

Original Research Article

Role of preoperative upper gastrointestinal endoscopy in patients with symptomatic cholelithiasis: a prospective study

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ABSTRACT

Background: Laparoscopic cholecystectomy is the standard treatment for symptomatic cholelithiasis. However, several upper gastrointestinal (UGI) disorders may present with symptoms similar to gallstone disease and can contribute to persistent symptoms following surgery. This study aimed to evaluate the diagnostic yield of preoperative UGI endoscopy (UGIE) in patients with symptomatic cholelithiasis and identify coexisting UGI pathologies.

Methods: A prospective observational study was conducted among patients with symptomatic cholelithiasis diagnosed by ultrasonography who underwent preoperative UGIE. Demographic data, clinical presentation, and endoscopic findings were reviewed and analyzed.

Results: Ninety patients with symptomatic cholelithiasis were included in the study. UGIE was normal in 17 (18.89%) patients, while 73 (81.11%) patients demonstrated abnormal findings. The stomach was the most commonly affected site, with gastritis being the predominant pathology. Other UGI abnormalities were also identified, indicating a substantial coexistence of gastrointestinal disorders in patients presenting with symptomatic gallstone disease.

Conclusions: A significant proportion of patients with symptomatic cholelithiasis demonstrated concomitant UGI pathology on endoscopic evaluation. Preoperative UGIE may aid in identifying coexisting gastrointestinal disorders and facilitate comprehensive management of patients presenting with symptoms attributed to gallstone disease.

Keywords: Esophagogastroduodenoscopy, Gallstone disease, Gastritis, Laparoscopic cholecystectomy, Symptomatic cholelithiasis, Upper gastrointestinal endoscopy

INTRODUCTION

Gallstones are the most common biliary pathology, remaining asymptomatic in the majority of cases.¹ Approximately 1-2% of asymptomatic patients develop symptoms annually, eventually requiring treatment.² The typical symptom is biliary colic, characterized by severe right upper quadrant or epigastric pain that may radiate to the back, shoulder, or chest, and may last from minutes to several hours. Atypical symptoms include abdominal discomfort, dyspepsia, nausea, vomiting, belching, heartburn, food intolerance, flatulence, and loss of appetite.³

Laparoscopic cholecystectomy is the gold-standard treatment for symptomatic cholelithiasis.⁴ However, the symptomatology of gallstone disease overlaps considerably with that of other UGI disorders, and some patients continue to experience symptoms even after cholecystectomy. This persistence may be due to coexisting UGI pathology that was not identified during preoperative evaluation.⁵

Therefore, to reduce the incidence of post-cholecystectomy syndrome and improve postoperative symptom relief, it may be prudent to exclude other UGI diseases before surgery. Furthermore, patients may

benefit from early diagnosis and treatment of such conditions.

UGIE is a minimally invasive procedure that allows evaluation of the oesophagus, stomach, and proximal duodenum and can be incorporated as a preoperative investigation before cholecystectomy.⁶

The aim of this study was to determine the role of preoperative UGIE in patients with symptomatic cholelithiasis. The objectives were to assess UGIE findings in patients with symptomatic cholelithiasis and evaluate the utility of routine preoperative UGIE before cholecystectomy.

METHODS

This prospective observational study was conducted in the Department of General Surgery at a tertiary care centre over a period of two years. A total of 90 consecutive adult patients with symptomatic cholelithiasis were enrolled after obtaining informed consent.

Patients presenting to the surgical outpatient department, emergency department, or inpatient wards with symptoms suggestive of gallstone disease, including right hypochondrial pain, epigastric pain, dyspepsia, nausea, vomiting, belching, heartburn, food intolerance, flatulence, or loss of appetite, were clinically evaluated. All patients underwent ultrasonographic examination of the abdomen performed by experienced radiologists, and those with single or multiple gallbladder calculi were considered eligible for enrolment.

Study type

It was a prospective observational cross-sectional study.

Study location

Study conducted at Department of General Surgery, Stanley Medical College, Chennai, Tamil Nadu, India.

Duration

Study carried out for 2 years from March 2021- March 2023.

Inclusion criteria

Patients aged 18 years or older with ultrasonographical confirmed cholelithiasis, presenting with biliary colic and/or UGI symptoms, scheduled for elective laparoscopic cholecystectomy, and willing to provide informed consent were included in the study.

Exclusion criteria

Patients younger than 18 years, those presenting with an acute abdomen requiring emergency surgery, choledocholithiasis, acute cholangitis, gallstone pancreatitis, cholecystoenteric fistula, suspected or confirmed gallbladder malignancy, a history of previous biliary, pancreatic, or UGI surgery, or those with contraindications to or refusal of UGIE were excluded from the study.

Sampling technique

Consecutive non-probability sampling was employed, and all eligible patients presenting during the study period were enrolled until the desired sample size of 90 was achieved.

As part of the study protocol, all enrolled patients underwent preoperative UGIE. Endoscopic findings were documented and analyzed to determine the prevalence of UGI pathology among patients with symptomatic cholelithiasis and to assess the association between UGI lesions and presenting symptoms.

The association between demographic and clinical variables and UGI endoscopic findings was assessed using the Chi-square test.

A p value of less than 0.05 was considered statistically significant.

Statistical analysis

The collected data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY, USA).

Descriptive statistical methods were employed to summarize the demographic, clinical, and endoscopic characteristics of the study population.

Categorical variables such as age groups, sex distribution, presenting symptoms, ultrasonographic findings, and UGIE findings were expressed as frequencies and percentages. Continuous variables, including age, were summarized using mean and standard deviation (SD).

Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test wherever appropriate.

A p value of less than 0.05 was considered statistically significant. The results were presented in the form of tables and charts to facilitate interpretation and comparison of findings.

RESULTS

The present prospective observational study was conducted in the Department of General Surgery, Stanley

Medical College, and included 90 patients with symptomatic cholelithiasis who underwent preoperative UGIE (Figure 1).

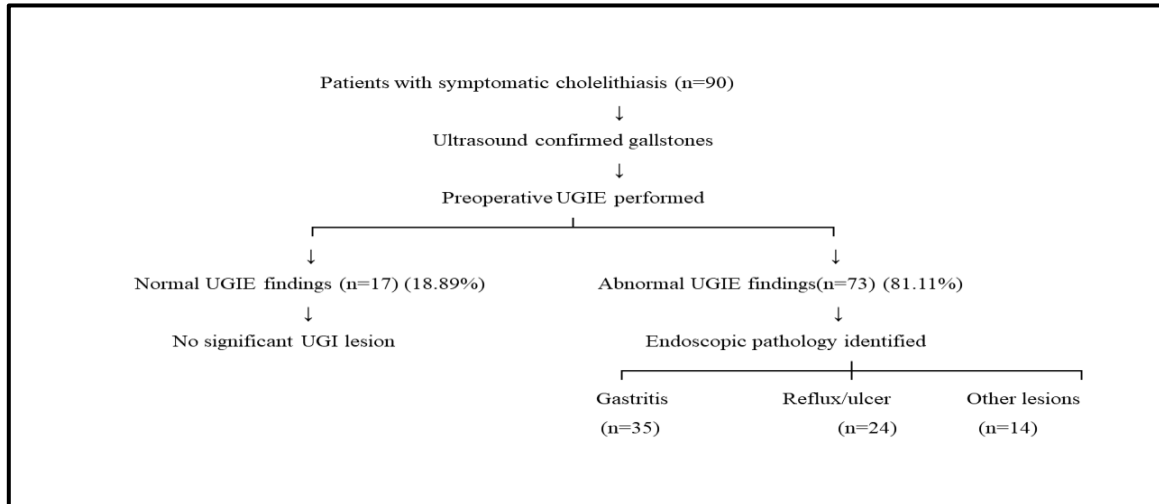


Figure 1: Study flow diagram.

Age distribution

The age of the study participants ranged from 18 to more than 65 years. The majority of patients belonged to the 35-44 years age group (36.67%) (n=33), followed by the 25-34 years age group (30.00%) (n=27) and the 45-54 years age group (23.33%) (n=21). Patients aged 55 years and above constituted a relatively small proportion of the study population. The mean age of the study population was 38.8 years (Table 1).

Gender distribution

Females constituted the majority of the study population, accounting for 68 (75.0%) patients, while males accounted for 22 (25.0%) patients, resulting in a female-to-male ratio of approximately 3:1 (Table 1).

Table 1: Age and gender distribution, (n=90).

Variables	Category	N	Percentage (%)
Age (in years)	18-24	5	5.56
	25-34	27	30.00
	35-44	33	36.67
	45-54	21	23.33
	55-64	3	3.33
	≥65	1	1.11
Gender	Female	68	75.00
	Male	22	25.00

Distribution of presenting symptoms

Abdominal pain was the most frequently reported symptom, followed by heartburn and belching. Several patients presented with more than one UGI symptom.

Therefore, the cumulative frequency of symptoms exceeded the total number of study participants (Table 2).

UGIE findings

Of the 90 patients who underwent UGIE, abnormal findings were detected in 73 (81.11%) patients, while 17 (18.89%) patients had normal endoscopic examinations. Gastritis, including pangastritis, was the most common endoscopic abnormality and was observed in 35 (38.89%) patients. Reflux esophagitis and gastric ulcer were each identified in 12 (13.33%) patients. Duodenal ulcer was noted in 7 (7.78%) patients, duodenitis in 5 (5.56%) patients, and hiatus hernia in 2 (2.22%) patients. Overall, gastric pathologies constituted the majority of endoscopic abnormalities observed in the study population (Table 2).

Overall, the study demonstrated a high prevalence of coexisting UGI pathology in patients with symptomatic cholelithiasis, with gastritis being the predominant endoscopic finding. The majority of patients were females in the fourth decade of life, and abdominal pain was the most frequent presenting symptom.

Association of demographic and clinical variables with UGIE findings

The association between demographic and clinical variables and UGIE findings were evaluated. Abnormal UGIE findings were observed more frequently among females than males and were most common in the 35-44-year age group (Table 3).

Among presenting symptoms, abdominal pain was the most frequent symptom associated with abnormal UGIE findings, followed by heartburn and belching. Patients

with nausea/vomiting, abdominal discomfort, and food intolerance also demonstrated abnormal endoscopic findings, although the distribution varied across symptom groups (Table 3).

Association between presenting symptoms and UGIE findings

The association between presenting symptoms and UGI endoscopic findings was analyzed using Chi-square test. Heartburn showed a statistically significant association with abnormal UGI endoscopic findings ($\chi^2=9.58$, $p=0.002$). Similarly, nausea and/ vomiting demonstrated a significant association with abnormal endoscopic findings ($\chi^2=9.15$, $p=0.002$). Food intolerance was also

significantly associated with abnormal UGIE findings ($\chi^2=4.50$, $p=0.034$). In contrast, abdominal pain ($\chi^2=2.00$, $p=0.157$), belching ($\chi^2=0.59$, $p=0.442$), and abdominal discomfort ($\chi^2=0.52$, $p=0.472$) did not show a statistically significant association with abnormal endoscopic findings (Table 4).

These findings indicate that dyspeptic symptoms such as heartburn, nausea/vomiting, and food intolerance are more likely to be associated with underlying UGI pathology than abdominal pain alone in patients with symptomatic cholelithiasis (Figure 2).

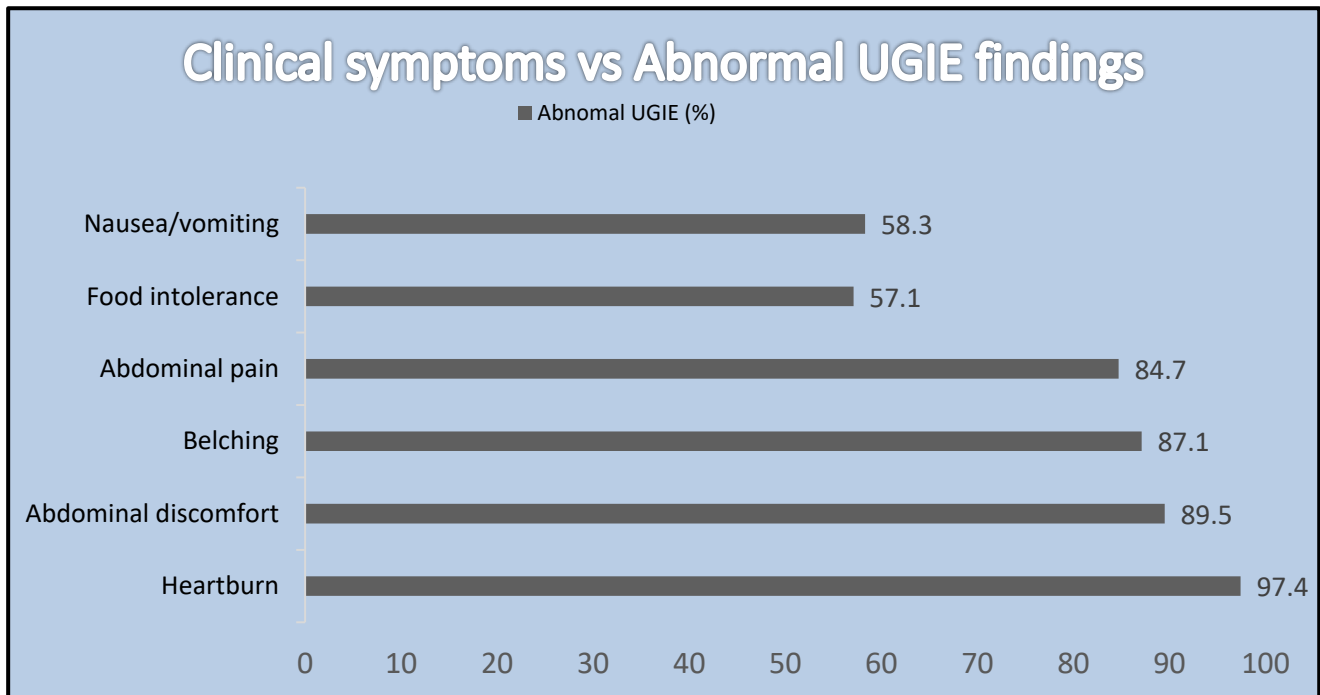


Figure 2: Clinical symptoms versus abnormal UGIE findings.

Table 2: Clinical presentation and UGIE findings, (n=90).

Variables	Category	N	Percentage (%)
Presenting symptoms*	Abdominal pain	72	80.00
	Heartburn	38	42.20
	Belching	31	34.40
	Nausea/vomiting	24	25.00
	Abdominal discomfort	19	21.10
	Food intolerance	14	15.60
Endoscopic findings	Normal	17	18.89
	Gastritis/pangastritis	35	38.89
	Duodenitis	5	5.56
	Hiatus hernia	2	2.22
	Reflux esophagitis	12	13.33
	Gastric ulcer	12	13.33
	Duodenal ulcer	7	7.78

*Multiple symptoms were reported by the several patients; therefore, cumulative frequency and percentage exceed total study population.

Table 3: Association of demographic and clinical variables with UGIE findings, (n=90).

Variables	Category	Normal UGIE	Abnormal UGIE	Total
Gender	Male	7	15	22
	Female	10	58	68
Age group (in years)	18-24	2	3	5
	25-34	9	18	27
	35-44	4	29	33
	45-54	2	19	21
	55-64	0	3	3
	≥65	0	1	1
Abdominal pain	Present	11	61	72
	Absent	6	12	18
Nausea/vomiting	Present	10	14	24
	Absent	7	59	66
Heartburn	Present	1	37	38
	Absent	16	36	52
Belching	Present	4	27	31
	Absent	13	46	59
Abdominal discomfort	Present	2	17	19
	Absent	15	56	71
Food intolerance	Present	6	8	14
	Absent	11	65	76

Table 4: Association between presenting symptoms and UGIE findings.

Symptoms	Chi-square (χ^2)	P value	Significance
Abdominal pain	2.00	0.157	Not significant
Nausea/vomiting	9.15	0.002	Significant
Heartburn	9.58	0.002	Significant
Belching	0.59	0.442	Not significant
Abdominal discomfort	0.52	0.472	Not significant
Food intolerance	4.50	0.034	Significant

DISCUSSION

Gallstone disease is one of the most common gastrointestinal disorders worldwide and represents a major indication for elective abdominal surgery. Although laparoscopic cholecystectomy remains the gold standard treatment for symptomatic cholelithiasis, UGI symptoms frequently overlap with biliary symptoms, making accurate identification of the primary pathology challenging.⁵ Consequently, the role of preoperative UGIE has gained increasing attention as a means of detecting coexisting UGI disorders that may contribute to patients' symptoms.⁶⁻⁸

In the present study, the majority of patients belonged to the 35-44-year age group (36.67%), followed by the 25-34-year age group (30%). These findings are consistent with the established epidemiology of gallstone disease, which predominantly affects adults in the third to fifth decades of life.⁹

The observed age distribution is similar to those reported in recent studies evaluating symptomatic cholelithiasis and preoperative endoscopic findings.^{6,7}

Females constituted 75% of study population, demonstrating a clear female predominance. Similar female predominance has been reported in contemporary studies evaluating role of UGIE before cholecystectomy.^{6,7,10} This finding is consistent with previous reports and reflects the recognized influence of female sex hormones on cholesterol metabolism and gallstone formation.^{9,11}

Abdominal pain was the most common presenting symptom in our study, accounting for 80%, followed by belching, heartburn, nausea and vomiting, abdominal discomfort, and food intolerance. These symptoms frequently overlap with manifestations of gastritis, gastroesophageal reflux disease, and peptic ulcer disease, making differentiation from biliary pathology difficult on clinical grounds alone.^{5,7} Several authors have emphasized that dyspeptic symptoms in patients with gallstones should not automatically be attributed to cholelithiasis, as coexisting gastrointestinal disorders are frequently present.^{5,7,12}

A major finding of the present study was the high prevalence of abnormal endoscopic findings. Only

18.89% of patients had normal UGIE results, whereas 81.11% demonstrated one or more abnormalities. This high diagnostic yield is comparable to recent prospective studies. Morrison and Mokoena reported a similarly high prevalence of UGI pathology among patients undergoing elective cholecystectomy and concluded that routine preoperative endoscopy may be justified in selected patients with symptomatic gallstones.⁵ Likewise, Kunnuru et al reported that UGIE identified clinically significant abnormalities in a substantial proportion of patients undergoing laparoscopic cholecystectomy, supporting its role in preoperative evaluation.⁶

Gastritis and pangastritis constituted the most common endoscopic findings in our study, occurring in 38.89% of patients. This observation is consistent with multiple studies that have identified gastritis as the predominant lesion detected during preoperative UGIE in patients with symptomatic cholelithiasis.^{6,7,12} Gastritis can present with epigastric pain, dyspepsia, bloating and nausea, symptoms that closely mimic those of gallstone disease. Consequently, failure to identify and treat gastritis before surgery may contribute to persistent postoperative symptoms despite technically successful cholecystectomy.^{5,6}

Reflux esophagitis and gastric ulcer were each observed in 13.33% of patients. These findings are clinically important because both conditions are well-recognized causes of upper abdominal symptoms and may significantly influence postoperative outcomes if left untreated.^{8,13} Several studies have demonstrated that appropriate medical management of reflux disease and peptic ulcer disease before surgery improves symptom control and may reduce postoperative dissatisfaction.^{5,7}

Duodenal ulcer and duodenitis were identified in 7.78% and 5.56% of patients, respectively. Recent studies have consistently demonstrated that endoscopic abnormalities are present in a majority of symptomatic cholelithiasis patients and that their detection may influence clinical management.^{12,14} Similar findings have been reported in previous studies assessing the utility of routine UGIE before cholecystectomy.^{15,16} The presence of peptic ulcer disease further highlights the overlap between biliary and gastroduodenal symptoms and reinforces the value of direct endoscopic evaluation in selected patients.

Hiatus hernia was identified in 2.22% of cases. Although relatively uncommon, hiatus hernia remains an important contributor to reflux symptoms and chronic UGI discomfort. Identification of such lesions allows targeted therapy and more accurate patient counselling regarding expected symptom resolution following surgery.⁸

The overall prevalence of abnormal UGIE findings in our study supports the growing evidence that UGI pathology commonly coexists with gallstone disease. Recent studies have consistently demonstrated that endoscopic abnormalities are present in a majority of symptomatic

cholelithiasis patients and that their detection may influence clinical management.^{7,14} Khedkar et al reported abnormal findings in over three-fourths of patients, while other investigators have documented prevalence rates ranging from 60-85%, closely paralleling our findings.^{10,15}

A significant association was observed between heartburn and abnormal UGIE findings ($p=0.002$). Similarly, nausea/vomiting ($p=0.002$) and food intolerance ($p=0.034$) were significantly associated with endoscopic 8 of 10 abnormalities. These findings suggest that patients presenting with dyspeptic symptoms are more likely to harbour coexisting UGI pathology.

In contrast, abdominal pain, belching, and abdominal discomfort did not demonstrate statistically significant associations. This finding may be explained by the nonspecific nature of these symptoms, which can occur in both gallstone disease and UGI disorders.

The clinical implications of these observations are significant. Persistent symptoms after cholecystectomy remain a recognized challenge and are frequently attributed to overlooked gastrointestinal pathology rather than persistent biliary disease.¹⁷ Identification of concomitant gastritis, reflux esophagitis, peptic ulcer disease, or duodenitis before surgery provides an opportunity for medical treatment and more appropriate patient selection for cholecystectomy. Such an approach may improve postoperative symptom resolution and reduce incidence of the post-cholecystectomy syndrome.¹⁸

Recent evidence regarding indications for cholecystectomy has further emphasized the importance of careful patient selection. Lee et al demonstrated through decision-analysis modelling that clinical outcomes are optimized when operative intervention is appropriately matched to symptomatology and disease burden.¹⁹ Similarly, Lamberts highlighted that symptom correlation remains a critical determinant of surgical benefit in gallstone disease.²⁰ These observations reinforce the value of identifying coexisting UGI pathology before surgery.

Despite these advantages, routine UGIE for all patients with symptomatic cholelithiasis remains controversial. Some authors advocate selective endoscopy, particularly in patients presenting with dyspeptic symptoms, heartburn, belching, food intolerance, or atypical abdominal pain.²⁰ Karmacharya et al demonstrated that preoperative symptoms combined with endoscopic findings may help predict which patients are most likely to benefit from cholecystectomy, thereby supporting a selective approach to endoscopic evaluation.²¹

However, given the high prevalence of abnormalities observed in the present study, the use of preoperative

UGIE appears particularly valuable in patients with symptoms suggestive of concomitant UGI disease.

The strengths of the present study include prospective data collection and systematic endoscopic evaluation of all enrolled patients. The findings contribute to the growing evidence supporting the role of UGIE in identifying coexisting UGI pathology among patients with symptomatic cholelithiasis.

However, several limitations should be acknowledged. The study was conducted at a single tertiary care center, which may limit the generalizability of the findings. Histopathological correlation and *H. pylori* testing were not performed. Additionally, long-term postoperative follow-up was not available, preventing assessment of symptom resolution following treatment of the identified lesions and subsequent cholecystectomy. Additionally, potential confounding factors such as *H. pylori* infection, smoking status, alcohol consumption, obesity, NSAID use, and diabetes mellitus were not evaluated.

CONCLUSION

This study demonstrated a high prevalence of UGI pathologies in patients with symptomatic cholelithiasis, with abnormal endoscopic findings observed in the majority of cases. Gastritis was the most common lesion identified. These findings highlight that UGI symptoms may not be solely due to gallstone disease and can coexist with other significant disorders. Preoperative UGIE may therefore be valuable, particularly in patients with dyspeptic or atypical symptoms, to optimize management and improve postoperative outcomes.

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