of myocardial infarction within past 6 months before surgery, previous percutaneous coronary intervention or cardiac surgery or history of angina within 1 month before surgery, congestive heart failure 30 days within the surgery, hypertension requiring medication, impaired sensorium, cerebrovascular problems (history of transient ischemic attack), history of stroke (cerebrovascular accident or stroke with neurologic deficit), decreased peripheral pulses manifested by history of revascularization or amputation for peripheral vascular disease or rest pain or gangrene. This index has a range between 0 and 1. For example, patient will be assigned the score of 0.45 for 5/11 positive screened items.

Dindo *et al.* [32] developed a graded classification of surgical complications. This scoring begins with grade 1 complication, corresponding to any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions (e.g. wound infections treated at the bedside) to grade 5 complication – patient death. By applying this mFI, it was found that posthepatectomy frail patients had more Clavien grade 4 complications (OR = 40.0, 95% CI = 15.2–105.0) (defined as myocardial infarction, cardiac arrest, pulmonary embolism, septic shock, need for reintubation and/or new postoperative hemodialysis and failure to wean from mechanical ventilation in 48 h). They also experienced a rise in 30-day mortality (OR = 26.4, 95% CI = 7.7–88.2) and extended length of stay [7]. In this study, frailty was the most accurate tool for the prediction of major complication and mortality,

compared with risk predictors such as age, ASA score, emergent surgery and so on.

An equivalent 'mFI' was evaluated by George *et al.* [8] as a predictor of postoperative morbidity and mortality. This model was studied upon women undergoing hysterectomy. The ability to predict Clavien 4 complications was increased by 22% using this index (compared with chance alone). A combination of age, mFI, ASA class and functional status had a predictive ability of 34% of these complications.

Patients having total hip arthroplasty (THA) and total knee arthroplasty (TKA) were also studied in this context. Assigning an 'mFI' as defined by Shin *et al* [9], this patient population showed that an increase in this index corresponded to a rise in Clavien 4 complications rate. The most frail patients in this study correspond to mFI of 0.45 or higher (equivalent to having five or more conditions in the mFI scoring system). As mFI increased from 0 to 0.45 or higher, Clavien grade 4 complication rates increased from 0.67 to 12.5% and 1.14 to 8.51% for THA and TKA groups, respectively [9]. MFI of 0.45 or higher was also shown to be a good marker in this study for high-risk patient groups, as it was the strongest independent predictor of Clavien grade 4 complications when compared with age of 75 years or higher, BMI of 40 or higher and ASA class of 4 and higher, for both the THA and TKA cohorts.

Finally, applying an 'mFI' for emergency general surgery found that a rise in frailty score was associated with increased postoperative complications. Mortality also increased from 3.6% in patients with an mFI of 0 to 51% in patients with an mFI of 0.73 and greater ($P < 0.001$) [10].

'First minute impression' – O'Neill *et al.* [13] examined the predictive value of initial clinical impression. During preoperative clinic evaluation for vascular surgery, before history taking, physical examination or viewing laboratory results, a vascular anesthetist or an experienced nurse had to respond to the question 'Is the patient in front of me fit for the proposed operation?'. Frail patient was classified as 'no – fit'. This 'first minute impression' relied on independent mobilization/gait speed, balance, strength of handshake, nutritional status, body habitus and cognitive function. After adjustment for age, sex, comorbidities and surgery, they found a hazard ratio of death for 'frail' of 2.14 (95% CI 1.51–3.05) compared with 'nonfrail' in the following 4 years

The Vulnerable Elders Survey (VES-13) – The challenge imposed by emergency surgery in the elderly was also examined with respect to patient frailty. The VES-13 is a screening tool originally developed for the identification of the elderly prone to death or functional decline in the community. It encompasses 13 items which reflect age, personal self-perception of health and daily living function [11]. This screening tool was shown to be applicable for emergency surgery in the elderly. In a prospective study of 184 patients aged 65 years or more, patients were screened for frailty using this tool. Having emergency abdominal surgery along with frailty diagnosis by VES-13 carried OR of 2.4 for postoperative morbidity and mortality (95% CI 1.4–4.1), with sensitivity of 85 and 91% for morbidity and mortality, respectively [12].

Sarcopenia – An attempt to predict clinical outcome by using only one feature of the Fried frailty criteria (weakness feature represented by sarcopenia) was conducted upon 102 surgical ICU patients [14▪]. In this study, sarcopenia was diagnosed by ultrasound measurement of Rectus femoris cross-sectional area. Sarcopenia was found to be an independent risk factor for adverse discharge disposition defined as skilled nursing facility or in-hospital death (OR 7.49; 95% CI 1.47–38.24; $P = 0.015$). The authors also classified the patients as frail or nonfrail per 50 item questionnaires based on the Canadian Study of Health and Aging [33]. This questionnaire is based upon preadmission frailty items, including baseline functional dependence, social support, nutrition, comorbidities, depression and patient demographics. The prediction ability of the sarcopenia measurement and this frailty index were not statistically different. Moreover, combining these two methods did not improve the predictive ability of adverse outcomes. Sarcopenia measurement as a prognostic factor was also applied successfully upon liver recipient patients. Underwood *et al.* [15] retrospectively analyzed 'total psoas area' (TPA) by measuring the cross-sectional areas of the left and right psoas muscles at the level of the L4 vertebra. Patients with smaller TPA had 1.4-fold higher complication rates and 2.8-fold higher death rates compared with patients with higher TPA. Multivariate regression showed TPA as a significant predictor of death following complication within 1-year post transplantation (OR = 0.27 per 1000 mm^2 increase in TPA, $P < 0.001$).

A systematic review analyzing heterogeneous surgical disciplines found frailty to be associated with increased postoperative mortality, complications and discharge to residential care facility [34▪].

These associations were demonstrated in other systemic reviews and meta-analyses [1▪,35].

The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) and American Geriatrics Society (AGS) guidelines for the preoperative assessment of the geriatric surgical patient recommend evaluation of the patient for frailty syndrome and documentation of its

magnitude [36]. They suggest evaluation by the Fried criteria or by testing cognitive, functional and nutritional status, history of falls, comorbidity and anemia. The assessment of frailty during the preoperative period is expected to be more than just a predictive scale for postoperative outcomes. In a joint statement, the National Institute on Aging and the AGS declare that assessing frailty '...will open a window into patient-centric care' [37▪▪]. By doing so, it may lead to better coordination of the patient–caregiver expectations regarding the suggested intervention. Addressing patients' goals and risks is becoming part of standard patient care, as stated in the NSQIP and AGS statement for the perioperative management guidelines of the geriatric patient [38]. Forman *et al.* [25] shared interesting perspectives regarding frailty measurement suggesting that selection of a method should take into consideration the purpose of the measurement and the clinical situation. For example, Joseph *et al.* [39] showed prediction of postoperative morbidity and mortality in elderly patient having emergency general surgery by applying a modified 50-variable Rockwood Preadmission frailty index. However, using a 50-variable screening tool in the setting of emergency surgery might be time-consuming and inapplicable. Thus, frailty assessment before emergency surgery ought to be different from geriatric clinic assessment. Moreover, the diversity of assessment tools should not preclude the clinician from conducting the assessment, as using any tool is better than omission of this perspective altogether [25]. An intense research effort is currently underway to find the most appropriate and efficient frailty measurement tool for a concrete clinical situation.

CAN WE OPTIMIZE THE FRAIL PATIENT PREOPERATIVELY?

There is a debate whether frailty can be an intervention target. All agree that operational measure that will help reduce the prevalence or severity of frailty is likely to have large benefits for the individual, their families and society. Several approaches have been investigated in clinical trials.

Prehabilitation, defined as enhancement of preoperative condition of a patient, is a possible strategy for improving postoperative outcome. Evaluation of physical and mental status in the preoperative patient and providing interventions for their improvement is the core of this effort. This is done to allow the patient to regain his maximal level of function after the operation and to minimize the associated morbidity and mortality [40]. In practice, the quality of the studies looking into this topic is poor and large-scale well-designed studies examining the effectiveness of prehabilitation on perioperative outcomes are needed. A systematic review by Wang *et al.* [41] examined existing evidence. Preoperative physiotherapy and exercise programmes were examined as an intervention method in 22 trials for elective hip and knee replacement patients. Among 15 trials comparing postoperative pain, only two reported significant reduction in various pain scores at 6 and 12 weeks following the procedure. Regarding postoperative function (measured by various ADL scales and various ranges of motion of the operated joint), only a quarter (4/16) of the studies reported significant improvement. Length of stay, cost and quality of life were not substantially influenced following this intervention according to the studies analyzed.

Although not targeting frail surgical patient, but rather high-risk elderly patient having surgery, preoperative assessment and intervention shows promising results. Braude *et al.* [42▪] implemented the Proactive care of Older People undergoing Surgery (POPS) within a urologic department. They identified preoperative active medical problems and geriatric syndromes among elderly patients. Afterward, a guided intervention for various problems was conducted to optimize the preoperative status. They also implemented a postoperative care programme for the high-risk elderly surgical patients, which included education programme along with multidisciplinary care of the patients by POPS physician/nurse specialist, physician from the ward, occupational therapist, physiotherapist and social worker. The result was a reduction in the length of stay by 19% (mean 4.9 vs. 4.0 days; $P = 0.01$) and in postoperative complication [risk ratio 0.24 (95% CI 0.10–0.54); $P = 0.001$]. The benefits of perioperative identification and intervention of medical problems led by a specialist were shown to be beneficial for other surgical disciplines as well [43,44].

Frailty detection during the preoperative period may have an impact on postoperative results. Hall *et al.* [45▪▪] examined the postoperative mortality rates in a single site in two periods – the first period was without frailty screening and the second after initiating frailty screening. Following positive frailty screening, a frail patient's records were reviewed by medical specialist from the different disciplines (surgery, anesthesia, critical care and palliative care) and a perioperative programme was put together based on geriatric care principles and complication recognition and treatment. Preoperative palliative care consultation was also recommended in high-risk frail patients' surgeries. They found a reduction in 30-day mortality rate from 1.6% before this programme initiation to 0.7% ($P < 0.001$) after this screening was implemented. The greatest

improvement in 30-day mortality rate was among frail patients: 12.2–3.8% ($P < 0.001$), more so when mortality rate was assessed at 180 days (reduction from 23.9 to 7.7%, $P < 0.001$) and 365 days (34.5–11.7%, $P < 0.001$). Although statistically significant results were found after frailty screening and intervention in this study, enthusiasm should be tempered as this is a retrospective study relating to two different time periods.

CONCLUSION

Frailty mostly affects the elderly. This multifaceted disorder can be defined in two ways – the phenotype (Fried criteria) and the accumulation of deficits model. It encompasses a decreased reserve and resistance for stressors and therefore has a significant role in the perioperative period. Assessment of frailty is now recommended as a preoperative routine, as it may influence patient selection, care modality and outcomes. Various assessment tools have been developed successfully with the ability to predict patients' morbidity and mortality in efficient manner. This, however, did not prompt widespread assessment of frailty in the surgical patient, as most measurement tools are either lengthy/require special equipment or have been validated only for a discrete clinical situation. Multifactorial interventions (physical, nutritional, pharmacological and so on) undertaken by a dedicated medical team with the aim to preoptimize the frail patient scheduled for surgery and to help with recovery show mixed results. Further studies need to simplify frailty assessment in the surgical population and define the patient group that will benefit most from serial assessments and targeted interventions.

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Conflicts of interest

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