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Comparison between Laparoscopic Cholecystectomy versus Open Cholecystectomy in Elderly Individuals Presenting with Acute Cholecystitis: A Retrospective Study

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Abstract

Aim: The goal of this study was to compare the outcomes of laparoscopic cholecystectomy with open cholecystectomy in elderly adults.

Design: Retrospective study

Place and duration: This Study was conducted at Sindh Rangers Hospital Karachi, Pakistan from December 2019 to December 2021.

Methodology: The search was performed for patients with acute cholecystitis who had laparoscopic cholecystectomy, which included individuals aged 75 years and above. Between December 2019 to December 2021, total 296 individuals had their cholecystectomy for acute cholecystitis. Patients in the comparison group had an open cholecystectomy for acute cholecystitis at the same age and for the same length of time as the research participants. Time in the operating room, length of stay in the hospital, morbidity, and death was recorded.

Results: Between the two groups, demographic statistics and co-morbidities were comparable. Patients who underwent laparoscopy had a significantly shorter postoperative hospital stay (P=0.03). Patients having laparoscopy had a substantially decreased overall morbidity rate

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(P0.05). The mortality rate, on the other hand, showed no statistically significant change. There was no substantial bile duct damage in any group of individuals.

Conclusion: Laparoscopic cholecystectomy is a safe surgery that results in fewer complications and a shorter hospital stay than open cholecystectomy in older individuals with acute cholecystitis

Keywords: laparoscopy, cholecystectomy, patients, cholecystitis,

Introduction: Cholecystitis is a medical issue that requires immediate surgical intervention in elderly people. Laparoscopic cholecystolithiasis (LC) is the gold standard method for the treatment of uncomplicated cholecystolithiasis. (1) In comparison to open cholecystectomy, many studies have demonstrated that LC is a safe and effective therapeutic option for acute cholecystitis. (2, 3) The function of LC in acute cholecystitis in older people, the majority of whom have co-morbidities, remains unknown. Furthermore, rapid OC rather than a 'prolonged' laparoscopic surgery is often preferable. With the ageing of the population, it is more important to study the morbidity and mortality associated with LC for acute cholecystitis in the elderly. With this study, the researchers hoped to see whether they could compare the results of LC with those of OC to determine if LC was more safe and effective for acute cholecystitis in older people aged 75 and older.

Methodology

In the period between December 2019 to December 2021, hospital database was utilized to conduct a research on the usage of LC for acute cholecystitis. Permission was taken from the ethical review committee of the institute. Out of 296 a total of 169 people underwent laparoscopic cholecystectomy (LC) and 127 people were treated with an open procedure (OC). Patients with acute cholecystitis who had laparoscopic cystoscopy and were 75 years old or older were included in the study. We also included patients in the same age range who got OC for acute cholecystitis throughout the same length of time in order to compare results. An investigation and comparison of the preoperative, perioperative, and postoperative care features was conducted.

Symptoms of acute cholecystitis, such as stomach pain and right upper quadrant tenderness, were present in all of the patients when they were admitted to the hospital. Unconfirmed diagnosis of acute cholecystitis was confirmed by an ultrasound scan that indicated a thicker gallbladder wall and the presence of pericholecystic fluid. Those who had acute cholecystitis and those who had an elective cholecystectomy with a histological diagnosis of acute cholecystitis were excluded from the study. A four-port approach was employed for the laparoscopic cholecystectomy, with an extra port being introduced when it was necessary. Once the bowel noises had been returned, the diet was continued as before. Data was analyzed by using SPSS version 22.

To compare nominal variables, the Chi squared test and Fisher's exact test were utilized. If necessary, the Student's t test and the Mann-Whitney U test were employed to compare ordinal

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variables. Significant was defined as a two-sided level of 0.05. The comparisons between groups were made with the purpose to treat in reference.

Results

Total 296 individuals had their cholecystectomy for acute cholecystitis. Ten patients with acute cholecystitis were treated with a percutaneous cholecystectomy within the same time period, since surgery was not an option due to their general medical problems. Six of the ten patients had interval cholecystectomy as a result of the procedure. A total of 169 people underwent laparoscopic cholecystectomy (LC) and 127 people were treated with an open procedure (OC). The patients' age or medical condition had no influence on the treatment technique. Consultants, senior medical officers, and medical officers performed 16.7 percent (7/42) of procedures in the LC group and 16.8 percent (17/31) of operations in the OC group.

There was no significant difference in the history of prior abdominal surgery, comorbidities, or the physical status score of the American Society of Anesthesiologists (As shown in Table 1). The most prevalent medical co-morbidities were hypertension and diabetes mellitus (As shown in Table 2). The LC group had more endoscopic retrograde cholangiopancreatography's (ERCP) and a higher incidence of common bile duct stone (22.6%). There was no difference in the size of the gallstones or the incidence of acalculus cholecystitis between the 2 groups (As shown in Table 3). The LC group had a conversion rate of 35.5 percent (11/31) to an open procedure. Because to the unknown anatomy and delayed development of six patients, the surgery was converted. Only one patient had to have an open conversion because to uncontrollable bleeding.(As shown in table 4) The LC group's operating time was somewhat longer (92.5 minutes) than the OC group's (84.8 minutes). In both groups, the average duration from admission to the hospital and operation was roughly two days.

The OC group had more patients (19.0 percent; 8/42) who bled more than 500 mL than the LC group (6.5 percent; 2/31). The two groups had identical results when it came to surgical drain placement . Patients in the LC group required a nasogastric tube substantially less during and after the surgery than those in the OC group (8 vs 29), but this had no influence on the time to diet resumption. Patients receiving LC stayed in the hospital for an average of 7.2 days, whereas those getting OC stayed for an average of 10.6 days. The difference (P=0.03) was statistically significant. The two groups' pathophysiology was equivalent (As shown in Table 5). Gallbladder cancer was shown to be more common in older people with acute cholecystitis

Those in the LC group had a 12.9 percent problem rate, whereas patients in the OC group had a 40.5 percent complication rate. [As shown in Table 6] The difference was statistically significant (P0.05). The majority of the problems were mild, such as infections in the chest and wounds. The conversion group (LC) and the OC group (27.3 percent) had no statistically significant differences in morbidity rates (40.4 percent). Two patients in the OC Group had postoperative myocardial infarction complications, two of whom died. All three patients were treated successfully with an end prosthesis and percutaneous drainage of intra-abdominal accumulation.

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Table 1: Demographic characteristics and physical status score of the American Society of Anesthesiologists of study participants

	Laparoscopic cholecystectomy	Open cholecystectomy	P values
Sex	20/11	22/20	NS
Mean age (Years)	79.1	80.7	NS
Mean body weight (Kg)	57.6	57.2	NS
Previous surgery	4	10	NS
Co- morbidity	16	31	NS
American society of anesthesiologist physical status score			
1	5	0	NS
2	21	24	NS
3	4	15	NS
4	1	3	NS

Table 2: Medical co-morbidities of study participants

	Individuals undergoing Laparoscopic cholecystectomy	Individuals undergoing open cholecystectomy
Hypertension	9	14
Diabetes	9	13
Ischemic heart diseases	5	9
Cerebrovascular accident	4	4
Chronic obstructive airways diseases	2	2
Renal impairment	0	2
Congestive heart failure	1	1

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Table 3: Complications of study participants

	Individuals undergoing Laparoscopic cholecystectomy	Individuals undergoing open cholecystectomy	P-values
Fever	21	27	NS
Gallbladder mass	11	14	NS
Leukocytosis	19	32	NS
Deranged liver function	14	12	NS
Preoperative endoscopic retrograde cholangiopancreatography	8	2	<0.05
Intraoperative cholangiography	1	3	NS
Concurrent common bile duct stone	7	1	<0.05
Gallstone			
< 1cm	13		NS
>1cm	17		NS
Acalculus	1		NS

Table 4: Perioperative outcome of study participants

	Laparoscopic cholecystectomy	Open cholecystectomy	P-values
Duration			
Mean	55.4	47.5	NS
SD	27.4	29.4	NS
Range	12-120	15-142	NS
Mean operation time (minutes)	92.5	84.5	NS
Blood loss (ml)	2	8	NS
Drain	24	27	NS
Nasogastric tube	8	29	<0.01
No. of days to resume diet	2.2	2.7	NS
No. of days for post-operative stay	7.2	10.6	0.03

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Table 5: Operative findings of study participants

	Laparoscopic	Open	P values
Acute cholecystitis	9	17	NS
Acute on chronic cholecystitis	14	10	NS
Gangrene	7	12	NS
Carcinoma	1	1	NS

Table 6: Postoperative complication of study participants

	Individuals undergoing Laparoscopic cholecystectomy	Individuals undergoing open cholecystectomy	P values
Chest infection	1	6	NS
Wound infection	1	6	NS
Myocardial infraction	0	4	NS
Cystic stump leakage	2	1	NS
Total	4	17	<0.05

Discussion

Over the last several decades, life expectancy has been continuously growing. Improvements in primary prevention, enhancements in acute medical treatment, and developments in pharmacological and biological technologies are all factors contributing to these demographic shifts. In medical literature, the word 'elderly' is used to denote persons above the age of 65. (4)

As a result, individuals aged 75 and over are likely to represent the true high-risk cohort of surgical patients in industrialized nations (5). A total of 296 individuals had cholecystectomy at the Hospital's Department of Surgery due to acute cholecystitis. This is why participants in this study, which looked at the effects of LC in elderly patients with acute cholecystitis, were aged 75 and over. In a randomized experiment, LC was shown to have a clear benefit over OC for acute cholecystitis.(6) However, there is significant regional and worldwide heterogeneity in the use of LC to treat acute cholecystitis. (7) The poor LC rate might be due to the procedure's technical complexity, concerns about increasing bile duct damage risks. Given this context and the high frequency of co-morbidity, senior emergency room patients are less likely to undergo LC. (8) In New England, the usage of LC ranges from 30.3 percent to 75.5 percent for older individuals with acute cholecystitis. LC is still suggested as a safe therapy for older adults with acute cholecystitis, despite the high rate of co-morbidity. However, as compared to a younger age

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group, the elderly have a greater chance of conversion, delayed recovery and a longer stay in the hospital. (9)

For elective cholelithiasis, the department started conducting laparoscopic cholecystectomy. Acute cholecystitis was added to the list of indications in 1994. In randomized controlled trials, early LC for acute cholecystitis has been found to be practicable, safe, and favorable in terms of shorter hospital stays when compared to delay LC. (10, 11) At the Pamela Youde Nethersole Eastern Hospital, LC is now the primary line of therapy for all patients with acute cholecystitis. LC may enhance the morbidity and mortality of surgery in older patients, many of whom have inadequate cardiopulmonary reserves. (12) Despite the fact that Behrman et al discovered no incidences of hypotension or hypercarbia during the procedure in their research, they nonetheless recommend caution when doing LC on older patients with acute cholecystitis (13). Due to the comparatively loose muscular tone of senior persons, a pressure of 10 mm Hg is sufficient to get a good operational vision. A high conversion rate from LC to OC is linked to old age and acute cholecystitis. However, the risk of problems with OC rises with age. (14) Surgeons are worried that the high conversion rate for older patients with acute cholecystitis might lead to unacceptably high morbidity and death rates from both LC and OC sequelae. (15) Contrary to our results, the postoperative prognosis of conversion patients for acute cholecystitis was equivalent to that of patients with OC, despite the fact that the conversion rate for acute cholecystitis was higher than the rate for OC patients. A possible disadvantage of laparoscopic surgery in acute cholecystitis as compared to open surgery is the longer operating time. It has been questioned whether or not the prolonged operation and anesthetic time has any consequences. In the first instance, the amount of time spent operating is dictated by the surgeon's experience and the availability of current laparoscopic gear. In this research, it was also shown that when operating surgeons have equivalent levels of expertise, the operating time for OC and LC is comparable. Another problem with LC in acute cholecystitis is bile duct damage. Bile duct damage affects 0.1 percent to 0.2 percent of OC patients and 0.3 percent to 0.6 percent of LC patients. (16) Early research discovered that the rate of bile duct injury in acute cholecystitis was higher than previously. (17) Mistaking the common bile duct for the cystic duct is the most prevalent cause of serious bile duct damage. The cystic duct is edematous, shorter, and frequently lies near to the common bile duct in acute cholecystitis, putting it in risk. However, with more information and expertise, the risk of significant bile duct damage during LC for acute cholecystitis is no longer as great as it is during elective surgery. There was no substantial bile duct damage in either the LC or OC groups in this trial.

The most prevalent biliary system consequence of LC is bile leakage (without overt bile duct damage). Bile commonly escapes from the Lushka auxiliary duct or cystic duct stump. The incidence of detection of common bile duct stones during LC is less than 5%, which is much lower than the percentage reported for OC (7 percent -15 percent). (18) Acute cholecystitis and older people are more likely to have co-existing common bile duct stones. The real incidence of

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ductal stones, on the other hand, is dependent on whether cholangiography is done preoperatively or intraoperatively.

In this study, patients in the LC group (22.6 percent) had a considerably greater rate of ductal stones than those in the OC group (2.4 percent). One explanation for this could be that patients in the LC group had a higher percentage of preoperative ERCP or intraoperative cholangiography than patients in the OC group (which had a lower percentage of preoperative ERCP and intraoperative cholangiography) (11.9 percent; two preoperative ERCP and three intraoperative cholangiography). If more preoperative or intra-operative cholangiographies had been done on patients in the OC group, more ductal stones could have been discovered. The disadvantages of this retrospective analysis include the non-comparable data.

In terms of shorter hospital stays and reduced morbidity rates, this research showed that the laparoscopic technique is superior to open surgery. In either the LC or the OC groups, there is no evidence of severe bile duct injury. Of course, while interpreting the data, it is necessary to take into account the inherent bias of a retrospective study as well as the small number of patients that were included.

Conclusion

When compared to open cholecystectomy, laparoscopic cholecystectomy is a more safe treatment choice for those who have acute cholecystitis. A lower risk of morbidity is associated with it, as is a shorter hospitalization. In comparison to traditional open cholecystectomy, laparoscopic cholecystectomy reduces postoperative pain and the need for postoperative analgesics. It also reduces the length of hospital stay from a full week to less than 24 hours, and it allows the patient to return to normal activities within one week of the procedure being performed

Conflict of interest:

None

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