

ROLE OF UPPER GI ENDOSCOPY IN PATIENTS UNDERGOING CHOLECYSTECTOMY IN PREDICTING POST-CHOLECYSTECTOMY SYNDROME

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Abstract

Introduction: Cholelithiasis is a common gastrointestinal disorder frequently managed through laparoscopic cholecystectomy. Although it is effective in the management of cholelithiasis, the majority of patients, 10–40%, may still suffer from symptoms referred to as post-cholecystectomy syndrome (PCS). A significant number of these symptoms are associated with the undetected extra-biliary gastrointestinal pathologies. The purpose of this study was to examine the role of preoperative upper gastrointestinal endoscopy (UGE) in anticipating PCS in patients with cholelithiasis before cholecystectomy.

Methodology: A descriptive case series was carried out at Mayo Hospital in Lahore between November 2024 and April 2025. Sixty-five adult patients diagnosed with symptomatic cholelithiasis received preoperative UGE and were divided into two categories: Group A (normal UGE results) and Group B (positive UGE results). All participants subsequently underwent laparoscopic cholecystectomy and were monitored for six weeks to evaluate symptoms of PCS. Data analysis was performed using SPSS version 27, with statistical significance defined as $p < 0.05$.

Results: Of 65 patients, 36 were assigned to Group A and 29 to Group B. The incidence of PCS was higher in Group B than in Group A (37.9% vs 13.9%, $p = 0.025$). The predominant endoscopic findings included peptic ulcers (12.1%) and gastritis (9.1%). The most frequently reported PCS symptoms were abdominal pain (50%) and heartburn (37.5%). Among PCS patients, 25% had peptic ulcers and 18.7% had gastritis.

Conclusion: Preoperative UGE can effectively predict the probability of PCS by recognizing and managing concurrent upper gastrointestinal conditions. Routine UGE may improve postoperative outcomes and patient satisfaction by guiding comprehensive preoperative management.

Introduction:

Cholelithiasis is one of the most common gastrointestinal disorders worldwide and a frequent cause of right upper quadrant

abdominal pain. Laparoscopic cholecystectomy is the preferred surgical treatment for cholelithiasis. (1) Even though cholecystectomy is effective in 90% of cases, some patients

continue to experience gastrointestinal symptoms even after surgical intervention, termed as postcholecystectomy syndrome (PCS). (2) PCS is characterized by a group of heterogeneous symptoms, such as dyspepsia, jaundice, and abdominal pain, especially in the right hypochondrium. The symptoms can occur from 2 days to 25 years post-cholecystectomy, with the incidence staggering from 10% to 40%.

(3)

Womack and Crider characterized PCS for the first time in 1947 as "the presence of symptoms after cholecystectomy." (4) PCS is either the persistence of symptoms induced by cholelithiasis before cholecystectomy or the development of new symptoms after the surgery. The majority of patients could have been suffering from extra-biliary or other organic disorders that may have been present prior to cholecystectomy. Etiology of PCS could be broadly classified as biliary, extra-biliary, organic, and functional. (5) Biliary causes of PCS include retained calculi, bile leak, sphincter of Oddi dysfunction, remnant of cystic duct, and stenosis. (6) Extra-biliary causes contribute to the development and exacerbations of PCS. The most common causes of PCS are extra-biliary, such as reflex esophagitis, peptic ulcer disease, irritable bowel syndrome, or chronic pancreatitis. (4) Early identification of these pathologies could have a significant role in the prediction and prevention of PCS.

Upper gastrointestinal endoscopy (UGE) serves as a reliable and minimally invasive diagnostic procedure for identifying mucosal pathologies in the esophagus, stomach, and duodenum. (3) Patients with positive UGE findings had a significantly higher percentage of development of atypical biliary symptoms. (7) Despite the diagnostic importance of UGE in the diagnosis of gastrointestinal mucosal diseases, it is not routinely employed. The usage of UGE as a routine procedure before laparoscopic cholecystectomy in patients with confirmed gallstones may lead to a modification in the management plan by identifying additional pathologies and could reduce the persistence of symptoms after cholecystectomy.

There is insufficient regional data and a lack of clinical consensus on the predictive efficacy of preoperative UGE concerning post-cholecystectomy syndrome. Therefore, this study

was conducted to explore the role of UGE in predicting post-cholecystectomy syndrome among patients undergoing laparoscopic cholecystectomy. The aim is to evaluate whether the detection and management of pre-existing upper GI disorders can lead to a reduction in the frequency of post-cholecystectomy syndrome and ultimately improve patient outcomes.

Methodology

Study Design and Setting: A descriptive case series was conducted at the Department of Surgery, Mayo Hospital, Lahore, Pakistan, from November 2024 to April 2025. Patients of both genders aged above 18 years presenting with right hypochondrium pain and confirmed clinical and radiological diagnosis of cholelithiasis undergoing laparoscopic cholecystectomy were included in the study. Patients with obstructive jaundice, gallstones, pancreatitis, cholangitis, carcinoma of the gallbladder, and a previous history of gallbladder or pancreatic surgery were excluded.

Sample Size: A sample of 65 patients in each group was included, with a 95% confidence interval, a 12% margin of error, and a 34.2% incidence of upper gastrointestinal (UGI) pathologies in cholelithiasis patients. (8)

Ethical Consideration: Informed consent was acquired from all the participants before inclusion in the study. The benefits and side effects of all the interventions were fully explained. Personal information was not recorded to keep the anonymity of the participants. The ethical approval of the study was acquired from the College of Physicians and Surgeons, Pakistan.

Data Collection: Non-probability, a consecutive sampling technique was used to recruit the participants fulfilling the inclusion criteria, presenting at the outdoor patient department, Mayo Hospital, Lahore. Demographic information of the patients as age, gender, and BMI were recorded. All the participants underwent upper gastrointestinal endoscopy 1-2 days prior to laparoscopic cholecystectomy under local anesthesia, and the gastrointestinal pathologies, such as mucosal inflammation, hernia, ulcer, and polyps, were documented.

Participants with normal endoscopy were included in Group A, and patients with positive findings were included in Group B. Later on, all the participants had laparoscopic cholecystectomy under general anesthesia. Post-operatively, all the patients were given intravenous analgesia using inj. Paracetamol 1g 8 hourly and inj. Ketorolac 30mg as per the demand of the patient. Patients were discharged after 2 days on oral antibiotics (tab. Co-amoxiclav 1g 12 hourly), oral analgesics (tab. Diclofenac sodium 50mg 12 hourly), and PPI (cap. Omeprazole 40mg 24hourly) for 5 days. All patients were advised regarding lifestyle modification and wound care. Patients were followed at the intervals of 1st, 4th, and 6th week. Patients were assessed for symptoms of post-cholecystectomy syndrome, such as fatty food indigestion, heartburn, nausea, vomiting, bloating, flatulence, diarrhea, intermittent episodes of jaundice, or abdominal pain on every follow-up by the trained postgraduate residents, and they will be blinded to group allocation of

patients. All data was recorded on a pre-designed proforma.

Data Analysis

Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 27. Quantitative variables, such as age and BMI, were presented as mean $\pm$ standard deviation. Qualitative variables, such as gender, upper gastrointestinal pathologies, and PCS, were presented as frequency and percentage. PCS was compared between the two groups using the chi-square test. A p -value < 0.05 was considered statistically significant.

Results

A total of 65 patients with cholelithiasis were included, with 36 in group A and 29 in group B. The mean age and BMI were 38.49 ± 8.77 years and 27.91 ± 5.09 kg/m², respectively. The majority of participants were female, with a male-to-female ratio of 1:1.7. (Table 1)

Table 1: Demographics of the participants

Variables	Group A (N = 36)	Group B (N = 29)	Overall (N = 65)
Age (Years)	38.16 ± 9.05	38.89 ± 8.55	38.49 ± 8.77
BMI (kg/m ²)	27.61 ± 5.13	28.28 ± 5.11	27.91 ± 5.09
Gender			
Male	13 (36.1%)	11 (37.9%)	24 (36.9%)
Female	23 (63.9%)	18 (62.1%)	41 (63.1%)

The most common UGI endoscopic findings were peptic ulcer (12.1%), gastritis (9.1%), and polyp (6.1%). Hiatal hernia was the least common finding on endoscopy (3.0%). (Table 2)

Table 2: Upper gastrointestinal endoscopy findings in Group A (N = 29)

UGI Endoscopy finding	Frequency (Percentage)
Peptic ulcer	8 (12.1%)
Gastritis	6 (9.1%)
Polyp	4 (6.1%)
Gastric ulcer	3 (4.5%)
Esophagitis	3 (4.5%)
Barret's oesophagus	3 (4.5%)
Hiatal hernia	2 (3.0%)

Only 24.6% of all the cholecystectomy patients had PCS. The incidence of PCS in Group B (37.9%) was higher than in Group A (13.9%), with statistical significance as $p = 0.025$. (Table 3)

Table 3: Correlation of PCS with Group A and Group B

PCS	Groups		Pearson Correlation	p-value
	A	B		
Yes	5 (13.9%)	11 (37.9%)	5.003	0.025
No	31 (86.1%)	18 (62.1%)		

The most common symptoms of PCS were abdominal pain (50.0%) and heartburn (37.5%). The least common symptoms were diarrhea (25.0%) and jaundice (12.5%). (Table 4)

Table 4: PCS Symptoms in patients (N = 16)

PCS Symptoms	Frequency (Percentage)
Abdominal pain	8 (50.0%)
Heartburn	6 (37.5%)
Fatty food indigestion	5 (31.3%)
Flatulence	5 (25.0%)
Bloating	5 (31.3%)
Diarrhea	4 (25.0%)
Jaundice	2 (12.5%)

Peptic ulcer (25.0%) and gastritis (12.5%) were the most common pathologies found on UGI endoscopy in PCS patients. (Table 5)

Table 5: Upper Gastrointestinal Endoscopy Findings in PCS patients (N = 16)

UGI Endoscopy finding	Frequency (Percentage)
Peptic ulcer	4 (25.0%)
Gastritis	3 (18.7%)
Polyp	2 (12.5%)
Gastric ulcer	1 (6.3%)
Hiatal hernia	1 (5.9%)
Normal UGI endoscopy	5 (31.3%)

Discussion

Post-cholecystectomy syndrome is a well-established condition with a broad range of incidence. The persistence or onset of gastrointestinal symptoms post-cholecystectomy may be due to unrecognized underlying conditions, which can be either biliary or extra-biliary. Extra-biliary causes are often significant but are usually overlooked during diagnosis. This study evaluated the predictive role of UGE in recognizing PCS among individuals undergoing laparoscopic cholecystectomy for symptomatic cholelithiasis.

The overall incidence rate of PCS was 24.6%. Khatana et al. found that 185.6% of patients undergoing laparoscopic cholecystectomy had PCS. 52.95% had extra-biliary causes of PCS, and 47.05% had biliary disease responsible for PCS. (9) The results in our study demonstrated a higher prevalence of PCS in patients with

pathological findings on preoperative UGE compared to those with normal findings (37.9% vs. 13.9%; $p = 0.025$). Paul et al. reported the role of preoperative UGE in cholelithiasis. UGE revealed gastrointestinal pathologies in 24% of patients presenting with typical symptoms of biliary colic, while 81% of patients with atypical biliary symptoms had upper gastrointestinal pathologies. (10) Similarly, Srikantaiah and Manjappa reported that patients with positive findings on UGE had a higher incidence rate of atypical biliary presentations (70%, $n=28$) compared to those with typical biliary colic (30%, $n=12$; $p<0.05$). (7) These results emphasize the importance of routine preoperative endoscopic evaluation in enhancing the postoperative outcome of cholecystectomy. Positive findings on UGE indicate a higher probability of persistence of symptoms in cholelithiasis patients after the

surgical resection of the gallbladder. UGI pathology should be managed along with the surgical intervention for the symptom resolution of the patients.

The most common UGI pathology in PCS patients was peptic ulcer (25.0%), followed by gastritis (18.7%). Saleem et al. reported that the causes of PCS were biliary tract disorders (7.3%), peptic ulcer disease (4%), and chronic pancreatitis (2.9%). (3) Morrison and Mokena found that in symptomatic cholelithiasis patients, 35.4% had pathological UGE findings, and the most common findings were acute gastritis (27.4%) and peptic ulcers (4.8%). (11) Khedar et al. indicated that gastritis (72.5%), followed by esophagitis (55.0%), and hiatus hernia (16.5%) were common findings in cholelithiasis patients on UGE. (12) The clinical presentation of symptomatic gallstones can often resemble that of various other foregut or upper gastrointestinal disorders. As a result, numerous patients may be subjected to cholecystectomy, which is the preferred treatment for symptomatic gallstone disease, even when their symptoms stem from an alternative upper gastrointestinal condition. (13,14) Patients may still suffer from upper gastrointestinal symptoms following a successful and uncomplicated cholecystectomy, usually referred to as PCS. Although there are alternative explanations for this syndrome, the majority of related upper gastrointestinal conditions can be promptly diagnosed via UGI endoscopy and treated appropriately before proceeding with elective cholecystectomy. Consequently, the cholecystectomy may be avoided in these situations. (15,16)

The most common presenting complaints of PCS patients were abdominal pain (50.0%) and heartburn (37.5%). Karmacharya et al. reported that the commonest PCS symptoms were heartburn (10%), abdominal pain (9%), and dyspepsia (7%). (17) Similarly, Malik et al. reported that in PCS patients, abdominal pain was the most prevalent symptom, impacting 99% of patients. Other notable symptoms included epigastric burning (32%), early satiety (17%), and a sensation of bloating (12%). (18) The increased occurrence of simultaneous upper gastrointestinal issues in patients with gallstones and atypical abdominal pain can significantly impact treatment strategies before elective

cholecystectomy, thereby enhancing postoperative outcomes.

Limitations

The sample size was limited and obtained from only a single tertiary care hospital, which may restrict the generalizability of the results to wider populations. The non-probability, consecutive sampling approach could have introduced selection bias. Furthermore, the follow-up period was limited to six weeks following surgery, which may not adequately diagnose the late-onset cases of PCS. In addition, confounding elements such as dietary habits, psychosocial stressors, and existing functional gastrointestinal disorders were not controlled for, potentially impacting the occurrence of PCS.

Conclusion

Patients with pathological findings on UGI endoscopy had a higher rate of PCS, with peptic and gastric ulcers being the most frequently observed pathologies in PCS patients. This emphasizes the critical role of routine preoperative UGI endoscopy in patients suffering from symptomatic cholelithiasis in diagnosing and managing any existing gastrointestinal disorders that might exacerbate postoperative symptoms. Prompt detection and appropriate management of these pathologies could potentially decrease the rate of postoperative complications and improve overall patient outcomes. Patients with positive endoscopic results should be closely observed in the postoperative period to ensure prompt identification and intervention for PCS. Moreover, further large-scale research is essential to create standardized guidelines for screening and management aimed at improving surgical results.

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