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Original Article

Assessment of the Relationship between the Presence of *Helicobacter pylori* Infection and Cholelithiasis

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Abstract

Introduction: *Helicobacter pylori* is a gram-negative, micro-aerophilic bacteria commonly persisting in the stomach lining. This study aims to detect a possible relationship between *H. pylori* colonization of the stomach and the occurrence of cholelithiasis.

Materials and Methods: This is a cross-sectional study carried out in the Department of General Surgery, Saveetha Medical College and Hospital, Chennai from January 2021 to April 2021. Patients who presented to the Surgery OPD with complaints of abdominal pain were asked to undergo diagnostic endoscopy and ultrasound (USG). A sample size of 53 patients tested positive for *H. pylori* infection in the rapid urease test following diagnostic endoscopy. A thorough history was elicited from the patients who fit the above criteria. Subsequently, a positive finding of *H. pylori* in the biopsy was correlated with the presence of cholelithiasis in the USG.

Results: The study population included 21 female and 32 male patients. A large percentage of the study population (39%) belonged to the age group 51–60 years. Among the study population, only four out of the 53 patients were found to have cholelithiasis based on abdominal USG findings. This indicates that cholelithiasis was present in only 7.55% of the study population. Among the four patients with cholelithiasis, only one was a female patient and the remaining three were male patients. There was no significant sex difference in the occurrence of cholelithiasis in *H. pylori*-positive patients.

Conclusion: From this study, we conclude that there was no significant relationship between *H. pylori* colonization of the stomach and the occurrence of cholelithiasis as only four out of 53 patients had both *H. pylori* Infection and Cholelithiasis.

Key words: Cholelithiasis, Diagnostic endoscopy, *Helicobacter pylori*

INTRODUCTION

Helicobacter pylori is a gram-negative, micro-aerophilic bacteria that commonly persists in the stomach lining. It is very common across the world, occurring in 40-50% of the population in developed countries and 80–90% of the population in developing regions.[1] Gastric colonization with *H. pylori* can lead to a variety of upper gastrointestinal disorders, such as chronic gastritis, peptic ulcer disease, gastric mucosa-associated lymphoid tissue lymphoma, and gastric cancer.[2] *H. pylori* can be detected by a variety of invasive and non-invasive tests. Invasive tests include diagnostic endoscopy, rapid urease test, histology, etc while urea breath test and stool examination are the most common non-invasive methods available.[3] *H. pylori* can easily be treated with oral antibiotics. It is usually treated with a standard Triple Therapy including a Proton Pump Inhibitor, Amoxicillin, and Clarithromycin.[4] However, the rise of antibiotic-resistant strains has become a major concern in recent times. Although *H. pylori* is highly prevalent around the globe, no vaccines exist to prevent the infection. Several vaccines remain in the trial phase.

While there are several studies on the effect of *H. pylori* on the stomach, very few studies are available on the association of *H. pylori* with the pathology of organs other than the stomach and duodenum. Since the isolation of

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Helicobacter species in the biliary system, several studies have hypothesized a possible association between *H. pylori* and gallstones. Urease-induced calcium precipitation by *Helicobacter* species has been hypothesized to initiate gallstone formation.[5] An increase in the presence of *H. pylori* in Cholelithiasis patients as compared to the control group has been detected in some places and this trend has been found to be significant in areas with a higher prevalence of *H. pylori*.[6] However, only limited evidence is available on the same.

In this study, the presence of cholelithiasis in the abdominal ultrasound (USG) of patients with *H. pylori*-positive results in diagnostic endoscopy was investigated. This study aims to detect a possible relationship between *H. pylori* colonization of the stomach and the occurrence of Cholelithiasis.

MATERIALS AND METHODS

This is a cross-sectional study carried out in the Department of General Surgery, Saveetha Medical College and Hospital, Chennai from January 2021 to April 2021. Patients who presented to the Surgery OPD with complaints of abdominal pain were asked to undergo diagnostic endoscopy and USG. Informed consent was elicited from the patients.

Inclusion Criteria

- Patients who underwent diagnostic endoscopy for symptoms of abdomen pain and tested positive for *H. pylori* infection
- Patients who underwent USG scan for symptoms of abdomen pain.

Exclusion Criteria

- Patients with a previous history of cholecystectomy
- Patients with acute cholecystitis.

A sample size of 53 patients tested positive for *H. pylori* infection in the rapid urease test following diagnostic endoscopy. A thorough history was elicited from the patients who fit the above criteria. Subsequently, a positive finding of *H. pylori* in the biopsy was correlated with the presence of cholelithiasis in the USG.

All the procedures followed in our study are in accordance with the ethical standards of the Institutional Committee and informed consent was obtained from the study population.

RESULTS

This cross-sectional study was done in the Department of General Surgery in Saveetha Medical College with a sample size of 53 patients. All 53 patients had undergone diagnostic endoscopy and the biopsy specimen had tested positive for *H. pylori*. They also had an abdominal USG done to detect the presence of cholelithiasis. The following findings were observed from the collected data.

The study population included 21 female and 32 male patients [Figure 1]. A large percentage of the population (39%) belonged to the age group 51–60 years with 34% of the study population belonging to the age group 41–50 years [Figure 2].

Among the study population, only 4 out of the 53 patients were found to have cholelithiasis based on abdominal USG findings. This indicates that Cholelithiasis was present in only 7.55% of the study population [Figure 3].

Among the four patients with Cholelithiasis, only one was a female patient and the remaining 3 were male patients [Figure 4]. The p value was found to be >0.05. Hence, there was no significant sex difference in the occurrence of cholelithiasis in *H. pylori*-positive patients.

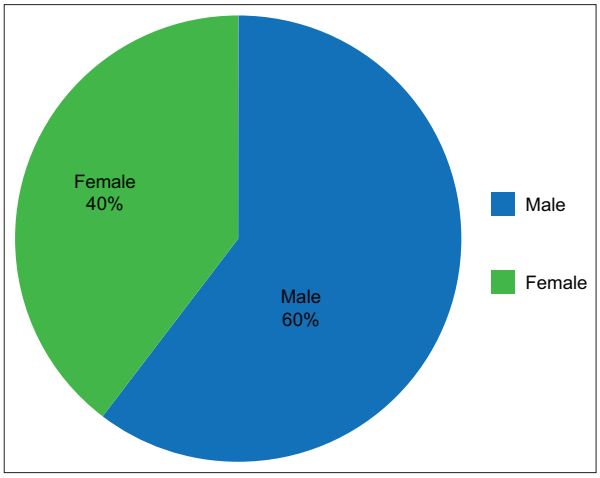

Figure 1: Sex ratio of the study population

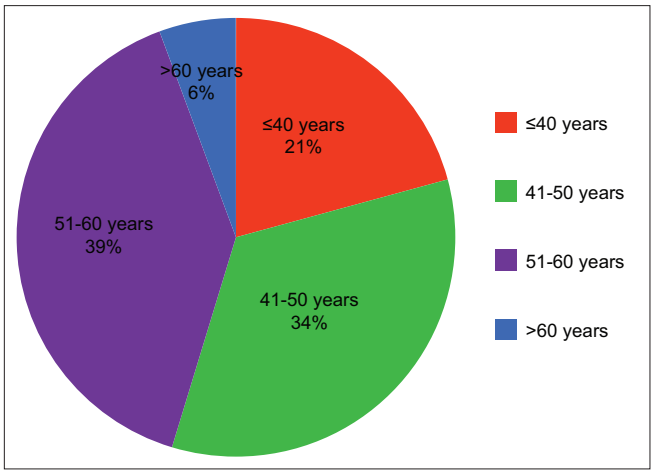

Figure 2: Age distribution of the study population

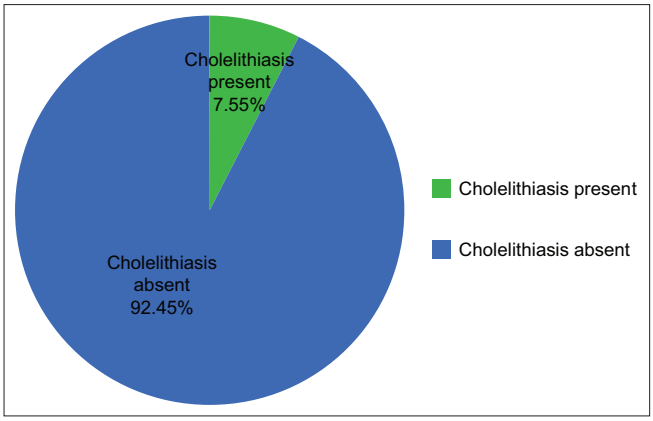

Figure 3: Presence of cholelithiasis in the study population

Cholelithiasis	Male (%)	Female (%)	Total (%)
Present	3 (5.66)	1 (1.89)	4 (7.55)
Absent	29 (54.72)	20 (37.73)	49 (92.45)
Total	32 (60.38)	21 (39.62)	53
Chi square=0.3867		*P* value=0.534	

Figure 4: Comparison of sex of the subject with the presence of cholelithiasis

DISCUSSION

This study done to detect any possible association between *H. pylori* in the gastric mucosa and cholelithiasis yielded the following results.

Overall, four out of the 53 patients were found to have gallstones. This amounts to 7.55% of the study population. The most common complaint of patients with *H. pylori* was found to be abdominal pain and vomiting. Some patients also had complaints of dyspepsia, hematemesis, and loss of appetite. The patients who were found to have cholelithiasis underwent laparoscopic cholecystectomy. The remaining patients were conservatively managed with antibiotics for *H. pylori* eradication.

A similar study by Ari *et al*. detected no significant relationship between the occurrence of gallstones and stomach *H. pylori*-positivity but it did confirm a significant relationship between stomach and gallbladder *H. pylori*-positivity.[7]

A large-scale cross-sectional study in China by Zhang *et al*. showed a positive association between *H. pylori* infection and gallstones with 9.47% of *H. pylori*-positive patients having gallstones. They also observed that even after age stratification, *H. pylori* infection was still a risk factor for the prevalence of gallstones.[8]

A study by Helaly *et al*. reported a significant positive relationship between *H. pylori* infection in the stomach and the presence of H. *pylori* in the gallbladder. The study hypothesized that gastric colonization with *H. pylori* could lead to gallbladder infection and that *H. pylori* may act as a lithogenic component, especially in the case of pure pigmented gallstones.[9]

A study by Attaallah *et al*. demonstrates the presence of *H. pylori* in the gallbladder in 37% of patients with symptomatic gallstones. Concomitant presence of *H. pylori* in the gastric and gallbladder mucosa was also observed in their study.[10] A similar study by Athavale *et al*. reported that *H. pylori* infection was associated with gall stones in 18% of the study population.[1]

A study in Tamil Nadu by Gunasekaran and Vinson on *H. pylori* colonization of gallbladder in patients with symptomatic cholelithiasis report that among the 40 patients included in their study, only 10% of the patients' gallbladder histopathology revealed *H. pylori* in the gallbladder mucosa, 40% of the study population had gastric mucosa *H. pylori* positivity and 5% of the study population presented with positivity in both gastric and gallbladder mucosa for *H. pylori*.[11] Despite the geographical proximity, our study didn't yield similar results.

A study by Zhou *et al*. demonstrated that the presence of *H. pylori* infection in the gallbladder mucosa was strongly associated with *H. pylori* colonization in the stomach.[12]

A systematic review and meta-analysis conducted by Wang *et al*. theorized about a potential positive correlation between *Helicobacter* species infection and increased risk of chronic cholecystitis or cholelithiasis due to a significantly higher prevalence of *Helicobacter* species in the chronic cholecystitis/cholelithiasis group as compared to the control group (24.40% vs. 8.55%).[13]

Several studies report that the prevalence of *H. pylori* infection is higher in men as compared to women.[14-16] A similar finding can be observed in our study with 60.38% of the *H. pylori*-positive patients being male.

While previous studies reported that females had a significantly higher risk of developing gallstones, especially in western countries, no such finding was observed in our study.[17-19] No significant sex difference was found in the occurrence of cholelithiasis in *H. pylori*-positive patients in our study. Similar results were obtained in a study by Zhang *et al*.[8]

The pathogenesis of the formation of gallstones in patients with *H. pylori* infection remains unclear. Several studies exist on the subject. A study by Monstein *et al*. demonstrated *H. pylori* DNA in cholesterol gallstones and explained the role of *H. pylori* in the etiology of cholesterol gallstones.[20] Chronic *H. pylori* infection of the gallbladder

has been suspected to impair the contractility of the gallbladder and lead to an increase in the precipitation of bile components to form stones.[10]

There were a few limitations to our study. Our study population was not sufficiently representative. Another inherent limitation of any cross-sectional study is that a cause-and-effect relationship cannot be demonstrated. The final limitation was the lack of control over potentially confounding risk factors such as high fat intake, alcohol consumption, sedentary lifestyle, and their contribution to the development of gallstones.

CONCLUSION

H. pylori infection and gallstones are common disorders worldwide; hence it is important to clarify whether *H. pylori* eradication can prevent gallstones. This might lead to a drastic reduction in the occurrence of gall stones and early detection can help avoid subsequent surgeries for cholelithiasis. We detected the presence of cholelithiasis in only 7.55% of patients with *H. pylori* infection, hence we do not find any relationship between *H. pylori* infection and Cholelithiasis. However, the results of this study may not be representative of the true prevalence of gallstones in *H. pylori* patients as this is a hospital-based study and it has a relatively limited patient sample. Further studies are required on this topic to conclusively prove any possible relationship existing between Cholelithiasis and *H. pylori* infection.

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