

## Original Research Article

# Diagnostic value of pre-operative upper GI endoscopy in gall bladder stone patients undergoing elective laparoscopic cholecystectomy

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## ABSTRACT

**Background:** Cholecystectomy does not offer all symptomatic relief in most of the patients because of an overlap in the symptomology of biliary and gasroduodenal pathologies. Thus, we aimed at evaluating the efficacy of upper gastrointestinal endoscopy (UGE) in all patients with upper abdominal pain irrespective of ultrasound findings or symptoms.

**Methods:** This prospective study was carried out from November 2015 – August 2017. Patients above 18 years, with ultrasonographically proven diagnosis of cholelithiasis, undergoing laparoscopic cholecystectomy by a single surgeon were studied. UGE was referred to all patients before surgery. Descriptive statistics was used to analyze pathological UGE findings and corresponding 95% confidence levels (CI) was calculated.

**Results:** A total of 117 patients were included in this study with a mean age of  $43.6 \pm 13.8$  years. Majority of the patients were women (59.8%) and most of them presented atypical biliary colic symptoms ( $n=64$ , 54.7%). UGE of patients with biliary colic symptoms showed that 65.8% of patients had normal endoscopy findings when compared to 34.2% of patients had positive endoscopy findings. Significantly higher proportion patients with positive UGE findings presented atypical biliary (70%,  $n=28$ ) when compared to typical biliary colic patients with positive findings (30%,  $n=12$ ;  $p<0.05$ ). Among patients being positive for UGE detected lesions, gastritis (~18%), followed by duodenal ulcer (10%) and reflux esophagitis (5%) were the common upper GI problems observed.

**Conclusions:** Pre-elective and routine use of UGE before laparoscopic cholecystectomy helps in reducing persistence of symptoms and in treatment management.

**Keywords:** Laparoscopic cholecystectomy, Upper gastrointestinal endoscopy, Cholecystectomy

## INTRODUCTION

Being the most common surgical problem, cholelithiasis is prevalent in 5-10% of population, especially among older individuals and females.<sup>1</sup> Sudden expansion of the gall bladder caused due to the pain by the obstructing stone is referred to as “Biliary Colic”, commonly occurring at right upper quadrant or epigastric region. The gold standard surgery for symptomatic cholelithiasis is laparoscopic cholecystectomy, which can be curative only whose symptoms are due to gallstones but not due to other upper GI pathologies.

Nevertheless, unjustifiable cholecystectomies can occur due to high proportion of non-specific abdominal symptoms in the people with known cholelithiasis.<sup>2,3</sup> Post ultrasound examination and detection, the clinician usually focus only at treating the gallstones and further investigations to rule out other pathologies with similar symptoms are seldom considered.<sup>3</sup> It has been documented that nearly all patients with proven gallstones are referred laparoscopic cholecystectomy whereas, 80% of the referred patients present with other abdominal symptoms.<sup>4,5</sup> Inappropriate cholecystectomies

in such a group of patients are likely to be associated with poor relief and symptomatic outcomes.<sup>6</sup>

Therefore, evaluating patients with upper GI symptoms with gall stones has still remained a challenge because surgeons cannot surely point if stones are the actual source of symptoms or if it is just an incidental finding. Thus, routine upper GI endoscopic (UGE) examination performed prior to surgery allows ruling out the presence of other upper GI complications along with diagnosis stomach cancer at an early stage. Pre-elective UGE also assists in planning treatment modality for patients with recognized cholelithiasis accordingly. Thus, this study was conducted to contribute UGI endoscopy as routine preoperative investigation and the importance of UGI endoscopy to evaluate the association between gastrointestinal symptoms with gallstones and reduce the prevalence of post cholecystectomy pain.

## METHODS

This prospective study was conducted in Ramaiah Medical College and Hospital, Bangalore. Patients visiting the outpatient department of general surgery were enrolled from November 2015 – August 2017. The study was approved by the institutional ethical review board. All patients provided signed, informed consent prior to participation.

Patients above 18 years, with ultrasonographically proven diagnosis of cholelithiasis and with symptoms (typical and atypical) were included. Patients with obstructive jaundice, cholangitis, gall stones pancreatitis, gall bladder (GB) neoplasm, previous GB or pancreatic surgery were excluded from the study.

### Sample size determination

Diettrich et al observed that the pathological findings with upper GI endoscopy for all those diagnosed with gall bladder stone disease was 31%.<sup>7</sup> To observe similar results with 95% confidence levels and with 27% relative precision, the study required a minimum of 117 subjects.

### Data collection

The data collected from the patients included personal information, presenting symptoms – typical / atypical biliary colic, findings from ultrasonography, UGE and biopsy reports if present.

Patients were categorized as typical biliary colic case if they presented constant pain that increased in severity over time, located in the epigastrium or right upper quadrant and frequently radiates to the right upper back or between the scapulae. Other symptoms of typical biliary colic were abruptly pain associated with nausea and sometimes vomiting.

## Methodology

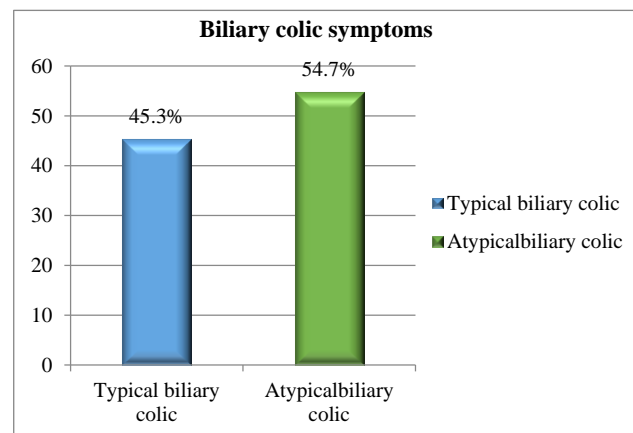
UGE was performed in the endoscopy room 1-2 days prior to surgery wherein the presence of ulcer and inflammation of gastric mucous membrane were subjected to histopathological examination. The clinical symptoms were either categorized as typical or atypical based on aforementioned characters. The endoscopic findings were later classified as normal, inflammatory, erosions, ulcers and others including carcinomas. Similar categorizations were applied for histopathological findings as well.

### Statistical analysis

Statistical analysis was performed using SPSS 16. Descriptive statistics was used to analyze pathological UGE findings and corresponding 95% confidence levels (CI) was calculated. Chi square test was used to assess association between pain type, gender and endoscopic findings.

## RESULTS

A total of 117 patients were included in this study with a mean age of  $43.6 \pm 13.8$  years. Among the enrolled patients, 46.2% were in the age group of 31-45 years. It was seen that majority of the patients were women (n=70, 59.8%) and 40.2% (n=47) were men.



**Figure 1: Distribution of biliary colic symptoms among patients.**

Majority of the study patients presented atypical biliary colic symptoms (n=64, 54.7%) whereas 45.3% (n=53) of them presented typical biliary colic symptoms (Figure 1). The UGE of patients with biliary colic symptoms showed that 65.8% (n=77) of the patients had normal endoscopy findings when compared to 34.2% (n=40) of patients with positive endoscopy findings. Significantly higher proportion of patients with positive UGE findings presented atypical biliary (70%, n=28) when compared to typical biliary colic patients with positive findings (30%, n=12;  $p < 0.05$ ).

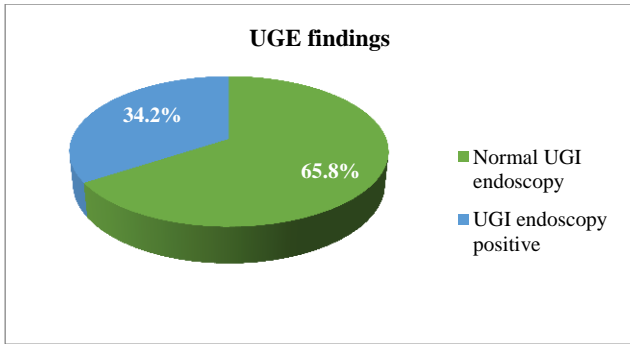


Figure 2: Distribution of UGE findings.

Table 1: Relationship between biliary colic and upper GI endoscopy findings.

Biliary colic symptoms	UGE findings		Total	P value
	Normal	Positive		
<b>Typical biliary colic</b>	41 (77.4)	12 (22.6)	53 (100)	0.013
<b>Atypical biliary colic</b>	36 (56.2)	28 (43.8)	64 (100)	
<b>Total</b>	77 (65.8)	40 (34.2)	117 (100)	

$\chi^2=5.741$ ,  $df=1$ .

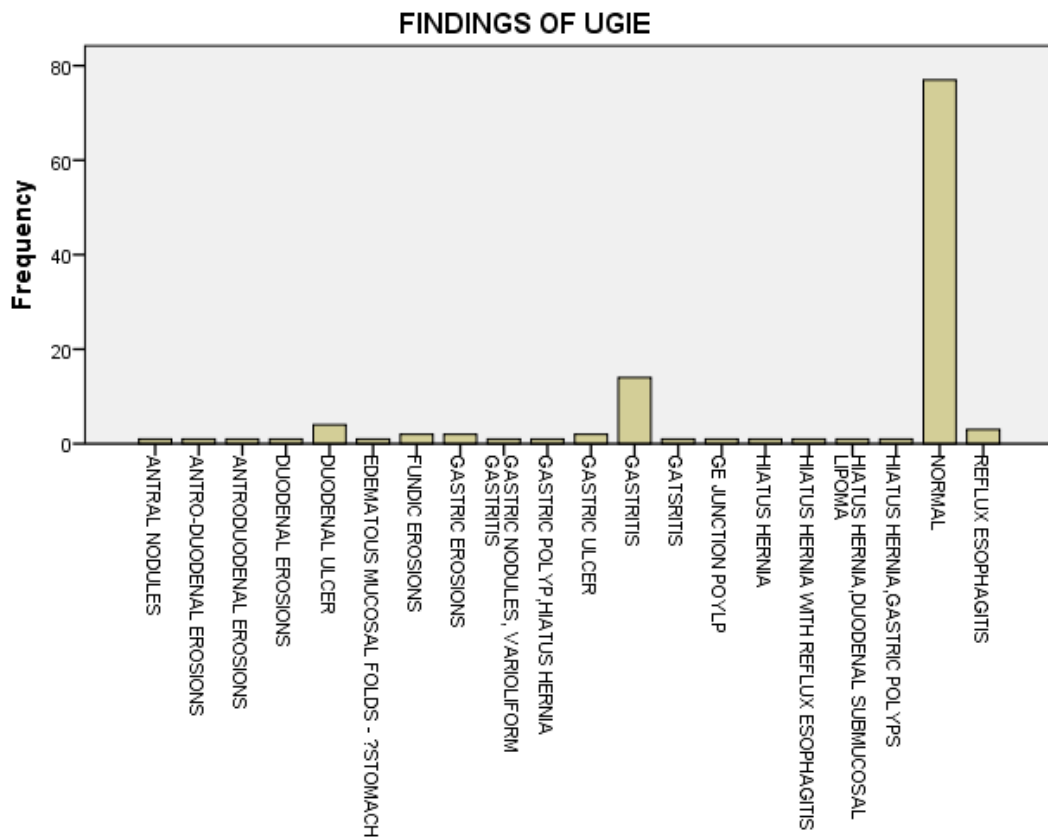


Figure 3: Pathological findings from UGE.

Among 40 patients who were positive for upper GI lesions, 28 (43.8%) of them had atypical and 12 (22.6%) had typical biliary colic symptoms. In comparison, among 77 normal UGE findings patients, 41 (77.4%) patients had typical biliary colic and 36 (56.2%) patients had atypical symptoms. This difference was statistically significant ( $p=0.013$ , Table 1).

Majority of the patients were found to be normal (~80%), with rest being positive for UGE detected lesions. Among them, majority of them were found to have gastritis (~18%), followed by duodenal ulcer (10%) and reflux esophagitis (5%) (Figure 3).

Among 117 study subjects, typical biliary symptoms was seen in 31 (44.3%) females and 22 (46.8%) males whereas atypical biliary symptoms was seen in 39 (55.7%) females and 25 (53.2%) males. However, the difference in sex distribution of biliary colic symptoms was not statistically significant ( $p=0.468$ , Table 2).

Distribution of biliary colic symptoms based on age is shown in Table 3. Incidence of typical biliary colic was higher among younger age group (63.2%) compared to atypical biliary colic which was common in older age group (66.7%). No association was seen between age and symptoms of biliary colic.

**Table 2: Sex based distribution of patients with symptoms of biliary colic.**

	Typical biliary colic	Atypical biliary colic	Total	P value
	N (%)	N (%)	N (%)	
<b>Male</b>	22 (46.8)	25 (53.2)	47 (100.0)	0.468
<b>Female</b>	31 (44.3)	39 (55.7)	70 (100.0)	
<b>Total</b>	53 (45.3)	64 (54.7)	117 (100.0)	

**Table 3: Age wise distribution of biliary colic symptoms.**

Age in years	Biliary colic symptoms		Total	P value
	Typical biliary colic	Atypical biliary colic		
	N (%)	N (%)	N (%)	
<b>16-30</b>	12 (63.2)	7 (36.8)	19 (100.0)	0.487
<b>31-45</b>	24 (44.4)	50 (55.6)	54 (100.0)	
<b>46-60</b>	11 (42.3)	15 (57.7)	26 (100.0)	
<b>61-75</b>	6 (33.3)	12 (66.7)	18 (100.0)	
<b>Total</b>	53 (45.3)	64 (54.7)	117 (100.0)	

It was seen that younger age group (73.7%) had normal UGI endoscopy findings when compared to positive endoscopy findings, which was mostly seen in age group of 46-60 years (66.7%). No association between age and UGE findings was observed.

## DISCUSSION

Majority of patients with complaints of chronic abdominal pain undergo ultrasound examination which has in recent times emerged as a routine and inexpensive diagnostic technique. Post examination, gall stones remain the main focus of treatment for surgeons and almost all patients with proven gall stones are referred to undergo laparoscopic cholecystectomy, a common and a safe procedure. In these scenarios, further investigations to rule out other pathologies causing similar symptoms are seldom considered. Nonetheless, owing to the fact that high proportion of non-specific abdominal symptoms in patients with known gallstones may lead to unjustifiable cholecystectomies, ruling out other causes of pain prior to laparoscopic cholecystectomy will not only decrease persistence of symptoms but can also be helpful in detecting gastroduodenal pathologies at an early stage.<sup>2,8</sup>

Findings from the current study has also re-emphasized on preferred use of pre-elective UGE prior to cholecystectomy. A total of 117 patients were studied, mostly in the age group of 31-45 years. Females constituted 59.8% of the overall study patients and 40.2% were males, a common trend observed in other studies.

It was seen that majority of the study patients presented with atypical biliary colic (54.7%) with 40 patients (34.2%) having positive upper GI lesions. Comparatively, normal UGE was seen in 77.4% of patients with typical biliary colic and 56.2% being atypically symptomatic patients and was statistically significant ( $p=0.013$ ). These

observations may hint at possibilities of UGE being abnormal / yielding positive findings in patients having gallstones with atypical symptoms. In agreement, (11) normal UGI findings were seen in patients with typical pain reinforcing the fact that patients with typical abdominal pain, the likelihood of presenting with coexisting upper gastrointestinal lesion is lower.

Role of preoperative endoscopy of upper GI tract in patients undergoing cholecystectomy has been recommended by prior studies. Similar to our findings, Diettrich et al, found abnormal upper GI lesions in 31 patients.<sup>8</sup> Schwenk et al also reported an incidence of 30.2% (345 patients) with abnormal UGI.<sup>9</sup> 1064/ 1143 (93.1%) patients underwent oesophagogastroduodenoscopy (OGD) and 30.2% (345 patients) had pathological findings (12). Of these, 68.3% were inflammatory in nature. 28 patients (2.5%) underwent additional GI surgical procedures along with cholecystectomy and bile duct exploration. 227 (19.8%) underwent pharmacological treatment of the GI disease after their biliary surgery.

Another study reported that among patients who underwent a pre-operative OGD and treatment for positive findings, only 2 (3.3%) had recurrence of symptoms at six months.<sup>10</sup> On the other hand, patients without prior OGD showed persistent symptoms (32.78%), thereby suggesting that one third of patients who undergo cholecystectomy without prior OGD remain symptomatic.<sup>10</sup> Sosada et al has studied on 2800 patients in which there were 1187 (42%) patients with pathological findings.<sup>11</sup>

Apart from the established diagnostic value of pre-elective UGE for cholelithiasis, studies have also aimed at understanding other pathologic changes which may have been overlooked. In the current study, UGE results showed that majority of the patients were normal (~75%)

whilst the rest being positive for UGE detected lesions. Among them, majority of them had gastritis (~18%), followed by duodenal ulcer (10%) and reflux esophagitis (5%). Our data is in line with other studies wherein gastritis was the common problem detected by an UGE (14) followed by peptic ulcer and hiatus hernia. In studies by Faisal et al, and Mozafar et al, 77.2% and 83% of patients with atypical pain had abnormal OGD observation.<sup>12,13</sup> This establishes the importance of UGE prior to elective cholecystectomy especially with atypical pain.

These findings may plausibly explain the reason for persistent pain despite successful surgery in few patients. Patients received surgical therapy for symptomatic cholelithiasis, even while significant inflammation of the gastric or duodenal mucous membrane was seen in current and other studies.<sup>14-16</sup> This suggests that gastroscopy need not necessarily correlate with clinical symptoms and that a UGE findings can surely influence treatment management, posing a strong argument for routinely performed UGE before planned cholecystectomy.

Additionally, we also observed that the prevalence of typical biliary colic was high (63.2%) among the younger age group compared to atypical symptoms of 36.8% (16-30 years), whereas atypical biliary colic (66.7%) was seen in the older age group (61-75 years) compared to typical symptoms of 33.3% in the same group.

In summary, the routine use of UGE before laparoscopic cholecystectomy in the presence of proven gallstones may result in change of the management plan due to detection of other pathologies such as gastritis, peptic ulcer disease or hiatus hernia, thereby reducing postoperative persistence of symptoms. In our study routine use of UGE resulted in detection of other coexisting pathologies in about 25% of patients. This study highlights the diagnostic value of UGE as a routine investigation before laparoscopic cholecystectomy especially in those selected group of patients, who do present with overlapping upper GI symptoms. We also hypothesize that routine use of UGE before laparoscopic cholecystectomy will help reduce postoperative persistence of symptoms and may reduce overall cholecystectomy rates. Such an elective planning would also be clinically and economically beneficial.

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