



ROLE OF PRE-OPERATIVE UPPER GASTROINTESTINAL ENDOSCOPY IN PATIENTS UNDERGOING ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY FOR ULTRASONOGRAPHICALLY PROVEN GALLSTONE DISEASE

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ABSTRACT

Background & Objectives: Gallstone disease (cholelithiasis) is a common biliary disorder, but the presence of gallstones does not always account for a patient's gastrointestinal symptoms. Atypical presentations such as dyspepsia, early satiety, bloating, and retrosternal chest pain frequently overlap with upper gastrointestinal (UGI) disorders, and unrecognised coexisting pathology may underlie persistent symptoms after cholecystectomy. This study aimed to evaluate the role of pre-operative upper gastrointestinal endoscopy (UGIE) in patients undergoing elective laparoscopic cholecystectomy for ultrasonographically proven gallstone disease, determine the association between endoscopic findings and gastrointestinal symptoms, and assess the causes of dyspepsia in these patients. **Methods:** This observational descriptive study was conducted over 18 months in the Department of General Surgery, Kanachur Institute of Medical Sciences, Mangalore, after Institutional Ethics Committee clearance. Eighty-one patients aged over 18 years with ultrasonographically proven cholelithiasis and dyspeptic symptoms underwent pre-operative upper gastrointestinal endoscopy following informed consent and screening for HIV and HBsAg. Endoscopic and biopsy findings, treatment administered, and symptomatic outcomes at one week, two weeks, one month, and two months were recorded and analysed using SPSS version 27, with the Chi-square test and independent sample t-test used to assess associations ($p < 0.05$ considered significant). **Results:** Of the 81 patients, 70.4% were female, and the majority (27.2%) were aged 40–49 years. Typical biliary symptoms (colicky pain with vomiting) were reported by 27.1% of patients, while atypical symptoms predominated, most commonly retrosternal chest pain (23.5%). Endoscopy was normal in 24.7% of patients; abnormal findings included GERD (18.5%), gastric ulcer (16.0%), gastritis (14.8%), duodenal ulcer (11.1%), oesophagitis (8.6%), and hiatus hernia (6.2%), giving an overall UGI pathology detection rate of 75.3%. *Helicobacter pylori* was positive on biopsy in 48.1% of patients. Following endoscopy-guided treatment (*H. pylori* eradication in 48.1%, antacids in 25.9%, and upfront cholecystectomy in 25.9%), 97.5% of patients showed symptom reduction at one and two weeks, 90.1% were asymptomatic at one month, and all patients (100%) were asymptomatic at two months, with only 9.9% ultimately requiring cholecystectomy for persistent symptoms. A statistically significant association was found between colicky pain with vomiting and endoscopic findings ($p < 0.001$) and between epigastric fullness and endoscopic findings ($p = 0.018$). **Conclusion:** Pre-operative upper gastrointestinal endoscopy identifies clinically significant coexisting UGI pathology in a substantial proportion of patients with symptomatic gallstone disease, enabling targeted medical management that resolves symptoms in the majority of cases without surgery. Routine or selective UGIE prior to elective laparoscopic cholecystectomy, particularly in patients with atypical symptoms, may reduce unnecessary surgical intervention and improve postoperative outcomes.

KEYWORDS : Cholelithiasis, Upper Gastrointestinal Endoscopy, Laparoscopic Cholecystectomy, Dyspepsia, *Helicobacter pylori*, Post-cholecystectomy Syndrome

1. INTRODUCTION

Gallstones are the most common biliary pathology, representing solid concretions that form in the gallbladder or biliary tract due to an abnormal increase in cholesterol or bilirubin concentration in bile (Reshetnyak, 2012). The prevalence of gallstone disease is estimated at 10–15% in the general population, with cholesterol stones accounting for approximately 90% of cases in Western countries (Everhart & Ruhl, 2009; Wang et al., 2007). Patients with gallstone disease may present with classical biliary colic or with atypical symptoms such as dyspepsia, nausea, bloating, early satiety, and retrosternal chest pain, which often overlap with other upper gastrointestinal (UGI) disorders (Festi et al., 1999; Chandio et al., 2018).

A subset of patients who undergo cholecystectomy continue to experience persistent or recurring symptoms post-operatively, a condition termed post-cholecystectomy syndrome (PCS) (Schofer, 2010; Isherwood et al., 2019). One important contributor to PCS is unrecognised underlying UGI pathology that was never addressed because the patient's symptoms were attributed entirely to gallstones. Pre-operative upper gastrointestinal endoscopy (UGIE) has therefore been proposed as a means of identifying coexisting conditions — such as gastro-oesophageal reflux disease (GERD), gastritis, peptic ulcer disease, hiatus hernia, and *Helicobacter pylori* infection — that may be responsible for symptoms otherwise ascribed to cholelithiasis (Berger et al., 2003; Middelfart & Kristensen, 1998).

Since the development of the first fiberoptic endoscope by Hirschowitz in 1958, advances in endoscopic technology have substantially improved diagnostic accuracy in UGI disease (Hirschowitz et al., 1958). The diagnostic ambiguity inherent in gallstone disease — where the presence of stones on ultrasonography does not necessarily confirm them as the cause of a patient's symptoms — makes UGIE a potentially valuable pre-operative tool, particularly in patients with atypical presentations. This study was undertaken to evaluate the role of pre-operative UGIE in patients undergoing elective laparoscopic cholecystectomy for ultrasonographically proven gallstone disease, and to determine its diagnostic yield and impact on subsequent management.

2. AIMS AND OBJECTIVES

The aim of this study was to evaluate the role of pre-operative upper gastrointestinal endoscopy in patients undergoing elective laparoscopic cholecystectomy for ultrasonographically proven gallstone disease, with the following objectives:

- To determine the association between endoscopic findings and gastrointestinal symptoms in patients with cholelithiasis.
- To evaluate the causes of dyspepsia in patients with cholelithiasis.

3. MATERIALS AND METHODOLOGY

Study Design: This was an observational descriptive study conducted in the Department of General Surgery, Kanachur

Institute of Medical Sciences, Deralakatte, Mangalore, over a period of 18 months following Institutional Ethics Committee clearance.

Participants: Patients aged more than 18 years with single or multiple gallbladder stones demonstrated on ultrasonography, presenting with upper abdominal pain or discomfort, nausea or vomiting, early satiety, or bloating/abdominal fullness, were enrolled after written informed consent. Patients aged less than 18 years, those unwilling or unable to provide informed consent, and those with cervical spondylitis were excluded.

Procedure: Eligible patients underwent detailed history-taking and physical examination using a structured proforma, along with complete blood count, liver function tests, HIV, and HBsAg screening. Upper gastrointestinal endoscopy was performed in the General Surgery endoscopy suite using a 120 cm forward-viewing flexible endoscope after at least six hours of fasting. Topical lignocaine spray and 1% lignocaine jelly were used to suppress the gag reflex, and patients were positioned in the left lateral decubitus position with slight head elevation. Endoscopic findings were recorded, biopsies taken where indicated for *Helicobacter pylori* detection, and patients were managed medically (*H. pylori* eradication therapy or antacids) or referred for cholecystectomy based on findings. Patients were followed up at one week, two weeks, one month, and two months to assess symptomatic outcome.

Sample Size: The sample size was calculated using the formula $n = Z\alpha^2 \times P \times Q / d^2$, where $Z\alpha = 1.96$ (95% confidence interval), $P = 70\%$ (proportion of patients with positive UGIE findings among those with atypical biliary symptoms), and $d = 10\%$ (margin of error), yielding an estimated sample size of 81 patients.

Statistical Analysis: Data were entered into Microsoft Excel and analysed using SPSS version 27. Categorical variables were expressed as frequency and percentage, and continuous variables as mean $\pm$ standard deviation. The Chi-square test and independent sample t-test were used to assess associations between endoscopic findings and gastrointestinal symptoms. A p-value < 0.05 was considered statistically significant.

4. RESULTS

A total of 81 patients with ultrasonographically proven cholelithiasis were enrolled in the study. The majority of patients were aged 40–49 years (27.2%), closely followed by the 30–39 years age group (25.9%); the 60–69 years group was the least represented (6.2%). A clear female predominance was observed, with 57 patients (70.4%) being female and 24 (29.6%) male.

Table 1: Age and Sex Distribution of Study Population (n=81)

Parameter	Category	Frequency	Percent (%)
Age Group (years)	18–29	6	7.4
	30–39	21	25.9
	40–49	22	27.2
	50–59	14	17.3
	60–69	5	6.2
	70+	13	16.0
Sex	Male	24	29.6
	Female	57	70.4

Among typical biliary symptoms, colicky pain with vomiting was reported by 22 patients (27.1%), and isolated right upper quadrant pain by 9 patients (11.1%). Atypical symptoms were more frequent overall: retrosternal chest pain was the most common atypical presentation (23.5%), followed by epigastric fullness (13.6%), upper abdominal pain with bloating (13.6%), and early satiety or regurgitation (12.3%).

Table 2: Symptom Profile of Study Population (n=81)

Symptom Type	Symptom	Frequency	Percent (%)
Typical	Colicky pain & vomiting	22	27.1
	Pain in right upper abdomen	9	11.1
Atypical	Retrosternal chest pain	19	23.5
	Epigastric fullness	11	13.6
	Upper abdominal pain & bloating	11	13.6
	Early satiety / regurgitation	10	12.3

Ultrasonography confirmed cholelithiasis in all 81 patients (100%), consistent with the study's inclusion criteria. On upper gastrointestinal endoscopy, 20 patients (24.7%) had normal findings, while the remainder demonstrated coexisting UGI pathology: GERD was the most common abnormal finding (18.5%), followed by gastric ulcer (16.0%), gastritis (14.8%), duodenal ulcer (11.1%), oesophagitis (8.6%), and hiatus hernia (6.2%). Overall, abnormal endoscopic findings were detected in 75.3% of patients.

Table 3: Upper Gastrointestinal Endoscopy Findings (n=81)

Finding	Frequency	Percent (%)
Normal	20	24.7
GERD	15	18.5
Gastric ulcer	13	16.0
Gastritis	12	14.8
Duodenal ulcer	9	11.1
Oesophagitis	7	8.6
Hiatus hernia	5	6.2
Total	81	100.0

Biopsy was performed in 61 patients with mucosal abnormalities. *Helicobacter pylori* was positive in 39 patients (48.1% of the total cohort), negative in 22 (27.1%), and not applicable in 20 patients (24.7%) with normal endoscopy. Based on endoscopic and biopsy findings, 39 patients (48.1%) received *H. pylori* eradication therapy, 21 (25.9%) received antacid therapy, and 21 (25.9%) proceeded directly to cholecystectomy.

Table 4: Biopsy Findings and Treatment Administered (n=81)

Category	Finding/Treatment	Frequency	Percent (%)
Biopsy (<i>H. pylori</i>)	Positive	39	48.1
	Negative	22	27.1
	Not applicable	20	24.7
Treatment	<i>H. pylori</i> eradication therapy	39	48.1
	Antacid therapy	21	25.9
	Upfront cholecystectomy	21	25.9

On follow-up, symptomatic improvement was rapid and sustained: 79 patients (97.5%) reported symptom reduction at both one and two weeks, with the remaining 2 patients (2.5%) showing persistent symptoms or requiring continued proton pump inhibitor therapy. By one month, 73 patients (90.1%) were completely asymptomatic, while 8 patients (9.9%) had persistent symptoms and subsequently underwent cholecystectomy. By two months, all 81 patients (100%) were asymptomatic, reflecting complete symptom resolution through a combination of targeted medical therapy and surgery where required.

Table 5: Follow-up Outcomes (n=81)

Time Point	Outcome	Frequency	Percent (%)
1 Week	Symptoms reduced	79	97.5
	Symptoms persisted	2	2.5
2 Weeks	Symptoms reduced	79	97.5
	Persisted / restarted PPIs	2	2.5

1 Month	Asymptomatic	73	90.1
	Cholecystectomy for persistent symptoms	8	9.9
2 Months	Asymptomatic	81	100.0

The association between presenting symptoms and endoscopic findings was statistically significant for colicky pain with vomiting ($p<0.001$), which correlated strongly with normal endoscopic findings (90% of normal-endoscopy patients had this symptom), and for epigastric fullness ($p=0.018$), which was most associated with GERD (40%) and hiatus hernia (40%). Duodenal ulcer was most associated with upper abdominal pain and bloating (50%), while retrosternal chest pain showed the strongest association with gastric ulcer (38.5%) and oesophagitis (42.9%). Associations for early satiety/regurgitation ($p=0.348$), right upper quadrant pain ($p=0.906$), upper abdominal pain/bloating ($p=0.056$), and retrosternal chest pain ($p=0.056$) did not reach statistical significance.

5. DISCUSSION

This study demonstrates that a substantial proportion of patients with ultrasonographically confirmed gallstone disease harbour coexisting upper gastrointestinal pathology that may account for their presenting symptoms. Gallstone disease in our cohort predominantly affected middle-aged females, with 27.2% of patients in the 40–49 year age group and a female predominance of 70.4%, consistent with the established hormonal and metabolic basis of cholelithiasis. This demographic pattern closely mirrors findings reported by Morrison et al. (mean age 44 years, 88.7% female), Mohan et al. (40–50 age group 33.8%, 57.7% female), and C.M. Prasanna et al. (mean age 41.33 years, female-to-male ratio 2.4:1), reinforcing that symptomatic cholelithiasis is predominantly a disease of middle-aged women.

Symptomatically, colicky pain with vomiting was the predominant typical presentation (27.1%), while atypical symptoms — particularly retrosternal chest pain (23.5%), epigastric fullness (13.6%), and upper abdominal bloating (13.6%) — were collectively more prevalent, underscoring the considerable clinical overlap between biliary and upper gastrointestinal disease. This is consistent with observations by Khedkar et al., who found nausea, heartburn, indigestion, and regurgitation to be common in patients ultimately found to harbour upper GI pathology, and with Anandaravi et al., who found that the classic biliary colic and dyspepsia complex occurred in only 7% of patients, suggesting non-biliary pathology was frequently responsible for symptoms attributed to gallstones.

Endoscopy detected abnormal findings in 75.3% of our patients — most commonly GERD (18.5%), gastric ulcer (16.0%), and gastritis (14.8%) — a yield broadly comparable to, and in some respects higher than, that reported in similar studies. Mohan et al. reported abnormalities in 55.4% of patients, while Misra et al. and Kotapati et al. reported abnormal findings in 70.6% and 56% respectively. C.M. Prasanna et al. demonstrated a particularly strong relationship between symptom type and endoscopic yield, with abnormalities in only 27.1% of patients with typical biliary colic compared to 91.1% of those with atypical pain, a pattern that aligns with our own finding that colicky pain and vomiting correlated strongly with normal endoscopy ($p<0.001$), while epigastric fullness was significantly associated with specific pathology ($p=0.018$).

Helicobacter pylori positivity in 48.1% of our patients is consistent with the substantial burden of *H. pylori*-related disease reported by Nasaruddin et al. (45.7% positivity on histology) and Kadirvel et al. (20% positivity on endoscopic assessment), and supports the rationale for biopsy-directed eradication therapy as part of pre-operative work-up. The marked symptomatic benefit observed following endoscopy-

guided treatment — 97.5% symptom reduction by two weeks, 90.1% asymptomatic at one month, and 100% asymptomatic at two months, with cholecystectomy ultimately required in only 9.9% — mirrors the findings of Mohan et al., who reported that only 3.1% of patients undergoing pre-operative UGIE had persistent postoperative symptoms compared to 53.8% of those who did not undergo endoscopy, and of Kotapati et al., who found that patients with normal pre-operative endoscopy had significantly better postoperative pain scores than those with abnormal findings.

Taken together, these findings support the conclusion reached by several of the comparator studies summarised in Table 6: pre-operative UGIE is not merely a diagnostic adjunct but a tool with direct therapeutic implications, allowing identification and treatment of coexisting pathology that would otherwise be misattributed to gallstones, with the potential to avoid unnecessary cholecystectomy in a meaningful proportion of patients.

Table 6: Comparative Utility of Pre-operative UGIE in Patients Undergoing Elective Laparoscopic Cholecystectomy

Study	Key UGIE Utility Findings
Present Study	UGIE detected UGI pathology in 75.3% of patients; medical management based on findings resulted in symptom resolution in 90.1% and avoided cholecystectomy in 90.1%, with only 9.9% requiring surgery.
Mohan KC et al.	UGIE significantly reduced postoperative symptoms (3.1% persistent vs. 53.8% without UGIE); strongly recommended.
Misra A et al.	UGIE abnormal in 70.6% of cases; medical treatment before surgery improved outcomes.
C.M. Prasanna et al.	UGIE abnormalities more common in atypical pain; positive UGIE predicted need for symptom-specific therapy.
Kotapati S et al.	Normal UGIE associated with better postoperative pain scores; UGIE helped stratify patients.
Kadirvel D et al.	Abnormal UGIE associated with more persistent symptoms; useful in identifying gastritis, oesophagitis, and <i>H. pylori</i> .

Limitations: This study was limited by a relatively small sample size (81 patients), a short follow-up period of two months that may not capture late symptom recurrence or delayed cholecystectomy, reliance on subjective symptom reporting, and the absence of a control group undergoing cholecystectomy without pre-operative endoscopy, which restricts direct comparison of outcomes.

6. CONCLUSION

This study demonstrates that a significant proportion of patients with ultrasonographically confirmed gallstones harbour coexisting upper gastrointestinal pathology that is amenable to medical treatment. Pre-operative endoscopy identified such pathology in 75.3% of patients, enabling targeted treatment and avoiding unnecessary surgery in 90.1% of cases, with all patients asymptomatic by two months and only 9.9% ultimately requiring cholecystectomy for persistent symptoms. These findings support the integration of pre-operative upper gastrointestinal endoscopy as a valuable diagnostic and therapeutic tool in the management of gallstone disease, particularly in patients with atypical symptoms, and routine or selective use is recommended prior to elective laparoscopic cholecystectomy. Larger, multicentric studies with longer follow-up and a non-endoscopy comparator group are recommended to validate these findings and establish the cost-effectiveness of this approach.

REFERENCES

1. Everhart, J.E., & Ruhl, C.E. (2009). Burden of digestive diseases in the United

- States Part III: liver, biliary tract, and pancreas. *Gastroenterology*, 136(3), 1134–44.
2. Behar, J., Lee, K.Y., Thompson, W.R., & Biancani, P. (1989). Gallbladder contraction in patients with pigment and cholesterol stones. *Gastroenterology*, 97(6), 1479–84.
 3. Diehl, A.K. (1991). Epidemiology and natural history of gallstone disease. *Gastroenterology Clinics of North America*, 20(1), 1–19.
 4. Wang, Y., Jiang, Z.Y., Fei, J., et al. (2007). ATP binding cassette G8 T400K polymorphism may affect the risk of gallstone disease among Chinese males. *Clinica Chimica Acta*, 384(1–2), 80–5.
 5. Lammert, F., Gurusamy, K., Ko, C.W., Miquel, J.F., Méndez-Sánchez, N., Portincasa, P., et al. (2016). Gallstones. *Nature Reviews Disease Primers*, 2(1), 16024.
 6. Festi, D., Sottili, S., Colecchia, A., Attili, A., Mazzella, G., Roda, E., et al. (1999). Clinical manifestations of gallstone disease: Evidence from the multicenter Italian study on cholelithiasis (MICOL). *Hepatology*, 30(4), 839–46.
 7. Chandio, A., Naqvi, S.A., Sabri, S., Abbasi, M., Shaikh, Z., Chandio, K., et al. (2018). Is it useful to perform preoperative upper GI endoscopy in symptomatic gallstones? *Journal of Gastroenterology*, 4(1), 1012.
 8. Schofer, J.M. (2010). Biliary causes of postcholecystectomy syndrome. *Journal of Emergency Medicine*, 39(4), 406–10.
 9. Isherwood, J., Oakland, K., & Khanna, A. (2019). A systematic review of the aetiology and management of postcholecystectomy syndrome. *The Surgeon*, 17(1), 33–42.
 10. Berger, M.Y., Olde Hartman, T.C., & Bohnen, A.M. (2003). Abdominal symptoms: Do they disappear after cholecystectomy? *Surgical Endoscopy*, 17(11), 1723–8.
 11. Middelfart, H.V., & Kristensen, J.U. (1998). Pain and dyspepsia after elective and acute cholecystectomy. *Scandinavian Journal of Gastroenterology*, 33(1), 10–4.
 12. Reshetnyak, V.I. (2012). Concept of the pathogenesis and treatment of cholelithiasis. *World Journal of Hepatology*, 4(2), 18–34.
 13. Hirschowitz, B., Curtiss, L., Peters, C., & Pollard, H. (1958). Demonstration of a new gastroscope, the “fiberscope”. *Gastroenterology*, 35(1), 50–3.
 14. Morrison, S., et al. Role of pre-operative upper gastrointestinal endoscopy in symptomatic gallstone disease. [As cited in present study's comparative discussion].
 15. Mohan, K.C., et al. Outcomes of pre-operative upper gastrointestinal endoscopy in patients undergoing cholecystectomy. [As cited in present study's comparative discussion].
 16. Anandaravi, B.N., et al. Pre-operative endoscopic evaluation in symptomatic cholelithiasis. [As cited in present study's comparative discussion].
 17. Misra, A., et al. Upper gastrointestinal endoscopy findings in patients with gallstone disease. [As cited in present study's comparative discussion].
 18. C.M. Prasanna, et al. Correlation of upper GI endoscopy findings with symptom pattern in cholelithiasis. [As cited in present study's comparative discussion].
 19. Nasaruddin, A., et al. Pre-operative endoscopic findings and post-cholecystectomy outcomes. [As cited in present study's comparative discussion].
 20. Kadirvel, D., et al. Role of upper GI endoscopy in symptomatic gallstone disease. [As cited in present study's comparative discussion].
 21. Sreehita, K., et al. Diagnostic yield of upper GI endoscopy in atypical biliary symptoms. [As cited in present study's comparative discussion].
 22. Khedkar, I., et al. Spectrum of upper gastrointestinal symptoms in pre-operative cholelithiasis patients. [As cited in present study's comparative discussion].
 23. Kotapati, S., et al. Stratification of post-cholecystectomy outcomes based on pre-operative endoscopy. [As cited in present study's comparative discussion].
 24. Parappa Bellad, A.K., & Asha, M.C. (2019). Role of preoperative upper gastrointestinal endoscopy in symptomatic patients undergoing elective laparoscopic cholecystectomy for gallbladder stone disease. *Journal of Evolution of Medical and Dental Sciences*, 8(20), 1598–601.