

## Does a Dedicated Frailty Service Improve Outcomes for Emergency Laparotomy in Elderly Patients?

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ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Brief Report</p> <hr/> <p><b>Article History:</b> Received: 4 Sep 2022 Accepted: 21 Sep 2022</p> <hr/> <p><b>Key words:</b> Emergency laparotomy, Frailty, Length of Stay, Mortality, Readmission</p>	<p><b>Introduction:</b> With improvements in medical care, more and more patients are surviving into old age. Elderly patients presenting with abdominal surgical emergencies constitute the majority of an emergency surgeon's workload. Recently, there has been a lot of interest in improving surgical outcomes for frail and elderly patients needing emergency laparotomies. We carried out a prospective audit to investigate the impact of having a dedicated frailty service on the post-operative outcomes of such frail elderly patients.</p> <p><b>Materials and Methods:</b> Our audit included all elderly patients (defined as &gt; 65 years of age at the time of surgery) undergoing emergency laparotomy for a period of six months from January to June 2021 in our 700-bed acute care hospital in the UK. Post-operative outcomes were 30 and 90-day mortality, length of stay in hospital, and proportion of patients discharged to their own home after surgery.</p> <p><b>Results:</b> Our data demonstrates that the availability of such a dedicated frailty service does significantly decrease the proportion of patients discharged to their own homes and the rate of readmissions after emergency laparotomies. Length of stay, 30 and 90 day mortalities decreased to a non-significant level.</p> <p><b>Conclusion:</b> Therefore, establishing a dedicated frailty service for both preoperative optimization as well as improving post-operative care is an important step to improving outcomes for this group of high-risk surgical patients.</p>
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## Introduction

An emergency laparotomy is a common operation performed by acute care surgical teams in the UK as well as worldwide. With the improvement of health care, more and more individuals are surviving into old age, and hence the proportion of elderly and frail patients undergoing emergency abdominal surgery is growing (1). Although the recent focus has been on the reduction of mortality after laparotomy in such patients, with ongoing projects such as NELA, there has been very little emphasis on the optimal provision of post-operative care after laparotomy for these frail elderly patients (2). It is often a neglected aspect of the provision of emergency surgical care.

We believe that this aspect of emergency surgical care can be acted upon and improved. Such improvements are critical in view of the growing elderly (> 65 years of age) population in the UK and worldwide. Secondly, accurate data and improvement in care may lead to improved shared decision-making between the patient and the surgeon.

## Materials and Methods

We carried out an audit of all elderly patients (defined as > 65 years of age at the time of surgery) undergoing emergency laparotomy for a period of six months from January to June 2021 in our 700-bed acute care hospital in the UK.

We serve a population of about 1.8 million, mainly from Kent, and those over 65 years of age make up about 17.6% of the population. Therefore, the provision of emergency care for the elderly population accounts for a significant bulk of our emergency workload.

Data was collected retrospectively after reviewing the booking forms and entered into a prospectively maintained database. The main data points that were collected were demographic data, calculated NELA mortality and morbidity scores, preoperative mobility, ADL status, preoperative albumin levels, and whether the patients were from their own homes or care homes. We monitored length of stay (LOS), 30-and 90-day mortality, discharge back to their own homes, and readmissions during the study period. As an intervention

to improve care for the elderly patients undergoing emergency laparotomy, we implemented a dedicated frailty service within the surgical department, consisting of Hospital Care of the Older Patients (HCOOP) consultant and a team. The surgical team could refer any elderly patient planned for an emergency laparotomy directly to the HCOOP team via an electronic referral system. We continued to collect the demographic and outcome data for the post-intervention cohort from July to December 2021. All the data was entered into a secure database after anonymizing all the patient identifiers. The project was approved by the institutional ethics board.

After the study period was completed, data was analysed for both the pre and post-intervention cohorts with SPSS Version 28 (Statistical Package for Social Services-IBM, UK).

## Results

For the said pre-intervention period, we recovered records of 65 patients who underwent emergency laparotomies. The mean age was 75.5 years. Males outnumbered female patients by a small proportion. (N = 35, 53.8%). The median Rockwood score was 3 in the pre-intervention cohort. The majority of the cohort were independent in ADL (N = 54, 83.1%) and had independent mobility (N = 56, 86.1%), as recorded on admission. Only 7 patients required the help of a carer at home (10.7%).

The average albumin level in the pre-intervention cohort was 30.7 g/dl, signifying that they were of acceptable nutrition status preoperatively. Calculated NELA scores for mortality for this cohort were 12.6% on average, and morbidity scores were 73.5%. Postoperatively, the average length of stay was 19 days. Post-operative mortality as calculated at 30 and 90 days for this cohort was 21.5% and 29.3% (N = 14, N = 19) respectively. The majority were discharged back to their homes, N = 38, 58.4%. 15 readmissions (23.1%) were recorded in this group postoperatively.

Following the implementation of a dedicated frailty service including a medical team comprising of an HCOOP (Hospital Care

of Elderly Patients) consultant and the surgical team having access to a direct electronic referral system, we collected data for the post-intervention cohort of elderly patients who had emergency laparotomy from July 2021 to December 2021.

Our post-operative cohort consisted of 44 patients, with a mean age of 77.3 years. This group had a slight majority of female patients (N = 25, 56.8%). The average Rockwood score was 3 for this group, similar to the pre-intervention cohort. Similar to the pre-intervention group, only a minority required assistance for activities of daily living (N = 10, 22.7%), and mobility (N = 8, 18.2%). The average albumin level

was 26.7 g/dl, demonstrating they had acceptable nutrition preoperatively.

Calculated NELA scores for mortality for the post-intervention group were 15% and morbidity scores were 77%. The post-operative length of stay was 18.9 days. Calculated mortality scores at 30 and 90 days were 20.4% and 27.3%, respectively (N = 9 and 12). The majority were discharged back to their own homes (N=43, 97.7%). 3 (6.8%) readmissions were recorded for the post-intervention group.

The data for the pre and post-intervention groups are displayed in Table 1.

**Table 1:** Pre- and post-intervention data (P 0.05, 95% CI).

Parameter	Pre-intervention cohort (N = 65)	Post-intervention cohort (N=44)	(95% confidence interval) P-value
Demographics			
Age	75.5	77.3	0.214
Male	35(53.8)	19(43.2)	
Female	30(46.2)	25(56.8)	
ADL independent	54(83.1)	34(77.3)	
Independent mobility	56(86.1)	36(81.8)	
Albumin level	30.7	26.7	0.19
Rockwood score	3	3	
NELA Mortality	12.6	15	0.474
NELA Morbidity	73.5	77	0.413
Outcomes			
LOS	19	18.9	0.978
Mortality after 30 days	21.5	20.4	0.845
90-day mortality	29.3	27.3	0.824
Released to own a home	58.4	97.7	0.0002
Readmissions	23.1	15.9	0.0248

## Discussion

To the best of our knowledge, our study is the first of its kind to evaluate the effect of a dedicated frailty service on post-operative outcomes for elderly patients undergoing emergency laparotomy.

Looking at the demographic data, the pre-intervention and post-intervention cohorts are well matched with no significant differences in measured demographical parameters. Interestingly, we note that the

establishment of a dedicated frailty service for the emergency surgical care of the elderly led to a statistically significant reduction in readmissions and a proportion of patients being discharged home instead of care packages.

Although we did not have data to calculate the financial impact of this, given the high cost and limited availability of inpatient beds within the National Health Service (NHS), this may translate to significant financial

gains. Secondly, by freeing up inpatient bed capacity by reducing the number of patients waiting for care packages and readmissions, this intervention may have important effects on the backlog of elective operations within the NHS. Although the length of stay, 30 days and 90-day mortality were reduced compared to the pre-intervention cohort, this reduction did not reach statistically significant levels in our study. We believe this is a reflection of a short follow-up period of 6 months, and further long-term follow-up is recommended. It has been clearly demonstrated in previous studies that post-operative outcomes consistently worsen with increasing age (3).

Similarly, frailty has been shown to be associated with increased mortality irrespective of age in several recent studies. For example, McRae (4) recruited 110 vascular patients in his study and reported that frail patients had a longer hospital stay and needed to be discharged to a higher level of care. Similarly, a large study of 1418 older patients, including both medical and orthopaedic patients, found an increase in discharges to residential homes among those who were frail (5).

Therefore, preoperative identification of such patients and establishing a dedicated frailty service for both preoperative optimization as well as improving post-operative care is an important step to improving outcomes for this group of high-risk surgical patients.

The need for such strategies specifically for this group of patients has been highlighted by high-risk surgical patient workgroups before (6).

We believe that the establishment of a dedicated frailty service led by an HCOOP consultant with direct access to the surgical team is the best way to implement this.

## Conclusion

Establishment of a dedicated frailty service leads to improvement of post-operative outcomes for elderly and frail patients undergoing emergency laparotomy.

## Limitations

Our study has several important limitations. Firstly, this was an audit carried out by a retrospective review of medical records with inherent interviewer bias. Secondly, due to the limited details recorded on the electronic records, we could not identify the comorbidities and different surgical pathologies that may have an effect on outcomes such as 30 day and 90-day mortality. Thirdly, the patient numbers were not very high and the follow-up period was comparatively short. For simplicity and ease of data collection, we limited ourselves to elderly patients undergoing emergency laparotomy, excluding other emergency surgeries such as hernia, vascular or orthopaedic procedures. We did not have data to calculate the financial impact or quality of life scores.

Further large-scale prospective studies with a longer follow-up period may be necessary to overcome these limitations and to evaluate the true effect of the establishment of a dedicated frailty service for elderly patients undergoing emergency surgery. Nevertheless, initial results from our audit are encouraging.

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