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Identification of Factors Affecting Post Operative Outcomes in Elective LAP Cholecystectomy

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ABSTRACT
One major method for treating acute cholecystitis is laparoscopic cholecystectomy (LC). According to the Tokyo Guidelines 2018 (TG18), if the patient's overall health indicates they can tolerate surgery, LC should be carried out as soon as the cholecystitis severity has been determined to be light or moderate. To identify potential risk factors for postoperative complications in LC according to the perioperative condition and scoring systems for post- operative complications The present study was a Comparative study. This Study was conducted for 1 year at Department of General surgery, Murshidabad medical college. Total 100 patients were included in this study. In our study, 40 (40.0%) patients had Hypertension, 10 (10%) patients had Cardiovascular, 20 (20%) patients had Respiratory, 12 (12%) patients had Neurogenic and mental disorder, 5 (5%) patients had Diabetes mellitus, 5(5%) patients had Other, 40 patients had Grade I (mild) Severity grade of cholecystitis, 25 patients had Grade II (moderate) Severity grade of cholecystitis, 35 patients had Grade III (severe) Severity grade of cholecystitis, 20 (20%) patients had External gallbladder drainage. To sum up, in order to maximize patient care and surgical success, it is critical to identify the variables influencing postoperative outcomes in elective laparoscopic cholecystectomy procedures. Postoperative problems and recovery are largely dependent on variables such patient demographics, comorbidities, the severity of gallbladder disease and intraoperative obstacles.

INTRODUCTION

One major method for treating acute cholecystitis is Laparoscopic Cholecystectomy (LC). According to the Tokyo Guidelines 2018 (TG18), if the patient's overall health indicates they may tolerate surgery, LC should be carried out as soon as the severity of the cholecystitis has been determined to be light or moderate[1]. The patient's general condition has substantially deteriorated in cases of severe acute cholecystitis and the course of therapy should be chosen after giving careful thought to the patient's medical history, including any problems or comorbidities. 2. Risks should be avoided at all costs to guarantee that LC is performed safely.

The short postoperative stay and minimal morbidity and mortality as medical and economic advantages have been reviewed in various publications about the feasibility and safety of LC for acute cholecystitis in early therapy[2]. Therefore, combining pre- and intraoperative data, it may be helpful to evaluate the risk of early postoperative complications of LC for acute cholecystitis. Previous research has examined a number of factors, including age, gender, body mass index (BMI), total bilirubin, white blood cell (WBC) count, C-reactive protein (CRP) level, renal function and ultra- sound results, as predictors of postoperative problems following LC., If a patient's overall health is deemed satisfactory based on the Charlson Comorbidity Index (CCI) and American Society of Anesthesiologists (ASA) criteria, early LC is advised in the TG18[3,4].

Since 1990, the preferred course of therapy for symptomatic gallstone disease has been laparoscopic cholecystectomy (LC)[5]. Less postoperative discomfort, a quicker recovery period following surgery, a decreased incidence of postoperative complications and early ambulation that reduces hospital stays are the primary benefits of laparoscopic surgery. According to a research by Tsang *et al*.[6] age above 60, duration for food resumption longer than 8 hours and oral analgesia consumption larger than two tablets were independent prognostic variables for protracted postoperative stay. The duration of hospital stay was unaffected by operational findings of acute inflammation or postoperative sequelae. The American Society of Anesthesiologists (ASA) score and LC difficulty are the most predictive determinants on hospital stay time, according to a recent analysis by Morimoto *et al*.[7]. Therefore, the current study sought to determine possible risk factors for postoperative problems in LC based on the perioperative state and postoperative complications scoring systems.

MATERIALS AND METHODS

Study area: Department of General surgery, Murshidabad medical college.

Study design: Comparative study.

Study period: 1 Year

Inclusion criteria:

- Adults, typically aged 18-75 years old
- **Diagnosis:** Patients diagnosed with symptomatic gallbladder disease such as: Cholelithiasis (gallstones), Chronic cholecystitis, Biliary dyskinesia
- Patients scheduled for elective (non-emergency) laparoscopic cholecystectomy
- Individuals deemed fit for elective surgery based on pre-operative assessment (e.g., ASA grade I-III).
- Informed Consent: Patients who have provided written informed consent to participate in the study
- Patients with cholecystitis, gangrenous gallbladder, or other emergencies requiring urgent surgery

Exclusion criteria:

- Exclude cases where laparoscopic surgery was converted to open surgery
- Patients with severe, uncontrolled systemic diseases, such as end-stage renal disease or active malignancy

Sample size: A total of 100 samples have been included in this study.

Statistical analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests, which compare the means of independent or unpaired samples, were used to assess differences between groups. Paired t-tests, which account for the correlation between paired observations, offer greater power than unpaired tests. Chi-square tests (χ^2 tests) were employed to evaluate hypotheses where the sampling distribution of the test statistic follows a chi-squared distribution under the null hypothesis, Pearson's chi-squared test is often referred to simply as the chi-squared test. For comparisons of unpaired proportions, either the chi-square test or Fisher's exact test was used, depending on the context. To perform t-tests, the relevant formulae for test statistics, which either exactly follow or closely approximate a t-distribution under the null hypothesis, were applied, with specific degrees of freedom indicated for each test. p-values were determined from Student's t-distribution tables.

A $p \leq 0.05$ was considered statistically significant, leading to the rejection of the null hypothesis in favour of the alternative hypothesis.

RESULTS

In our study, 40 (40.0%) patients had Hypertension, 10 (10%) patients had Cardiovascular, 20 (20%) patients had Respiratory, 12 (12%) patients had Neurogenic and mental disorder, 5 (5%) patients had Diabetes mellitus, 5(5%) patients had Other, 40 patients had Grade I (mild) Severity grade of cholecystitis, 25 patients had Grade II (moderate) Severity grade of cholecystitis, 35 patients had Grade III (severe) Severity grade of cholecystitis, 20 (20%) patients had External gallbladder drainage, 35 patients had Urgent cholecystectomy and 33 patients had Conversion to open cholecystectomy. In Group A, 25 (25%) patients had Moderate cholecystitis, 20 (20%) patients had WBC count >18,000/mm^2, 12 (12%) patients had Marked local inflammation, 1 (1%) patient had Duration of complaints >72 hrs, 3 (3%) patients had Palpable tender mass, 4 (4%) patients had Severe cholecystitis and 5 (5%) patients had Platelet count <100,000/mm^2 (Table 1 and 2).

In Group B, 10 (10%) patients had Moderate cholecystitis, 3 (3%) patients had WBC count >18,000/mm^2, 4 (4%) patients had Marked local inflammation, 2 (2%) patients had Duration of complaints >72 hrs, 1 (1%) patient had Palpable tender mass, 2 (2%) patients had Severe cholecystitis, 1 (1%) patients had Platelet count <100,000/mm^2 and 1 (1%) patients had Cardiovascular dysfunction. In our study, 2 patients had Surgical infectious, 1 patient had Bile leakage, 1 patient had Subhepatic abscess, 16 patients had Nonsurgical infectious, 3 patients had Paralytic ileus, 5 patients had Pulmonary, 3 patients had Cardiac, 3 patients had Cholangitis, 2 patients had Neurologic and 1 patient had Liver failure. In Group A, 10 patients had Moderate or severe cholecystitis. In Group B, 35 patients had Moderate or severe cholecystitis. Association of Moderate or severe cholecystitis with Group was statistically significant ($p<0.0001$). In Group A, 16 patients had External gallbladder drainage. In Group B, 12 patients had External gallbladder drainage. Association of External gallbladder drainage with Group was not statistically significant ($p = 0.175$). In Group A, 16 patients had External gallbladder drainage. In Group B, 12 patients had External gallbladder drainage. Association of External gallbladder drainage with Group was not statistically significant ($p = 0.175$). In Group A, 15 patients had Operation within 72 hrs from onset. In Group B, 35 patients had Operation within 72 hrs from onset. Association of Operation within 72 hrs from onset with Group was statistically significant ($p = 0.006$). In Group A, 44 patients had Blood loss. In Group B, 10 patients had Blood loss. Association of Blood loss with Group was statistically significant ($p<0.001$) (Table 3 and 4).

Table 1: Patient characteristics, severity grading of cholecystitis, intraoperative findings and postoperative complications of laparoscopic cholecystectomy

Comorbidity	No.	Percent
Hypertension	40	40
Cardiovascular	10	10
Respiratory	20	20
Neurogenic and mental disorder	12	12
Diabetes mellitus	5	5
Other	5	5
Severity grade of cholecystitis		
Grade I (mild)	40	40
Grade II (moderate)	25	25
Grade III (severe)	35	35
External gallbladder drainage		
Yes	20	20
No	80	80
Urgent cholecystectomy		
Yes	35	35
No	65	65
Conversion to open cholecystectomy		
Yes	33	33
No	67	67

Table 2: Factors of Severity Grading in TG 18

	Group A		Group B	
	No.	Percent	No.	Percent
Moderate cholecystitis	25	25	10	10
WBC count >18,000/mm^2	20	20	3	3
Marked local inflammation	12	12	4	4
Duration of complaints >72 hrs	1	1	2	2
Palpable tender mass	3	3	1	1
Severe cholecystitis	4	4	2	2
Platelet count <100,000/mm^2	5	5	1	1
Cardiovascular dysfunction	0	0	1	1
Renal dysfunction	0	0	0	0

Table 3: Breakdown of postoperative complications in laparoscopic cholecystectomy

Parameter	No.
Surgical infectious	2
Bile leakage	1
Subhepatic abscess	1
Nonsurgical infectious	16
Paralytic ileus	3
Pulmonary	5
Cardiac	3
Cholangitis	3
Neurologic	2
Liver failure	1

DISCUSSION

We discovered that 35 patients in Group B and 15 patients in Group A had operations within 72 hrs of their conditions starting. This had statistical significance Deterioration of the overall condition (caused by pulmonary, neurological, or cardiac conditions) was the cause of postoperative problems in nine cases. The death rate was extremely low and the 4.3% postoperative morbidity rate was smaller than or similar to the value in previous trials[8]. Problems with our LC approach do not seem to be common; postoperative problems resulting from the surgical procedure happened in only two cases. Rather, the primary concern in this investigation of complications was the worsening of the postoperative status.

Table 4: Prevalence of postoperative complications and potential risk factors for postoperative complications in laparoscopic cholecystectomy

	Parameters	Group A	Group A	p-value
Moderate or severe cholecystitis	Yes	10	35	<0.001
	No	40	15	
External gallbladder drainage	Yes	16	12	0.175
	No	54	18	
Operation within 72 hrs from onset	Yes	15	35	0.006
	No	45	5	
Blood loss	≥112 mL	44	10	<0.001
	<112 mL operating	36	10	

The rate of Grade I cholecystitis in our hospital was greater than in the earlier study. Although the exact explanation of the disparity is unknown, it is possible that a very small percentage of patients had severe or moderate cholecystitis since our hospital was not a high-volume center for LC and lacked an emergency medical care facility. In Japan, LC is regularly performed for cho- lecystitis, not only at acute care centers but also at small or midsize hospitals. The surgical technique and the methodology of perioperative care in LC are largely fixed by TG18 and the other studies. We do not believe there is any marked difference in the technique or quality of care between acute care centers and any other hospitals.

POSSUM morbidity and moderate (Grade I) or severe (Grade II) cholecystitis were determined to be independent risk variables of postoperative complications in the current investigation. POSSUM is a technique for calculating the likelihood of surgical complications that takes into account data and pre- and postoperative condition parameters[9]. The findings imply that the perioperative general state may have an association with the elevated risk of postoperative complications for LC.TG18 recommends the general condition be evaluated with the CCI and ASA, in the flowchart of initial medical treatment and organ support but studies concerning risk factors for postoperative complications in LC have thus far been insufficient[10].

In their analysis of 22,953 cases from a Swiss database, Gigar et al. found that the predictive factors with the highest risk of causing postoperative systemic complications were an ASA score >2, conversion to open surgery, emergency surgery, acute cholecystitis, old age and intervention time[11]. Ambe *et al*.[12] found that in their nationwide inpatient sample, emergent LC, high CCI, male gender, advanced age and comorbidities were linked with postoperative problems. They also reported that the complication rate of LC was 6.8%. A number of studies also noted that independent risk variables for postoperative complications in liver cancer included age, gender, comorbidities, BMI, fever and conversion to open cholecystectomy. The evaluation of the patient's general status, which permits the prediction of the possibility of postoperative problems, was crucial for the perioperative care in LC, as stated in these studies and TG18.

The majority of patients, it was discovered, had hypertension [40 (40.0%)]. We discovered that the majority of patients [40 (40.0%)] had Grade I (mild) cholecystitis. According to the current investigation, LC for Grade II (moderate) or Grade III (severe) cholecystitis may further increase the chance of problems following surgery. The risk of postoperative complications and conversion to open cholecystectomy in LC for moderate or severe cholecystitis was greater than in LC for mild cholecystitis, according to the TG18 and several other investigations[13]. In three individuals who had problems following LC, severe cholecystitis was identified as the cause. Two of the patients had cardiac and renal failure as its causative characteristics, while the third case had thrombocytopenia (platelet count <100,000). Patients with low platelet counts who have severe cholecystitis can undergo LC without experiencing any postoperative problems. However, cases of severe cholecystitis associated with organ dysfunction, such as renal and cardiac failure, were only observed in the group that had postoperative difficulties. Following LC, both patients with organ dysfunction passed away. Prior to doing LC for acute cholecystitis with organ failure, the patient's overall health must be restored. LC can be a fatal surgery. As such, the ideal approach for risk management in cases of LC for severe cho-lecystitis patients with organ failure should be differentiated from that in patients being treated for severe cholecystitis with a low platelet count.

These parameters may be utilized to predict and avoid postoperative complications, given the current results of POSSUM morbidity and serenity of cholecystitis as possible risk factors. It is very crucial to use these parameters to prevent postoperative problems. If you have cholecystitis, there are a few ways to get well before surgery. As an alternative to immediate LC, the TG18 advised that patients with acute cystitis who posed a high surgical risk undergo PTGBD and antimicrobial treatment.28 In fact, it is said to be rather successful to utilize antibiotics for conservative treatment prior to cholecystectomy[14]. PTGBD is a method of improving acute cholecystitis and its therapeutic role in patients with severe or moderate cholecystitis has been discussed in several studies.

According to the current data, only 4.5% of patients with cholecystitis had PTGBD done and only 17.5% of cases had urgent LC completed within 72 hrs.

For Grade I (mild) cholecystitis, TG18 recommended early LC; for Grade II (moderate) cholecystitis, general supportive treatment and antibiotics were first recommended, followed by early or elective LC[4]. According to our research, Group B experienced a greater rate of LC within 72 hrs following the commencement of cholecystitis than did Group A. This finding implies that conservative therapies for cholecystitis followed by elective LC might not increase problems following LC, in contrast to the TG18 advice of early LC. Because many patients did not come to our hospital within 72 hrs of the commencement because their symptoms were minor or because they had previously received conservative therapy at another institution before arriving, LC was not conducted for the remaining 78% of patients within that time frame. In addition, cautious measures were necessary before to LC since our institution lacked a mechanism for carrying out emergency procedures. Early LC for older patients without an assessment of the general condition can be dangerous due to the risk of deterioration of the comorbidities and general condition after LC. For these patients, elective LC followed by an adequate assessment of comorbidities is suitable.

The POSSUM is used to analyze the risk of postoperative complications in many operative procedures. However, such analyses for LC have been rare. Tambyraja *et al*.[15] showed that the POSSUM score performed well for pre- dicting morbidity after LC in patients ≥80 years old.

It is anticipated that our research on the possible risk factors of postoperative problems linked to LC may enhance the care of these patients' perioperative conditions. When evaluating the findings, one should take into account the limitations of this study. To begin with, this was a retrospective research that used data from our hospital's operating database. Second, because cases where an open cholecystectomy was conducted from the beginning were excluded, there were probably many sources of selection bias.

CONCLUSION

In conclusion, the best possible patient care and surgical success depend on the identification of the variables influencing postoperative outcomes in elective laparoscopic cholecystectomy. Postoperative recovery and complications are influenced by several factors, including patient demographics, comorbidities, the intricacy of gallbladder disease and intraoperative problems. By comprehending these factors, medical professionals may adjust perioperative care, anticipate results more accurately and put risk-reduction plans into action, all of which will enhance surgical efficacy and patient safety. To improve the overall quality of treatment for laparoscopic cholecystectomy, these prediction models must be improved via ongoing research and data collecting.

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