

An Observational Study On Spectrum of Surgical Diseases in Geriatric Population with Special Reference to Outcome

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Abstract

Background: The geriatric population is at increased risk of surgical diseases and adverse postoperative outcomes due to age-related physiological changes, multiple comorbidities, and reduced functional reserve. Understanding the spectrum of surgical conditions and factors affecting outcomes is essential for improving perioperative care and reducing morbidity and mortality. The aim is to assess the spectrum of surgical diseases in the geriatric population and evaluate their clinical presentation, treatment approaches, and postoperative outcomes, with special reference to morbidity and mortality. **Material and Methods:** This was a hospital-based observational study conducted in the Inpatient Department (IPD) of Calcutta National Medical College and Hospital over a period of one year (01/06/2023 to 01/06/2024). The study population comprised individuals aged >60 years who fulfilled the predefined selection criteria and were admitted to the surgical IPD with any surgical condition. A total of 94 patients were included in the study. **Results:** Among 94 patients, the mean age was 68.98 ± 7.12 years, with males predominating (54.3%). Non-malignant diseases were more common (74.5%), and 67.0% had comorbidities, mainly T2DM. Surgical management was performed in 84.0% of patients. Grade 4 postoperative pain was most frequent (29.5%), while major and minor complications were absent in 71.8% and 50.0%, respectively. The mean hospital stay was 11.35 ± 5.88 days, and 66.7% returned to daily activities within 1–4 days. Malignancy, mortality, and trauma were present in 21, 7, and 5 patients, respectively. **Conclusion:** Geriatric patients represent a high-risk surgical population with a broad spectrum of surgical diseases and increased vulnerability to postoperative complications. Early diagnosis, appropriate selection of treatment modality, comprehensive preoperative assessment, optimization of comorbidities, and careful postoperative monitoring are essential to improve surgical outcomes and reduce morbidity and mortality in elderly patients.

Keywords: Geriatric population, Elderly, Surgical diseases, Surgical outcomes, Postoperative complications, Morbidity, Mortality, Comorbidities, Geriatric surgery, Observational study.

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INTRODUCTION

The geriatric population is a rapidly growing segment of society globally, and India is no exception to this demographic shift. According to the World Health Organization (WHO), the global population aged 60 years and above is projected to reach 2 billion by 2050, with a significant proportion residing in low- and middle-income countries like India.^[1] In India, the geriatric population defined as people with age more than 60 years.^[2] This population has been steadily increasing, and it is estimated that by 2050, the country will have nearly 340 million geriatric individuals, representing a significant healthcare challenge. As people age, their physiological reserves gradually diminish, increasing their vulnerability to surgical disorders. These problems range from basic maladies like gallbladder diseases and hernias to more complicated pathologies like vascular disorders and cancers. The healthcare needs of the geriatric population are complex and multifaceted, including a range of surgical diseases that require intervention.^[3] In recent years, there has been a growing recognition of the importance of understanding the surgical disease burden in the geriatric and evaluating the

outcomes associated with surgical interventions specific to this population.^[4] Globally, studies have reported varying prevalence rates of surgical diseases in the geriatric, highlighting the need for context-specific research to address the unique challenges faced by each country or region.^[5] There are particular difficulties in managing surgical disorders in older patients, such as higher postoperative complications, changed physiological reactions to stress, and increased comorbidities. Further complicating surgical results in this age range are issues like delayed presentation, dietary deficits, and fragility. In the Indian context, there is a scarcity of comprehensive studies that have investigated the spectrum of surgical diseases prevalent in the geriatric population and their associated outcomes.^[6]

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Limited data are available on the specific surgical diseases that commonly affect the geriatric in India and the outcomes of surgical interventions in this population. With an emphasis on presenting patterns, surgical intervention types, and postoperative outcomes, this observational study attempts to examine the range of surgical disorders in elderly patients. Optimizing preoperative evaluation, enhancing perioperative care, and improving overall patient prognosis can all be achieved by being aware of these factors. It is crucial to fill this knowledge gap to guide healthcare providers, policymakers, and researchers in India in developing targeted strategies for managing surgical diseases in the geriatric and improving patient outcomes.^[7] Therefore, this observational study aims to investigate the spectrum of surgical diseases prevalent in the geriatric population in India and evaluate the outcomes associated with surgical interventions. By examining data from a diverse range of surgical specialties and analyzing relevant demographic and clinical information, this study intends to contribute valuable insights into the surgical disease burden and outcomes in the geriatric population in the Indian context. The findings of this study can provide useful information that may bring change in healthcare policies, guide clinical decision-making, and improve the overall quality of surgical care provided to the geriatric population in India.

The study aimed to assess the spectrum of surgical diseases among the geriatric population, along with their clinical manifestations, treatment approaches, and postoperative outcomes. It focused on evaluating surgical outcomes, identifying factors influencing these outcomes, and determining the risk of postoperative morbidity and mortality in elderly patients.

MATERIALS AND METHODS

Study type: Hospital based Observational study.

Study design: Hospital based Observational study.

Study setting: The study is based on the hospital's inpatient department (IPD).

Period of study: The study was conducted over a period of

One Year. (01/06/2023-01/06/2024)

Study population: Individuals over 60 years of age who met the study's selection criteria and were admitted in surgical inpatient department (IPD) at Calcutta National Medical College and Hospital with any surgical condition.

Sample size: 94 patients

Study variables

- Sociodemographic and Clinical Characteristics of Study Participants
- Distribution of Diseases and Nature of Disease
- Comorbidity and ASA Grading
- Management and Postoperative Outcomes
- Hospital Stay, Functional Recovery and Outcomes

Inclusion criteria

- Patients aged 60 years and above underwent surgical evaluation or intervention.
- Patients diagnosed with surgical diseases required conservative or surgical management.
- Patients underwent emergency or elective surgery were admitted to the surgical department.
- Patients who gave consent.

Exclusion criteria

- Patients who did not give consent.
- Patients below 60 years of age.
- Patients with incomplete medical records or lost to follow-up.
- Patients with terminal illnesses where surgical intervention was not indicated.
- Patients with mental illnesses or significant cognitive impairment that inhibit cooperation and consent.
- Patients who declined to participate in the research.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 27.0 and GraphPad Prism version 5. Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequency and percentage. Independent samples t-test and paired t-test were used for comparison of continuous variables, as appropriate. Categorical variables were compared using the Chi-square test or Fisher's exact test, as applicable. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Table 1: Sociodemographic and Clinical Characteristics of Study Participants (N=94)

Variable	Category	No. (%)	p-value
Age (years)	60–69	53 (56.4)	<0.001
	70–79	30 (31.9)	
	80–89	11 (11.7)	
	Mean $\pm$ SD	68.98 $\pm$ 7.12	
Sex	Male	51 (54.3)	0.411
	Female	43 (45.7)	
Presentation	Acute	40 (42.6)	0.147
	Chronic	54 (57.4)	
Admission	ER	41 (43.6)	0.206
	OPD	53 (56.4)	

Table 2: Distribution of Diseases and Nature of Disease (N=94)

Variable	Category	No. (%)	p-value
Nature of disease	Non-malignant	70 (74.5)	<0.001
	Malignant	24 (25.5)	
Common disease categories	Chronic calculous cholecystitis	4 (4.3)	<0.001

	Incisional hernia	4 (4.3)
	Inguinal hernia	4 (4.3)
	Breast carcinoma	3 (3.2)
	Hemorrhoids	3 (3.2)
	Peptic perforation	3 (3.2)
	Hepatic abscess	3 (3.2)
	Gastric carcinoma	3 (3.2)
	Cholelithiasis	3 (3.2)
	Wet gangrene	3 (3.2)
	Acute cholecystitis	3 (3.2)
	Colon carcinoma	2 (2.13%)
	Cellulitis	2 (2.13%)
	Phyllodes tumor of breast	2 (2.13%)
	Carcinoma anal canal	1 (1.06%)
	Hemothorax	1 (1.06%)
	Penile carcinoma	1 (1.06%)
	Hydrocele	2 (2.13%)
	Rectal prolapse	1 (1.06%)
	Necrotising fasciitis	1 (1.06%)
	Gastric outlet obstruction	1 (1.06%)
	Caecal perforation	1 (1.06%)
	Thigh abscess	1 (1.06%)
	Parotid tumor	1 (1.06%)
	Chronic pancreatitis	1 (1.06%)
	Massive pleural effusion	1 (1.06%)
	Psoas abscess	1 (1.06%)
	Rectal carcinoma	1 (1.06%)
	Appendicular perforation	1 (1.06%)
	Peripheral arterial disease	1 (1.06%)
	Lipoma	1 (1.06%)
	Jejunal perforation	1 (1.06%)
	Metastatic gastric carcinoma	1 (1.06%)
	Sigmoid volvulus	1 (1.06%)
	Abdominal tuberculosis	1 (1.06%)
	Subdural hemorrhage	1 (1.06%)
	Paraphimosis	1 (1.06%)
	Gallstone pancreatitis	1 (1.06%)
	Thyroid carcinoma	1 (1.06%)
	Carcinoma head of pancreas	1 (1.06%)
	Retroperitoneal sarcoma	1 (1.06%)
	Squamous cell carcinoma	1 (1.06%)
	Dry gangrene	1 (1.06%)
	Distal cholangiocarcinoma	1 (1.06%)
	Tension pneumothorax	1 (1.06%)
	Varicose ulcer	1 (1.06%)
	Subacute intestinal obstruction	1 (1.06%)
	UTI with sepsis	1 (1.06%)

Table 3: Comorbidity and ASA Grading (N=94)

Variable	Category	No. (%)	p-value
Comorbidity	None	31 (33.0)	<0.001
	T2DM	26 (27.7)	
	HTN	15 (16.0)	
	T2DM + HTN	8 (8.5)	
	Hyperlipidemia	4 (4.3)	
	Hyperlipidemia + T2DM	1 (1.1)	
	Hypothyroidism	2 (2.1)	
	Hypothyroidism + T2DM	1 (1.1)	
	Tuberculosis	2 (2.1)	
ASA grade	Grade I	7 (7.4)	<0.001
	Grade II	35 (37.2)	
	Grade III	34 (36.2)	
	Grade IV	10 (10.6)	
	Grade V	8 (8.5)	

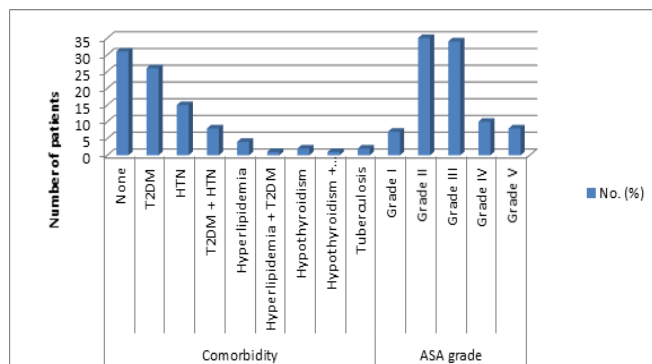
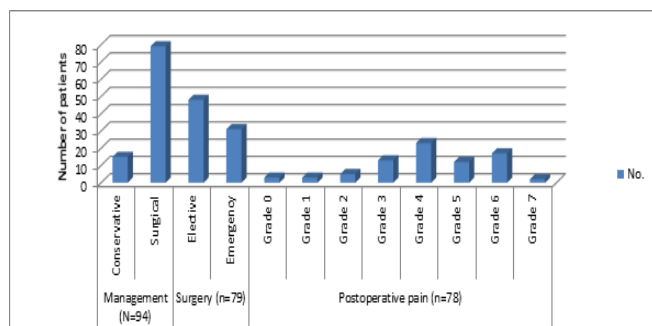
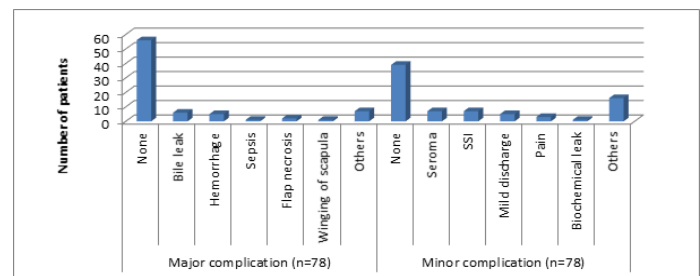
Table 4: Management and Postoperative Outcomes

Variable	Category	No. (%)	p-value
Management (N=94)	Conservative	15 (16.0)	<0.001
	Surgical	79 (84.0)	

Surgery (n=79)	Elective	48 (51.1)	0.057
	Emergency	31 (48.9)	
Postoperative pain (n=78)	Grade 0	3 (3.8)	<0.001
	Grade 1	3 (3.8)	
	Grade 2	5 (6.4)	
	Grade 3	13 (16.7)	
	Grade 4	23 (29.5)	
	Grade 5	12 (15.4)	
	Grade 6	17 (21.8)	
	Grade 7	2 (2.6)	
Major complication (n=78)	None	56 (71.8)	<0.001
	Bile leak	6 (7.7)	
	Hemorrhage	5 (6.4)	
	Sepsis	1 (1.3)	
	Flap necrosis	2 (2.6)	
	Winging of scapula	1 (1.3)	
	Others	7 (9.0)	
Minor complication (n=78)	None	39 (50.0)	<0.001
	Seroma	7 (9.0)	
	SSI	7 (9.0)	
	Mild discharge	5 (6.4)	
	Pain	3 (3.8)	
	Biochemical leak	1 (1.3)	
	Others	16 (20.5)	

Table 5: Hospital Stay, Functional Recovery and Outcomes

Variable	Category	No. (%)	p-value
Length of hospital stay	1–5 days	15 (16.4)	<0.001
	6–10 days	32 (35.2)	
	>10 days	44 (48.4)	
	Mean $\pm$ SD	11.35 $\pm$ 5.88 days	
Return to daily activities	1–4 days	58 (66.7)	<0.001
	>4 days	29 (33.3)	
	Mean $\pm$ SD	4.24 $\pm$ 1.86 days	
Malignancy	Present	21	
Mortality	Death	7	
Trauma	Present	5	

**Figure 1: Comorbidity and ASA Grading****Figure 2: Management and Postoperative Outcomes**

Among the 94 patients included in the study, the mean age was 68.98 ± 7.12 years. The majority of patients were aged 60–69 years (53, 56.4%), followed by 70–79 years (30, 31.9%) and 80–89 years (11, 11.7%), with a statistically significant difference across age categories ($p < 0.001$). Regarding sex, 51 (54.3%) patients were male and 43 (45.7%) were female, with no statistically significant difference ($p = 0.411$). In terms of presentation, 40 (42.6%) patients presented with an acute condition, whereas 54 (57.4%) had chronic presentation, and the difference was not statistically significant ($p = 0.147$). Regarding the mode of admission, 41 (43.6%) patients were admitted through the Emergency Room (ER) and 53 (56.4%) through the Outpatient Department (OPD), with no statistically significant difference ($p = 0.206$). [Table 1]

Among the 94 patients included in the study, 70 (74.5%) had non-malignant diseases, while 24 (25.5%) had malignant

diseases, showing a statistically significant difference ($p < 0.001$). Among the various disease categories, chronic calculous cholecystitis, incisional hernia, and inguinal hernia were the most frequently observed conditions, with 4 (4.3%) patients each. Breast carcinoma, hemorrhoids, peptic perforation, hepatic abscess, gastric carcinoma, choledocholithiasis, wet gangrene, and acute cholecystitis were reported in 3 (3.2%) patients each. Colon carcinoma, cellulitis, phyllodes tumour of the breast, and hydrocele were observed in 2 (2.13%) patients each. The remaining disease categories were individually uncommon, occurring in 1 (1.06%) patient each, including carcinoma of the anal canal, hemothorax, penile carcinoma, rectal prolapse, necrotising fasciitis, gastric outlet obstruction, caecal perforation, thigh abscess, parotid tumour, chronic pancreatitis, massive pleural effusion, psoas abscess, rectal carcinoma, appendicular perforation, peripheral arterial disease, lipoma, jejunal perforation, metastatic gastric carcinoma, sigmoid volvulus, abdominal tuberculosis, subdural hemorrhage, paraphimosis, gallstone pancreatitis, thyroid carcinoma, carcinoma head of pancreas, retroperitoneal sarcoma, squamous cell carcinoma, dry gangrene, distal cholangiocarcinoma, tension pneumothorax, varicose ulcer, subacute intestinal obstruction, and UTI with sepsis. The distribution of the common disease categories was statistically significant ($p < 0.001$). [Table 2]

Among the 94 patients included in the study, 31 (33.0%) had no comorbidities, while 63 (67.0%) had at least one comorbidity, with the distribution showing a statistically significant difference ($p < 0.001$). The most common comorbidity was type 2 diabetes mellitus (T2DM), present in 26 (27.7%) patients, followed by hypertension (HTN) in 15 (16.0%) and T2DM with HTN in 8 (8.5%). Hyperlipidemia was observed in 4 (4.3%) patients, while 1 (1.1%) patient had hyperlipidemia with T2DM. Hypothyroidism and tuberculosis were each reported in 2 (2.1%) patients, whereas 1 (1.1%) patient had hypothyroidism with T2DM. Regarding ASA (American Society of Anesthesiologists) grade, the majority of patients were classified as Grade II (35, 37.2%), followed by Grade III (34, 36.2%). Grade IV was observed in 10 (10.6%) patients, Grade V in 8 (8.5%), and Grade I in 7 (7.4%) patients. The distribution of ASA grades was statistically significant ($p < 0.001$). [Table 3]

Among the 94 patients, 15 (16.0%) were managed conservatively, whereas 79 (84.0%) underwent surgical management, with a statistically significant difference ($p < 0.001$). Among the 79 patients who underwent surgery, 48 (51.1%) underwent elective surgery and 31 (48.9%) underwent emergency surgery; this difference was not statistically significant ($p = 0.057$). Among the 78 patients assessed for postoperative pain, the most common pain grade was Grade 4, observed in 23 (29.5%) patients, followed by Grade 6 in 17 (21.8%), Grade 3 in 13 (16.7%), Grade 5 in 12 (15.4%), and Grade 2 in 5 (6.4%). Grade 0 and Grade 1 pain were each reported in 3 (3.8%) patients, while Grade 7 was observed in 2 (2.6%) patients. The distribution of postoperative pain grades was statistically

significant ($p < 0.001$). Regarding major postoperative complications, 56 (71.8%) patients had no major complication. Among those with complications, bile leak occurred in 6 (7.7%) patients, hemorrhage in 5 (6.4%), flap necrosis in 2 (2.6%), and sepsis and winging of scapula in 1 (1.3%) patient each. Other major complications were reported in 7 (9.0%) patients. The distribution was statistically significant ($p < 0.001$). For minor postoperative complications, 39 (50.0%) patients had no complications. Among the observed complications, seroma and surgical site infection (SSI) were each reported in 7 (9.0%) patients, mild discharge in 5 (6.4%), pain in 3 (3.8%), and biochemical leak in 1 (1.3%) patient. Other minor complications occurred in 16 (20.5%) patients. The distribution of minor complications was statistically significant ($p < 0.001$). [Table 4]

Among the patients evaluated, the mean length of hospital stay was 11.35 ± 5.88 days. The majority of patients, 44 (48.4%), had a hospital stay of >10 days, followed by 32 (35.2%) who stayed for 6–10 days, while 15 (16.4%) had a stay of 1–5 days. The distribution of hospital stay was statistically significant ($p < 0.001$). Regarding return to daily activities, the mean time was 4.24 ± 1.86 days. A total of 58 (66.7%) patients resumed their daily activities within 1–4 days, whereas 29 (33.3%) required >4 days, with a statistically significant difference ($p < 0.001$). Malignancy was present in 21 patients, while mortality occurred in 7 patients. Trauma was present in 5 patients. [Table 5]

DISCUSSION

Chua MSH, et al,^[8] studied elderly patients undergoing emergency laparotomy and found that elderly patients had significantly greater postoperative morbidity and mortality. The elderly group had a longer hospital stay (31.5 vs 18.6 days, $p = 0.006$), higher postoperative complications (65.8% vs 37.4%, $p < 0.001$) and higher 30-day mortality (31.5% vs 8.8%, $p = 0.019$). This study strongly supports the importance of age and emergency surgery in determining postoperative outcomes. Hewitt et al,^[9] evaluated frailty among elderly patients undergoing emergency general surgery and found that frailty was strongly associated with postoperative complications. Postoperative complications occurred in 35% of patients, with 19% experiencing major complications. Frailty independently predicted in-hospital complications (OR=2.13, 95% CI: 1.09–4.16; $p = 0.02$) and major complications (OR=3.87, 95% CI: 1.69–8.84; $p = 0.001$). Mortality was 3.2%, and all patients who died were frail. Hajibandeh S et al,^[10] performed a systematic review and meta-analysis involving 66,701 octogenarians undergoing emergency general surgery. The pooled 30-day mortality was 26% overall and 29% after emergency laparotomy. Importantly, mortality increased markedly with ASA grade: 11% for ASA II, 22% for ASA III, 39% for ASA IV and 94% for ASA V. These findings are particularly relevant to your study because Grade II and III were the predominant ASA categories. Guttman MP et al,^[11] examined long-term outcomes following emergency general surgery in older adults. Their study highlighted that surviving the initial operation does not necessarily mean complete recovery, as older adults may experience persistent functional limitations after emergency

surgery. The authors emphasized the importance of evaluating outcomes such as return home, functional independence and long-term survival, which is relevant to your finding that 66.7% of patients returned to daily activities within 1–4 day. Fehlmann CA et al,^[12] conducted a systematic review and meta-analysis of elderly patients undergoing emergency general surgery and demonstrated a strong relationship between frailty and mortality. Their findings showed that frailty was significantly associated with increased 30-day mortality, as well as longer-term mortality, postoperative complications, loss of independence and increased level of care at discharge. Gong S et al,^[13] performed a systematic review and meta-analysis involving 18 studies and 4,479 older surgical patients. Frailty was associated with substantially increased 30-day mortality (OR=6.62, 95% CI: 2.80–15.61; $p<0.01$) and postoperative complications (OR=3.11, 95% CI: 2.06–4.68; $p<0.01$). Frailty was also associated with postoperative delirium (OR=2.65, 95% CI: 1.85–3.80; $p<0.01$). A large ACS-NSQIP analysis involving 9,062 patients aged ≥ 65 years reported by Kazaure HS et al,^[14] found an overall 30-day complication rate of 33.6%, functional decline of 34.5%, and mortality of 3.5%. The mean age was 73.9 years, and 41.9% were aged ≥ 75 years. These results demonstrate the substantial burden of postoperative morbidity and functional decline among elderly surgical patients and support your assessment of postoperative complications and return to daily activities. Aucoin S et al,^[15] reviewed emergency general surgery in older adults and emphasized that perioperative risk increases with increasing age and is further amplified by frailty and sarcopenia. The authors highlighted the importance of multidisciplinary perioperative care and individualized decision-making for elderly surgical patients. This supports the importance of comprehensive assessment of your patients' age, comorbidities, ASA grade, postoperative complications and functional recovery.

CONCLUSION

The present study concludes that elderly patients undergoing surgical care represent a clinically vulnerable population with a high burden of comorbidities and systemic illness. Both malignant and non-malignant surgical conditions were encountered, with operative management being required in the majority of patients. Postoperative pain and complications remained important concerns, although most patients had an uncomplicated recovery. Hospital stay was often prolonged, while functional recovery and return to daily activities were generally achieved within a short period. Overall, comprehensive preoperative assessment, optimization of comorbidities, appropriate risk stratification, effective postoperative pain and complication management, early mobilization, and multidisciplinary geriatric surgical care are essential for improving outcomes in elderly surgical patients.

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Conflicts of interest

There are no conflicts of interest.

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