## CHAPTER – 6

## Frailty and Post-operative Management

**Background:**

Older patients are at increased risk of developing post-operative complications, longer hospital stays and at increased risk of mortality after undergoing any major surgical procedure. This complication occurs in spite of technological and biomedical advances in the field of anaesthesia and surgery. Age is predicted to be the vital factor that determines the post-operative outcome. Even after regulating the comorbidities, age relics as an unfettered risk factor for undesirable postoperative outcome.

Various researches and studies amidst a vastscale of surgical fieldssteadilycorrelate poor surgical outcomes to preoperative frailty (Figure 1). This post-operative outcome in older adults is linked to factors such as poor nutritional status, lack of fitness and exercise, decline of cognitive function, and functional limitations.

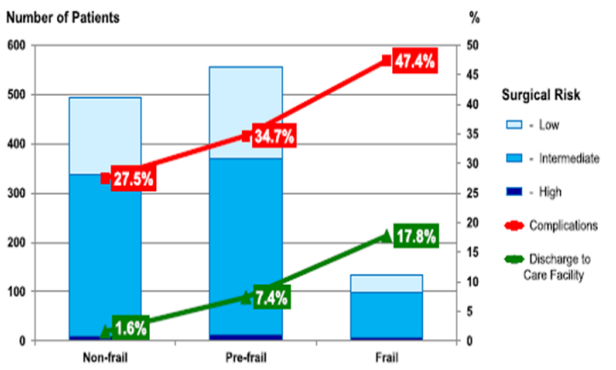



**Figure 1: Incidence of postoperative complications and discharge to care facility by frailty status and according to surgical risk[1]**

Image adapted from: Birkelbach O, Mörgeli R, Spies C, Olbert M, Weiss B, Brauner M, et al. Routine frailty assessment predicts postoperative complications in elderly patients across surgical disciplines–a retrospective observational study. BMC anesthesiology. 2019;19(1):1-10.

**Frailty and surgery:**

Older patients often present with complex health related conditions such as comorbidities, and low reserve energy and capacity. The extent and rate at which these changes transpire determines the degree of frailty in these older patients. The core characteristicsof frailty embrace the impairmentof various interrelated systems, especially the functions of musculoskeletal system, cognitive function and nutritional status. Along with these factors, presence or absence of stressors and the individual's ability to tolerate these stressors plays a vital role in determine the surgical prognosis.

Reckoning frailty in older patientsenduring surgical treatmentmust be examined thoroughly in milieu of altering the patient care protocols based on the assessment of frailty status. The primary goal of intervention for such frail individuals should focus on improving the quality of life, preventingthe deterioration of health due to chronicdiseases, reducing the risk of disastrous treatment outcome, and providing proper risk assessment to guide the patient in making decisions regarding the treatment.

Approaches for integrating the assessment of degree of frailty and the method of surgical intervention must include the following aspects (Table 1) [2]:

**Table 1: Various approaches to manage a frail patient postoperatively and to prevent post-operative morbidity [2]**

1. Preoperative risk assessment
   - Modify the surgical technique to reduce the invasiveness
   - Adopt appropriate methods of counseling the patient regarding the outcome
2. Trauma triage
   - Older patients are more prone for trauma; therefore frailty assessment is mandatory prior to admission
3. Prehabilitation to modify risk
   - Improving the nutritional status
   - Physical therapy and regular exercise
   - Increasing the physiologic reserve
4. Tailor anesthesia approach
   - Prefer regional anesthesia over general anesthesia whenever possible
   - Will enable in reducing the chances of post-operative delirium and cognitive impairment
5. Implement team-based care pathways
6. Delirium prevention
7. Palliative care approaches

**Preoperative Risk Assessment:**

Pre-operative frailty assessment is a well-recognized method to predict the surgical outcomes such as risk of developing post-operative complications, duration of hospital stay, need for institutionalization, and mortality rate. Quantifying frailty enables the surgeon to forecastif there is an increased surgical risk and the methods to modify care. This can be achieved in two ways. Firstly, by modifying the surgical technique in such a way

that the invasiveness of the surgery decreases. For example, preferring endovascular valve replacement over opensurgery. Secondly, by adopting appropriate methods of counseling the patient regarding the projected surgical outcome. Furthermore, adequate knowledge onprerequisite for institutionalization or prolonged stay in nursing homes along with a caregiver is mandated.[3,4]Informing the patient regarding the augmented risk of complications concocts the patients and their families for their postoperative course.Identifying and addressing the families about the need for co-dependence of the frail patient's partner preceding hospitalization alleviates the concern and encumbrance of the family.

**Trauma Triage:**

Elderly patients tend to have increased incidence of trauma presentations, predominantly due to fall from height. Frailty assessment explicit to trauma must beexecuted duringpreliminary presentation.[5] It should beexpounded to support trauma physicians and surgeons in their decision-making regarding the treatment plan. The prior assessment of frailty ahead of hospital admission will enable in forecasting the prognosis post-operatively.[6,7]

**Prehabilitation to Modify Risk:**

Superseding prior to operations to increase the physiologic reserve enables a frail patient to endure and tolerate the surgical stress. This can be achieved by two modalities of prehabilitation, i.e., proper exercise and good nutrition. Physical therapy aiming at improving the pulmonary function as well as muscle activity is essential to reduce the post-operative complications and the duration of hospital stay after cardiac surgeries.[8] Multi-modalpreoperative approaches that include physical therapy in the form of exercises, proper nutritional supplements rich in protein

and vitamins, and measures to reduce anxiety are also being researched to prepare patients to enhance the surgical outcomes.[9]

**Tailor Anesthesia Regimen:**

Choice of anesthesia for frail elderly patientsmust compriseoptimized regional anesthetic techniques and minimizedusage of sedation. An ideal regimen for administering anesthesia for frail patients is yet to be established. Amongst the anesthetic choices, regional anesthetic technique is suggested over general anesthesia to aid in controlling the perioperative pain.[10] Apart from pain management, regional anesthesia is also proven to reduce postoperative delirium. Recent evidencesrecommend that mild sedation couldlessen postoperative delirium in older patientsenduring surgery for hip bone fracture under spinal anesthesia.[11]

**Implement Team-Based Care Pathways:**

Team based care methodologies are verified to befavourable for frail older patients in both the inpatient and outpatient settings (Figure 2). Acute Carefor Elders (ACE) model is applied for the inpatients and it is recognized to enable in maintaining the functional status of frail patients during their hospital stay.[12] Program of All-inclusive Care for the Elderly (PACE) is employed for the outpatients to deliver adequate health, social, recreational, and nutritional support. Moreover it will also aid in preserving the functional ability of those patients.[13]

**Delirium Prevention:**

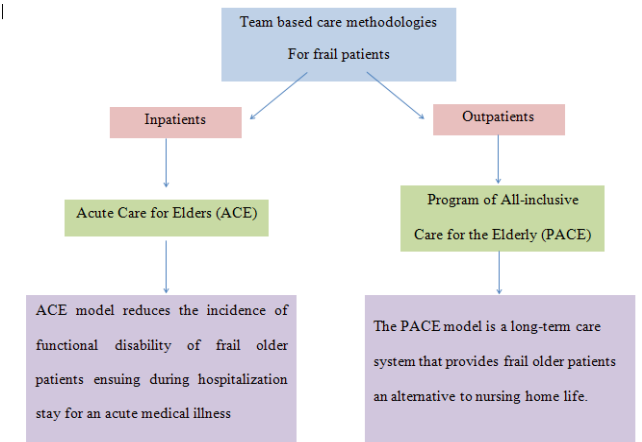
Frailty is connected to the incidence of postoperative delirium. Delirium is a significantlypertinent surgical outcome for older individuals due to its intimate association

to adverse postoperative outcomes such as increased risk of developing complications, protracted hospital stays, increased admissions atnursing homes, and in worst cases, leads to death of the patient. Nearly 40% of post-operative delirium can be prevented if necessary precautions are adopted pre- and peri-operatively.[14]Ascertaining baseline frailty can elicit immediate collation of evidence based postoperative delirium prevention programs.

**Palliative Care Approaches:**

Palliative care is an essential approach that must be employed even during the preoperative period to aid the physicians and the patients to define their care goals.[15] To ascertain whether surgical procedure is necessary, the physicians, anesthetists and surgeons mustevaluate the "need value" of the planned surgery for a frail patient. Significant decisions are supportedto help in achieving patient oriented expectations and outcomes. However, this must be deliberated ahead of major surgical interventions.

**Figure 2: Team- based care for inpatients and outpatients**



**Postoperative Management:**

Postoperative management mustincorporate an improved recoveryprogram, ample analgesia, early mobilization and discharge from hospital. Once the patient is discharged from the hospital, they must be in a condition to accommodate in a step-down facility. This is succeeded by effective and improved rehabilitation approaches, supportive modalities to tackle certain geriatric matters such as postoperativedelirium and its effective prevention.

A Cochrane collaboration review of literatureonrehabilitation of elderly patients in long-term care was conducted by Crocker T et al in 2012.[16]The primary objective of this study was to evaluate the benefits and harms of rehabilitation interventions aimed at maintaining, or improving, physical function for older people in long-term care. The review included various randomized and cluster randomised controlled trials. This study concludedthat rehabilitation attempts may be advantageous in moderatingthe chances of disability in a frail patient post-surgically. Furthermore, it will also enable in reducing the incidence of adverse events such as frequent hospitalization, infections and need for institutionalization. However, further long-term studies are required to make decisionsconcerning the most suitable and favourable interventions that provideamended sustainability, and cost-effectiveness.

Likewise, a systematic review byMcIsaac DI and co-authors in 2017 compiled the articles that evaluated the efficacy of interventions that aimed to improve the outcome of frailpatients after undergoing surgical procedures under anesthesia.[17] The results of this systematic review suggested that that prehabilitation of the individuals by physical therapy in the form of routine exercise paradedenhancement in functional status and quality of lifeof the patients.However, the conclusion also highlighted

the need for higher quality studies to test whether these interventions improve the outcomes of these frail patients undergoing surgery on a long-term basis.

**Frailty and adverse outcomes**

Frailty has long been exposedas a front-runner of adverse outcomes in surgical patients. The connection between frailty and adverse surgical events postoperatively has gained recognition in the past decade. Lin HS and co-authors in 2016 conducted a systematic review by assessing 23 studies that evaluated the association between frailty and surgical outcomes.[18] The study synopsizedvarious adverse outcomes seen in frail patients with a mean age of 75 years and above (Table 2). Amongst these adverse outcomes, the extent of mortality and post-operative complications where of particular interest and were largely focusedon.

**Table 2: Various adverse outcomes seen in frail patients postoperatively**

1. Mortality
   - Increased rate of 30-day, 90-day, and 1 year mortality
2. Post-operative complication
   - Non-routine recovery
   - Need for resuscitation
   - Postoperative delirium
3. Discharge
   - Increased duration of hospital stay
   - Discharge to institution
   - Functional and cognitive decline
4. Post-discharge
   - Increased rate of readmission within the next 1 year
   - Functional decline
5. Quality of life
   - Reduced quality of life and increased rate of dependance

**Mortality:** For example, 10 out of 10 studies evaluatingthe relationship between frailty and increased 12-monthmortality found a significant relationship with frailty, withodds ratios ranging from 1.1 to 4.97.[18] Likewise, frailty was realized to be linked with increased shorter (30 days and 90 days) andlonger-term (2 and 5 years) mortality rates post-surgically. This relationship was uncoveredirrespective of the instruments exercised to quantify frailtyand regardless of the type of surgery performed.

**Postoperative complications**: The complications evaluated were the length of stay, quality of life, delirium, functional decline, anddischarge to a residential care facility. It was studied that the risk of developing these complications had a significant associations to frailty. However, this risk cannot be generalized to all types of surgical procedures and the type of surgery and expected post-operative complications must be categorized in future to develop an understanding regarding this topic. This is a gap that future researchesmust explore.

**Discharge:** Ideally, a healthy individual is expected to be discharge once the patient is reviewed by the physician and considered fit. However, frail individuals whose physiological reserve is normally low, tend to have an increased duration of hospital stays. This is further complicated if the frail older patient develops any postsurgical complication. Certain patient might experience severe decline in functional ability and even require institutionalization.

**Post discharge and quality of life:** Adverse outcomes that are significant to frail older adultsare reduced quality of life, functional decline, amplified dependency, and postsurgical delirium. But these aspects must beexplored and validated through randomized controlled clinical trials. Nevertheless, various studies also recommended

that frailty is a superior predictor of mortality and morbiditythan age and associated comorbidities.

**Summary:**

Postoperatively, frail individuals are expected to develop many complications such as altered quality of life, increased hospital stay, risk of institutionalization, etc. However, these adverse outcomes can be modified if proper preoperative assessment of frailty is done before planning any surgical procedure. Additionally, consideration about anesthetic technique is also essential to reduce certain postoperative outcomes such as delirium and cognitive decline. Prehabilitating the patients to achieve satisfactory nutritional status, ability to perform exercise and improved physiological reserve enhances the surgical outcomes.

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