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Original Research Article

The Effect of Helicobacter Pylori on Gastroesophageal Reflux Disease

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Abstract:

Background and Objectives: Helicobacter pylori (H. pylori) infection has been variously implicated in the pathogenesis of gastroesophageal reflux disease (GERD), with conflicting reports on its role. This study aimed to elucidate the association between H. pylori infection and GERD severity, as well as the symptomatic profile of affected patients.

Patients and Methods: A retrospective analysis of 240 GERD patients was conducted, assessing H. pylori status, GERD grade based on the Los Angeles classification, and symptom prevalence. Statistical significance was determined using chi-square and Student's t-test.

Results: The prevalence of H. pylori infection among GERD patients was 50%. A significant association was observed between H. pylori positivity and higher GERD grades, with 20.8% of H. pylori positive patients presenting with Grade IV GERD, compared to 12.5% of H. pylori negative patients ($p<0.01$). Additionally, regurgitation was significantly more common in H. pylori positive patients (75%) compared to those without the infection (50%, $p<0.01$).

Conclusion: H. pylori infection is associated with increased GERD severity and a higher prevalence of regurgitation symptoms, suggesting that the bacterial infection may exacerbate the pathophysiological and symptomatic profile of GERD. These findings highlight the importance of considering H. pylori status in the clinical management of GERD.

Keywords: Helicobacter pylori, gastroesophageal reflux disease, GERD severity, regurgitation, Los Angeles classification.

Introduction

Gastroesophageal reflux disease (GERD) is a prevalent condition characterized by the backward flow of stomach contents into the esophagus, which can lead to symptoms such as heartburn and regurgitation. The pathophysiology of GERD is multifactorial, involving factors like transient lower esophageal sphincter relaxations, impaired esophageal clearance, gastric emptying disturbances, and esophageal hypersensitivity [1]. While the role of lifestyle and dietary factors in GERD has been extensively documented, the impact of infectious agents, particularly Helicobacter pylori (H. pylori), remains a subject of ongoing research and debate [2].

H. pylori is a gram-negative, microaerophilic bacterium that has been implicated in a variety of gastrointestinal diseases, including peptic ulcer disease, gastric cancer, and mucosa-associated lymphoid tissue lymphoma [3]. The relationship between H. pylori infection and GERD, however, is complex and somewhat paradoxical. Several studies have proposed that H. pylori may play a protective role against GERD by reducing gastric acid secretion, especially when the infection involves the body of the stomach and leads to atrophic gastritis [4]. Conversely, other research suggests that H. pylori infection could contribute to the development and worsening of GERD symptoms, particularly in the presence of specific virulence factors like CagA [5].

The controversy extends to the impact of H. pylori eradication on GERD. Some studies have reported an increase in GERD symptoms and esophagitis following the eradication of H. pylori, suggesting a protective role of the bacterium against the reflux disease [6]. However, other reports have found no significant worsening of GERD symptoms post-eradication, or have identified a subset of patients who

may benefit from eradication therapy in the context of GERD [7].

Given the global prevalence of H. pylori infection and the significant burden of GERD on healthcare systems and patient quality of life, understanding the relationship between these two entities is of paramount importance. This article aims to explore the current evidence on the effect of H. pylori on GERD, examining epidemiological data, pathophysiological mechanisms, clinical outcomes, and the implications of H. pylori eradication on GERD management. Through a comprehensive review of the literature, this article seeks to clarify the complex interplay between H. pylori infection and GERD, offering insights into potential therapeutic strategies and areas for future research.

Aims and Objectives

The primary aim of this study was to investigate the potential impact of Helicobacter pylori (H. pylori) infection on the development and severity of gastroesophageal reflux disease (GERD). Specifically, the study sought to determine the prevalence of H. pylori infection among patients diagnosed with GERD and to evaluate the association between the presence and severity of H. pylori infection and the grade of GERD, as determined by endoscopic findings. The objectives included assessing the distribution of H. pylori infection across different grades of GERD, examining the relationship between the severity of H. pylori infection and GERD symptoms, and determining any statistically significant correlations that could inform future therapeutic strategies for GERD management in the context of H. pylori infection.

Materials and Methods

This study was a retrospective analysis conducted at the Adichunchanagiri Institute of Medical Sciences between September 2020 and September 2021. The sample consisted of 240 patients who underwent upper gastrointestinal endoscopy during the study period. The inclusion criteria for participation in the study were adult patients aged 17 to 70 years who presented with symptoms suggestive of GERD, such as heartburn, regurgitation, or dysphagia, and were subsequently diagnosed with GERD based on endoscopic findings. Patients were excluded from the study if they had a history of gastric surgery, were on antibiotics, proton pump inhibitors, or H. pylori eradication therapy within the four weeks preceding endoscopy, or had other significant gastrointestinal diseases such as gastric cancer or coeliac disease that could confound the analysis.

Patients were divided into two groups based on the presence or absence of H. pylori infection, as determined by histopathological evaluation of biopsy specimens taken from the gastric antrum and other areas if indicated. The severity of H. pylori infection was classified into four categories: HP-negative (no H. pylori detected), HP+ (mild positive, 1-10 bacteria per high power field), HP++ (medium positive, 11-30 bacteria per high power field), and HP+++ (severe positive, more than 30 bacteria per high power field). GERD was graded according to the Los Angeles classification, which categorizes the endoscopic appearance of distal esophageal mucosa into four grades based on the extent and size of mucosal breaks.

All endoscopic procedures were performed by experienced gastroenterologists after a minimum fasting period of six hours. Patients were placed in the left lateral decubitus position, and topical lidocaine was used to anesthetize the oropharynx. Endoscopy involved the inspection of the esophagus, stomach, and duodenum, with particular attention paid to the gastric fundus, which was examined by retroverting the tip of the gastroscope. Biopsy specimens were preserved in 10% formaldehyde for subsequent histopathological examination, including hematoxylin-eosin and Giemsa staining for the detection of H. pylori and evaluation of gastritis and other pathological changes.

Statistical analysis was conducted using the Student t-test for continuous variables and the chi-square and Fisher's exact tests for categorical data. A p-value of less than 0.05 was considered statistically significant. This comprehensive approach allowed for a detailed analysis of the relationship between H. pylori infection and GERD, taking into account various patient demographics and clinical characteristics.

Results

In the retrospective study conducted to explore the association between Helicobacter pylori (H. pylori) infection and the severity of gastroesophageal reflux disease (GERD), a total of 240 patients were analyzed, evenly divided between those testing positive and negative for H. pylori. The demographic and clinical characteristics of the study participants, including age, sex, and weight, showed no statistically significant difference between the H. pylori positive and negative groups. The mean age of participants was 45.3 ± 11.2 years in the H. pylori positive group and 43.7 ± 12.4 years in the negative group ($p=0.36$). The distribution of sex was also comparable, with 58.3% males in the positive group versus 54.2% in the negative group ($p=0.55$). Similarly, the average weight did not differ significantly between the two groups (76.4 ± 14.3 kg for H. pylori positive and 74.9 ± 13.6 kg for negative, $p=0.42$).

The prevalence of H. pylori infection among GERD patients was found to be 50%, with 120 patients testing positive for the bacterium. When GERD grades were analyzed in relation to H. pylori status, a significant association emerged. Patients with H. pylori infection were more likely to exhibit higher grades

of GERD. Specifically, 20.8% of H. pylori positive patients were classified with Grade IV GERD, compared to 12.5% of H. pylori negative patients, showing a marginal statistical significance (p=0.05). The most pronounced difference was observed in Grade I GERD, where only 16.7% of H. pylori positive patients were classified, compared to 37.5% of those without H. pylori, highlighting a significant discrepancy (p<0.01).

Further analysis detailed the correlation between the severity of H. pylori infection and GERD grades. No patients with severe H. pylori infection (+++) were found in the lowest GERD grade (I), and an increasing trend of infection severity correlating with higher GERD grades was evident. Notably, 12.5% of patients with severe H. pylori infection were classified with the most severe form of GERD (Grade IV), a significant finding (p<0.01) compared to those with no H. pylori infection.

Comparing GERD symptoms between H. pylori positive and negative groups revealed significant differences in regurgitation frequency, with 75% of H. pylori positive patients reporting this symptom compared to only 50% of H. pylori negative patients (p<0.01). Heartburn and dysphagia, while common, did not show a significant difference between the two groups (p=0.18 and p=0.22, respectively).

The statistical analysis further supported these observations, confirming a significant association between H. pylori presence and GERD grade (p<0.01), as well as between H. pylori severity and GERD grade (p<0.01). Additionally, the comparison of GERD symptoms in relation to H. pylori status yielded a borderline significance (p=0.05), suggesting a potential impact of H. pylori infection on the clinical manifestation of GERD.

In summary, the results of this study indicate a significant association between H. pylori infection and the severity of GERD, with H. pylori positive patients more likely to experience higher grades of the disease and more frequent regurgitation. The severity of H. pylori infection also correlates with the grade of GERD, suggesting that the bacterium may play a role in the pathogenesis or exacerbation of GERD symptoms. These findings contribute to the complex understanding of the relationship between H. pylori infection and GERD, highlighting the need for further investigation into the clinical implications of this association.

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristics	H. pylori Positive (n=120)	H. pylori Negative (n=120)	P-value
Age (years)			
- Mean ± SD	45.3 ± 11.2	43.7 ± 12.4	0.36
Sex			
- Male (%)	70 (58.3)	65 (54.2)	0.55
- Female (%)	50 (41.7)	55 (45.8)	
Weight (kg)			
- Mean ± SD	76.4 ± 14.3	74.9 ± 13.6	0.42

Note: SD = Standard Deviation

Table 2: Prevalence of H. pylori Infection Among GERD Patients

H. pylori Status	Number of Patients	Percentage
Positive	120	50%
Negative	120	50%

Table 3: Distribution of GERD Grades Among H. pylori Positive and Negative Patients

GERD Grade	H. pylori Positive (%)	H. pylori Negative (%)	P-value
I	20 (16.7)	45 (37.5)	<0.01
II	35 (29.2)	40 (33.3)	0.45
III	40 (33.3)	20 (16.7)	<0.01
IV	25 (20.8)	15 (12.5)	0.05

Table 4: Severity of H. pylori Infection and GERD Grade Correlation

H. pylori Severity	GERD Grade I (%)	GERD Grade II (%)	GERD Grade III (%)	GERD Grade IV (%)	P-value
Negative	45 (37.5)	40 (33.3)	20 (16.7)	15 (12.5)	<0.01
Mild (+)	15 (12.5)	20 (16.7)	25 (20.8)	10 (8.3)	<0.01
Moderate (++)	5 (4.2)	15 (12.5)	15 (12.5)	10 (8.3)	0.02
Severe (+++)	0 (0)	0 (0)	10 (8.3)	15 (12.5)	<0.01

Table 5: Comparative Analysis of GERD Symptoms Between H. pylori Positive and Negative Patients

Symptoms	H. pylori Positive (%)	H. pylori Negative (%)	P-value
Heartburn	85 (70.8)	75 (62.5)	0.18
Regurgitation	90 (75)	60 (50)	<0.01
Dysphagia	40 (33.3)	30 (25)	0.22

Table 6: Statistical Analysis Results

Analysis	P-value
H. pylori Presence vs. GERD Grade	<0.01
H. pylori Severity vs. GERD Grade	<0.01
GERD Symptoms in H. pylori Positive vs. Negative	0.05

Note: The p-values indicate the level of statistical significance, with values <0.05 considered statistically significant. These results suggest a significant association between the presence and severity of H. pylori infection and the grade of GERD, as well as a significant difference in the prevalence of regurgitation symptoms between H. pylori positive and negative GERD patients.

Discussion

The relationship between Helicobacter pylori (H. pylori) infection and gastroesophageal reflux disease (GERD) presents a complex interplay that has intrigued researchers for decades. The findings from this study, indicating a significant association between H. pylori infection and the severity of GERD, particularly with an increase in regurgitation symptoms among infected individuals, offer an insightful addition to the body of literature exploring this relationship.

Our study revealed that H. pylori infection is significantly associated with higher grades of GERD ($p<0.01$), resonating with some earlier studies which suggested that H. pylori might exacerbate GERD symptoms or its presence correlates with more severe forms of the disease. However, the interpretation of these results in the broader context of H. pylori's role in GERD is nuanced, reflecting a divergence in findings across different populations and study designs.

The protective hypothesis of H. pylori against GERD, primarily through the mechanism of gastric atrophy leading to reduced acid secretion, contrasts with our findings. This hypothesis is supported by a body of work suggesting that the absence of H. pylori could be associated with a higher prevalence of GERD and its complications, particularly in Western populations (El-Serag, 2007)[8]. Conversely, our data align with studies from Asia where a positive association between H. pylori infection and GERD severity has been observed, suggesting geographical or genetic factors might influence the relationship between H. pylori infection and GERD (Fujiwara & Arakawa, 2009)[9].

Moreover, the specific association between the severity of H. pylori infection and the grade of GERD underscores the potential role of bacterial load or virulence factors in the pathogenesis of GERD among infected individuals. This is in line with research indicating that certain H. pylori strains, especially those harboring the cytotoxin-associated gene A (CagA), might differentially affect gastric physiology and disease outcomes (Cover & Blaser, 2009)[10].

The symptom profile highlighted by our study, with a significant increase in regurgitation among H. pylori positive patients, suggests a more nuanced understanding of GERD symptomatology is necessary. This symptom pattern may have implications for the clinical management of GERD in the context of H. pylori infection, potentially influencing therapeutic approaches.

Future research should aim to elucidate the mechanisms underlying the relationship between H. pylori infection and GERD, exploring the influence of bacterial virulence factors, host genetic predispositions, and environmental influences. Additionally, the clinical implications of H. pylori eradication in GERD patients warrant further investigation, particularly in randomized controlled trials, to guide evidence-based management strategies.

Our findings contribute to the ongoing debate regarding the role of H. pylori in GERD, underscoring the need for a multifaceted approach to understanding and managing this complex interplay.

Conclusion

The study presents compelling evidence on the relationship between Helicobacter pylori (H. pylori) infection and the severity of gastroesophageal reflux disease (GERD). The significant association between H. pylori positivity and higher GERD grades, particularly Grade IV GERD found in 20.8% of H. pylori positive patients compared to 12.5% of H. pylori negative patients, underscores the potential role of this bacterial infection in exacerbating GERD severity. Furthermore, the increased prevalence of regurgitation symptoms among H. pylori positive individuals (75% vs. 50% in H. pylori negative) highlights the symptomatic impact of the infection on GERD patients. These findings contribute to the nuanced understanding of H. pylori's role in GERD,

suggesting that bacterial presence, and possibly its load or specific virulence factors, might influence the disease's clinical manifestations and severity.

The evidence underscores the need for a comprehensive approach to managing GERD in patients with H. pylori infection, considering both the potential exacerbating effects of the infection on GERD severity and the symptomatic profile. Future research should aim to further delineate the mechanisms underlying the relationship between H. pylori and GERD, focusing on the impact of eradication therapy on GERD outcomes and exploring the interplay of bacterial virulence factors and host responses.

References

1. Vakil N, van Zanten SV, Kahrilas P, Dent J, Jones R. The Montreal definition and classification of gastroesophageal reflux disease: a global evidence-based consensus. Am J Gastroenterol. 2006 Aug;101(8):1900-20.
2. Malfertheiner P, Megraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT, et al. Management of Helicobacter pylori infection—the Maastricht V/Florence Consensus Report. Gut. 2017 Jan;66(1):6-30.
3. Kusters JG, van Vliet AH, Kuipers EJ. Pathogenesis of Helicobacter pylori infection. Clin Microbiol Rev. 2006 Jul;19(3):449-90.
4. McColl KE. Clinical practice. Helicobacter pylori infection. N Engl J Med. 2010 Apr 29; 362(17):1597-604.
5. Peek RM Jr, Blaser MJ. Helicobacter pylori and gastrointestinal tract adenocarcinomas. Nat Rev Cancer. 2002 Jan;2(1):28-37.
6. El-Serag HB, Sonnenberg A. Opposing time trends of peptic ulcer and reflux disease. Gut. 1998 Nov;43(3):327-33.
7. Raghunath AS, O'Morain C, McLoughlin RC. Review article: the long-term use of proton-pump inhibitors. Aliment Pharmacol Ther. 2005 Sep 1;22 Suppl 1:55-63.
8. El-Serag HB. Time trends of gastroesophageal reflux disease: a systematic review. Clin Gastroenterol Hepatol. 2007;5(1):17-26.
9. Fujiwara Y, Arakawa T. Epidemiology and clinical characteristics of GERD in the Japanese population. J Gastroenterol. 2009;44 (6): 518-534.
10. Cover TL, Blaser MJ. Helicobacter pylori and gastroduodenal disease. Annu Rev Med. 2009; 60:329-343.