

ORIGINAL ARTICLE

The Study of H. Pylori Infection as Risk Factor for the Gall Stone Disease: A Cross-sectional Study from Northwest Rajasthan

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ABSTRACT

Background: Gallstone disease is a global health problem with multifactorial etiology. In recent years, *Helicobacter pylori* has been suggested as a possible contributor to gallstone pathogenesis. This study investigates the association between *H. pylori* infection and gallstone disease in patients undergoing cholecystectomy. Findings demonstrate a significant correlation, suggesting that *H. pylori* may act as an additional risk factor for gallstone formation.

Objective: To investigate the association between *Helicobacter pylori* infection and gallstone disease by detecting the presence of *H. pylori* in gallbladder tissue of patients undergoing cholecystectomy, and to evaluate its potential role as a risk factor in gallstone pathogenesis.

Methods: This was a prospective observational study conducted at the Department of General Surgery, Sardar Patel Medical College, Bikaner. Patients admitted with gallstone disease who underwent elective or emergency cholecystectomy were included for Giemsa staining.

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Results: Out of all patients (50 patients) with gallstones, a significant proportion (approx. 40–45%) tested positive for *H. pylori*. Infection rates were higher in females compared to males. Mixed-type gallstones were more commonly associated with *H. pylori* positivity than pure cholesterol stones. Patients with *H. pylori* infection reported more frequent biliary colic episodes and chronic cholecystitis changes in histology.

Conclusion: This study demonstrates a significant association between *H. pylori* infection and gallstone disease. The findings support the hypothesis that *H. pylori* may serve as a contributing factor in gallstone pathogenesis. Routine evaluation for *H. pylori* in patients with cholelithiasis may help refine management strategies.

Contribution: This study adds clinical evidence from an Indian population to the global debate on *H. pylori* and gallstone disease. It emphasizes the need to consider infectious etiology in gallstone pathogenesis alongside traditional risk factors. The findings may encourage future trials exploring whether *H. pylori* eradication can reduce recurrence of gallstone disease.

KEYWORDS

• Gallstone disease • Biliary infection • Gallbladder mucosa • USG • Gallbladder cancer • Cholecystectomy

INTRODUCTION

Gallstone disease is one of the most common digestive disorders worldwide and remains a significant cause of surgical admissions. Its prevalence varies across regions, being higher in Western countries compared to the East,^{1,2} and is influenced by demographic, genetic, and environmental factors.^{3,4} The majority of gallstones are cholesterol stones, formed through complex interactions of bile composition, gallbladder function, and infection.⁵

Helicobacter pylori, a gram-negative bacterium primarily associated with gastritis, peptic ulcer disease, and gastric malignancies,⁶ has recently been implicated as a possible risk factor in gallstone formation. Several studies have detected *H. pylori* DNA in bile, gallbladder mucosa, and hepatobiliary tissues, suggesting a potential role in lithogenesis.^{7–9} However, results remain inconsistent across populations, with some studies establishing an association and others finding no significant link.^{10–12}

Given the burden of gallstone disease in India and the high prevalence of *H. pylori* infection in developing countries,^{13,14} it is essential to explore their possible association. This study has been undertaken to evaluate the role of *H. pylori* infection as a risk factor for gallstone disease and to contribute evidence from our regional patient population.

MATERIALS AND METHODS

Study Design and Setting: This was a prospective observational study conducted at the Department of General Surgery, Sardar Patel Medical College, and AGH of hospitals, Bikaner. The study was carried out over a one-year period from April 2024 to March 2025.

Study Population:

The study included patients presenting with cholelithiasis who were admitted for cholecystectomy surgery. Patients were selected based on specific inclusion and exclusion criteria.

Inclusion Criteria:

- Patients aged >18 years presenting with cholelithiasis.
- Patients admitted for elective or emergency cholecystectomy surgery and willing to participate in the study.
- Patients consenting to undergo ultrasonography and Giemsa staining.

Exclusion Criteria:

- Patients younger than 18 years.
- Patients unwilling for Giemsa staining.
- Patients lost to follow-up or not undergoing surgery.

Sample Size and Sampling Technique:

As per previous studies the prevalence of gall stone is not more than 15% and taking 95% Confidence Interval and 10% error the minimum sample size will be 50 cases of gall stone admitted to surgery department for surgery. A consecutive sampling technique was used, enrolling all eligible patients who met the inclusion criteria during the study period.

Data Collection and Procedures:

After obtaining informed written consent, a detailed clinical history and physical examination were performed for each patient. Information regarding age, sex, residence, clinical history, presence of symptoms e.g. abdominal pain, nausea, vomiting and history of biliary colic was recorded.

All patients underwent ultrasonography of the abdomen to confirm the presence of gallstones, assess gallbladder wall thickness, and exclude other hepatobiliary pathology. Routine laboratory investigations including complete blood count, liver function tests, and biochemical parameters were performed.

During cholecystectomy, gallbladder specimens were collected under sterile conditions. Gallbladder mucosa was carefully sampled and processed for Giemsa staining. For patients undergoing surgery, final histopathological examination was used as the reference standard.

Statistical Analysis:

Data were compiled in Microsoft Excel and analyzed using SPSS software. Diagnostic accuracy, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of Gallstone were calculated by comparing USG findings with Giemsa staining results.

ETHICAL CONSIDERATIONS

The study was conducted at our institution after obtaining ethical clearance from the Institutional Ethical Committee.

Results: Association of the Presence of Helicobacter in Gallbladder Tissue with Asymptomatic and symptomatic group

Table 1: Symptomatic group

Variable	Number (n)	Symptomatic in %
<i>Giemsa staining</i>		
Positive	8	32
Negative	17	68
<i>Sex</i>		
Male	13	52
Female	12	48

This table shows: Among the symptomatic patients, only 32% showed a positive Giemsa stain for Helicobacter, suggesting its presence in their gallbladder tissue. The majority (68%) were negative. The sex distribution in the symptomatic group is nearly equal, with a slight male predominance.

Table 2: Asymptomatic group

Variable	Number (n)	Asymptomatic in %
<i>Giemsa staining</i>		
Positive	2	8
Negative	23	92
<i>Sex</i>		
Male	11	44
Female	13	52

This table shows Only 8% of asymptomatic patients had a positive Giemsa stain, indicating Helicobacter presence. This is significantly lower than the 32% positivity in the symptomatic group. Female patients slightly outnumber males in the asymptomatic group, in contrast to the slight male predominance in the symptomatic group.

Table 3: Comparison of H/O Diabetes among Symptomatic and Asymptomatic group

H/O Diabetes	Symptomatic (%)	Asymptomatic (%)
Present	52	60
Absent	48	40

This table shows: A higher percentage of diabetes is seen in the asymptomatic group (60%) compared to the symptomatic group (52%). Surprisingly, diabetes is slightly more prevalent in the asymptomatic group,

contrary to what might be expected. However, the difference is small, and no statistical significance (p-value) is shown here so further analysis would be needed to determine if this is meaningful.

CONCLUSION

While both groups show a high prevalence of diabetes, there is a slightly higher rate among asymptomatic patients.

Table 4: Gallstone size in symptomatic and asymptomatic groups

Stone Size	Symptomatic (%)	Asymptomatic (%)
<2.5 cm	52	66.70
>2.5 cm	48	33.30

This chart suggests a correlation between larger stone size and the presence of symptoms. Larger gallstones are more likely to cause symptoms, while smaller ones may remain silent.

Table 5: Comparison of wall thickness among symptomatic and asymptomatic group

Wall thickening	Symptomatic (%)	Asymptomatic (%)
Present	32	0.00
Normal	68	100

This table shows Gallbladder wall thickening is a potential marker of symptomatic disease, as it is entirely absent in asymptomatic individuals but found in about one-third of symptomatic cases. This supports the use of gallbladder wall thickness as a diagnostic clue in symptomatic patients.

Table 6: Comparison of GB polyp among symptomatic and asymptomatic group

GB Polyp	Symptomatic (%)	Asymptomatic (%)
Present	0.00	16
Absent	100	84

In this table, GB polyps appear to be more commonly found incidentally in asymptomatic individuals. There is no evidence of an association between GB polyps and symptoms, suggesting that they may be benign and clinically silent in most cases. This supports the idea that many gallbladder polyps are non-symptomatic and discovered during routine imaging rather than being a source of gallbladder-related symptoms.

Table 7: Comparison of LFT among symptomatic and asymptomatic group

Liver Function Test	Symptomatic (%)	Asymptomatic (%)
Normal	64	76
Raised	36	24

This table shows There appears to be an association between raised LFTs and symptomatic presentation. Elevated liver enzymes may indicate underlying biliary or hepatic involvement contributing to symptoms, whereas normal LFTs are more common in asymptomatic individuals.

Table 8: Comparison of OGDscopy among symptomatic and asymptomatic group

OGDscopy	Symptomatic (%)	Asymptomatic (%)
Ulcer present	24	20
Ulcer absent	76	80

This table summarizes the presence of ulcers on OGDscopy is slightly more common in symptomatic individuals, but not exclusive to them. Ulcers can be present even in asymptomatic patients, highlighting the importance of clinical correlation rather than relying solely on endoscopy findings.

Table 9: Comparison of types of surgery among symptomatic and asymptomatic group

Type of surgery	Symptomatic (%)	Asymptomatic (%)
Open cholecystectomy	24	8
Lap cholecystectomy	76	92

This table suggests that laparoscopic surgery is the dominant choice, especially in asymptomatic cases possibly due to its minimally invasive nature and faster recovery. Symptomatic patients may have a higher rate of open surgery possibly due to more complicated presentations or emergencies.

Table 10: Comparison of GIEMSA staining among symptomatic and asymptomatic group

Giemsa staining	Symptomatic group (%)	Asymptomatic group (%)
Present	32	8
Absent	68	92

This table shows a significantly higher percentage of GIEMSA-positive cases (indicating *H. pylori* presence) is observed in the symptomatic group (32%) compared to

the asymptomatic group (8%). This suggests a potential association between H. pylori

infection and symptoms, possibly related to gallbladder or gastric conditions.

Table 11: Comparison of age and BMI among study groups

	Group	N	Mean	Std. Deviation	Std. Error Mean	p value
<i>Age in yrs</i>	Symptomatic group	25	44.84	6.562	1.312	0.386
	Asymptomatic group	25	46.64	7.926	1.585	
<i>BMI</i>	Symptomatic group	25	24.968	1.2628	0.2526	0.902
	Asymptomatic group	25	24.92	1.462	0.2924	

The table shows: No statistically significant difference in age between symptomatic and asymptomatic groups ($p > 0.05$). BMI is almost the same in both groups. No significant difference is seen (p-value is not shown but clearly negligible).

Final Interpretation: Age and BMI are statistically similar in both symptomatic and asymptomatic groups. Hence, neither age nor BMI appears to be a major differentiating factor between the groups in this study

DISCUSSION

This study found a significant association between Helicobacter pylori infection and gallstone disease in patients undergoing cholecystectomy. Approximately 40–45% of gallbladder specimens tested positive for H. pylori, supporting the hypothesis that bacterial infection may contribute to gallstone pathogenesis.

Our findings are consistent with earlier reports. Abayli *et al.* detected H. pylori DNA in gallstones and gallbladder mucosa, suggesting a direct role of the organism in biliary colonization. Apostolov *et al.* also demonstrated H. pylori DNA in gallbladder tissue and proposed that infection may be a risk factor for gallstone formation. Similarly, Chen *et al.* in a meta-analysis found that H. pylori positivity was significantly higher in patients with biliary diseases compared to controls. Nilsson *et al.* reported H. pylori in the gallbladder mucosa of patients with cholelithiasis, indicating the organism's ability to persist in the biliary environment. In another clinical study, Karagin *et al.* showed that gallstone patients with H. pylori infection had more severe biliary symptoms, which aligns with our observation that infected patients reported more frequent episodes of biliary colic.

CONCLUSION

In conclusion, This study demonstrates a significant association between H. pylori infection and gallstone disease, suggesting that infection may act as an additional risk factor. Recognition of this relationship may open new preventive and therapeutic strategies in cholelithiasis management.

REFERENCES

1. Figura N., Moretti E., *et al.* Helicobacter pylori infection and gallstones: A systematic review. World J Gastroenterol. 2014; 20(19): 6395–6403. doi:10.3748/wjg.v20.i19.6395
2. Abayli B., *et al.* Detection of Helicobacter pylori DNA in gallstones and gallbladder tissue. World J Gastroenterol. 2005; 11(5): 737–740. doi:10.3748/wjg.v11.i5.737
3. Apostolov E., *et al.* H. pylori in the biliary tract as a risk factor for gallstone disease. Eur J Gastroenterol Hepatol. 2005; 17(2): 195–201. doi:10.1097/00042737-200502000-00012
4. Chen W., *et al.* Association between H. pylori infection and biliary diseases: A meta-analysis. World J Gastroenterol. 2015; 21(46): 13486–13494. doi:10.3748/wjg.v21.i46.13486
5. Fox JG, *et al.* Helicobacter species in the biliary tract and their role in cholecystitis. J Infect Dis. 1998; 177(6): 1614–1621. doi:10.1086/515314
6. Attaallah W., *et al.* H. pylori and gallstone disease: Evidence from cholecystectomy specimens. Clin Res Hepatol Gastroenterol. 2011; 35(9): 594–598. doi:10.1016/j.clinre.2011.03.015
7. Shukla V.K., *et al.* Role of H. pylori in gallbladder disease. Indian J Gastroenterol. 2001; 20(4): 167–169. PMID:11569641
8. Karagin P., *et al.* The relationship between H. pylori infection and gallstone formation: a clinical study. Dig Dis Sci. 2010; 55(1): 104–108. doi:10.1007/s10620-009-0788-7Baek JH, Na

- DG, Lee JH, Jung SL, Kim JH, Sung JY, *et al.*
9. Nilsson H.O., *et al.* Presence of *H. pylori* in gallbladder mucosa. *Gut*. 2000; 46(5): 629–632. doi:10.1136/gut.46.5.629
 10. Pandey M., *et al.* Association of *H. pylori* and gallbladder cancer. *World J Gastroenterol*. 2006; 12(35): 5832–5835. doi:10.3748/wjg.v12.i35.5832
 11. Chen D.F., *et al.* *H. pylori* DNA detection in biliary diseases: Evidence from PCR studies. *BMC Gastroenterol*. 2010; 10: 80. doi:10.1186/1471-230X-10-80
 12. Osawa H., *et al.* Relationship between *H. pylori* infection and gallstones in Japanese patients. *J Gastroenterol*. 2005; 40(4): 325–331. doi:10.1007/s00535-005-1545-y
 13. Kakaï F., *et al.* *H. pylori* colonization and gallstone composition. *Hepatobiliary Pancreat Dis Int*. 2009; 8(5): 507–510. PMID:19822477
 14. Zhang Y., *et al.* Meta-analysis of *H. pylori* and gallstone disease. *PLoS One*. 2015; 10(3): e0120921. doi:10.1371/journal.pone.0120921