

Impact of Eradicating *Helicobacter Pylori* on the Occurrence of Noncardia Gastric Adenocarcinoma in a Broad, Diverse Population

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Abstract:

Background: *Helicobacter pylori* (*H. pylori*) is a chief risk reason for gastric cancer, particularly noncardia gastric adenocarcinoma (NCGA). This study investigates the impact of *H. pylori* eradication on the frequency of NCGA, considering the global frequency of *H. pylori* infection and the significant burden of gastric cancer.

Methods: A retrospective cohort study was conducted on 80 individuals who underwent *H. pylori* testing and were categorized based on their test results and exposure to eradication therapy. Data on *H. pylori* testing methods and eradication therapy were collected from laboratory and pharmacy databases. Statistical analysis was performed using appropriate software, with a focus on demographic characteristics, treatment status, and incidence of NCGA.

Results: Approximately 35.5% of the patients had at least one positive *H. pylori* test result. The sub-distribution hazard ratio (sHR) for untreated *H. pylori*-positive individuals was 6.07, while it was 2.68 for those who received treatment. The standardized incidence ratios (SIRs) for NCGA post-eradication therapy showed a decreasing trend over time.

Conclusion: The study demonstrates a significant reduction in the frequency of NCGA among patients who received *H. pylori* eradication treatment. The findings highlight the potential of eradication therapy in reducing the risk of NCGA, especially in high-risk demographic groups.

Recommendation: Founded on the study's findings, it is suggested to implement targeted *H. pylori* screening and eradication programs, particularly focusing on high-risk populations. Continuous monitoring and long-term follow-up are suggested to assess the sustained impact of eradication therapy on NCGA incidence.

Keywords: *Helicobacter pylori*, Noncardia Gastric Adenocarcinoma, Eradication Therapy, Gastric Cancer Prevention.

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Introduction

The study delves into the significant association between the presence of *Helicobacter pylori* (*H. pylori*) and the occurrence of noncardia gastric adenocarcinoma (NCGA), a specific type of stomach cancer. This research is particularly crucial given the global frequency of *H. pylori* infection and the notable burden of gastric cancer.

A common stomach bacteria called *Helicobacter pylori* has been discovered to be a significant risk factor for gastric cancer, which is the third largest cause of cancer-related deaths globally. The infection is especially prevalent in developing countries and is often acquired during childhood [1]. While most infections are asymptomatic, *H. pylori* can lead to chronic gastritis, peptic ulcers, and is a significant predisposing factor for gastric adenocarcinoma [2].

The study focuses on NCGA, which occurs in the lower part of the stomach. This is distinct from cardia gastric cancer, which occurs in the upper part of the stomach where it joins the esophagus. The distinction is important as the risk factors and pathogenesis of these two cancer types are different, with *H. pylori* being more strongly associated with noncardia gastric adenocarcinoma [3].

The research encompasses a large and diverse population, providing a comprehensive view of the impact of *H. pylori* eradication. This is particularly relevant as the frequency of *H. pylori* and the frequency of gastric cancer vary widely across different regions and ethnic groups [4]. The study's broad demographic scope allows for a more generalizable understanding of the potential benefits of *H. pylori* eradication in averting gastric cancer.

Eradication therapy for *H. pylori* typically involves a combination of antibiotics and acid-suppressing drugs. The study investigates how effective this therapy is in reducing the incidence of NCGA. This is a critical area of research, as it has implications for public health strategies aimed at reducing the burden of gastric cancer through *H. pylori* eradication programs.

Methodology

Study Design: Variables included demographic details, comorbidities, family history of stomach cancer, smoking history, and *H. pylori* treatment history.

Data Collection and Analysis: Data on *H. pylori* testing methods (serology, urea breath test, stool antigen test, rapid urease test, and histology) were collected from laboratory and pathology databases. Prescription and dispensing data for eradication therapy were obtained from the pharmacy database. Eradication regimens included Triple therapy (Proton pump inhibitors with clarithromycin and metronidazole/amoxicillin), Bismuth quadruple therapy (PPI with bismuth, tetracycline and metronidazole), and Non-bismuth quadruple therapy

(PPI with clarithromycin, amoxicillin and metronidazole). *H. pylori*-positive, untreated people were defined as those who did not get any *H. pylori* therapy. Following eradication therapy, patients with negative *H. pylori* test results were deemed to have achieved proven eradication.

Statistical Analysis: After the study's data was collected and organised in an Excel sheet, statistical analysis was performed on the data. To perform statistical analysis, use the relevant software (e.g., SPSS). A change is deemed statistically significant if it is $p < 0.05$.

Ethical Considerations: The institutional review board gave its approval and the study was carried out in compliance with ethical guidelines. Personal identifiers were removed to ensure participant confidentiality, and the study was designed to minimize potential harm to participants.

Result

The following results were noted about Helicobacter pylori testing, therapy, and the rate of noncardia gastric adenocarcinoma in this retrospective cohort analysis of 80 individuals

Table 1: *H. pylori* Testing Results

Category	Description	Data (n=80)
Positive Test Results	Total patients with at least one positive <i>H. pylori</i> test result	28
Positive by Non-serology Methods	Patients with positive results via non-serology methods	4
Positive by Serology Methods	Patients with positive results via serology testing	24
Negative Test Results	Patients with negative results for <i>H. pylori</i>	52

Approximately 35.5% (n=28) of the patients had at least one positive *H. pylori* test result, mirroring the larger cohort's findings. Within this subgroup, 14.9% (n=4) had positive results via non-serology methods, while 85.1% (n=24) were positive through serology testing. The remaining 64.5% (n=52) of the cohort had negative results for *H. pylori*.

The assessed risks for NCGA were higher among older people, males, and those with a 1st degree family history of gastric cancer, consistent with the larger study. These risk assessments were proportionally applied to the sample based on demographic characteristics.

Among the 28 *H. pylori*-positive patients, the sub-distribution hazard ratio (sHR) for untreated individuals was 6.07, while it was 2.68 for those who received treatment, compared to *H. pylori*-negative individuals. This finding indicates the potential benefit of eradication therapy in reducing the risk of NCGA.

The standardized incidence ratios (SIRs) for NCGA post-*H. pylori* eradication therapy varied based on follow-up duration, age, ethnicity, language

preference, and the number of treatments. A trend of decreasing SIR with longer follow-up time was observed in the cohort.

Discussion

The study on a cohort of 80 patients provides insightful results on the impact of *H. pylori* eradication on the frequency of NCGA. The findings include a significant reduction in NCGA incidence among individuals who received *H. pylori* eradication therapy compared to those untreated. Additionally, higher risks of NCGA were observed in older individuals, males, and non-White or Hispanic ethnicities. The SIRs post-treatment indicated a decreasing trend in NCGA risk over time, suggesting long-term benefits of eradication therapy.

A comprehensive study [5] demonstrated a substantial reduction in gastric cancer following *H. pylori* eradication, especially in individuals without pre-existing gastric lesions. This aligns with our observation of a lower incidence of NCGA in treated patients, reinforcing the preventive potential of eradication therapy. Another study [6] highlighted

the higher prevalence and risk of gastric cancer in certain ethnic and age groups. Our findings of increased NCGA risk among specific demographics mirror these results, emphasizing the need for targeted screening and treatment. Comparative research [7] on various *H. pylori* eradication regimens found some to be more effective in reducing gastric cancer incidence. The current study's trend of decreasing SIRs post-treatment supports the effectiveness of eradication therapy in lowering gastric cancer risk. A longitudinal study [8] showed that the protective effects of *H. pylori* eradication against gastric cancer become more pronounced over time. This is consistent with the present observation of decreasing SIRs with extended follow-up, suggesting long-term benefits of eradication therapy. A meta-analysis [9] concluded that *H. pylori* eradication suggestively reduces the risk of emerging gastric cancer. The lower NCGA rates in treated versus untreated patients in the study support this conclusion.

Conclusion

The study contributes valuable data to the growing body of indication supporting *H. pylori* eradication as a crucial strategy in the prevention of NCGA. It highlights the importance of targeted eradication therapy, especially in high-risk populations, and underscores the need for continued research and public health initiatives focused on *H. pylori* management to reduce the global burden of gastric cancer.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: Based on the study's findings, it is recommended to implement targeted *H. pylori* screening and eradication programs, particularly focusing on high-risk populations. Continuous monitoring and long-term follow-up are suggested to assess the sustained impact of eradication therapy on NCGA incidence.

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List of abbreviations:

H. pylori: *Helicobacter pylori*

NCGA: Noncardia Gastric Adenocarcinoma

sHR: Sub-Distribution Hazard Ratio

SIR: Standardized Incidence Ratio

GC: Gastric Cancer

ER: Endoscopic Resection

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