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Short Term Outcomes after Elective Gastrointestinal Surgery in Octogenarians: A Retrospective Matched Cohort Study

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ABSTRACT

Introduction

The incidence of gastrointestinal surgical conditions like malignancy increases with age. There is growing requirement of gastrointestinal surgery in elderly patients due to the aging of general population. Gastrointestinal surgery in octogenarian patients posses an unique challenges due to decreased functional status of organs and higher incidence of co-morbidities.

Methods

In this retrospective study we compared the co-morbidities and perioperative outcomes of octogenarian patients with case matched younger patients. There were 2115 patients who underwent gastrointestinal surgery from October 2021 to September 2024 out of which thirty four were octogenarian patients. Sixty eight younger patients who underwent similar surgical procedures were selected for comparison. Patients' data were obtained from the medical records and the outcomes of surgery in two groups were compared.

Results

Octogenarian patients had more co-morbidities compared with younger patients. Occurrence of major postoperative complications (23.5% vs 8.8%; p value 0.04) and cardiac complications (20.6% vs 4.4%; p value 0.01) were higher in octogenarians. Postoperative hospital stay, intensive care unit stay, occurrence of overall complication and mean comprehensive complication index was similar in two groups.

Conclusion

Octogenarian had higher occurence of major complications after gastrointestinal surgery. Proper perioperative care is required for surgical management of octogenarian patients.

Keywords

Gastrointestinal surgery; octogenarian; outcome; surgery

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INTRODUCTION

With improvement on life expectancy the percentages of octogenarian population is increasing worldwide[1]. In recent years there has been increase in the proportion of elderly patients needing surgical care. Gastrointestinal surgery in elderly patients present unique challenges due to age related physiological changes, co-morbidities and altered response to stress[2]. As the patients age, they often experience decreased organ function including diminished renal and hepatic clearance, reduced gastrointestinal motility which affects the tolerance to surgery and anesthesia[2].

In a multicenter study of 19080 patients of colorectal cancer in Germany, 68.3% of octogenarian patients had American Society of Anesthesiology(ASA) grade III and IV compared to 35.4% of younger patietns[2]. Moreover, co-morbid conditions like cardiovascular disease, diabetes and respiratory issues are more common in elderly and can aggravate the complications during post-operative period[3]. With recent improvement in the health care service including surgical techniques and perioperative care, more complicated and morbid patients are undergoing major surgical procedures. Tailored perioperative management including nutritional and functional evaluations, appropriate surgery and postoperative care are crucial to optimize recovery and minimize post-operative complications.

Many studies have shown higher post-operative complications after surgery in octogenarians.[4,5] There are few studies comparing the outcomes of gastrointestinal surgery in elderly patients from our part of the world. In this retrospective study we compared the short-term outcomes after gastrointestinal surgery in octogenarian with that of younger patients.

METHODS

This is a retrospective matched cohort study of patients who underwent elective gastrointestinal surgery in our hospital from October 2021 to September 2024. Thirty-four octogenarian patients who underwent various gastrointestinal surgeries were included as cases. Sixty-eight case matched younger patients who underwent similar surgery during the study period were included as control. Controls were selected by individual matching based on the surgical procedure performed at 1:2 ratio. All the patients were arranged in chronological order, for each octogenarian case, two subsequent younger patients who underwent similar surgery were selected as control.

Data were obtained from the medical records. Patients demographic characters, nature of disease, organ involved and type of surgery done were obtained. Perioperative outcomes including duration of hospital stay, admission in intensive care unit, complications recorded and were compared between cases and control group. Post operative outcomes and morbidity depends on the nature of individual surgical procedure so the cases and controls were compared in subgroups of specific surgical procedures. Clavien-Dindo(CD) classification was used to define and classify post-operative complications and CD grade III or more was considered as major complication. Comprehensive complication index(CCI) was calculated from all the postoperative complications. Statistical package for social science (SPSS) for Windows version 26 was used for data analysis. Chi square test and student's t test were used where appropriate to compare the groups and p value of 0.05 or less was considered significance. Permission for conduction of study and ethical clearance was obtained from institutional review committee.

RESULTS

There were total of 2115 gastrointestinal surgery done during the study period out of which 34 were octogenarians and 68 patients selected in control group. Mean age in octogenarians was 82.2±2.4 years and that in control group was 56.1±15.5 years. Proportion of female patients was 35.5% in octogenarians and 45.3% in younger patients group. About 50% of the cases were malignant in each group. Biliary tree was the most common organ involved followed by stomach and large bowel.(Table 1)

The surgery performed were cholecystectomy, gastrectomy, hernioplasty for incisional hernia, bile duct exploration, Whipple operation and liver resection. Ileostomy closure, sleeve gastrectomy for gastric GIST, small bowel resection, gastrojejunostomy were grouped together in "others" group. Many of cases had multiple co-morbidities, eight patients in cases and 48 patients in control group were without co-morbidities. Common co-morbidities were hypertension, diabetes and chronic obstructive airway disease (COAD); which were significantly higher in elderly group.

The post-operative hospital stay was slightly higher in octogenarians but this difference was not statistically significant. On subgroup analysis there was no significance difference in postoperative hospital stay and CCI of individual surgical procedures (Table 2).

Post operative complications were surgical site infection, respiratory tract infection and cardiac arrhythmias. When individual complications were analyzed in two groups cardiac complications were found significantly higher in octogenarians. These cardiac complications were mainly arrhythmias and

Table 1. Demographic and clinical characters of octogenarian patients and control group

Clinical characters	Octogenarian	Control	p value
Age(mean)	82.2±2.4	56.1±15.5	0.01
Gender			
Male	22	39	0.45
Female	12	29	
Nature of disease			
Benign	17	33	0.89
Malignant	17	35	
Co-morbidity			
None	8	48	
HTN	12	12	
IHD	7	4	
COAD	6	3	
DM	8	7	
CLD	3	2	
Others	3	4	
Surgical technique			
Laparoscopic	5	20	0.10
Open	29	48	
Organ involved			
Biliary tree	9	18	
Stomach	7	14	
Colorectal	5	10	
Pancreas	2	4	
Liver	2	4	
Others	9	18	
Surgery performed			
Cholecystectomy	6	12	
Colectomy	5	10	
Gastrectomy	5	10	
CBD Exploration	3	6	
Hernioplasty	3	6	
Whipple operation	2	4	
Hepatectomy	2	4	
Others	8	16	

Abbreviations: CBD: common bile duct, CLD: chronic liver disease, COPD: chronic obstructive airway disease, DM: diabetes mellitus, HTN: hypertension, IHD: ischemic heart disease

ischemic events which occurred in seven cases out of which only three had preexisting cardiac co-morbidities. Major post-operative complications were also significantly higher in octogenarians cases. There was no significant difference in overall complications; respiratory complications or hospital acquired infections. (Table 3) There were one mortality in each group, one in octogenarian group was 86 years male with duodenal obstruction who underwent gastrojejunostomy and the other patient in control group was 56 years female with recurrent ileal gastrointestinal stromal tumor (GIST) who underwent ileal resection anastomosis.

Table 2. Comparison of outcomes of surgery in octogenarians and control group

Outcomes		Octogenarian	Control	p value
Post operative hospital stay	Overall	8.7±5.4	9.8±9.4	0.59
	Cholecystectomy	2.8±1.1	1±0.3	0.11
	Colectomy	14.3±5.7	11.2±5.8	0.41
	Gastrectomy	8.8±1.3	8.2±2.1	0.62
	CBD Exploration	11.2±5.2	11.1±4.1	0.97
	Hernioplasty	4.6±3.7	2.2±0.5	0.26
	Whipple operation	14.5±2.1	13.8±7.5	0.12
	Hepatectomy	7.50	7.14	0.56
	Others	6.7±5.9	5.6±4.3	0.47
ICU Stay	No	28	59	0.55
	Yes	6	9	
CCI	Overall	16.7±22.3	11.9±20.9	0.29
	Cholecystectomy	5.9±13.2	1.9±6.3	0.44
	Colectomy	33.9±26.3	19.2±17.6	0.15
	Gastrectomy	14.2±13.5	11.3±27.3	0.82
	CBD Exploration	20.6±11.1	10.7±9.1	0.18
	Hernioplasty	6.9±12.1	5.2±11.7	0.88
	Whipple operation	26.4±25.1	17.2±5.3	0.60
	Hepatectomy	17.2±11.5	14.8±14.3	0.79
	Others	13.33±57.7	9.2±16.1	0.22

Abbreviations: CBD: common bile duct, CCI :comprehensive complication index, ICU :intensive care unit

Table 3. Comparison of common post-operative complications between octogenarians and control group

Complications		Octogenarian	Control	Odds ratio (95% CI)	p value
Cardiac complications	No	27	65	5.6 (1.3-23.4)	0.01
	Yes	7	3		
Respiratory complications	No	30	63	1.7 (0.4-6.7)	0.45
	Yes	4	5		
Hospital acquired infection	No	25	57	1.9 (0.7-5.0)	0.21
	Yes	9	11		
Major complications	No	25	62	3.3 (1.0-10.5)	0.04
	Yes	8	6		
Overall complications	No	14	34	1.4 (0.6-3.2)	0.40
	Yes	20	34		

DISCUSSION

Outcomes of surgery in octogenarian patients have been a topic of increasing interest due to aging population and rising demands for surgical interventions in such population. In our study 1.6% of all patients were octogenarians which is lower as compared to other studies. In a nationwide registry of surgical patients in the Netherlands, octogenarian patients comprises of 19.2% colon and 6.6% of pancreas resection.[4] Lower proportion of octogenarian patients in our study might be due

to lower life expectancy in our country and lack of early diagnosis and referral specially for malignant conditions. Proportion of such patients is expected to be higher in the future. Higher likelihood of having co-morbidities, malnutrition and inherent age related physiological changes makes the surgery challenging in octogenarian patients.[5,6] The oldest patient in our series was 88 years. Male: female ratio was slightly higher in octogenarians compared to younger patients. Proportion of female population is higher in elderly age group.[1] Lower number of female patients in our study might be due to less health seeking behavior in females in our society.

About 50% of the patients in each group had benign condition most of which were biliary stone diseases or hernias. In a large retrospective study of operated patients in the United States of America showed cholecystectomy, bile duct exploration and colorectal surgery were the most common surgeries performed in octogenarians[7]. Laparoscopic surgery was less in octogenarian population mainly due to multiple cardiac or respiratory co-morbidities making them at higher risk for laparoscopic surgery. Other studies have shown laparoscopic surgery is safe and has better early post-operative outcomes in elderly patients.[8–10] Minimal invasive surgery and Enhanced Recovery After Surgery are found to be beneficial and recommended treatment methods in elderly patients.[10] Many of the patients in our study had multiple co-morbidities making them at higher risk post-operative complications. Many assessment tools like comprehensive geriatric assessment(CGA) has been developed to evaluate the overall health status of geriatric patients.[11] Some studies have found CGA useful to predict the post-operative complications while many authors fund it difficult to use or not predictive of post-operative outcomes[12–14].

Our study included heterogeneous group of patients undergoing different surgical procedures having huge variations in post-operative course like duration of post-operative hospital stay or comprehensive complications index. But; post-operative cardiac complications and post-operative major complication (defined as complication higher or equal to CD grade III) were higher octogenarian compared to younger patients. Other studies have also found cardiac arrhythmias occurs more frequently in elderly patients after gastrointestinal surgery.[15] In a study by Lu et at in China, elderly patients undergoing pancreatic and hepatic surgery had more infective complications than younger patients[16]. Similarly, a meta-analysis by Scholz et al showed higher rate of delirium in elderly patients during post-operative period.[17] These differences were not seen in our study which might be because of smaller sample size. There was no difference in post-operative mortality in our study. Our study has some limitations as we included selected group of patients who underwent rigorous preoperative evaluation and optimization to undergo major surgery like Whipple operation or hepatectomies. Besides we included all octogenarian patients who underwent different surgical procedures with heterogeneous data on post-operative outcomes.

CONCLUSION

Octogenarian patients have higher prevalence of comorbidities.They are at higher risk of complications specially major postoperative complications and cardiac complications. Proper case selection and appropriate perioperative care is required for better short-term outcomes of octogenarian patients.

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CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

Study concept, design, data collection, data analysis, manuscript writing: Bishnu Prasad Kandel; data collection, manuscript writing: Nishnata Koirala; study concept, data analysis; Deepak Sharma; data collection, manuscript writing: Narendra Maharjan; data analysis, manuscript review: Sumita Pradhan; study concept, design, manuscript review: Ramesh Singh Bhandari; study design, manuscript review :Paleswan Joshi Lakhey. All authors read and approved the final manuscript.

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