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Retrospective Analysis of Patients Aged 65 and Over who were Admitted to the General Surgery Clinic from the Emergency Department

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What is known on this subject?

Patients aged over 65 years are a population that increasingly utilizes healthcare services due to the progression of aging, which is associated with a rise in chronic diseases and a decline in physical function. This age group is particularly vulnerable to multiple chronic conditions, such as heart failure, hypertension, diabetes mellitus, and chronic obstructive pulmonary disease, and is also at high risk of acute medical conditions and trauma. Consequently, emergency departments are frequently utilized by the elderly population, leading to a significant increase in the number of elderly patients visiting these facilities. Frequent visits to emergency services by patients aged over 65 years are driven by factors such as the potential for rapid deterioration of acute illnesses, age-related immune system deterioration, and challenges in managing existing chronic conditions.

What this study adds?

This study aimed to analyze the conditions that necessitate general surgery admission among patients aged >65 years who presented to the emergency department and identify the factors affecting the management and prognosis of these patients.

ABSTRACT

Objective: This study aimed to retrospectively analyze the surgical intervention needs and outcomes of patients aged >65 years who were admitted from the emergency department to the general surgery ward due to gastrointestinal complaints. This study further explores the impact of age and comorbidities on surgical outcomes in this population.

Material and Methods: A total of 525 patients aged 65 years and older who presented with gastrointestinal symptoms were included in this retrospective observational study conducted at İzmir Katip Çelebi University Atatürk Training and Research Hospital. Data on demographic characteristics, presenting complaints, diagnoses, surgical interventions, and outcomes were collected and analyzed using IBM SPSS Statistics 26.0.

Results: The mean age of the study population was 79.72±9.25 years, and 45.1% were female. The most common presenting complaint was abdominal pain (54.7%), and the most frequent diagnoses were ileus (25.0%), acute cholecystitis (21.9%), and perforation (10.1%). Emergency surgery was required in 35.6% of the patients. The present study found a statistically significant association between higher mortality rates and diagnoses such as perforation, mesenteric ischemia, and trauma. Mortality was also significantly higher among patients with severe comorbidities.

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ABSTRACT

Conclusion: Elderly patients requiring emergency surgical intervention are at high risk of mortality, particularly in the presence of specific diagnoses and comorbidities. These findings highlight the need for careful surgical decision-making and the adoption of multidisciplinary approaches in the management of elderly patients to improve outcomes. Further research is recommended to optimize perioperative care in this vulnerable population.

Keywords: Geriatrics, emergency department, general surgery

Introduction

Patients aged >65 years represent a population that increasingly utilizes healthcare services due to the progression of aging, which is associated with a rise in chronic diseases and a decline in physical function (1,2,3). This age group is particularly vulnerable to multiple chronic conditions, such as heart failure, hypertension, diabetes mellitus, and chronic obstructive pulmonary disease (COPD), and is also at high risk of acute medical conditions and trauma (4,5,6). Consequently, emergency departments are frequently utilized by the elderly population, leading to a significant increase in the number of elderly patients visiting these facilities. Frequent visits to emergency services by patients aged over 65 years are driven by factors such as the potential for rapid deterioration of acute illnesses, age-related immune system deterioration, and challenges in managing existing chronic conditions.

In the general population presenting to emergency departments, acute conditions requiring general surgical constitute a significant healthcare burden (6). Conditions such as acute abdomen, appendicitis, bowel obstruction, gastrointestinal perforation, acute cholecystitis, and trauma are common general surgical issues encountered in the emergency department that require prompt intervention (7). These conditions increase the need for surgical evaluation and intervention, and delays in surgical management can lead to severe complications. These acute conditions directly impact the treatment process and prognosis of patients.

Common general surgical pathologies in the elderly include gallbladder diseases, gastrointestinal obstruction, diverticulitis, and hernia complications (8). These patients are more susceptible to surgical intervention because of age-related physiological changes and comorbidities, and they also carry a higher risk of postoperative complications. This study aimed to analyze the conditions that necessitate general surgery admission among patients aged >65 years who presented to the emergency department and identify the factors affecting the management and prognosis of these patients.

Material and Methods

Study Design

This retrospective observational study was conducted in the Emergency Department of İzmir Katip Çelebi University Atatürk Training and Research Hospital. The İzmir Katip Çelebi University Ethics Committee approved the study prior to its commencement (decision no: 0634, date: 17.10.2022). The study was conducted by including the patient population between 13.04.2021 and 05.06.2023.

Study Population

This study included all adult patients aged over 18 years who presented to the emergency department with complaints of abdominal pain, nausea, vomiting, and other gastrointestinal symptoms. Patients who were referred from other centers, were brought to the emergency department intubated or in cardiac arrest/exitus, pregnant, or with incomplete data were excluded from the study (Figure 1).

Study Protocol

The age, sex, presenting complaint, diagnosis, need for surgery, admission location, and outcome information of all

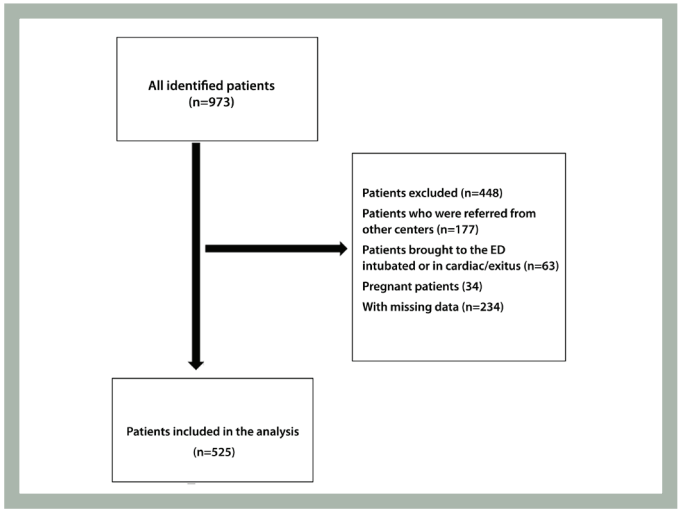

Figure 1. Flow-chart
ED: Emergency department

included patients were obtained from the hospital's electronic medical records and recorded on the study form. Statistical analyses were conducted based on these data.

Statistical Analysis

The data were analyzed using IBM SPSS Statistics 26.0 (IBM Corp., Armonk, New York, USA). Descriptive statistics were presented as n and % for categorical variables and as mean ± standard deviation (minimum-maximum) or median, 25th and 75th percentiles (Q1-Q3) for continuous variables, depending on the normality assumption. The Shapiro-Wilk test was used to assess the normality of the assumption of continuous variables; when the p value was less than 0.05, the data were considered not normally distributed. Levene's test was applied to evaluate the homogeneity of variances; in cases in which the assumption of homogeneity was not met, alternative non-parametric tests were used.

The Mann-Whitney U test was used to compare age distributions by gender and discharge/exit status between the two independent groups. For comparisons involving more than two groups, the Kruskal-Wallis test was used to analyze variables such as presenting complaint, diagnosis, the necessity of surgery, discharge from the emergency department, and admission to the ward or intensive care unit (ICU). The continuity correction test and Pearson's chi-square test were used to analyze the distributions of gender according to presenting complaint, diagnosis, surgery, ward admission, and discharge or exit status, as well as the distribution of discharge/exit status according to gender, presenting complaint, diagnosis, surgery, and ward admission. A p value of <0.05 was considered statistically significant in all statistical analyses.

Results

A total of 525 patients were included in the study, of which 237 were women. The mean age of female patients was 80.73±9.50 years (range: 65-101), whereas the mean age of male patients was 78.89±8.97 years (range: 65-98). This indicates that female patients were, on average, older than male patients. The overall mean age was 79.72±9.25 years, reflecting a wide age range among the patients (65-101 years). The most common presenting complaint was abdominal pain [54.7% of cases, followed by nausea and vomiting (13.3%), constipation (6.9%), and other complaints]. The most common diagnosis was ileus (25.0%), followed by acute cholecystitis (21.9%) and perforation (10.1%). In total, 35.6% of patients underwent emergency surgery. Most patients (93.0%) were discharged, whereas 7.0% were exitus. The mean age of exitus patients (87 years) was significantly higher than that of those who were discharged ($p<0.001$). The demographic characteristics of the patients are presented in Table 1.

Comparison of presenting complaints, diagnosis, surgical need, ward admission, and exitus status by sex was

Table 1. Descriptive statistics (n=525)

Variable	Descriptive statistics
Age	
Mean ± SD	79.72±9.25
Min-max	65-101
Sex (n, %)	
Female	237 (45.1%)
Male	288 (54.9%)
Presenting complaint (n, %)	
Abdominal pain	287 (54.7%)
Nausea, vomiting	70 (13.3%)
Constipation	36 (6.9%)
Bloody stool	6 (1.1%)
Diarrhea	4 (0.8%)
Other	122 (23.2%)
Diagnosis (n, %)	
Ileus	131 (25.0%)
Acute cholecystitis	115 (21.9%)
Perforation	53 (10.1%)
Hernia	46 (8.8%)
Diverticulitis	24 (4.6%)
Gastrointestinal bleeding	11 (2.1%)
Acute appendicitis	30 (5.7%)
Mesenteric ischemia	15 (2.9%)
Trauma	30 (5.7%)
Other	70 (13.3%)
Surgery (n, %)	
No surgery	248 (47.2%)
Emergency surgery	187 (35.6%)
Elective surgery	90 (17.1%)
Ward/ICU (n, %)	
Discharge from the ED	3 (0.6%)
Ward admission	469 (89.3%)
ICU admission	53 (10.1%)
Exitus/discharge (n, %)	
Discharged	488 (93.0%)
Exitus	37 (7.0%)

SD: Standard deviation, Min-max: Minimum-maximum, ICU: Intensive care unit, ED: Emergency department

performed. A statistically significant difference was found in the diagnostic category between the two genders, whereas no significant differences were observed in other variables. Specifically, the diagnosis of hernia was significantly more common in males than in females, and the difference was statistically significant. The comparison results are presented in Table 2.

Table 2. Distribution analysis of presenting complaint, diagnosis, surgery, ward admission, and discharge or exit status by gender (n=525)

Variables	Gender		p value
	Female (n, %)	Male (n, %)	
Presenting complaint			
Abdominal pain	133 (56.1)	154 (53.5)	0.112^{++}
Nausea, vomiting	36 (15.2)	34 (11.8)	
Constipation	14 (5.9)	22 (7.6)	
Blood stool	0 (0.0)	6 (2.1)	
Diarrhea	3 (1.3)	1 (0.3)	
Other	51 (21.5)	71 (24.7)	
Diagnosis			
Ileus	61 (25.7)^{a}	70 (24.3)^{a}	0.033^{++}
Acute cholecystitis	51 (21.5)^{a}	64 (22.2)^{a}	
Perforation	26 (11.0)^{a}	27 (9.4)^{a}	
Hernia	11 (4.6)^{a}	35 (12.2)^{b}	
Diverticulitis	14 (5.9)^{a}	10 (3.5)^{a}	
Gastrointestinal bleeding	3 (1.3)^{a}	8 (2.8)^{a}	
Acute appendicitis	13 (5.5)^{a}	17 (5.9)^{a}	
Mesenteric ischemia	9 (3.8)^{a}	6 (2.1)^{a}	
Trauma	10 (4.2)^{a}	20 (6.9)^{a}	
Other	39 (16.5)^{a}	31 (10.8)^{a}	
Operation			
No operation	114 (48.1)	134 (46.5)	0.713^{++}
Emergency operation	86 (36.3)	101 (35.1)	
Elective operation	37 (15.6)	53 (18.4)	
Clinic/ICU			
Discharged from an emergency	1 (0.4)	2 (0.7)	0.461^{++}
Directorate admission	208 (87.8)	261 (90.6)	
Intensive care admission	28 (11.8)	25 (8.7)	
Ex/discharged			
Discharged	218 (92.0)	270 (93.8)	0.538^{+}
Ex	19 (8.0)	18 (6.3)	

$^{+}$Continuity correction test, $^{++}$Pearson's chi-square test, Here, a and b as superscripts represent statistically similarity and difference groups, ICU: Intensive care unit

The comparison of other variables according to in-hospital mortality status is presented in Table 3. There is a statistically significant differences between the discharge and exitus groups in the diagnosis and ward-ICU categories. The exitus rates are higher in the perforation, mesenteric ischemia, and trauma groups, and this increase is statistically significant. The results are detailed in Table 3.

Table 3. Distribution analysis of exitus/discharge status by sex, presenting complaint, diagnosis, surgery, and ward admission (n=525)

Variables	Discharge/ex status		p value
	Discharge (n, %)	Ex (n, %)	
Gender			
Female	218 (44.7)	19 (51.4)	0.538^{+}
Male	270 (55.3)	18 (48.6)	
Presenting complaint			
Abdominal pain	265 (54.3)	22 (59.5)	0.213^{++}
Nausea, vomiting	69 (14.1)	1 (2.7)	
Constipation	34 (7.0)	2 (5.4)	
Bloody stool	6 (1.2)	0 (0.0)	
Diarrhea	3 (0.6)	1 (2.7)	
Other	111 (22.7)	11 (29.7)	
Diagnosis			
Ileus	126 (25.8)^{a}	5 (13.5)^{a}	**<0.001^{++}**
Acute cholecystitis	111 (22.7)^{a}	4 (10.8)^{a}	
Perforation	44 (9.0)^{a}	9 (24.3)^{b}	
Hernia	43 (8.8)^{a}	3 (8.1)^{a}	
Diverticulitis	24 (4.9)^{a}	0 (0.0)^{a}	
Gastrointestinal bleeding	11 (2.3)^{a}	0 (0.0)^{a}	
Acute appendicitis	28 (5.7)^{a}	2 (5.4)^{a}	
Mesenteric ischemia	11 (2.3)^{a}	4 (10.8)^{b}	
Trauma	23 (4.7)^{a}	7 (18.9)^{b}	
Other	67 (13.7)^{a}	3 (8.1)^{a}	
Operation			
No operation	235 (48.2)	13 (35.1)	0.116^{++}
Emergency operation	168 (34.4)	19 (51.4)	
Elective operation	85 (17.4)	5 (13.5)	
Clinic/ICU			
Discharged from an emergency	3 (0.6)^{a}	0 (0.0)^{a}	**<0.001^{++}**
Ward admission	444 (91.0)^{a}	25 (67.6)^{b}	
Intensive care admission	41 (8.4)^{a}	12 (32.4)^{b}	

$^{+}$Continuity correction test; $^{++}$Pearson's chi-square test, Here, a and b as superscripts represent statistically similarity and difference groups, ICU: Intensive care unit

Discussion

This study examined the surgical intervention needs and outcomes of patients over 65 years old who presented to the emergency department with gastrointestinal complaints. The findings show significant parallels with similar studies in the literature, highlighting the high risk associated with surgical interventions in the elderly population and the need for careful management of these cases. Consistent with the literature, perforation, mesenteric ischemia, and trauma were found to be more fatal in patients over 65. In these patient groups, quicker decision-making and more aggressive treatment are necessary.

Our study found that the need for surgical intervention increases with advancing age, and the postoperative prognosis of these patients is generally poorer. These findings align with numerous studies that examine the outcomes of surgical interventions in elderly patients, with the literature frequently noting that patients over 80 years old have a higher risk of surgical complications and mortality. For example, emergency surgical interventions in patients over 80 years old are associated with mortality, particularly due to surgical complications, sepsis, and pneumonia (9,10). Additionally, it is emphasized that long-term survival rates after surgical interventions are generally low in elderly patients and that postoperative care is critically important for this group (11).

In the literature, comorbidities are identified as one of the main factors affecting postoperative mortality in elderly patients. Our study also examined the impact of comorbidities on surgical outcomes in elderly patients. Many studies have shown that advanced age and associated chronic diseases negatively impact surgical outcomes, with these patients being at higher risk for complications and mortality after surgery (12). Specifically, comorbidities such as hypertension, chronic heart disease, and chronic obstructive pulmonary disease (COPD) increase the risk of mortality following surgical intervention in elderly patients. However, some studies suggest that this relationship is not always clear, and that surgical outcomes in elderly patients cannot be solely explained by comorbidities (9). In this context, our study observed a similar trend, where chronological age alone did not have a significant impact on postoperative mortality, but severe comorbidities emerged as important risk factors.

Our finding that perforation, mesenteric ischemia, and trauma are more closely associated with mortality in elderly patients is widely supported by the literature. Perforation cases, particularly gastrointestinal perforations, are associated with high mortality rates in elderly patients; this is further exacerbated by weakened immune systems, reduced physiological reserves, and comorbidities (13). In such cases, delayed diagnosis and treatment significantly reduce the chances of survival, leading to rapid progression of sepsis (14). Similarly, mesenteric ischemia is a serious cause of death among elderly patients, often linked to atherosclerosis and other vascular diseases, leading to rapid necrosis and sepsis, which increases mortality (15). The literature indicates that elderly patients have a reduced ability to tolerate mesenteric ischemia due to circulatory issues, which is why surgical intervention is often insufficient (16). Trauma also carries a high risk of mortality in the elderly population, particularly when complicated by osteoporosis and general frailty (11). This significantly increases the likelihood of fatal outcomes from traumatic injuries; particularly head traumas and long bone fractures are associated with serious outcomes in elderly patients (13). Studies examining the impact of trauma in the elderly population have found significantly higher mortality rates compared to younger populations (15). Additionally, each of these diagnoses carries significantly increased risks of morbidity and mortality in the postoperative period in elderly patients (14). Elderly patients, with their declining physiological reserves and increasing burden of comorbidities, are more vulnerable to these types of surgical interventions, leading to significantly higher mortality rates (11).

These results clearly indicate that surgical intervention decisions in the elderly population must be carefully evaluated and that a multidisciplinary approach should be adopted for these patients. Particularly in cases of perforation, mesenteric ischemia, and trauma requiring surgical intervention, early diagnosis and treatment strategies can improve survival rates, but these cases generally carry high risks, as frequently emphasized in the literature (11,16).

Surgical intervention decisions in the elderly should be made carefully, considering the patient's overall health status, comorbidities, and the potential benefits of surgery. The literature often discusses the impact of advanced age and comorbidities on surgical outcomes, but it is also noted that these factors alone should not determine surgical decisions (10,12). Our study also emphasizes the need for careful evaluation of the surgical needs of elderly patients and the optimization of postoperative care.

The long-term outcomes of surgical interventions in elderly patients are important in terms of the overall health status and quality of life of this population. Studies have shown that long-term survival rates are low after surgical interventions in elderly patients, and that these patients have greater postoperative care needs (9,10). Additionally, managing postoperative complications in elderly patients is

critically important to improve their quality of life and reduce mortality rates. In this context, multidisciplinary approaches can contribute to optimizing postoperative care following surgical interventions.

Study Limitations

This study is based on a retrospective design and is subject to the inherent limitations of retrospective data collection, such as data loss and recording errors. The study used data obtained from a single center, which may limit the generalizability of the results. Additionally, the inability to fully control for potential confounding variables, such as comorbidities and other clinical factors, may create limitations in the interpretation of the findings. Finally, the study focused on cases requiring surgical intervention and may have overlooked other clinically significant conditions that did not require surgery.

Conclusion

In conclusion, this study highlights the high risk associated with emergency surgical interventions in elderly individuals and underscores the importance of multidisciplinary approaches in managing such patients. It is also important to note that diagnoses such as perforation, mesenteric ischemia, and trauma are associated with higher mortality rates in patients aged >65 years. Future studies should focus on what can be done more quickly in cases of mortal diagnoses among older people.

Ethics

Ethics Committee Approval: The İzmir Katip Çelebi University Ethics Committee approved the study prior to its commencement (decision no: 0634, date: 17.10.2022).

Informed Consent: Retrospective study.

Authorship Contributions

Surgical and Medical Practices: T.D.Ş., E.E.G., Concept: S.K., Design: M.G.E., U.P., Data Collection or Processing: S.K., T.D.Ş., Analysis or Interpretation: U.P., E.E.G., Literature Search: M.G.E., T.D.Ş., Writing: M.G.E., S.K.

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