Section: General Surgery

Original Research Article

TO COMPARE INTERVAL CHOLECYSTECTOMY WITH EARLY CHOLECYSTECTOMY IN CASES OF ACUTE CHOLECYSTITIS

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Abstract

Background: Acute cholecystitis is becoming more prevalent worldwide, particularly in India. Gallstones are the primary cause of acute cholecystitis in 90-95% of cases. Initially, acute cholecystitis was managed conservatively, but recent research suggest early surgery as the preferred therapy. **Aim:** To compare interval cholecystectomy with early cholecystectomy in cases of acute cholecystitis. **Material and Methods:** There were 100 individuals hospitalized with acute cholecystitis. 50 instances of acute cholecystitis received prompt definitive cholecystectomy during the same hospital stay. The remaining 50 patients were treated conservatively and released, to return for elective cholecystectomy in 4-6 weeks. The total cases of acute cholecystitis were divided into two groups, Group A and Group B, using the odd-even method of randomization based on their primary surgical OPD presentation sequence. Group A underwent early laparoscopic cholecystectomy, while Group B underwent delayed/interval laparoscopic cholecystectomy. **Results:** All 50 cases in Group A underwent laparoscopic cholecystectomy, but in 3 cases, it was converted to open cholecystectomy due to tight adhesion in the Calot's triangle. In Group-B, laparoscopic cholecystectomy was performed on all 50 cases. However, in 8 cases, it had to be converted to open cholecystectomy due to various complications such as gallbladder wall thickening, omentum adherence, mucocoele formation in 5 cases, empyema formation in one case, intrahepatic gallbladder in one case, and cholecysto-duodenal fistula in one case. Three individuals in the early surgery group developed wound infections. 6 individuals had mild to moderate biliary leaking via the peritoneal drain. Five individuals in the delayed surgery group developed wound infections. Eight patients had mild to moderate biliary outflow via the peritoneal drain, with mild drainage defined as less than 200 ml and significant drainage as more than 200 ml. The average total hospital stays and total cost of therapy in the ES group are 6.50±4.44 days and 24000±1567 rupees, respectively. In the delayed group, the average total hospital stays are 10.80±5.55 days and the total cost of therapy is 30000±1678 rupees, excluding non-operating admission days. The data in Table 4 is statistically significant at a significance level of $p<0.05$. **Conclusion:** Early cholecystectomy was shown to be more cost-effective, resulting in shorter hospital stays and lower treatment costs compared to interval cholecystectomy for acute cholecystitis.

INTRODUCTION

Acute cholecystitis is inflammation of the gallbladder. Acute cholecystitis is caused by the obstruction of the cystic duct. Acute cholecystitis is caused by an obstruction in the cystic duct, leading to inflammation. Bile is typically produced in the liver, flows via the bile duct, and is stored in the gallbladder. Cholecystitis is often managed with surgery but may be treated non-surgically if required. The diagnosis of acute cholecystitis relies on clinical characteristics and is confirmed by ultrasound scanning findings.[1-3] There is a discussion over when to do surgery for the 80% of patients who do not show signs of gangrene or perforation. Open cholecystectomy is often

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scheduled 6-12 weeks after the acute episode to ensure that the inflammatory process has subsided before the operation (interval surgery). Patients with acute cholecystitis who receive early laparoscopic cholecystectomy (within 72-96 hours of symptom onset) have reduced complication rates and conversion rates compared to open cholecystectomy. They also have shorter hospital stays than those who undergo interval surgery.[4-6] Early surgery for acute cholecystitis had a lower conversion rate compared to delayed surgery, which is undertaken following conservative care during the initial hospitalization and after symptoms have persisted for 3-5 days. Early surgical intervention prevents problems in cases when conservative therapy is unsuccessful.[7,8] Most surgeons still choose to treat acute cholecystitis with conservative therapy, which includes intravenous fluids, analgesics, and often antibiotics. Elective cholecystectomy is performed 4 to 6 weeks after the initial episode has subsided. This research aimed to evaluate the outcomes of early surgery with delayed surgery for acute cholecystitis in order to determine the best effective treatment approach. The current research aimed to compare the effectiveness of Interval Cholecystectomy versus Early Cholecystectomy in patients with Acute Cholecystitis.

MATERIALS AND METHODS

The research comprised all patients with symptoms of acute cholecystitis and a select group with confirmed gallbladder stones who had elective cholecystectomy. Patients were included in the research based on clinical, laboratory, and radiographic evidence of acute calculous cholecystitis. The diagnosis was made based on the presence of at least two of the following four features: abdominal discomfort typical of acute cholecystitis, positive Murphy's sign, total leukocyte count over 10,000/ul, and ultrasonographic evidence of acute calculous cholecystitis. Cholecystectomy is the intended first surgical therapy, whether performed immediately or as an interval procedure. Patients exhibiting ultrasonographic evidence of common bile duct calculi, pancreatitis, gall bladder perforation, gangrene, or abscess. Patients with comorbid abdominal conditions, prior abdominal surgeries, septic shock, pregnant or breastfeeding women, and those with major systemic illnesses were not included in the research.

There were 100 individuals hospitalized with acute cholecystitis. 50 instances of acute cholecystitis received prompt definitive cholecystectomy during the same hospital stay. The remaining 50 patients were treated conservatively and released, to return for elective cholecystectomy in 4-6 weeks. The total cases of acute cholecystitis were divided into two groups, Group A and Group B, using the odd-even method of randomization based on their primary surgical OPD presentation sequence. Group A underwent early laparoscopic cholecystectomy, while Group B underwent delayed/interval laparoscopic cholecystectomy.

Group A patients had immediate cholecystectomy, while Group B patients underwent interval cholecystectomy following initial conservative therapy. Group B (delayed group) was re-examined for the following surgical procedure in this research.

All patients had a comprehensive medical history assessment, which included primary complaints, current and former sickness history, personal history, family history, as well as treatment and medication history. A thorough physical examination was conducted, including a general inspection, abdominal examination, and other systemic exams.

The chosen patients received initial tests such as a regular blood examination, which included assessments of hemoglobin, total leucocyte count, differential leucocyte count, ESR, RBS, urea, and creatinine. The majority of individuals with simple acute cholecystitis had leucocytosis. Liver function tests will include total serum bilirubin, liver enzymes, and total protein. Prothrombin time included in coagulation profile. A postero-anterior view chest X-ray and an electrocardiogram were performed as part of the patient's preanesthetic evaluation. Perform abdominal X-ray to exclude other acute abdominal disorders.

The patient had ultrasonography in our research. An ultrasound examination was conducted to assess the liver, gallbladder, pancreas, and common bile duct in order to confirm the diagnosis of acute cholecystitis. Ultrasonographic indicators of acute cholecystitis consist of gallbladder distension, pericholecystic fluid accumulation, swollen gallbladder, sludge or stones in the gallbladder, omental adhesion, and ultrasonographic Murphy's sign.

Methodology

The patient's overall state was stabilized by administering fluids, correcting electrolyte imbalances, administering intravenous antibiotics, and providing additional supportive measures such as antiemetics. The patient had pre-anesthetic evaluation. Patients exhibiting symptoms of acute cholecystitis had prompt cholecystectomy at the next scheduled elective surgery list. All patients who underwent early cholecystectomy initially had laparoscopic cholecystectomy but had to be switched to open cholecystectomy in two cases due to technical challenges such as thickening of the gall bladder wall, omentum adherence to the gall bladder, tight adhesions in the calot’s triangle, and empyema formation. During early cholecystectomy procedures that required conversion from laparoscopic to open surgery, a drain size 28 was used. For laparoscopic cholecystectomy procedures, a drain size 20 was used. All procedures were completed within the same hospital stay in the early surgery group. Elective cholecystectomy was

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performed in another group after 4-6 weeks after an acute episode, which was first handled conservatively during the first hospital stay. The bile obtained from the gallbladder was sent for culture and sensitivity testing. The gallbladder specimen was sent for histological analysis. Postoperatively, all patients received antibiotics, intravenous fluids for 24-48 hours, and analgesics. Post-surgery issues, length of hospital stay, and cost-effectiveness of each operation were considered. All patients were closely monitored in the surgical Outpatient Department (OPD). While a few patients had inconsistent follow-up, the majority were scheduled to be visited after 2 weeks, 6 weeks, and then 6 months.

Data Analysis

The data was analyzed using paired t-test and chi-square test. The p-value was ultimately calculated to assess the significance levels. A p-value greater than 0.05 was deemed nonsignificant, whereas a p-value between 0.01 and 0.05 was considered significant. The data were then analyzed and compared with prior research. The software version used was SPSS-25.0.

RESULTS

In Group A, the mean age is 44.11±5.86, whereas in Group B, it is 49.01±5.87. The data shows no statistical significance (p>0.05) as shown in Table 1. Female preponderance is evident in both groups based on the observations. The data does not show statistical significance (p>0.05), as shown in Table 1.

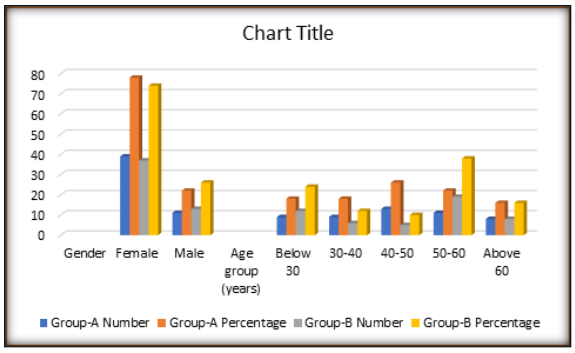

Figure 1: Gender and Age of the participants

All 50 cases in Group A underwent laparoscopic cholecystectomy, but in 3 cases, it was converted to open cholecystectomy due to tight adhesion in the Calot's triangle. One case had empyema formation, while the other had gall bladder wall thickening, omentum adherence to the gall bladder, and empyema formation. In Group-B, laparoscopic cholecystectomy was performed on all 50 cases. However, in 8 cases, it had to be converted to open cholecystectomy due to various complications such as gallbladder wall thickening, omentum adherence, mucocoele formation in 5 cases, empyema formation in one case, intrahepatic gallbladder in one case, and cholecysto-duodenal fistula in one case. Open cholecystectomy was performed in these cases along with Graham's patch repair. The data shown in Table 3 is not statistically significant (p>0.05).

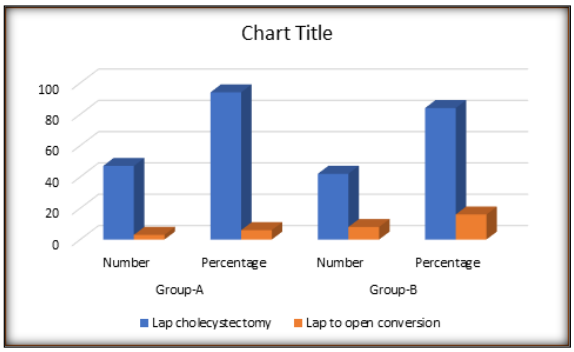

Figure 2: Details of different operative procedures

Three individuals in the early surgery group developed wound infections. 6 individuals had mild to moderate biliary leaking via the peritoneal drain. Five individuals in the delayed surgery group developed wound infections. Eight patients had mild to moderate biliary outflow via the peritoneal drain, with mild drainage defined as less than 200 ml and significant drainage as more than 200 ml. All patients with mild to severe biliary drainage underwent MRCP, which revealed no leakage from the cystic duct or the duct of Luschka. Hence, these individuals were treated with a cautious approach. The data in Table 3 is not statistically significant (p>0.05).

The average total hospital stays and total cost of therapy in the ES group are 6.50±4.44 days and 24000±1567 rupees, respectively. In the delayed group, the average total hospital stays are 10.80±5.55 days and the total cost of therapy is 30000±1678 rupees, excluding non-operating admission days. The data in Table 4 is statistically significant at a significance level of p<0.05.

Table 1: Gender and Age of the participants

	Group-A		Group-B		P value
	Number	Percentage	Number	Percentage	
Gender					
Female	39	78	37	74	0.24
Male	11	22	13	26	
Age group(years)					0.11
Below 30	9	18	12	24	
30-40	9	18	6	12	

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40-50	13	26	5	10	
50-60	11	22	19	38	
Above 60	8	16	8	16	
Mean age	44.11±5.86		49.01±5.87		

Table 2: Details of different operative procedures

Type of operation	Group-A		Group-B		P value
	Number	Percentage	Number	Percentage	
Lap cholecystectomy	47	94	42	84	0.14
Lap to open conversion	3	6	8	16	

Table 3: Post-operative complications in both groups

Complications	Group-A		Group-B		P value
	Number	Percentage	Number	Percentage	0.13
Wound infection	3	6	5	10	
Biliary leaks	6	12	8	16	
Stricture	0	0	0	0	
Others	0	**0**	0	**0**	

Table 4: Mean hospital stays and cost of the treatment

	Group-A	Group-B	P value
Hospital stays	7.02±1.56	11.47±2.65	0.24
Cost of the treatment	24057.47±1567.58	30345.98±1678.95	0.27

DISCUSSION

Obstruction of the cystic duct by gallstones causes 90% to 95% of acute cholecystitis cases.

5% to 10% of patients with acute cholecystitis have acalculous cholecystitis, which is characterized by acute inflammation of the gallbladder in the absence of gallstones, usually occurring in cases of severe critical disease. Acute cholecystitis usually presents with sudden discomfort in the upper right quadrant, fever, and nausea, which may worsen after eating. Physical examination may reveal soreness in the upper right quadrant.[8]

Sokhi et al. performed a research and reported complication rates of 30% in the early group and 27% in the delayed group.[9] Jarvinen et al. discovered that the complication rate was 13.8% in the early group and 17.3% in the delayed group.[10] Bhaumik et al. discovered that the complication rate was 39% in the early group and 33.3% in the delayed group.[11] Norrby et al's research revealed complication rates of 14.9% in the early group and 15.2% in the delayed group.[12] The complication rate was 18% in the early group and 26% in the delayed group in our research. In our research, the post-operative complication rate is similar in both groups, with a p-value of >0.05, indicating statistical insignificance. The preceding data corroborates the findings of our investigation.

Norrby et al. showed that the mean duration of hospitalization during non-operative care was 7.2 days.[12] The mean post-operative stay was 6.6 days in both groups, but the ES group had a total hospital stay that was 6.4 days less. The ES group had a total hospital stay of 9.1 days, whereas the DS group had a total hospital stay of 15.5 days. Addison et al. discovered that the duration between surgery and discharge was similar for both elective (12.8 days) and early (13.6 days) operations.[13] This aligns with the findings of others who argue that there is no difference in the length of time from surgery to discharge between the early and delayed groups, making the former more cost-efficient. Our research found that the overall hospital stay was significantly shorter in the early group (7.02±1.56 days) compared to the elective group (11.47±2.65 days), with a p-value of <0.05. The extended duration of the elective group's stay in our research may be due to challenging fibrotic adhesions after surgery at the Calot's triangle, resulting in a higher occurrence of biliary leaks. This group needed more time to address these complications. There were 8 biliary leakage in Group B and 5 in Group A in our research, which was not statistically significant (p>0.05). The patient who had early surgery did not incur additional costs for a double bed or antibiotics, unlike those in the delayed group who had prior hospital admissions. The cost of treatment in the early group is $24,057.47 ± $1,567.58, whereas in the delayed group it is $30,345.98 ± $1,678.95. The result was statistically significant at a significance level of p<0.05. The former group in our research was more cost-effective since the overall cost of treatment decreased as a result of a shorter hospital stay. The prior data corroborates our current research. Arther et al. reported zero mortality in both groups.[14] This is a favorable comparison to the 19% mortality rate reported by Houghton et colleagues.[15] Wright et al demonstrated a mortality rate of 4% in their study.[16] In acute cholecystitis, urgent or early cholecystectomy is considered quite safe for people under 70 years old. For individuals over 70 years old, typical conservative treatment may be deadly. Despite the presence of cardiorespiratory illness, obesity, and other age-related conditions, early cholecystectomy is advised despite the high death rate. In our current

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investigation on early and elective cholecystectomy, no deaths occurred.

CONCLUSION

Cholecystectomy is the ultimate therapy for acute cholecystitis. Some believe that patients should be managed conservatively, letting the initial inflammation resolve before undergoing elective cholecystectomy in around 4-6 weeks. Some argued that surgery should be performed immediately upon diagnosis. Patients who had early surgery had shorter hospital stays and incurred lower treatment costs compared to those in the delayed group. They also benefited from avoiding additional prices for twin beds and medical expenses such as antibiotics. Furthermore, there was reduced loss of working days compared to postponed surgery, since several patients were unable to be admitted promptly for scheduled surgery and had to visit the outpatient clinic multiple times before admittance. Early surgery is more cost-effective than delayed treatment for acute cholecystitis if the diagnosis is promptly established.

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