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Outcomes of Laparoscopic Cholecystectomy in Elderly Patients

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Abstract **Original Research Article**

***Background*:** Laparoscopic cholecystectomy (LC) is the standard treatment for both symptomatic gallstones and acute cholecystitis. Laparoscopic cholecystectomy is the surgical procedure to remove the gallbladder. While historically challenging in cases of acute cholecystitis, advancements in laparoscopic techniques have made it a viable and preferred treatment option for this condition. ***Objective*:** Our study's objective was to evaluate the efficacy of LC in elderly individuals. ***Methods*:** This prospective observational study was conducted at the general surgical department of Mymensingh Medical College Hospital from January 2023 to December 2023. A total number of 70 elderly patients who had acute cholecystitis (symptomatic gallstone disease) were included in this study. Based on physical examination, general conditions, laboratory investigation, and radiographic results, gallstone disease was diagnosed. All cases provided a signed, informed consent form. The research was done after approval of the ethical committee. ***Results*:** Among the 70 patients the majority of patients (87.14%) fall within the 60-69 years age range. A smaller proportion of older patients: A smaller percentage (12.86%) of patients are aged 70 years or older. The majority of the patients (68.30%) were male and (32.70%) were female. Hypertension is the most prevalent comorbidity among the patients, approximately 15.6% of the patients. Diabetes mellitus follows as the second most common comorbidity, with 11.1% of patients Cardiac disease is the third most frequent comorbidity, present in 6.7% of the patients. Peripheral vascular disease is the least common comorbidity among those presented, affecting 4.4% of the patients. Regarding the symptoms and clinical presentation, patients exhibited a variety of the usual gallbladder disease symptoms, including epigastric pain (51.30%), fatty food intolerance (37.14%), nausea and vomiting (24.29%), Murphy's sign (14.29%), biliary colic (32.86%), right upper quadrant pain radiating to the back (28.57%), dyspepsia (30.00%), fever (42.86%), bloating (14.29%), and belching (25.71%). The Operative time in elderly patients ranged from 45 min to 2.5 h with a mean value of (120.51±9.90). Blood gas samples were drawn from the arteries of the cases whose procedures lasted more than one hour, corresponding to 4 cases in (cases≥70 years) and 35 cases in group B (cases ≤69 years). The Mean PaCO2 was found to be 33.87 ±6.32 mmHg in and the pH had a mean of 7.42±0.06 the cases whose age were ≥70 years. Mean PaCO2 in cases ≤69 years was 38.32±9.32 mmHg and mean pH was 7.37±0.09. The rates of postoperative complication were 12 (17.14%) in the patients aged between 60-69 years and 4 (44.44%) in the patients aged ≥ 70 years**.** The presence of associated comorbidities is significantly associated with the incidence of postoperative complications. ***Conclusion*:** Laparoscopic cholecystectomy (LC) has demonstrated low mortality and morbidity rates when applied to elderly patients. Although Hypertension, cardiac, and diabetic comorbidities are frequently observed in this patient population, their contribution to overall morbidity following Laparoscopic cholecystectomy (LC) appears to be relatively minor.

Keywords: Cholelithiasis, Elderly, Laparoscopic Cholecystectomy.

INTRODUCTION

Gallstone disease constitutes one of the most prevalent indications for abdominal surgical intervention. The incidence of this condition is on the rise across all demographic groups [1]. Laparoscopic cholecystectomy has emerged as the gold standard treatment for symptomatic gallstone disease, supplanting the previously employed open cholecystectomy [2]. This minimally invasive surgical technique involves the removal of a diseased gallbladder. Since its introduction in the early 1990s, laparoscopic cholecystectomy has largely superseded the traditional open approach [3]. The pioneering laparoscopic cholecystectomy was performed by Muhe in Germany in 1985, a groundbreaking achievement at the time [4]. However, the majority of people chose to disregard his first report. Phillipe

Mouret, a French gynaecologist who is today acknowledged to be the pioneer, conducted a laparoscopic cholecystectomy in 1987. A few months later, he displayed a film of his method in Paris [5], which was the first time this procedure had been shown publicly.

The incidence of gallstone formation exhibits a positive correlation with advancing age. Furthermore, a notable gender disparity exists, with females demonstrating a significantly higher prevalence of gallstone disease compared to males. Epidemiological studies have indicated that approximately 20% of women and 5% of men within the age bracket of 50 to 65 years' experience gallstone formation. The geriatric population has witnessed a surge in surgical interventions for symptomatic gallstones, attributable to increased life expectancy, heightened prevalence of gallstone formation, and the ageing process itself [6]. This demographic is characterized by a higher incidence of comorbid conditions and diminished physiological reserves, thereby elevating the risk of postoperative complications and mortality. Despite the established status of laparoscopic cholecystectomy as the gold standard treatment for gallstones, its safety and efficacy in the elderly population remain subjects of ongoing inquiry [7].

A substantial body of research has focused on cholecystectomy in older patients. Individuals aged 80 and above exhibit a heightened likelihood of severe gallstone disease, acute cholecystitis, and perioperative complications, often necessitating open surgical procedures and prolonged hospitalizations [8]. The present study aims to evaluate the effectiveness of laparoscopic cholecystectomy in individuals aged 60 and older.

METHODS

This prospective observational study was conducted at the general surgical department of Mymensingh Medical College Hospital from January 2023 to December 2023. A total number of 70 elderly patients who had symptomatic gallstone disease were included in this study. Based on physical examination, general conditions, laboratory investigation, and radiographic results, gallstone disease was diagnosed. All cases provided a signed, informed consent form. The research was done after approval of the ethical committee.

Inclusion Criteria:

- Age ≥ 60 years.
- Both male and female

Exclusion Criteria:

- Age < 60 Years.
- ASA grade IV.
- Carcinoma in gall bladder.
- Bleeding disorders.
- Chronic liver disease.
- Infectious diseases of the liver.
- Cirrhosis.
- Portal hypertension.

Study Procedure:

A comprehensive prospective analysis was conducted on patients undergoing laparoscopic cholecystectomy. Detailed clinical histories, including both routine and exceptional presentations, were meticulously documented for each participant. Preoperative laboratory investigations encompassed complete blood count (CBC), serum glutamic-pyruvic transaminase (SGPT), hepatitis B surface antigen (HBsAg), blood glucose, bilirubin, and serum creatinine levels. All surgical procedures were performed by a consistent surgical team. Postoperative courses, including complications, were systematically recorded. The standard surgical approach involved four laparoscopic ports; however, additional ports were utilized as clinically indicated. A subset of patients underwent surgery within two to five days following an acute attack. In three instances, an open cholecystectomy was necessitated. All patients presenting with symptomatic gallstone disease (acute and chronic cholecystitis) underwent laparoscopic cholecystectomy, with conversion to open surgery considered and offered when deemed necessary.

Data Collection and Analysis:

Data were collected through a structured questionnaire administered by a single researcher. Upon completion of data collection, the information was organized and compiled using Microsoft Excel. A comprehensive dataset was subsequently constructed. Statistical analysis was performed using SPSS version 23, employing standard statistical methodologies. Categorical data were presented as frequency and percentage. Parametric numerical data were presented as mean ± standard deviation (SD).

RESULTS

Table 1 presents the age distribution of patients undergoing laparoscopic cholecystectomy. Most patients (87.14%) fall within the 60-69 age range. A smaller percentage (12.86%) of patients are aged 70 years or older.

Table 1: Age Distribution of the Patients

Age	Frequency	Percentage
60-69 years	61	87.14%
≥ 70 years	9	12.86%

Figure 1 presents the gender distribution of patients undergoing laparoscopic cholecystectomy. The majority of the patients (68.30%) were female and (32.70%) were male.

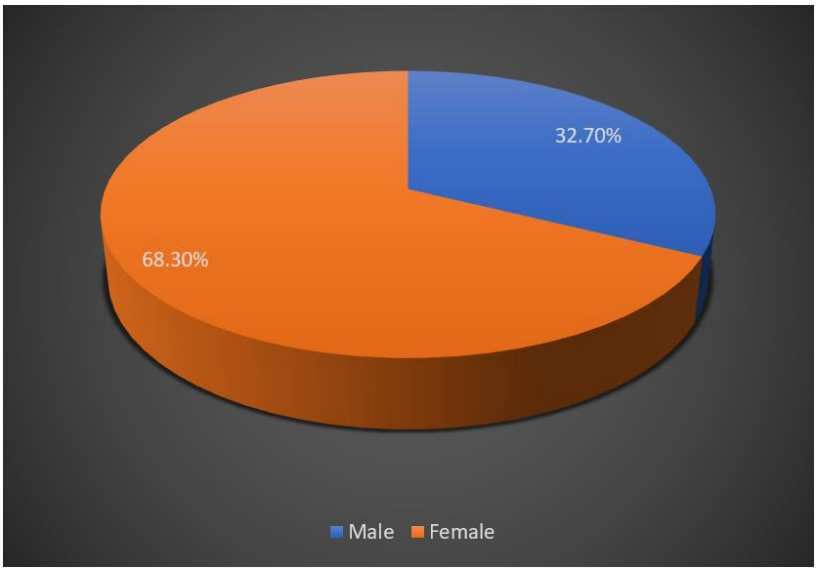

Figure 1: Gender Distribution of the Patients

This figure 2 presents the distribution of comorbidities among the patient population. Hypertension is the most prevalent comorbidity among the patients, approximately 15.6% of the patients. Diabetes mellitus follows as the second most common comorbidity, with 11.1% of patients Cardiac disease is the third most frequent comorbidity, present in 6.7% of the patients. Peripheral vascular disease is the least common comorbidity among those presented, affecting 4.4% of the patients.

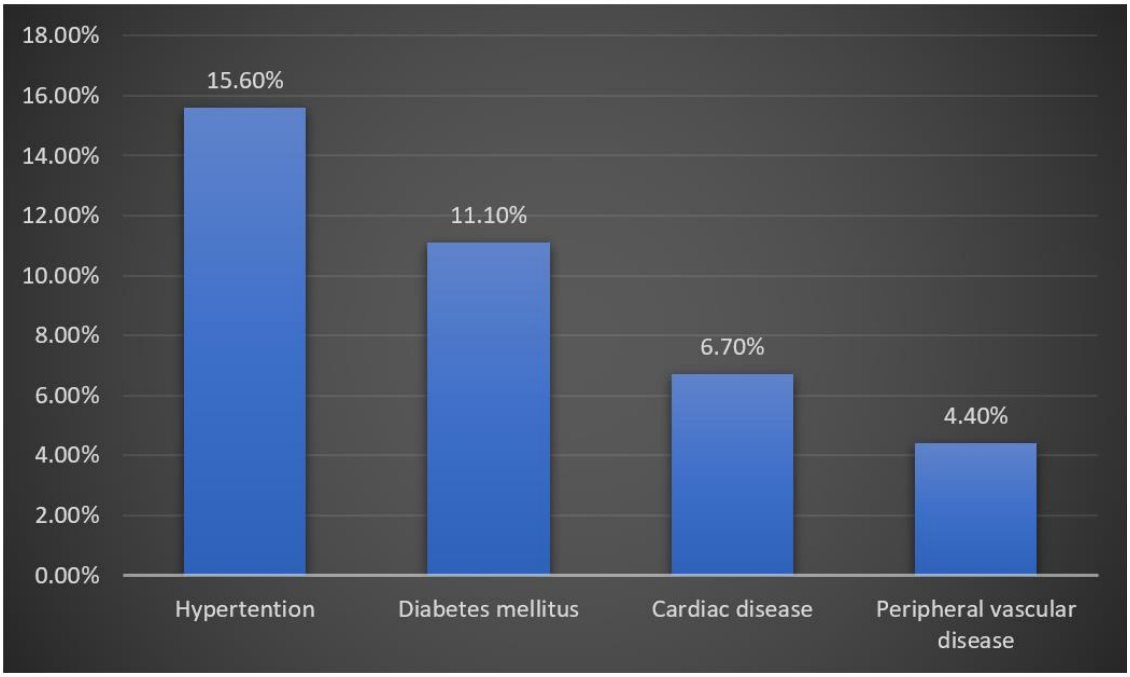

Figure 2: Comorbidities of the Patients

Table 2 presents the frequency and percentage of different clinical symptoms and presentations among patients diagnosed with acute cholecystitis. Regarding the symptoms and clinical presentation, patients exhibited a variety of the usual gallbladder disease symptoms, including epigastric pain (51.30%), fatty food intolerance (37.14%), nausea and vomiting (24.29%), Murphy's sign (14.29%), biliary colic (32.86%), right upper quadrant pain radiating to the back (28.57%), dyspepsia (30.00%), fever (42.86%), bloating (14.29%), and belching (25.71%).

Table 2: Distribution of the Symptomatic Gallstone Disease According to Their Clinical Presentation

Symptoms and Clinical Presentations	Frequency	Percentage
Epigastric Pain	36	51.30%
Fatty Food Intolerance	26	37.14%
Nausea and Vomiting	17	24.29%
Murphy's Sign	10	14.29%
Biliary Colic	23	32.86%
Right Upper Quadrant Pain Radiating to the Back	20	28.57%
Dyspepsia	21	30.00%
Fever	30	42.86%
Bloating	10	14.29%
Belching	8	25.71%

Figure 3 presents the proportion of patients who underwent preoperative Endoscopic Retrograde Cholangiopancreatography (ERCP). The vast majority of patients (95.80%) did not require preoperative ERCP. A small percentage of patients (4.20%) underwent preoperative ERCP.

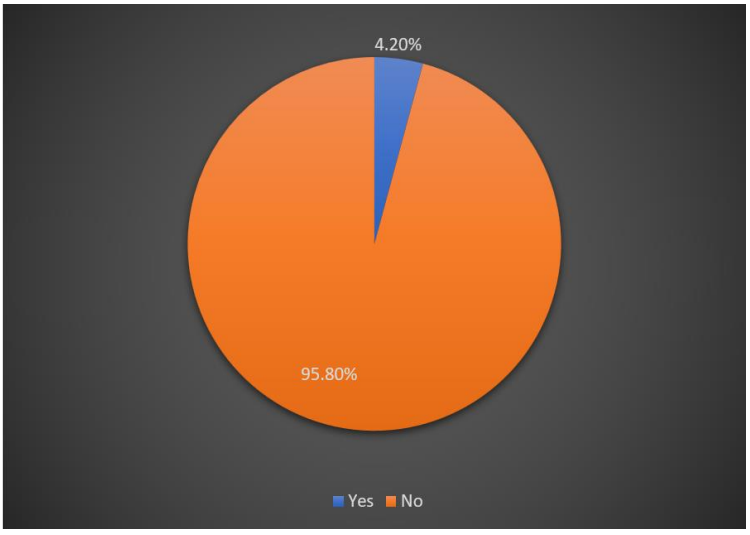

Figure 3: Preoperative Endoscopic Retrograde Cholangiopancreatography of the Studied

Patients

Table 3 presents the surgical indications of the study patients. Regarding surgical indications, 45 (64.28%) cases had biliary colic, 17 (24.28%) cases had acute cholecystitis, and 8 (11.44%) cases had biliary cholecystitis. The Operative time in elderly patients ranged from 45 min to 2.5 h with a mean value of (120.51±9.90).

Table 3: Surgical Indications of the Studied Patients

Surgical Indications	Frequency	Percentage
Biliary Colic	45	64.28%
Acute Cholecystitis	17	24.28%
Biliary Cholecystitis	8	11.44%

Acute cholecystitis was found in 53 (75.71%) patients whereas chronic cholecystitis was found in 17 (24.29%) patients.

Blood gas samples were drawn from the arteries of the cases whose procedures lasted more than one hour, corresponding to 4 cases in (cases≥70 years) and 35 cases in group B (cases ≤ 69 years). The Mean PaCO2 was found to be 33.87 ±6.32 mmHg and the pH had a mean of 7.42±0.06 for the cases whose age were ≥70 years. Mean PaCO2 in cases ≤ 69 years was 38.32±9.32 mmHg and the mean pH was 7.37±0.09.

Table 4: Blood Gas Samples of the Studied Patients

Age	Blood gas samples	
	PaCO2	pH
60-69 years	33.87 ±6.32 mmHg	7.42±0.06
≥ 70 years	38.32±9.32 mmHg	7.37±0.09

The rates of postoperative complication were 12 (17.14%) in the patients aged between 60-69 years and 4 (44.44%) in the patients aged ≥ 70 years.

Table 5: Postoperative Complications among the Studied Patients

Postoperative Complications	Age	
	60-69 years **n= 12(17.14%)**	≥ 70 years **n= 4(44.44%)**
Bile duct injury	4(33.33%)	1(25.00%)
Subhepatic collection	2(16.67%)	1(25.00%)
Retained bile duct stone	2(16.67%)	0
Wound infection	3(25.00%)	1(25.00%)
Urinary tract infection	1(8.33%)	1(25.00%)

Table 6 shows that there was a significant relation between the incidence of comorbidities and post-operative complications (P<0.001), presence of associated comorbidities is significantly associated with the incidence of postoperative complications.

Table 6: Associations Between Comorbidities and postoperative complications (n=16)

Comorbidities	Incidents of postoperative complications	P value
Hypertension	8 (50.00%)	
Diabetes militias	6 (37.50%)	
Cardiac disease	1(6.25%)	
Peripheral vascular disease	1(6.25%)	0.001

DISCUSSION

The escalating incidence of symptomatic gallstones in the elderly population, attributed to increased life expectancy and higher prevalence rates, has necessitated a surge in cholecystectomy procedures [9]. Laparoscopic cholecystectomy (LC) has emerged as the gold standard treatment for gallbladder pathologies, with acute cholecystitis and biliary colic constituting the predominant indications [10]. However, the presence of chronic comorbidities and diminished physiological reserves in the elderly population exacerbates the risk profile for surgical interventions [11].

The ageing demographic, characterized by increasing frailty, is anticipated to drive substantial growth in the demand for cholecystectomy in the coming decade [12]. Concomitantly, a rising proportion of elderly individuals will present with gallstone disease [12]. Given the established association between advanced age, reduced physiological function, and comorbidity burden, elderly patients undergoing surgery are considered at heightened risk of complications [13].

Despite these challenges, LC remains a therapeutic option for elderly patients. Comparative studies have consistently demonstrated an association between older age and increased postoperative complications, conversion rates, and length of hospital stay [14]. This study aimed to evaluate the efficacy and safety of LC in patients aged 60 and older.

Our cohort primarily comprised patients aged 60-69 years (87.14%), with a smaller subset aged 70 years and older (12.86%). While the elderly population is often defined as individuals aged 65 or 70 years [15, 16], the gender distribution in our study diverged from the established prevalence rates of gallbladder disease in this age group [18].

The demographic projection of a 25% increase in the population aged 65 and older within three decades, coupled with the elevated prevalence of gallstones in this age group, portends a significant rise in acute surgical admissions for gallstone-related complications [8]. The pneumoperitoneum induced during LC can exert adverse effects on respiratory and circulatory function due to increased intra-abdominal pressure and carbon dioxide absorption. Although these effects are generally well-tolerated in healthy individuals, they may pose heightened risks for patients with compromised physiological status (ASA 3 and 4) [17,18]. Our blood gas analysis revealed significant differences in PaCO2 and pH levels between younger and older patients undergoing prolonged procedures, corroborating the findings of previous studies [14, 19].

Acute cholecystitis was the predominant presentation in our cohort (75.71%), aligning with the established higher incidence of this condition in the elderly [20]. Notably, postoperative complication rates were significantly higher in patients aged 70 years and older compared to those aged 60-69 years (44.44% vs. 17.14%), respectively, supporting the existing literature on increased surgical risk in the oldest-old population [21, 22].

CONCLUSION

Laparoscopic cholecystectomy (LC) has demonstrated low mortality and morbidity rates when applied to elderly patients. Although Hypertension,

cardiac, and diabetic comorbidities are frequently observed in this patient population, their contribution to overall morbidity following Laparoscopic cholecystectomy (LC) appears to be relatively minor.

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