

Utility of Preoperative Upper Gastrointestinal Endoscopy in Reducing Post-Cholecystectomy Syndrome: An Analytical Cross-Sectional Study.

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Abstract

Background:

Cholelithiasis is a prevalent gastrointestinal disorder treated by laparoscopic cholecystectomy. However, nearly 40% of patients develop post-cholecystectomy syndrome (PCS), often due to undiagnosed non-biliary upper gastrointestinal (GI) pathologies.

Objective:

To determine the utility of preoperative upper gastrointestinal (GI) endoscopy in identifying concomitant GI disorders and its effect on the occurrence of PCS in patients undergoing laparoscopic cholecystectomy.

Methods:

This analytical cross-sectional study was conducted at ESIC Medical College and PGIMSR, Bengaluru, over 18 months. A total of 130 patients with symptomatic cholelithiasis were enrolled and divided into two groups of 65 each. Group I underwent laparoscopic cholecystectomy without prior endoscopy, while Group II underwent preoperative endoscopy, and the identified lesions were treated before surgery. Postoperative follow-up was carried out for three months, and the incidence of PCS was compared between groups using Fisher's exact test.

Results:

Baseline demographic characteristics were similar between groups. Significant upper gastrointestinal pathology was detected in 55.4 % of patients in Group II, with gastroesophageal reflux disease (23.1 %), gastritis (13.8 %), and peptic ulcer disease (10.8 %) being common findings. At three-month follow-up, PCS symptoms were reported in 53.8 % of patients without endoscopy versus only 3.1 % of those who underwent preoperative endoscopy ($p < 0.00001$). The results demonstrate a strong association between preoperative endoscopic screening and reduced PCS incidence.

Conclusion:

Preoperative upper gastrointestinal endoscopy aids in detecting and managing coexisting upper GI disorders, thereby markedly reducing PCS. Routine or selective use of endoscopy is recommended in patients presenting with atypical pain, dyspepsia, or reflux symptoms before cholecystectomy. Further multicentric studies with longer follow-up are recommended to validate these findings and establish protocol-based implementation.

Keywords: Cholelithiasis, Post-Cholecystectomy Syndrome, Upper Gastrointestinal Endoscopy, Laparoscopic Cholecystectomy, Dyspepsia

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Introduction:

Cholelithiasis, or gallstone disease, is a common gastrointestinal condition affecting approximately 10–20% of the adult population globally [1], with its incidence varying by geographic region and ethnicity. In Asia, about 5–20% of the adult population is affected [2], and more than

20% of these individuals develop symptoms during their lifetime [1]. Symptomatic gallstone disease commonly presents with vague upper abdominal discomfort, particularly after the consumption of fatty meals. Clinical manifestations may include biliary colic, acute cholecystitis, cholangitis, or biliary pancreatitis. Laparoscopic

cholecystectomy remains the standard treatment for symptomatic gallstone disease [1].

Despite surgery, nearly 40% of patients continue to experience symptoms postoperatively [3], a condition termed **Post Cholecystectomy Syndrome (PCS)**. PCS is defined as the persistence or recurrence of symptoms, or the onset of new symptoms, following cholecystectomy. The reported incidence of PCS varies depending on the study population and the definitions used. The aetiology of PCS may be biliary or non-biliary in origin [4–7].

Biliary causes include dysfunction of the biliary tract, such as retained or recurrent common bile duct (CBD) stones, sphincter of Oddi dysfunction, biliary strictures, bile leaks, or issues related to a remnant gallbladder or cystic duct stump. Non-biliary causes encompass a range of gastrointestinal disorders that may have been present before surgery, such as peptic ulcer disease, gastroesophageal reflux disease (GERD), chronic pancreatitis, irritable bowel syndrome (IBS), and acid-peptic disorders [4].

The timing of symptom onset provides important clues regarding the aetiology. Early PCS, occurring within three years post-surgery, is more commonly due to non-biliary causes, while late PCS is usually associated with biliary complications. Among the non-biliary causes, upper gastrointestinal (GI) pathologies such as GERD, peptic ulcer disease, and hiatus hernia are frequently encountered [4].

Given the high prevalence of upper GI disorders in early PCS, preoperative upper gastrointestinal endoscopy may play a critical role in identifying these conditions before cholecystectomy. Early diagnosis and appropriate management of these disorders could potentially reduce the incidence and severity of early PCS [8].

Therefore, we hypothesize that routine preoperative upper GI endoscopy in patients scheduled for cholecystectomy may aid in identifying upper GI tract pathologies and subsequently reduce the occurrence of early post-cholecystectomy syndrome.

Methodology:

Study Design

This study was designed as an analytical cross-sectional study. It evaluated the association between preoperative upper gastrointestinal (UGI) endoscopy findings and the occurrence of post-cholecystectomy syndrome (PCS) among patients with symptomatic cholelithiasis.

Study Setting

The study was conducted in the Department of General Surgery, ESIC Medical College and PGIMSR, Rajajinagar, Bengaluru, over 18 months (January 2019 – June 2020).

ESIC Medical College and PGIMSR is a high-volume public sector teaching hospital serving insured beneficiaries, functioning in a resource-constrained environment but with diverse clinical exposure.

Study Population and Sampling

A convenient sample size of 130 eligible patients with symptomatic cholelithiasis was enrolled and divided into two equal groups:

- **Group I:** Laparoscopic cholecystectomy without preoperative UGI endoscopy
- **Group II:** Laparoscopic cholecystectomy after preoperative UGI endoscopy and management of detected pathology

Inclusion Criteria:

Patients aged 18 years and above who presented with symptomatic cholelithiasis, manifesting as biliary colic, upper abdominal pain, dyspepsia, or acute cholecystitis and had ultrasonographic (USG) confirmation of gallstones, and were scheduled for elective laparoscopic cholecystectomy, were included in the study.

Exclusion Criteria:

Patients with pregnancy, biliary pancreatitis, cholangiocarcinoma, or known comorbid conditions such as congestive heart failure (CHF), chronic liver disease (CLD), chronic obstructive pulmonary disease (COPD), and chronic kidney disease (CKD) were excluded.

Bias:

Efforts to minimize bias included standardized inclusion criteria, objective endoscopic diagnosis, uniform follow-up duration (three months), and blinded symptom assessment by independent observers.

Data collection:

All patients were followed up for a period of three months postoperatively. The primary outcome was the occurrence of PCS, defined as persistent or new upper gastrointestinal symptoms following surgery. Symptoms were assessed using a structured symptom checklist, and data were recorded in a pre-designed proforma.

Statistical Analysis:

Data were entered into Microsoft Excel. Categorical variables were expressed as frequencies and percentages, and compared using Fisher's exact test. A *p*-value of less than 0.05 was considered statistically significant.

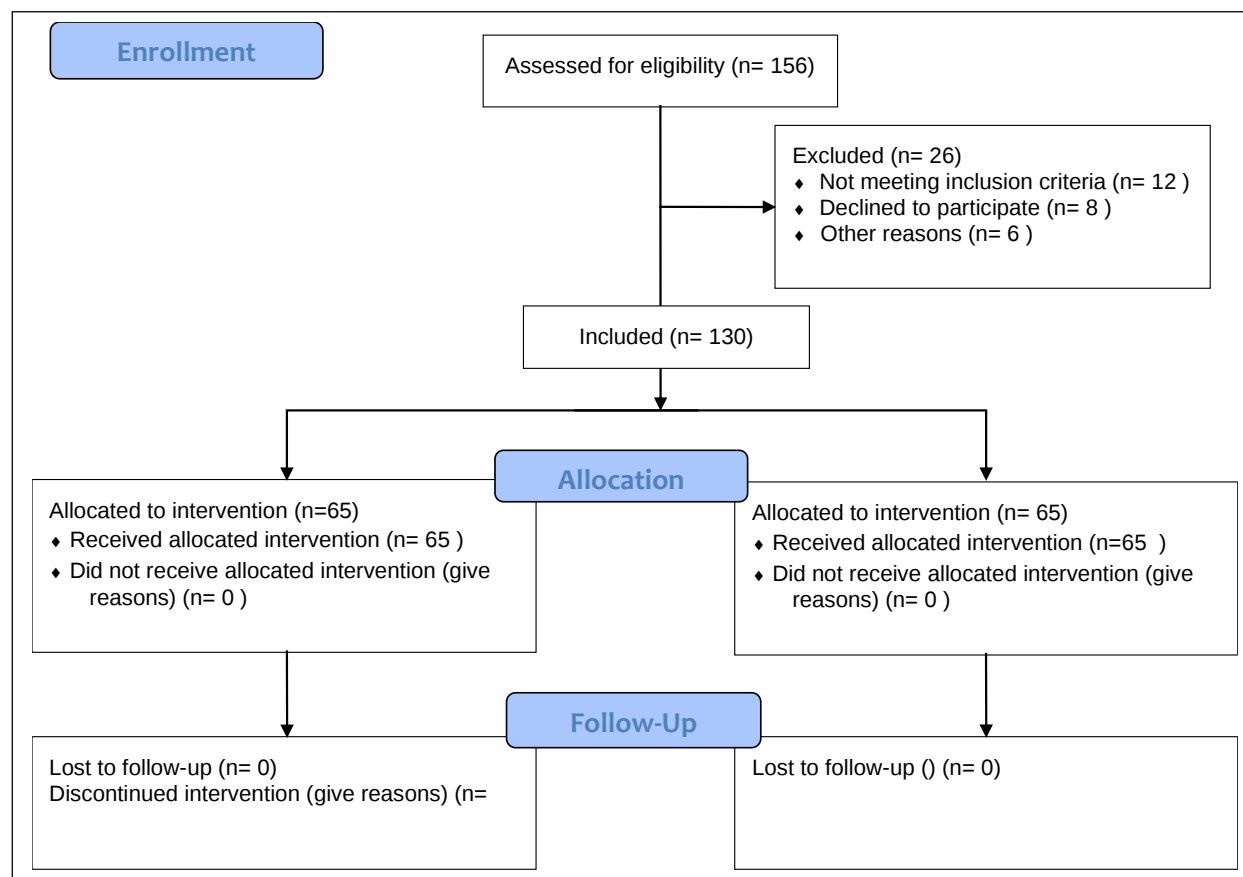
Ethical Considerations:

Ethical clearance was obtained from the Institutional Ethics Committee, ESIC Medical College and PGIMSR,

Rajajinagar, Bengaluru (Ref. No. 532/L/11/12/ethics/ESIC MC & PGIMSR/Estt.Vol. IV, dated 29.10.2018). Written informed consent was obtained from all participants.

Flow Diagram

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Results:

A total of 156 patients with symptomatic cholelithiasis were assessed for eligibility. Of these, 26 were excluded (12 not meeting inclusion criteria, 8 declined participation, 6 due to comorbidities). A total of 130 patients were included in the study, with 65 patients each in Group I (no preoperative upper gastrointestinal endoscopy) and Group II (who underwent preoperative upper GI endoscopy). The age of patients ranged from 30 to over 70 years. The majority of patients, 44 patients (33.8%), were between 40 and 50 years of age, followed by 32 patients (24.6%) in the 50–60 age group, and 30 patients (23.1%) under 40 years. A smaller proportion of patients were aged 60–70 years (17 patients, 13.1%) and above 70 years (7 patients, 5.4%).

Female participants formed a larger portion of the study population, with 75 females (57.7%) compared to 55 males (42.3%). Regarding body mass index (BMI), 82 patients (63.1%) had a normal BMI ($<25 \text{ kg/m}^2$), 34 patients (26.2%) were overweight ($25\text{--}29.9 \text{ kg/m}^2$), and 14 patients (10.7%) were obese ($\geq 30 \text{ kg/m}^2$). Among comorbidities, hypertension was present in 28 patients (21.5%) and diabetes mellitus in 22 patients (16.9%). GERD-like symptoms were reported by 55 patients (42.3%) of the study population before surgery.

With respect to symptom duration, 58 patients (44.6%) had experienced symptoms for 6–12 months, 42 patients (32.3%) for less than 6 months, and 30 patients (23.1%) had

symptoms for more than a year. Baseline demographic and clinical features are summarized in Table 1.

Table 1. Baseline Demographic and Clinical Characteristics (n = 130)

Characteristic	Group I (n=65)	Group II (n=65)	Total (n=130)
Age Distribution			
<40 years	15 (23.1%)	15 (23.1%)	30 (23.1%)
40–50 years	22 (33.8%)	22 (33.8%)	44 (33.8%)
50–60 years	16 (24.6%)	16 (24.6%)	32 (24.6%)
60–70 years	8 (12.3%)	9 (13.8%)	17 (13.1%)
>70 years	4 (6.2%)	3 (4.6%)	7 (5.4%)
Gender			
Male	28 (43.1%)	27 (41.5%)	55 (42.3%)
Female	37 (56.9%)	38 (58.5%)	75 (57.7%)
BMI			
<25 kg/m ² (Normal)	40 (61.5%)	42 (64.6%)	82 (63.1%)
25–29.9 kg/m ²	18 (27.7%)	16 (24.6%)	34 (26.2%)
≥30 kg/m ² (Obese)	7 (10.8%)	7 (10.8%)	14 (10.7%)
Comorbidities			
Hypertension	15 (23.1%)	13 (20.0%)	28 (21.5%)
Diabetes Mellitus	12 (18.5%)	10 (15.4%)	22 (16.9%)
GERD-like Symptoms	25 (38.5%)	30 (46.2%)	55 (42.3%)
Symptom Duration			
<6 months	20 (30.8%)	22 (33.8%)	42 (32.3%)
6–12 months	30 (46.2%)	28 (43.1%)	58 (44.6%)
>12 months	15 (23.1%)	15 (23.1%)	30 (23.1%)

Preoperative upper gastrointestinal endoscopy was performed in all 65 patients in Group II. Significant upper GI pathology was identified in 36 patients (55.4%). GERD was the most frequent diagnosis, observed in 15 patients (23.1%). Gastritis was reported in 9 patients (13.8%),

followed by gastric ulcer and duodenitis in 4 patients each (6.2%), and duodenal ulcer in 3 patients (4.6%). One patient (1.5%) had a hiatus hernia. The remaining 29 patients (44.6%) had no detectable pathology on endoscopy. These findings are shown in Table 2.

Table 2. Upper GI Endoscopy Findings in Group II (n = 65)

Endoscopy Findings	Number (Percentage)
Total patients with upper GI endoscopy	65 (100%)
Patients with upper GI pathology	36 (55.4%)
GERD	15 (23.1%)
Gastritis	9 (13.8%)
Gastric ulcer	4 (6.2%)
Duodenitis	4 (6.2%)
Duodenal ulcer	3 (4.6%)
Hiatus hernia	1 (1.5%)
No pathology on endoscopy	29 (44.6%)

At three-month postoperative follow-up, persistent or recurrent upper gastrointestinal symptoms (dyspepsia or reflux) were reported by 35 patients (53.8%) in Group I. In contrast, only 2 patients (3.1%) in Group II experienced similar symptoms postoperatively. Both were previously

diagnosed and treated for GERD. The difference in post-cholecystectomy symptom prevalence between the groups was statistically significant ($p = 0.00001$), indicating a strong clinical benefit from preoperative endoscopic screening. Details are provided in Table 3.

Table 3. Post-Cholecystectomy Symptom Distribution (n = 130)

Group	Total Patients	With PCS Symptoms n (%)	Without PCS Symptoms n (%)	p-value
Group I (No Endoscopy)	65	35 (53.8%)	30 (46.2%)	0.00001
Group II (Endoscopy Done)	65	2 (3.1%)	63 (96.9%)	
Total	130	37 (28.5%)	93 (71.5%)	

Discussion:

This prospective observational study investigated the impact of preoperative upper gastrointestinal (UGI) endoscopy on the incidence of post-cholecystectomy syndrome (PCS) among patients undergoing laparoscopic cholecystectomy for symptomatic cholelithiasis. Our findings demonstrate that routine preoperative UGI endoscopy facilitates the identification and management of concomitant upper GI pathologies, significantly reducing the incidence of persistent postoperative symptoms.

The demographic profile of our cohort is consistent with global epidemiological trends in gallstone disease, with a predominance of middle-aged females and normal BMI, as described in prior literature[9,10]. Notably, a substantial proportion of patients (42.3%) reported GERD-like symptoms preoperatively. Similar observations were made by Berhane T et al, where GERD symptoms were as high as 76%[11].

In Group II, more than half of the patients (55.4%) had detectable upper gastrointestinal abnormalities on endoscopy, with GERD, gastritis, and peptic ulcer disease being the most commonly observed conditions. These findings are consistent with previous studies highlighting the high prevalence of non-biliary gastrointestinal disorders contributing to upper abdominal symptoms in patients with cholelithiasis [4].

Morrison et al. similarly reported that UGI endoscopy revealed abnormal pathology in 35.4% of patients scheduled for cholecystectomy. Acute gastritis was the most frequent finding (27.4%), while peptic ulcer disease was identified as the most clinically significant (4.8%). Although a hiatus hernia was detected in 12 patients, only three had active pathology. These observations further support the notion that a substantial number of patients with presumed gallstone-related symptoms may, in fact, have underlying

upper GI conditions that warrant specific medical treatment [8].

The identification and management of these pathologies before cholecystectomy likely contributed to the significant reduction in postoperative PCS symptoms in our study (3.1% in Group II vs. 53.8% in Group I), underscoring the value of comprehensive preoperative evaluation.

PCS remains a clinical challenge, with an estimated 10–40% of patients experiencing persistent or new symptoms after gallbladder removal [3]. Our study confirms that many early PCS symptoms are attributable to untreated upper GI conditions rather than biliary pathology. Early PCS is predominantly caused by non-biliary factors such as GERD, peptic ulcers, and functional disorders, and failure to recognize these may lead to misattribution of symptoms to the biliary system alone[12–15].

Preoperative endoscopic evaluation allows surgeons to differentiate these causes and initiate medical management before surgery. This multidisciplinary approach can optimize patient outcomes by reducing unnecessary postoperative investigations, decreasing patient anxiety, and minimizing the burden on healthcare resources. Additionally, early treatment of upper GI pathology may improve overall patient satisfaction and quality of life following cholecystectomy.

While laparoscopic cholecystectomy remains the gold standard for symptomatic gallstone disease, our findings suggest that selective or routine upper GI endoscopy should be considered, especially in patients presenting with atypical symptoms, reflux, or dyspepsia. This approach may be particularly valuable in geographic regions with a high prevalence of peptic ulcer disease and GERD.

Conclusion:

Routine preoperative upper gastrointestinal endoscopy in patients undergoing laparoscopic cholecystectomy helps detect upper GI pathologies that contribute to postoperative symptoms. Early diagnosis and treatment of these conditions significantly reduce the incidence of post-cholecystectomy syndrome. Incorporating UGI endoscopy, particularly in patients with reflux or dyspeptic symptoms, may improve surgical outcomes and patient satisfaction. Larger randomized trials with longer follow-up are needed to confirm these findings and guide clinical practice.

Limitations:

This study has several limitations. The sample size was relatively small and limited to 130 patients, which may affect the statistical power and generalizability of the findings. The follow-up period was restricted to three months, precluding conclusions about long-term PCS outcomes. Being a single-centre study, results may not be applicable across diverse healthcare settings. Symptom assessment was based on self-reporting, which could be influenced by recall bias or underreporting. Additionally, standardized quality-of-life instruments and objective postoperative diagnostic tools were not employed. As this was a non-randomized observational study, the possibility of selection bias exists. Nevertheless, the marked reduction in PCS symptoms in the endoscopy group highlights the need for larger, multicenter randomized controlled trials to validate these results.

List of Abbreviations

BMI – Body Mass Index
CBD – Common Bile Duct
CHF – Congestive Heart Failure
CKD – Chronic Kidney Disease
CLD – Chronic Liver Disease
COPD – Chronic Obstructive Pulmonary Disease
GERD – Gastroesophageal Reflux Disease
GI – Gastrointestinal
PCS – Post-Cholecystectomy Syndrome
UGI – Upper Gastrointestinal.

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This study did not receive any external funding. It was conducted as part of routine academic and clinical practice.

Conflict of interest

The authors declare no conflicts of interest.

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