Al-Azhar International Medical Journal

Volume 5 | Issue 7 Article 33

7-31-2024
Section: General Surgery

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How to Cite This Article

Abdallah, Magdy Salah El-Din Hussain; Sultan, Ahmed Abd El Aal; and Abdallah, Amr Abd-Elaty (2024) "Evaluation of Laparoscopic Cholecystectomy Versus Conservative Management in Acute Calcular Cholecystitis," *Al-Azhar International Medical Journal*: Vol. 5: Iss. 7, Article 33.
DOI: https://doi.org/10.58675/2682-339X.2551

ORIGINAL ARTICLE

Evaluation of Laparoscopic Cholecystectomy Versus Conservative Management in Acute Calcular Cholecystitis

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Abstract

Background: ***Gallbladder inflammation is a hallmark of acute calculous cholecystitis (AC), usually caused by stones or sludge obstructing the cystic duct. It is a gallstone-related complication that occurs rather frequently.***

Aim of the Work: ***To evaluate, compare, and distinguish between the two methods of treating acute calculous cholecystitis: laparoscopic cholecystectomy versus conservative management.***

Patients and Methods: ***The investigation was conducted at Ahmed Mahear Teaching Hospital's general surgery department. The study participants were fifty individuals diagnosed with acute calcular cholecystitis.***

Results: ***Twenty percent of group A experienced abdominal pain, 8% had a fever, 20.0% had Nausea, 12% had Anorexia, 4% had Vomiting, 4% had epigastric pain, and 20.0% had right hypochondrial pain. Within group B, 16 points 0 percent experienced pain in their abdomen, 12 points 0 percent fever, 16 points 0 percent nausea, 12 points 0 percent anorexia, 4 points 0 percent pain in their epigastric area, 20 points 0 percent jaundice, 16 points 0 percent Merrizi syndrome, and 16 points 0 percent pain in their right hypochondrium. Twelve percent of group A suffered from bile duct injury, while eighty percent had bile duct stricture. The two groups differed significantly in terms of the need for postoperative ERCP.***

Conclusion: ***Conservative therapy may be a safer course of action for individuals with acute calcular cholecystitis, especially those who are at a high risk of surgical complications.***

Keywords: Laparoscopic Cholecystectomy; Conservative Management; Calcular Cholecystitis

1. Introduction

The condition known as acute calculous cholecystitis (AC) is defined as "gallbladder inflammation, usually caused by sludge or stones obstructing the cystic duct. It is a rather typical gallstone complication.[1] Every year, biliary colic affects 1-4 percent of people with established cholelithiasis. Although cholecystitis, cholangitis, or biliary pancreatitis are caused by up to 25% of gallstones, the majority of gallstones do not cause any symptoms at all.[2]

Because of its comorbidities, acute cholecystitis can be fatal or cause significant morbidity, and it can be challenging to diagnose and treat. Gallbladder perforation, gallbladder gangrene, and empyema are just a few examples of acute cholecystitis' potentially deadly side effects.[3]

The necessity for an early or delayed surgical procedure to remove the gallbladder arises from the high incidence of recurrent gallstone problems following hospitalization for an acute cholecystitis attack.[4]

The only effective treatment for gallstone disease with symptoms is cholecystectomy. The usual outcomes of emergency cholecystectomy for acute cholecystitis are shorter total stay during admission, lower overall treatment costs, and fewer long-term biliary problems.[5]

For most AC patients, LC can quickly (within 48-72 hours) alleviate inflammatory signs and symptoms. Nevertheless, LC may result in severe morbidity of up to 41% and death of up to 45% during the acute phase in high-risk patients with additional life-threatening comorbidities, who are categorized as the high-risk AC group.[5]

Accepted 21 July 2024.
Available online 31 July 2024

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https://doi.org/10.58675/2682-339X.2551

In 2013, the Tokyo Guidelines (TG, 2013) were developed to establish the most appropriate surgical approach for acute cholecystitis, considering factors such as the severity grade, time, and method.[6]

Various therapeutic alternatives are accessible for the three levels of acute cholecystitis and each category. The classification of acute cholecystitis mostly depends on the degree of gallbladder inflammation rather than the patient's overall state. It is categorized as mild, moderate, or severe.[7]

Some individuals in the 2013 TG expressed concerns about the rising occurrence of laparoscopic cholecystitis as an urgent procedure and the significant rate of switching to laparotomy during the acute stage.[8]

This study evaluates and distinguishes between laparoscopic cholecystectomy and conservative management of acute calculous cholecystitis.

2. Patients and methods

This study is a clinical trial in which patient data were gathered based on inclusion and exclusion criteria. The study was conducted at Ahmed Mahear Teaching Hospital's Department of General Surgery. The user's text is empty. The study included a cohort of 50 individuals diagnosed with acute calculus cholecystitis. They were split into two groups based on the management strategy used: "Group A" (25 patients) was undergoing laparoscopic cholecystectomy. "Group B": Consisting of 25 patients, this group received conservative care.

Inclusion Criteria: Adult patients between the ages of 18 and 60, both male and female, who are diagnosed with acute calculus cholecystitis based on the presence of the specified symptoms: The patient exhibits symptoms such as Fever, rigidity in the right hypochondrium, tenderness in the abdomen, rebound tenderness, distention of the gall bladder (possibly due to mucocele or pyocele), thickening of the gall bladder wall, presence of pericholecystic collections, gall bladder distention (possibly due to pyocele or mucocele), or an impacted stone at Hartmann pouch. The diagnosis is acute cholecystitis, which can be classified as mild or moderate based on the TG13/18 criteria.

Exclusion Criteria: Patients with gangrenous gall bladder, obstructive jaundice, persistent cholecystitis, open cholecystectomy instead of laparoscopic operation, postoperative ERCP, pancreatitis, and severe cases are excluded.

Preoperative data: Patient demographics (age, sex, residence, weight, BMI, etc.); current and past medical history; general and local examination; specifics of all investigations; indication for intervention; time interval between diagnosis and treatment decision; time interval between treatment decision and time of intervention; complications following the procedure; and long-term patient management.

Laboratory and radiological investigations: Including chest X-ray, ECG, CBC (Complete Blood Count), Blood sugar, Liver Function Tests 0.0 (SGOT- U/L- ALP, U/L- Total bilirubin, mg/d), Kidney function tests (KFTs), serum electrolytes, and indicators of viruses

Laparoscopic cholecystectomy (group A): After achieving the critical view of safety, the cystic duct and artery were cut using the four-trocar procedure. The patient is lying down on his back. The surgeon and helper are positioned on the patient's left side. Three 5 mm ports are placed in the upper right abdomen during laparoscopic surgery, and an open technique is used to place a 10 mm trocar peri-umbilically. A critical safety evaluation is acquired before the cystic duct and artery closure. When the operation cannot reach the critical safety perspective, it becomes an open procedure. Patients had preoperative antibiotic prophylaxis in a single dosage per local hospital practice.

Indications: comprise pancreatitis due to gallstones, acalculous cholecystitis, hypo- or hyperfunctioning biliary dyskinesia, signs of cholelithiasis, pancreatitis from acute and chronic cholecystitis, and gallbladder tumours or polyps.

Contraindications: comprise the existence of metastatic illness, coagulopathy that cannot be treated, and intolerance for general anaesthesia or pneumoperitoneum. Please be aware that while laparoscopic cholecystectomy was once believed to be contraindicated in gallbladder cancer cases, the evidence that is currently available supports this treatment.

Equipment: Two monitors, a single laparoscope (5/10 mm, 0/30 degrees) with a light source and camera cord, a carbon dioxide source, tubing for insufflation, three trocars with an average diameter of 5 mm and one trocar with an average diameter of 10 mm, and a variety of laparoscopic instruments, including Maryland graspers, atraumatic graspers, clip applier, and electrocautery (e.g., hook, spatula), as well as a significant open tray, absorbable sutures, forceps, needle driver, retrieval bag.

Preparation: Patient optimization is required prior to surgery. An intravenous infusion of 0.5 ml of ICG must begin an hour before surgery, and preoperative antibiotics must be administered within thirty minutes of the incision. An aseptic surgical region is formed, extending laterally to the left and right and just above the bilateral coastal boundaries to the pubic tubercle. This sterile surgical environment should allow for open surgery if one is necessary.

Technique: The laparoscopic cholecystectomy can start once anaesthesia has been induced, and the patient has been intubated. First, a 15-mmHg carbon dioxide inhalation is performed on the abdomen. Four tiny abdominal incisions are placed to place the trocar (one supraumbilical, one subxiphoid, and two right subcostal). Using a laparoscope and lengthier instruments, the gallbladder is retracted across the liver to reveal the targeted region of the hepatocystic triangle.

Careful dissection yields a critical perspective on safety. The fatty and fibrous tissue of the hepatocystic triangle has been removed, the gallbladder's base is only penetrated by two tubular structures, and the bottom third of the gallbladder has been divided from the liver to expose the cystic plate. These characteristics define this view. Once this view is effectively achieved, the operating surgeon can confidently move forward, knowing that the cystic duct and cystic artery have been successfully separated.

Both constructions have been split and cut with great care. Subsequently, the gallbladder is extracted entirely from the liver bed by electrocautery or harmonic scalpel. Hemostasis needs to be accomplished once the abdomen has been allowed to deflate to 8 mmHg for two minutes.

Using this technique, it is possible to prevent missing venous bleeding that could be hindered by high intra-abdominal pressure (15 mmHg). The gallbladder is extracted from the abdomen and placed in a specimen pouch. It is advised to remove any visible trocars.

This expert recommends facial closure of trocar sites greater than 5 mm to minimize incisional hernias during the postoperative period. However, port site closure varies depending on the surgeon.

Conservative management (group B) is the best supportive care without formal surgery, endoscopy, or radiological intervention.

The observations to be noted: When the patient first presents, or the surgery is scheduled, the severity of acute cholecystitis (as determined by TG13/18) is mild or moderate. Other factors that may be considered include morbidity, the length of time the patient spends in the hospital after all hospital admissions, total hospital stay, and the mortality rate.

Outcomes: Many factors were considered in this study, including the patient's readmission following laparoscopic cholecystostomy tube implantation or conservative therapy for gallstone-related problems. The cholecystectomy group's complications were also investigated, including the need for postoperative ERCP, bile duct stricture or damage, and the need for readmission.

Statistical analysis: For Windows, SPSS 29.0 (SPSS Inc., Chicago, IL, USA) was employed to gather, tabulate, and perform statistical analysis on all the data. To describe the qualitative data, percentages and numbers were utilized. The range was used to characterize quantitative data (minimum and maximum), mean, standard deviation, and median. Each two-tailed statistical comparison had a significance level of P-value ≤ 0 point05, which denotes a significant difference and p 0 point05, a non-significant difference.

Number and percentage characterize the qualitative variables, whereas mean, SD and range are used to characterize the quantitative variables. The chi-square test is employed to compare the qualitative variables between groups; the Fisher exact test is substituted for chi-square when one expects less than or equal to five; the t-test is utilized to compare the quantitative variables; and in parametric data (SD <50 percent mean), the odds ratio (OR), relative risk (RR), and risk difference (RD) are utilized, with the precision of the OR being estimated using the 95 percent confidence interval (CI).

3. Results

Table 1. Comparison between both group as regard demographic data.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
AGE, YEARS				
MEA ±SD	50.40±5.5	50.45±5.4	1.05	0.88
MEDIAN (MINIMUM-MAXIMUM)	50 (47 -60)	50 (35 -60)		
SEX				
MALE	10 (40%)	11 (44%)	0.44	0.77
FEMALE	15 (60%)	14 (56%)		

X2: Chi Square, T: Two-Sample Independent t Test, p value >0.05: nonsignificant, p value <0.05 significant

The mean age of group A was 50.40±5.5, with 40.0 percent of the participants being male and 60.0 percent female, according to our results. In group B, the average age was 50.45±5.04, with 44.0% of the participants being men and 56.0% being women. Age or sex did not significantly differ between the both groups.

Table 2. Comparison between both group as regard comorbidities.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
DIABETES MELLITUS	5 (20%)	4 (16%)	0.44	0.5
HYPERTENSION	4 (16%)	3 (12%)	0.41	0.49
BMI, KG/M^2			1.1	0.88
MEAN±SD	31.0±7.4	31.0±7.5		
MEDIAN (MINIMU-MAXIMUM)	32 (25-40)	32 (25-40)		

The mean BMI in group A was 31.0±7.4, 20.0% of the population had diabetes mellitus, and 16.0% had hypertension. Within group B, the average BMI was 31.05±7.05, with 16.0% of the population having diabetes mellitus and 12.0% having hypertension. Regarding diabetes mellitus, hypertension, or BMI, there was no discernible difference between the two groups.

Table 3. Comparing the two groups in terms of complaints.

COMPLAINT	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
ABDOMINAL PAIN	5 (20.0%)	4 (16.0%)	0.36	0.72
FEVER	2 (8.0%)	3 (12.0%)	-0.46	0.64
NAUSEA	5 (20.0%)	4 (16.0%)	0.47	0.72
ANOREXIA	3 (12.0%)	3 (12.0%)	-	1
VOMITING	1 (4.0%)	0.0	0.42	0.32
EPIGASTRIC PAIN	1 (4.0%)	1 (4.0%)	-	1
RIGHT HYPOCHONDRIAL PAIN	5 (20%)	4 (16.0%)	0.36	0.72
JAUNDICE	3(12.0%)	1 (4.0%)	1.80	.077
MERRIZI SYNDROME	4(16.0%)	1 (4.0%)	2.13	.038

Table 4. Comparison between both group as regard CBC.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
HEMOGLOBIN (G/DL)			1.1	0.77
MEAN±SD	11.86±1.21	12.2 ±0.84		
MEDIAN (MINIMUM-MAXIMUM)	11.9 (10-15)	12.8 (10.8-14)		
TLC X103(CELL/MM2)			1.4	0.65
MEAN±SD	12.6 ±1.8	12.7±2.7		
MEDIAN (MINIMUM-MAXIMUM)	12.8 (10-17)	12 (9.3-19)		
NEUTROPHILS (%)			1.2	0.6
MEAN±SD	61.3±10.2	62.3±9.3		
MEDIAN (MINIMUM-MAXIMUM)	60 (45-70)	66 (46-74)		

Table 5. Comparison between both group as regard liver function tests.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
SGOT, U/L			1.05	0.88
MEAN±SD	69.7±10.8	70.1±10.9		
ALP, U/L			1.19	0.24
MEAN±SD	166.8±18.2	160.5±17.4		
TOTAL BILIRUBIN, MG/D			1.2	0.6
MEAN ± SD	1.2±1	1.3±1.1		

Table 6. Comparison between both group as regard kidney function tests.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
CREATININE, MG/D			1.4	0.22
MEAN±SD	1.1±0.2	1.15±0.15		
MEDIAN (MINIMUM-MAXIMUM)	1.1 (0.7-1.4)	1.1 (0.7-1.4)		
UREA, MG/D			1.5	0.31
MEAN±SD	41.1±4.2	42.2±3.9		
MEDIAN (MINIMUM-MAXIMUM)	45 (30-50)	45 (30-50)		

Table 7. Comparison between both group as regard bile duct stricture.

	GROUP A (N=25)	GROUP B (N=25)	TEST	P VALUE
BILE DUCT STRICTURE				
YES	2 (8%)	0	2.30	0.03
NO	23 (92%)	25(100%)		

4. Discussion

Our findings align with the study conducted by Yang et al.[9], where the average age of the experimental group, which included 17 males and 18 females, was 60.08±8.83 years, with ages ranging from 5 to 85. The group contained 18 cases of hypertension, 11 cases of diabetes mellitus, and a mean BMI of 25.17±3.63 kg/m2. The experimental group in our investigation included 20 females and 15 males, ages 25–85, with a mean age of 60.13±8.21 years. There were nine cases of diabetes mellitus and twenty-one cases of hypertension, with an average BMI of 25.37±3.31 kg/m2. Crucially, both groups' initial patient characteristics were similar (P>0.05).

Our findings indicate that in group A, 20.0% experienced Abdominal pain, 8% had Fever, 20% reported Nausea, 12% encountered Anorexia, 4% suffered from Vomiting, 4% had Epigastric pain, and 20.0% presented with Right Hypochondrial pain. In group B, 16.0% had Abdominal pain, 12% experienced Fever, 16% reported Nausea, 12% encountered Anorexia, 4% had Epigastric pain, and 16.0% had Right Hypochondrial pain. Notably, the two groups had no discernible difference regarding the number of complaints reported.

Our findings are consistent with those of Gupta and Jain[10]. Abdominal pain became the most common complaint in both groups, followed by Vomiting, Nausea, and dyspepsia. There were no discernible variations in the two groups' physical symptoms, such as icterus and pallor. On the other hand, Murphy's sign demonstrated a noteworthy difference and statistical significance with a p-value of less than 0.001.

Our findings revealed that in group A, the mean Hemoglobin was 11.86±1.21, Total Leukocyte Count (TLC) was 12.6±1.8, and Neutrophils were 61.3±10.2. In group B, the mean Hemoglobin was 12.21±0.84, the mean TLC was 12.7±2.7, and the Neutrophils were 62.3±9.3. Importantly, There was no discernible variation in the two groups' Complete Blood Count (CBC).

Our findings are consistent with those of Agrawal et al.[11], who stated that there was no discernible change in the liver function tests between the two groups.

Our results indicate that in group A, the mean Creatinine was 1.1±0.2, and Urea was 41.1±4.2. In group B, the mean Creatinine was 1.15±0.15, and Urea was 42.2±3.9. Notably, On renal function tests, there was no statistically significant difference between both groups.

Our results indicate that in group A, 12.0% experienced bile duct injury, and 8.0% had bile duct stricture. In contrast, none in group B had bile duct stricture or injury. Importantly, the two groups had a significant difference concerning bile duct stricture or injury.

Our results align with those of Cao et al.[12] since they documented statistically substantial drops in the risks of early Laparoscopic Cholecystectomy (LC), including death, complications, wound infections, bile duct leaks, bile duct injuries, conversion rates, length of hospital stay, and blood loss.

Multiple trials, as reported by Kolla[13], documented cases of bile duct injury necessitating re-operations. However, Regarding this extremely worrying complication, there was no discernible difference between the two groups.

Our results indicate that 8.0% of participants in Group A required readmission, while 44% of participants in Group B needed readmission. Importantly, the two groups differed significantly

in terms of the necessity for readmission.

Our results differ from those reported by Turiño et al.[14], who discovered that 34.8% of patients were readmitted with symptoms due to gallstones during their long-term follow-up. The cumulative incidence of all readmissions was 38.6%, with the bulk happening during the first three years. 5.2% of patients in the PC group had readmission-causing complications, including cholecystocutaneous fistula and abscess. Nevertheless, a different patient in the PC group required an emergency laparoscopic cholecystectomy because of perforated cholecystitis after being readmitted at 11 months with recurrent cholecystitis.

Our investigation also evaluated the result of postoperative Endoscopic Retrograde Cholangiopancreatography (ERCP). The study found that the laparoscopic cholecystectomy group had a significantly greater need for ERCP compared to the conservative care group. The rise in demand for ERCP can be ascribed to the emergence of common bile duct stones or other complications linked to the surgical treatment.[15]

The main result, which is the total occurrence of illness, showed a preference for Early Laparoscopic Cholecystectomy (ELC). This mainly was related to difficulties that arose during the first conservative treatment or the period that had to wait until the scheduled Laparoscopic Cholecystectomy (LC). The incidence of morbidity, linked explicitly to gallstones, during the waiting period, was 18.3%, consistent with the 29.5% reported in the Cochrane review. Patients who did not see improvement in their symptoms with initial conservative treatment or experienced a return of symptoms while waiting for further treatment sought emergency laparoscopic cholecystectomy (LC), leading to a high conversion rate of 45%.[16]

4. Conclusion

Conservative management may be considered a safer alternative for patients with acute calculous cholecystitis, especially for those at a high risk of complications from surgery. However, it is crucial to emphasize that the decision for surgical intervention should be individualized, considering the patient's overall health and the severity of the disease. Opting for an early cholecystectomy may result in a reduction in biliary problems and a decrease in reported stomach discomfort compared to conservative therapy, as indicated by the observed high readmission rates in patients undergoing conservative treatment. Therefore, it is advisable to reevaluate the indications for cholecystectomy within the first week of acute cholecystitis, with a preference for attempting laparoscopy initially in the absence of complications.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

Funding

No Funds : Yes

Conflicts of interest

There are no conflicts of interest.

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