



## FACTORS INFLUENCING MORTALITY AND MORBIDITY IN ELDERLY POPULATION UNDERGOING VARIOUS ELECTIVE/ EMERGENCY SURGICAL PROCEDURE

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### Abstract

**Aim:** The purpose of the study is to determine various aspects that affect the outcome of elderly patients undergoing various surgical procedures in the surgery department.

**Place and Duration:** In the Surgical department of, PIMS Hospital, Islamabad for two-year duration from January 2021 to December 2022

**Methods:** This is a retrospective, descriptive analysis of all patients 60 years of age and older (n=200) who underwent elective or emergency surgical procedures. One of the co-authors was given authority for collecting all patient records aged over 60 who underwent various surgical procedures. To investigate common comorbidities in elderly patients and their impact on overall surgical outcomes, all patient records were studied and data was recorded on a proforma. The data was statistically analyzed with SPSS version 21.0.

**Results:** 200 patients aged >60 years admitted for emergency or elective general surgery were included in this study. The patients mean age was 65.8 years, mean BMI was 26.1 kg/m<sup>2</sup>, and 70% of the participants were men. In elderly patients, 85% had comorbidities. In this study, 85.5% of patients used minimum one medication at home before hospitalization. The Hernia repair (20.5%), Resection of the colon (22.5%), resection of the small intestine (19%) or Cholecystectomy (17%) were the most common elective or emergency procedures of general surgery, followed by laparotomy (9%). The most common complication (6% of patients) were pulmonary in nature and included pneumonia, pulmonary embolism, and respiratory failure (requiring treatment in the intensive care unit). In total, 30 very elderly patients who required emergency surgery died in the hospital (mortality 15%).

**Conclusions:** In conclusion, mortality among elderly adult patients undergoing urgent hernia surgery is high. Surgery remains difficult for the elderly due to coexisting health problems. This is an early planned hernia repair that is highly recommended.

**Keywords:** Elderly, Emergency or Elective Surgery, Morbidity, Mortality

## INTRODUCTION

Advance age is associated with a loss of the ability to function properly in various organ systems. However, this cannot be accredited to any pathological process as various organs are affected at different rates during this aging process<sup>1-2</sup>. Worldwide, the number of elderly people who have undergone various surgical procedures has increased. This is related with overall increase in life expectancy in advanced countries due to better diagnostic equipment<sup>3-4</sup>. Though, the foremost cause of increasing surgical procedures ratio in elderly patients in Pakistan and other under-developed countries is socio-economic reluctance to undergo surgery coupled with general fear of surgery<sup>5-6</sup>. In an underdeveloped country, perioperative mortality among elder patients is alarmingly common. The responsibility of development of predictive criteria for evaluating preoperative factors affecting mortality and morbidity in elder surgical patients has been imposed on surgeons worldwide<sup>7-8</sup>. However, such estimation criteria have not been developed. Elder people who require surgery often have comorbidities. Numerous studies have shown that mortality and morbidity increase exponentially in the case of emergency surgeries in elderly patients. Reluctance to undergo surgery ultimately leads to complications<sup>9-10</sup>. Elder people often do not seek medical attention until they experience a life-threatening condition. Comorbidities, complications, and urgent surgery significantly increase the risk of death<sup>11</sup>. The purpose of the study is to determine various aspects that affect the elderly patient's surgical outcome undergoing various surgical procedures.

## METHODS

This is a retrospective, descriptive analysis of all patients 60 years of age and older (n=200) who underwent elective or emergency surgical procedures. One of the co-authors was given authority for collecting all patient records aged over 60 who underwent various surgical procedures. Patients were admitted by the emergency department or outpatient clinic. Comorbidities were treated in both elective and life-threatening situations. After a full clinical and laboratory evaluation, the patients underwent surgery. Patients with complication at the time of admission were operated immediately after the necessary evaluation and resuscitation. After assessing the patient's condition, the anesthetist determines what type of anesthesia will be given. The variables studied were comorbidities and their impact on outcome, operative time, postoperative and operative complications, postoperative stay and surgical outcome in terms of mortality and morbidity. SPSS version 21.0 was used to evaluate the results.

## Results

200 patients aged >60 years admitted for emergency or elective general surgery were included in this study. The patients mean age was 65.8 years, mean BMI was 26.1 kg/m<sup>2</sup>, and 70% of the participants were men (Table 1).

**Table-I** shows the demographic and clinical features of the patients

Variables	n (%)
Age (years) Mean = 65.8 (SD = 4.2) 60-65	110 (55%)
66-70	60(30%)
71-75	30(15%)
<b>Sex</b>	140(70%)
Male	
Female	60(30%)
<b>BMI (kg/m<sup>2</sup>)</b>	16 (8%)
Mean = 26.1 (SD = 5.2) < 18.5 (Underweight)	
18.5-25 (Normal weight)	90 (45%)
25-30 (Overweight)	64 (32%)
> 30 (Obese)	30 (15%)
<b>ASA class</b>	5 (2.5%)
1E	
2E	34 (17%)
3E	96 (48%)
4E	65(32.5%)

In this group of elderly patients, 85% had comorbidities. The most common co-morbidities were hypertension, heart failure, respiratory diseases such as COPD, hypothyroidism and diabetes mellitus (Table 2).

**Table-II** shows the co-Morbidities of the patients

Comorbidity	n (%)
Hypertension	125 (62.5%)
Diabetes	39 (19.5%)
Respiratory disease (including COPD)	48 (24%)
Heart failure	29 (14.5%)
Hypothyroid	45(22.5%)
Osteoporosis	60 (30%)
Osteoarthritis	29 (14.5%)
Stroke with residual deficit	18 (9%)
Smoking history	89 (44.5%)
Myocardial infarction (within last 6 months)	26 (13%)
<b>Total number of comorbidities</b>	
None	30 (15%)
1-2	108 (54%)
3-5	55 (27.5%)
> 5	7 (3.5%)
<b>Number of home medications</b>	29 (14.5%)
None	
1-2	45 (22.5%)
3-5	92 (46%)
> 5	34 (17%)
<b>Home medication use</b>	
Anti-platelet agent	85 (42.5%)
ACE inhibitor	92 (46%)
Statin	102 (51%)
Beta-blocker	126(63%)
Calcium channel blocker	94 (47%)
Diuretics	74 (37%)
Anti-coagulant	82 (41%)
<b>CPS</b>	61 (30.5%)
0-3	
4-7	93 (46.5%)
8-10	37 (18.5%)
> 10	9 (4.5%)

In this study, 85.5% of patients used minimum one medication at home before hospitalization. The most commonly prescribed drugs were antiplatelet drugs, angiotensin converting enzyme inhibitors, statins, diuretics and beta-blockers (Table 2). The median class of ASA (48% of patients) was 3E and 6 is the median score of CPS (range 0 to 14). Hernia repair (20.5%), (Resection of the colon (22.5%), resection of the small intestine (19%) or Cholecystectomy (17%) were the most common elective or emergency procedures of general surgery, followed by laparotomy (9%). (Table 3).

**Table-III** shows the various surgical procedures performed among patients with its diagnosis

<b>Operative procedure</b>	<b>n (%)</b>
Small Bowel (Laparotomy for adhesions or resection)	38 (19%)
Colon (Laparotomy for resection or diversion)	45 (22.5%)
Cholecystectomy	34 (17%)
Laparotomy (other)	18 (9%)
Duodenal Bleed/Perforation	16 (8%)
Hernia elective/Incarcerated/Strangulation	50 (25%)
<b>Primary diagnosis</b>	
Small Bowel Obstruction	30 (15%)
Cholelithiasis (Complicated)	27 (13.5%)
Hernia	41 (20.5%)
Colon Cancer	24 (12%)
Appendicitis	17 (8.5%)
Duodenal Ulcer	10 (5%)
Colon Obstruction	14 (7%)
Bowel Ischemia	16 (8%)
Gastrointestinal Bleed	9 (4.5%)
Colon Perforation	12 (6%)

More than a fifth of patients experienced complications during their hospital stay (Table 4). The most common complication (6% of patients) were pulmonary in nature and included pneumonia, pulmonary embolism, and respiratory failure (requiring treatment in the intensive care unit). Surgical problems (postoperative bleeding, dehiscence and wound infection) and medications related complications (acute or chronic renal failure) were also common. In total, 30 very elderly patients who required emergency surgery died in the hospital (mortality 15%). The mean duration of stay in hospital was 14 days (range 1-90 days). 15.5% of patients spent more than 30 days in the hospital.

**Table-IV** shows the complications among patients post-operatively

<b>Complication</b>	<b>n (%)</b>
Bleeding	11 (5.5%)
Respiratory failure (requiring intubation)	12 (6%)
Sepsis	9 (4.5%)
Renal Failure	10 (5%)
PE	3 (1.5%)
Wound Complication	8 (4%)
Stroke	2 (1%)
Total number of complications	155 (77.5%)
0	
1-2	35 (17.5%)
3-5	10 (5%)
Mortality	30 (15%)
Length of Stay (Median 14 days)	51 (25.5%)
< 7 days	
8-14 days	63 (31.5%)
15-30 days	55 (27.5%)
31-90 days	29 (14.5%)
> 90 days	2 (1%)

## DISCUSSION

Until recently, surgeons had difficulty operating on elderly patients for a variety of reasons and opinions. If elder patients are denied surgery, a range of treatable disorders can develop, to the point where life-threatening surgical intervention is required<sup>12-13</sup>. However, there is a rising harmony that surgery must not be postponed solely on the base of age, particularly when it is a life-saving procedure. Worldwide, more and more elderly patients are being operated on for complex surgical procedures<sup>14-15</sup>. The complex surgical procedures are common in most poor countries, including Pakistan, and are generally caused by avoiding treatment for economic reasons as well as fear of surgery<sup>16</sup>. Emergency surgery is associated with a significant mortality risk in the elderly population, especially when intestinal invasion requires bowel resection and anastomosis<sup>16-17</sup>.

In this study, 85.5% of patients used minimum one medication at home before hospitalization. The most commonly prescribed drugs were antiplatelet drugs, angiotensin converting enzyme inhibitors, statins, diuretics and beta-blockers. The median class of ASA (48% of patients) was 3E and 6 is the median score of CPS (range 0 to 14). Hernia repair (20.5%), (Resection of the colon (22.5%), resection of the small intestine (19%) or Cholecystectomy (17%) were the most common elective or emergency procedures of general surgery, followed by laparotomy (9%). Assessing the emergency surgical interventions outcomes in elderly patients with complex procedures seems to be a tough mission<sup>18</sup>. Despite these realities, age is not a strict contraindication to any surgical intervention. According to numerous studies, the mortality rate after elective surgery is considerably very low<sup>19</sup>.

The outcomes in general surgery in the elderly is strongly related to concomitant comorbidities, the surgery type (emergency or elective), the clinical presentation of patients (complicated or uncomplicated) and the age of the patient<sup>20-21</sup>. According to other similar studies, uncomplicated elective surgical procedures have a lower mortality risk than emergency surgical procedures in elderly patients who are not eligible for surgery. For the elderly, early elective surgery is suggested to reduce mortality and morbidity<sup>22</sup>. In this series, urgent operations result in a higher mortality rate (29 deaths) than elective operations (1 death). This is in line with the outcomes of other studies that are comparable. Six of the seven patients who died in this cohort had an underlying systemic condition, suggesting that comorbidity and mortality are related. This is in line with relevant research findings showing that comorbidities increase the risk of complications and mortality<sup>23</sup>. According to our findings, the incidence of various postoperative problems was higher in those with associated systemic co-morbidities. The results of this study are comparable to several studies. Postoperative problems are more common with emergency surgical procedures compared to elective surgical treatment<sup>24</sup>. Surgeon experience, surgical environment, and instrument sterilization are other factors that contribute to this in addition to age and comorbidities. Additionally, there may be another contributing factor to the increased postoperative complications during urgent surgical procedure as patients are evaluated quickly in an emergency to avoid further delays in surgery<sup>25</sup>. Additional factors affecting mortality and morbidity in elderly patients enduring various surgical procedures include the time between admission and surgery, the number of hours after emergency complications and the general condition of the patient<sup>26</sup>.

## CONCLUSION

The morbidity and mortality rates of older people with comorbidities are much higher, especially when they are undergoing emergency surgery. Early elective surgery is highly recommended to increase the effectiveness of the operation.

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