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## Frailty and post operative outcomes in geriatric patients undergoing emergency laparotomy in Indian population

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### Abstract

**Background:** With an increase in the number of emergency laparotomies performed on geriatric age group, there is an urgent need to develop preoperative optimisation strategies for these vulnerable patients. Frailty being a common occurrence in this age group and a measurable index can be used to prognosticate such patients. Hence the study was aimed to determine the prevalence and influence of frailty on mortality and morbidity of geriatric patients undergoing emergency laparotomy.

**Methods:** A prospective observational study carried out in the Department of Surgery, SCB Medical College and Hospital, Cuttack, India from March 2021 to December 2021. All older adults undergoing emergency laparotomy were included in the study. Preoperative clinical frailty score (CFS) was calculated from 1 (very fit) to 7 (severely frail). The outcome of the study being 30 day postoperative mortality, length of hospital stay and post operative complications were analysed.

**Result:** A total of 110 older adults underwent emergency laparotomy. Frailty was present in 30.9%. The overall 30 day post operative mortality was 12.7%. The risk of 30 day mortality was associated with frailty: CFS 6/7 odds ratio 4.2 (26.3%). Similar associations were seen with length of hospital stay and post operative complications.

**Conclusion:** Frailty being present in nearly one third of older patients undergoing emergency laparotomy, is associated with greater risk of post operative mortality and morbidity. Frailty scoring must be integrated in routine preoperative assessment of geriatric patients undergoing emergency laparotomy which can help in the decision making process.

**Keywords:** Geriatrics, emergency laparotomy, frailty, surgery in elderly, prognostic scoring

### Introduction

With an increase in the world's geriatric population, the number of emergency laparotomies in this age group has also increased significantly. In a recent study, it is seen that 30% of all emergency general surgical cases were with patients over the age of 60 years<sup>[1]</sup>. In comparison to younger adults, the geriatric population poses an additional burden on the healthcare system in terms of having the highest postoperative mortality and morbidity, the utilisation of intensive care resources and longer hospital stays<sup>[2-4]</sup>. Developing a multi-disciplinary approach for the management of these complex clinical needs is of recent interest among authors<sup>[5, 6]</sup>. Nonetheless there is a paucity of good quality research in devising prognostication indices for geriatric patients undergoing emergency laparotomy<sup>[7]</sup>.

Frailty, an objective marker is defined as "a condition of decreased physiological reserve to an extent that there is impairment of activities of daily living"<sup>[8]</sup>. Although there are myriad scores formalised to assess frailty<sup>[9]</sup>, the Clinical Frailty Score (CFS) developed by the Canadian Study on Health and Ageing (CSHA)<sup>[10]</sup> is a simple and reproducible score which can be used by physicians and surgeons alike. There have been proven association by authors regarding the influence of frailty on older adults undergoing emergency laparotomy<sup>[11]</sup>. Several studies have shown that presence of frailty is associated with worse prognosis and are at an increased risk of death or other post operative complications<sup>[12, 13]</sup>. To our knowledge, there are no or very few studies done on the same in Indian population. Hence the aim of the study is to determine the prevalence and influence of frailty on 30-day mortality, morbidity and length of hospital stay in geriatric patients undergoing emergency laparotomy.

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## Methods

This prospective observational study was conducted in the Department of Surgery, SCB Medical College and Hospital, Cuttack, India from March 2021 to December 2021. All patients aged above the age of 60 years undergoing emergency laparotomy for acute surgical conditions were included in the study. Exclusion criteria of the study were patients lost to follow up, poly trauma patients, and patients with associated medical emergencies. The study was approved by the institutional ethical committee board and the need for an informed consent was waived. The clinical frailty score (Table 1) of all the patients was assessed by the surgeon prior to surgery. The presence of frailty was defined as CFS score of 6 and above. The outcome of the study being 30 day postoperative mortality, length of hospital stay and post operative complications (major complications being Clavien-Dindo score  $\geq 3$  [14]) were tabulated and analysed.

## Statistical Analysis

Sample size was justified based on a previous study [11] with 95% confidence interval and margin of error at 10%. The statistical analysis was performed using SPSS (version 20.0; SPSS Inc. Chicago IL., USA). The variables were compared

using the Pearson Chi-square test or Fischer's exact test and the level of significance was ascertained ( $p < 0.05$ ).

## Result

A total of 110 older adults who underwent emergency laparotomy for acute surgical conditions were included in the study. The most common surgical indication was intestinal obstruction (60.9%) as shown in table 2. The prevalence of frailty among the various surgical indications is depicted in table 1. Of the total study population, eighty two (74.5%) were male and twenty eight (25.5%) were female. The mean age of the study cohort was 71.2 SD 9.3 years. Frailty defined as CFS score of 6 and above was present in 30.9% (34) of patients. CFS of 4-5 was present in 41.8% (46) of patients and CFS score of 1-3 was present in 27.3% (30) of patients.

The overall 30 day mortality was 12.7% (14/110). The mortality rate among frail patients was 26.3% (9/34). There was a statistically significant association between frailty and 30 day mortality, with an odds ratio of 4.2 ( $p < 0.05$ ). The length of hospital stay was highest among the frail group at 12.2 SD 6.4 days (OR 2.23). The incidence of post operative complications among the frail patients was the highest at 38.2% (OR 3.63) as shown in table 3.

**Table 1:** The CSHA Clinical Frailty Scale

Clinical Frailty Score	Category	Description
1	Very Fit	Robust, active energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
2	Well	Without active disease, but less fit than people in category 1
3	Well, with treated co-morbid disease	Disease symptoms are well controlled compared with those in category 4
4	Apparently vulnerable	Although not frankly dependent, these people commonly complain of being "slowed up" or have disease symptoms
5	Mildly Frail	With limited dependence on others for instrumental activities of daily living
6	Moderately frail	Help is needed with both instrumental and non instrumental activities of daily living
7	Severely frail	Completely dependent on others for the activities of daily living, or terminally ill

**Table 2:** Indication and presence of Frailty in elderly patients undergoing emergency laparotomy

Indication for surgery	Presence of Frailty (CFS 6-7)		N (%)
	Yes	No	
Intestinal Obstruction	21	46	67 (60.9%)
Perforation	8	18	26 (23.6%)
Abdominal abscess	4	7	11 (10%)
Ischemia	1	2	3 (2.7%)
Others	0	3	3 (2.7%)

**Table 3:** Primary and secondary outcomes

Frailty score	N (%)	30 day mortality	Length of hospital stay (days)	Post operative complications (Grade 3 and above)
Frail (6-7)	34 (30.9%)	9 (26.3%) OR 4.2	12.2 SD 6.4 OR 2.23	13 (38.2%) OR 3.63
4-5	46 (41.8%)	5 (10.9%)	7.9 SD 4.2	6 (13.1%)
1-3	30 (27.3%)	0	6.4 SD 3.6	2 (6.7%)

## Discussion

This study prospectively analysed the association of frailty with mortality and morbidity of elderly patients undergoing emergency laparotomy. We found that frailty was present in nearly one third of patients. The National Emergency Laparotomy Audit (NELA) estimated the prevalence of frailty to be 11% in people over 65 years of age [15]. Although our estimate was higher than that of other studies, it may be attributed to the overall health of the society and its importance in developing countries. The study also added that the risk of 30

day postoperative mortality increased with frailty, and so did the length of hospital stay and post operative complications. Similar correlations were found by other authors [11, 16].

Performing emergency laparotomy in the elderly age group puts the operating surgeon in a difficult position as it is well known that the outcome in these patients is poor. Using a simple tool to prognosticate these patients would help the surgeon guide the preoperative optimisation and also counsel the patient's kith and kin. With many tedious and cumbersome prognostic scoring systems developed such as APACHE II, ASA, P-POSSUM and

Charlson's co-morbidity index, Clinical frailty scoring predicts both morbidity and mortality in an objective manner and is easily applicable [11].

The development of preoperative risk stratification in the elderly has many benefits of involving multidisciplinary approach. NEELA [15] also recommends the use of comprehensive geriatric assessment in all older adults undergoing emergency laparotomy. This scenario in India is still at its infancy with only a few centres implementing such geriatric assessment preoperatively. Hence, this study hopes to spread awareness regarding the importance of geriatric assessment prior to emergency laparotomy and the authors hope that this practice will continue to improve. With the emerging concept of prehabilitation [17] a preoperative index is an essential tool for optimisation. The limitations of this study include its relatively small sample size and the probable presence of selection bias. Hence further prospective studies on Indian population may clarify the findings and promote in the preoperative management of geriatric patients.

### Conclusion

Frailty is prevalent in around a third of the geriatric population undergoing emergency laparotomy. There is found to be a significant association between frailty and 30 day mortality, length of hospital stay, post operative mortality. Frailty scoring must be integrated in routine preoperative assessment of geriatric patients which can further help in their multidisciplinary treatment.

**Conflict of Interest:** None

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