Original Article

Changes in Post-Operative Compared to Pre-Operative Level of Liver Function Tests in Patients Undergoing Elective Lap Cholecystectomy in Tertiary Care Centre

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Abstract

Background: Laparoscopic cholecystectomy (LC) remains the preferred surgical intervention for patients with symptomatic gallstone disease, owing to its minimally invasive nature, reduced postoperative discomfort, shorter hospitalization, and faster recovery. Nevertheless, fluctuations in liver function tests (LFTs) following surgery continue to raise concerns, as they may reflect either benign physiological responses or early indications of complications. The aim is to assess alterations in LFT parameters before surgery and on postoperative days 1 and 5 in individuals undergoing elective LC. **Material and Methods:** This longitudinal observational analysis included 229 patients aged 18–75 years who underwent LC for symptomatic gallstones at a tertiary care institution. Patients with hepatobiliary malignancy, choledocholithiasis, viral hepatitis, diabetes or those converted to open surgery were excluded. Total bilirubin (TB), alkaline phosphatase (ALP), alanine aminotransferase (ALT), and aspartate aminotransferase (AST) were measured preoperatively, and again on postoperative days 1 and 5. Data were processed using SPSS v20. **Results:** Postoperative day 1 demonstrated a statistically significant increase in TB (0.745 to 0.976 mg/dL), ALP (49.358 to 62.131 IU/L) and ALT (22.445 to 30.563 IU/L) followed by a downward trend by day 5. AST values did not change significantly. **Conclusion:** Short-lived postoperative elevations in select LFT parameters are a frequent finding after LC and are generally not linked to adverse clinical outcomes. Routine post-LC LFT surveillance is unwarranted unless prompted by clinical symptoms. Additional studies focusing on patients with baseline hepatic dysfunction are recommended to refine perioperative strategies.

Keywords: Laparoscopic Cholecystectomy, Liver function tests, Hepatic function, Gallstone disease.

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Introduction

Acute cholecystitis accounts for approximately 3–10% of all acute abdominal emergencies, with cholelithiasis identified as the cause in up to 95% of cases.[1] Gallstone disease affects about 6% of the global population, with a higher prevalence observed among women.[2] When gallstones obstruct the cystic duct, they may precipitate acute inflammation and in roughly 20% of patients, result in complications such as pancreatitis or cholangitis.[3]

Laparoscopic cholecystectomy (LC) has become the gold-standard surgical management for symptomatic cholelithiasis,[4] offering notable benefits over open cholecystectomy, including reduced postoperative pain, shorter hospitalization, and faster recovery. Despite these advantages, LC is associated with potential risks, most notably biliary and vascular injuries, often arising from unclear visualization of anatomical structures within the hepatocystic triangle.[5–7] Achieving the critical view of safety (CVS), as outlined by Strasberg, is essential to reduce these complications.[6,8]

Vascular injuries during LC — most frequently involving the right hepatic artery or portal vein — may occur due to anatomical variations or inflammatory changes.[9] These can present as intraoperative bleeding or postoperative elevations in liver enzymes. Furthermore, pneumoperitoneum pressures of 12–14 mmHg, necessary for laparoscopic access, can transiently reduce hepatic perfusion, leading to short-term elevations in liver enzymes that may be mistaken for biliary injury.[10-13]

Radiological modalities such as MRCP, CT, and ultrasonography assist in identifying postoperative complications.[11,12] Biochemical markers, particularly LFT parameters such as ALT, AST, ALP, and bilirubin, remain essential in evaluating hepatic and biliary function.[14,15] Elevated levels may reflect either underlying pathology or temporary physiological changes

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following surgery.[14-16] Although LC is increasingly performed as a day-care procedure, postoperative transient LFT elevations are frequently observed and tend to resolve without intervention.[16] Previous research has shown no consistent correlation between abnormal preoperative LFTs and conversion to open surgery.[17] Given these conflicting findings, the present study aimed to assess changes in LFT values preoperatively and postoperatively in patients undergoing elective LC at a tertiary care center.[18]

Materials and Methods

Source of Data: Patients admitted with diagnosis of Symptomatic Gall Stone Disease in TMMC&RC, Moradabad

Study Design: Longitudinal Observational Study

Duration of Study: 18 months

Sample Size: 229 cases

Inclusion Criteria

Patients aged 18-75yrs with symptomatic gall stone disease undergoing elective LC

Exclusion Criteria

Patients having bile duct stones, suspected hepatobiliary malignancy, comorbidities like diabetes or viral hepatitis, preoperative enzyme elevation, intraoperative complications or conversion to open surgery, were medically unfit, or declined laparoscopic cholecystectomy.

Methodology: IEC and CRC approval taken and patients meeting the inclusion/exclusion criteria were enrolled after obtaining informed consent.

Assessment of patients done by comparing liver function tests preoperatively, on postoperative day 1 and day 5 to evaluate changes and draw final conclusions.

Results

Table 1: Represent the frequency distribution of the cases according to Age group

Parameters		Frequency (n)	Percentage (%)
Age groups (yrs)	<20	3	1.310
	20-30	77	33.624
	31-40	73	31.878
	41-50	50	21.834
	51-60	14	6.113
	>60	12	5.240

Table 2: Comparison of pre and post-operative Total bilirubin levels.

Total bilirubin	Mean	SD
Pre-operative	.745	.257
Post-operative at day 1	.976	.268
Post-operative at day 5	.910	.238
F-coefficient	50.2129	
pvalue	0.00016*	

Table 3: Comparison of pre and post-operative Alkaline phosphatise (ALP) levels

Alkaline phosphatise (ALP)	Mean	SD
Pre-operative	49.358	11.909
Post-operative at day 1	62.131	13.351
Post-operative at day 5	53.284	13.613
F-coefficient	58.1870	
pvalue	0.000023*	

Table 4: Comparison of pre- and post-operative ALT levels

Alanine aminotransferase (ALT)	Mean	SD
Pre-operative	22.445	7.442
Post-operative at day 1	30.563	8.918
Post-operative at day 5	22.431	7.531
F-coefficient	78.8982	
pvalue	0.0000112*	

Table 5: Comparison of pre and post-operative AST levels

Aspartate aminotransferase (AST)	Mean	SD
Pre-operative	22.677	7.433
Post-operative at day 1	21.865	7.528
Post-operative at day 5	21.865	7.371
F-coefficient	0.9087	
pvalue	0.4036*	

Discussion

Laparoscopic cholecystectomy (LC) has become the benchmark surgical approach for managing symptomatic gallstone disease due to its minimally invasive nature, faster convalescence, and lower postoperative morbidity compared with open techniques. Nevertheless, the possibility of biliary or vascular injury persists and when such complications occur, biochemical assessment often plays a pivotal role in their detection.

Liver function tests (LFTs) — particularly ALT, AST, ALP, and bilirubin — remain among the most sensitive (>90%) biochemical indicators of biliary obstruction or iatrogenic injury. Yet, mild postoperative elevations in these parameters are frequently observed in patients with an otherwise uncomplicated recovery. This raises the question of whether such changes represent pathological findings or temporary physiological responses to surgery.

In the present series of 229 elective LC cases, transient postoperative increases in TB, ALP, and ALT were identified, peaking on the first postoperative day and trending toward baseline by the fifth day. AST values, in contrast, showed no statistically meaningful variation. These patterns mirror those

described in previous reports, where pneumoperitoneum-induced reductions in hepatic perfusion, anesthetic effects and temporary metabolic adaptations have been implicated in enzyme elevation.

The clinical relevance of these transient biochemical changes is limited in the absence of corresponding symptoms or imaging abnormalities. Indeed, earlier studies have demonstrated that such postoperative fluctuations are generally self-limiting and should not, in isolation, prompt extensive diagnostic work-up. Our findings support this perspective and reinforce the notion that routine postoperative LFT surveillance in asymptomatic patients is unnecessary.

However, it is worth noting that in individuals with pre-existing hepatic impairment, such biochemical alterations could have greater clinical implications. Therefore, selective postoperative LFT monitoring may still be warranted in high-risk groups. Future multicentric studies with larger and more diverse patient populations could help clarify the interplay between baseline hepatic function, intraoperative variables, and postoperative biochemical dynamics.

Conclusion

Transient postoperative elevations in select liver function parameters are a common finding after laparoscopic cholecystectomy and in the majority of cases, do not indicate clinically significant complications. These changes typically resolve without intervention. Therefore, routine LFT monitoring after LC is not warranted for asymptomatic patients. Nonetheless, a more cautious approach is advisable in individuals with pre-existing hepatic dysfunction, where postoperative deviations may require closer observation. Further multicentre studies involving broader patient cohorts are recommended to establish optimal perioperative monitoring strategies for high-risk populations.

Summary

This prospective observational study assessed preoperative and postoperative changes in liver function tests (LFTs) in 229 patients undergoing elective laparoscopic cholecystectomy at a tertiary care center. Measurements were obtained preoperatively and again on postoperative days 1 and 5.

A statistically significant, short-term increase in total bilirubin, alkaline phosphatase (ALP), and alanine aminotransferase (ALT) was observed on the first postoperative day, with a decline toward baseline by day 5. Aspartate aminotransferase (AST) levels did not vary significantly.

These findings indicate that mild, transient LFT elevations following LC are common and self- resolving in the absence of clinical complications. Routine postoperative biochemical monitoring is therefore unnecessary in low-risk patients, although selective surveillance may benefit those with pre-existing hepatic impairment.

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Conflicts of interest

There are no conflicts of interest.

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