Role of upper gastrointestinal endoscopy prior to cholecystectomy to assess the postoperative outcome

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ABSTRACT
The aim of the study is to identify UGI pathologies in patients with cholelithiasis and association of these pathologies with a relief of symptoms in cholecystectomy patients. The study was conducted in 150 patients, who attended the surgical outpatient block or referred to our department from other departments and also known case of cholelithiasis by imaging studies. They were divided into a typical or atypical group based on their symptomatic presentation. UGI scopy was done on these groups, 2 days prior to surgery. Postoperatively patients were followed up on 7th, 21st and 42nd day and pain if any was assessed by NRS scaling method. Following results were noted. A female preponderance was seen (96 (64%)). Determining on age, 51 % of cases were seen among 31-50 years. UGI scopy revealed UGI pathologies in 22 among 92 (24%) patients who had typical symptoms of biliary colic, while 47 of 58 (81%) atypical presentations had UGI pathologies. The most common UGI pathology was gastritis and duodenitis (42 of 69 (61%)). Medical management was initiated for these pathologies prior to surgery. Postoperatively on 7th day 114 (76%) had no symptoms and 36 (24%) were symptomatic, of which 25 (69.4%) of them were UGI Positive preoperatively. Medical Management for their Gastrointestinal pathologies was continued and reviewed on 21st day of surgery which showed symptom relief in 31 of 36 patients (86.1%) and relief of symptoms in remaining 5 by 42nd day of surgery. Hence, this study recommend preoperative UGI scopy in cholelithiasis, which will help in postoperative management.

INTRODUCTION
The word cholelithiasis derived from 3 Greek words that are chol, lith and iasis, which means bile, stone and process respectively. It is one of the commonest presentations of abdominal discomfort that is presented in the emergency department worldwide (Hung et al., 2011). The difference in the prevalence is seen not only between countries but also between ethnic groups, age and gender (Shaffer, 2005). Gallstones are found in both sexes in an equal ratio until puberty and thereafter, there is an increase in the prevalence of gallstone noted in females more than males as the age advances. After menopause, the incidence of cholelithiasis is almost equal in both age groups and as age advances with a marked narrowing of the age gap (Barbara et al., 1987). Cholelithiasis occurs commonly in the Western population (Attili et al., 1995; Loria et al., 1994). In Asia, the prevalence of the gallstone dis-
ease was found to be 5-10% of the population, especially among the older age group and the females. Its prevalence in India was 6.12% and was mainly among the adult age group.

Most gallstones are silent and usually does not present any symptoms, which makes its diagnosis incidental while doing imaging for other pathologies or laparotomy. To become symptomatic, it must obstruct a visceral structure, such as the cystic duct. The intake of calories, fats, and proteins affects the cholesterol saturation of the bile and hence diet is an important factor that determines gall stone formation (Sachdeva et al., 2011). Along with diet, some added risk factors that contribute for the development of gallstones are obesity, female gender, geriatric age group, increased intake of chickpeas, oral contraceptive pills, sedentary lifestyle, and a family history of gallstones (Hung et al., 2011; Zamani et al., 2014; Bilal et al., 2016). Risk factors for biliary sludge include pregnancy, drugs like ceftriaxone, octreotide and thiazide diuretics, and total parenteral nutrition or fasting.

Diseases like cirrhosis, chronic hemolysis and ileal Crohn’s disease are risk factors for black pigment stones. Gallstone disease in childhood, which was considered rare, has increased, with similar risk factors as those in adults, particularly obesity. Low-calorie diets and rapid weight loss are also associated with cholesterol-rich gallstones (Dhamnetiya et al., 2019).

LC is one of the most commonly performed abdominal surgery for the management of patients with symptomatic gallstones. But a high proportion of non-specific abdominal symptoms in cholelithiasis may lead to unjustifiable outcomes in patients after cholecystectomy, as these symptoms may persist postoperatively—those patients whose symptoms persisted after cholecystectomy were often associated with illnesses unrelated to gallstones (Unisa et al., 2011). The probable reason for this was, less focus made on selecting the patients and in differentiating typical symptoms or common symptoms in order to study the symptoms during the postoperative period.

The incidence of asymptomatic gallstones has been understood recently, largely due to the application of ultrasonographic scanning of people for other reasons. The natural history of asymptomatic gallstones suggests that a large number of affected patients do remain symptomatically free for a longer period in life; and complications or symptomatic presentation was noted only in 1 – 4% per year. It is to be noted that almost 10% of them presented symptomatically within 5 years after the initial diagnosis and 20% of them in 20 years after the diagnosis (Unisa et al., 2011). There is always a period of symptomatic presentation before developing complications.

Coexistence of associated UGI pathologies with gallstones was also seen to contribute to the post cholecystectomy syndrome. It is often challenging to identify whether the UGI symptoms presented in a patient with cholelithiasis is due to the gall stones or the associated UGI pathologies. Differentiating this is an important factor as the gallstones may be an incidental finding and patient may have persistence of symptoms in the postoperative period.

MATERIALS AND METHODS

This prospective observational study was conducted in the department of general surgery at our institute. 150 patients were recruited in this study who had attended to the outpatient, emergency department and also referred from other departments. Patients were divided into 2 groups based on symptoms as typical and atypical. The study included patients of both sexes of age more than 18 years and those who had either single stone or multiple stones in the GB as per ultrasound finding and are willing for surgery. We excluded patients of age less than 18 years, those who had an acute abdomen, those with acalculous cholecystitis and those patients whose general condition was not stable and not willing for endoscopy and surgery.

An informed and written consent was taken from the patients and also a risk of conversion to open surgery was well explained. UGI endoscopy was done on 1 or 2 days prior to the proposed date of surgery. If found to have UGI pathologies, patients were started on appropriate medical management. Patients were informed regarding the UGI findings and all possible methods of medical management and those willing for cholecystectomy were included in this study. LC was attempted in a majority of the patients. All patients received prophylactic antibiotics and were operated under general anaesthesia.

The patients were followed up postoperatively and the pain was assessed by NRS scaling score at 7th day, 21st day and end of 6th week of POD to evaluate the presence of any UGI symptoms.

RESULTS AND DISCUSSION

This study has been carried out in our institute between the month of February 2018 to August 2020 and all 150 cases were studied. The incidence of cholelithiasis was highest among the age group of 40-50 years, showing 29.4 % and mean age of 48.4
years (Table 1 & Figure 1). A study by Karmacharya et al., showed the age group ranged between 20 – 75 years and the mean age was 40.3 years (Karmacharya et al., 2015). According to various studies held in India, the mean age of cholelithiasis at the time of presentation found to be 40.6 years (Nagaraj et al., 2012; Gaharwar, 2013). As the age increases, the rate of gallstone formation also increases which is mainly due to an increase in the amount of cholesterol in the bile due to dyslipoproteinemia. This change was noted beyond 20-30 years of age and it stays true with our present study as well. Dyslipoproteinemia causes an increase in the cholesterol excretion in the bile. Similarly, there is also a decrease in the synthesis of bile acid due to a decrease in the formation of enzyme cholesterol 7 alpha-hydroxylase. The decrease in the hemoperfusion on the wall of the GB due to some sclerotic changes along with age is also another factor that leads to cholelithiasis (Bergman et al., 2011; Grigorieva, 2007).

Table 1: Distribution depending on age

| Age   | Frequency | Percent |
|-------|-----------|---------|
| 21-30 | 11        | 7.4     |
| 31-40 | 33        | 22.2    |
| 41-50 | 44        | 29.4    |
| 51-60 | 28        | 18.7    |
| > 60  | 34        | 22.7    |
| Total | 150       | 100     |

Figure 1: Pie Chart depicting the age distribution

In the present study, 54 (36%) patients were males and 96 (46%) patients were females. Male to female ratio is 1:1.8 and was not statistically significant.

The symptoms of gallstone disease can be varied from nonspecific symptoms to even an acute medical emergency. The present study showed that right hypochondrial pain was the most common symptom (Table 2) noticed in 69 % of patients followed by nausea and vomiting seen in 55.3% of patients. A study of 80 patients by Khedkar et al., found that most common symptoms were a pain in the abdomen was seen in 80 (100%) patients and nausea and vomiting were found in only 57 (71.2 %) of them (Khedkar et al., 2017).

Table 2: Percentage of symptoms

| Symptoms                | Frequency | Percent |
|-------------------------|-----------|---------|
| Right hypochondrial Pain| 103       | 68.7    |
| Nausea & Vomiting       | 83        | 55.3    |
| Right Shoulder Pain     | 63        | 42      |
| Pain After Fatty Meal   | 49        | 32.7    |
| Epigastric Pain         | 18        | 12      |
| Belching                | 33        | 22      |
| Diffuse Abdominal Pain  | 32        | 21.3    |
| Dyspepsia               | 22        | 14.7    |

In the present study, out of 150 patients, abnormal UGI endoscopic findings were present in 69 (46%) patients who are statistically significant. The most common gastric pathology in UGI endoscopy was found to be gastritis 28 (40.3%) out of 69 patients and other common pathologies were duodenitis and esophagitis (Table 3).

In the present study, the nature of pain and symptoms assessed and was divided into typical and atypical symptoms. Preoperative UGI endoscopy was done. Out of 150 patients in this study, 69 (46%) showed positive UGI endoscopic findings which were statistically significant by chi-square at 5% level of significance (p=0.0001). Among those 69 who had positive UGI endoscopic findings, 47 of them presented with atypical symptoms and 22 presented with typical symptoms of biliary colic. Hence, UGI pathologies could be co-existing in patients with typical and atypical symptoms of biliary colic, which may lead to persistence of clinical symptoms or delay in the recovery during the post-operative period. Normal UGI endoscopy findings were seen among 70 patients with typical symptoms which supports the fact that the patients with typical biliary colic had a less chance of coexisting upper GI
Table 3: Comparison between two studies

| Characteristics | Khedkar et al., (n=40) | Present study (n=69) |
|-----------------|------------------------|---------------------|
| Gastritis       | 72.5 %                 | 40.3 %              |
| Duodenitis      | 6.25 %                 | 20.3 %              |
| Esophagitis     | 55 %                   | 3.3 %               |

Table 4: Relief of atypical symptoms in relation to UGI findings

| Based on UGE findings | Atypical symptoms (58) | Relief of symptoms POD - 7 | Relief of symptoms POD - 21 | Relief of symptoms POD - 42 |
|-----------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|
| Positive UGE findings | 47                     | 30 (63.8%)                  | Remaining 12 (25.5%)        | Remaining 5 (10.6%)         |
| UGE findings-Normal   | 11                     | 6 (54.5%)                   | Remaining 5 (10.6%)         | 0                           |

pathologies as seen in other studies (Borly, 1999; Velpen et al., 1993). At the same time, the majority of them with atypical symptoms had coexisting UGI pathologies diagnosed with the help of endoscopy. Appropriate medical management was initiated based on the UGI pathologies prior to cholecystectomy.

Postoperatively, a vast majority of patients who had typical symptoms did not have any kind of residual tenderness at the end of the 1st week of POD and was relieved of biliary colic, which was present pre-operatively. A decrease in the pain score among the patients at the end of the 1st week of the postoperative period suggested that it could be mainly due to intraoperative and postoperative analgesics. Whereas, most of them who had atypical pain and was subjected to cholecystectomy had persistence of symptoms at the end of 1st week of follow up. Follow up at the end of 3rd week showed a remarkable decrease in symptoms of these patients with 3.3% only complaining of gastritis. At the end of the 6th week of POD, none of the patients had any complaints. A study conducted in Pakistan showed complete relief of pain, flatulence and vomiting postsurgically (Amir and Zubair, 2009). Lumen et al., in a Scottish study, showed that among 97 patients who had cholelithiasis, 94 % were relieved from nausea (Luman et al., 1996).

47 of 58 (81%) patients (Table 4) who had atypical abdominal pain had positive UGI endoscopic findings, which shows that patients with atypical symptoms will have some UGI pathologies along with gallstones. This would not have been found out if the UGI endoscopy was not done preoperatively. Similar results were found in studies done by Mozafar et al. and Faisal et al. They found out that 83% and 77.2 % with atypical abdominal pain had abnormal UGI endoscopy findings (Mozafar et al., 2010; Faisal, 2013).

Hence, all patients should at 1st be thoroughly investigated to rule out any gastrointestinal pathology before undergoing elective cholecystectomy. This kind of approach will not only reduce the persistence of the symptoms but can also be helpful in managing the gastroduodenal pathologies at an early stage and thereby improving the postoperative outcome. A study conducted by Rassek et al. recommended that the investigation of the upper GI tract should be done prior to the elective cholecystectomy. His study showed that among 960 patients posted for elective cholecystectomy, 589 of them underwent gastroscopy. 56% had a normal gastroscopy and 11.3% had a change in management because of UGI findings (Rassek et al., 1988).

Another study by Diettrich et al. suggested that preoperative usage of endoscopy of the upper GI tract in patients undergoing cholecystectomy is necessary to exclude other gastrointestinal disorders. The study suggested, out of 100 patients, 31 of them had abnormal findings in UGI endoscopy resulting change in the plan of treatment (Diettrich et al., 1990).

In patients with positive UGI endoscopy findings, they were informed about the various methods of treatment, and they were given a choice for surgery on a later date. In the present study, we considered only those patients who were willing for cholecystectomy. They were started on appropriate medical management prior to surgery. Those who were not willing for surgery after undergoing UGI
endoscopy was not considered in this study and was treated conservatively. Hence, the present study suggests that the use of UGI endoscopy before an elective cholecystectomy in the presence of proven gallstones can also result in the change of management of the patients.

91.4% of patients with typical symptoms with normal UGI endoscopic findings were symptom-free at the end of 1st week while only 64% of patients who had typical symptoms with positive UGI endoscopic findings recovered at the end of 1st week and 36.3% of them showed recovery at the end of 3rd week. This data suggests that those patients with positive UGI endoscopic findings showed a delay in recovery even though they presented preoperatively with typical symptoms.

Out of 58 patients with atypical symptoms, 47 (Table 4) of them had positive UGI endoscopic findings of which 64% of them had relief of symptoms at the end of 1st week and remaining 25% and 11% of them were symptoms free at the end of 3rd week and 6th week respectively. 11 patients with normal UGE findings had complete relief of symptoms by the end of 6th week. This suggests that the majority of the patients who had presented with atypical symptoms had associated upper GI pathologies which were diagnosed during UGI endoscopy. Postoperative recovery was delayed in these patients, which could be probably due to the upper GI pathologies diagnosed in them.

Detection of the gastrointestinal pathologies such as peptic ulcer disease or hiatus hernia will help in reducing the postoperative persistence of symptoms and incidence of post-cholecystectomy pain. It also helps in detecting malignancy at an early stage which is also suggested by other studies (Yavorski et al., 1995; Beyermann et al., 1992).

CONCLUSIONS

Gallstones are frequently silent and UGI symptoms can be suspected to other GI pathologies. UGI endoscopy is a useful tool which can be done in all patients with a diagnosis or differential diagnosis of gallstones and those who present with UGI complaints. UGI endoscopy done before surgery can help in identifying co-existing UGI pathologies. This provides an opportunity for conservative management in those patients who are worried about undergoing surgical treatment. Patients presenting with typical and atypical symptoms were found to have some co-existing UGI pathologies. This suggests that UGI pathologies could be present in patients with cholelithiasis, irrespective of their symptomatic way of presentation. In general patients with atypical symptoms of presentation were found to have some co-existing UGI pathologies, compared to the typical presentation. Postoperatively delay in symptomatic relief was noticed in some patients, and most among them were diagnosed pre-operatively with associated UGI pathologies. This delay in recovery was treated effectively with appropriate medical management based on the preoperative evaluation. Hence this study highly recommends preoperative UGI endoscopy for a better postoperative outcome.

Conflict of Interest
The authors declare that they have no conflict of interest for this study.

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