

Incidence of Helicobacter pylori infections among perforated peptic ulcer patients of Garhwal region of Uttarakhand, India

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Abstract

Objectives: This present study was to evaluate the incidence of helicobacter pylori infections in various age group of population among perforated peptic ulcer patients.

Methods: A complete assessment (general and systemic examinations) and relevant investigations were performed to all patients. Blood sample specimen was allowed to clot at room temperature and centrifuged at 2500 rpm for 5 minutes in a REMI centrifuge after separating the clot from the upper wall of the test tube with sterile loop. The serum was separated and frozen until they tested as per the instruction of the manufacturer. Serological examination was performed by ELISA test. The biopsy specimens were subjected to rapid urease test. Giemsa staining was performed for the typical morphology of stained H. pylori organisms.

Results: Most of the cases 16(32%) were in age group of 31-40 years. 12(24%), 9(18%) and 6(12%) cases were in age group of 41-50, 51-60 and 61-70 years respectively. The ratio of male and female ratio was 3:2. Among all 50 patients, Giemsa staining and rapid urease test were positive in 27(54%) patients and both the tests were negative in 23(46%) of the patients. Rapid urease test was alone positive in 28(56%) of the cases. Among all the 50 perforated peptic ulcer cases both Giemsa staining and Serology were positive in 26(52%) of the cases and both were negative in 22(44%) of the patients. Giemsa staining was alone positive in 27(54%) of the patients.

Conclusions: We have found the preponderance of peptic ulcers in middle aged male population, pre-pyloric region being the commonest site of perforation. There has been a higher prevalence of H-pylori infection in patients with perforated peptic ulcers in our study.

Keywords: Peptic ulcer, perforation, H. pylori, incidence.

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Introduction

Helicobacter pylori (HP) is a gram-negative microaerophilic bacterium that infects the epithelial lining of the stomach [1]. *Helicobacter pylori* (*H. pylori*) was first identified in the stomach of dogs as a spiral microorganism by Giulio Bizzozero in 1892 [2]. As they are Campylobacter-like spiral microorganisms, they were named *Campylobacter pyloridis* by Barry Marshall and Robin Warren in 1983 [3]. A lower prevalence was suggested by the second meta-analysis [4] reporting an overall global *H. pylori* prevalence of 44.3%, ranging from 50.8% in developing countries to 34.7% in developed countries; the prevalence of *H. pylori* was similar between males (46.3%) and females (42.7%) [5].

In many countries, the incidence of HP infection has been decreasing in association with improved standards of living [6]. Yet the prevalence of this bacterium is still ubiquitous, especially in the Far East. It is the main cause of chronic gastritis and the principal etiological agent for gastric cancer and peptic ulcer disease [7,8]. In most regions, the main mechanism of spread is intra-familial transmission [9]. The prevalence remains high in most developing countries and is generally related to socioeconomic status and levels of hygiene. Objectives of this study was to evaluate the incidence of *Helicobacter pylori* (HP) among perforated peptic ulcer patients in Garhwal region, Uttarakhand, India.

Materials & Methods

This study was conducted in Department of Surgery, Veer Chandra Singh Garhwali Government Medical Sciences and Research Institute (VCSGGMSRI), Srinagar, Garhwal, India during a period from January 2019 to January 2022.

Methods:

A total of 50 diagnosed perforated peptic ulcer patients undergoing emergency

laparotomy with age group 20 to 70 years were enrolled in this study. Attendants/Entire subjects signed an informed consent approved by institutional ethical committee.

Exclusion criteria: Patients who were on triple drug therapy for *H. pylori* for acute gastritis or any other disease; patient who showed septicaemia, respiratory failure, congestive heart failure and patients with traumatic perforations and perforations due to malignancy were excluded from this study.

A complete assessment (general and systemic examinations) and relevant investigations were performed in all patients. Blood sample specimen was allowed to clot at room temperature and centrifuged at 2500 rpm for 5 minutes in a REMI centrifuge after separating the clot from the upper wall of the test tube with sterile loop. The serum was separated and frozen until they tested as per the instruction of the manufacturer.

ELISA test: Serological examination was performed by ELISA test for the detection of IgA and IgM antibodies using Calbiotech, USA diagnostic kit.

Rapid urease test: The biopsy specimen from the perforated peptic ulcer margin were placed in Rapid urease test broth (HiMedia) containing 2% urea solution with phenol dye red as indicator, the change in color to pink within 4 hrs was taken as positive.

Giemsa staining: The biopsy specimen from the perforated ulcer margin were subjected to Giemsa staining and viewed under microscopy for the typical morphology of stained *H. pylori* organisms.

Statistical Analysis:

Data was analysed by using SPSS software. Mean \pm Standard deviation were calculated.

Observations:

In this present study, most of the cases 16(32%) were in age group of 31-40 years. 12(24%), 9(18%) and 6(12%) cases were in age group of 41-50, 51-60 and 61-70 years respectively. 30(60%) cases were

males and 20(40%) cases were females. The ratio of male and female was 3:2. Mean age of male patients was 47.24±17.65 years while mean age of female patients was 45.78±16.73 years.

Table 1: Age wise distribution of perforated peptic ulcer patients.

Age group (years)	No of patients	Percentage of patients
20-30	3	6%
31-40	16	32%
41-50	12	24%
51-60	9	18%
61-70	6	12%
>70	4	8%
Total	50	100%

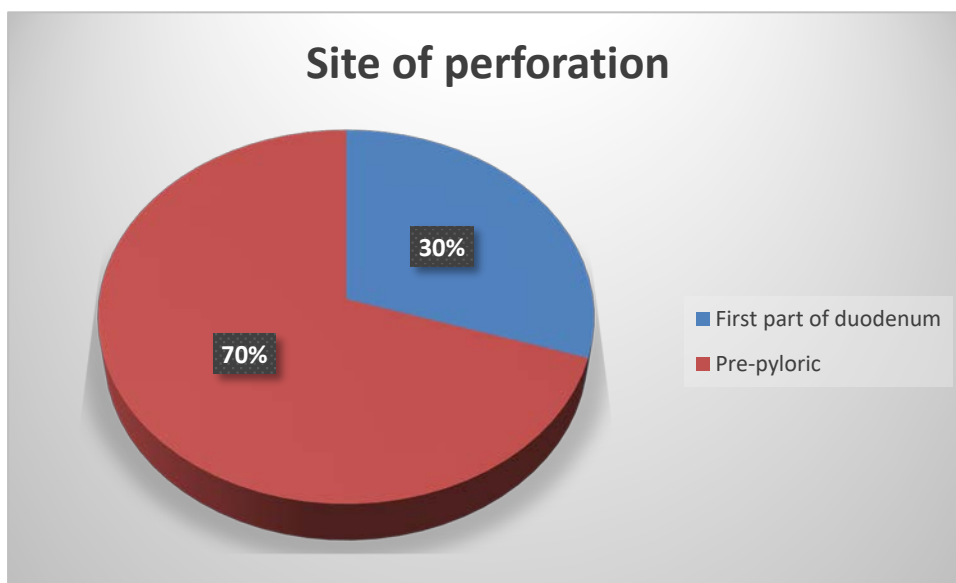


Figure 1: Site of perforation in peptic ulcer patients

In this present study, chief clinical presentation of all 50(100%) perforated peptic ulcer patients was pain abdomen. 35(70%) of the site of peptic ulcer perforation was in pre pyloric region and for 15(30%) of patients, the perforation was in the first part of duodenum.

Table 2: Peptic ulcer cases positive for H-pylori.

Giesma stain	No of cases	Percentage of cases
Positive	27	54%
Negative	23	46%
ELISA test		
Positive	26	52%
Negative	24	48%
Rapid urease test		
Positive	28	56%
Negative	22	44%

On biopsy with Giemsa staining 23(46%), biopsy samples were negative for *H. pylori* whereas 27(54%), samples were positive for *H. pylori*. Serology results for IgA and IgM antibodies were positive in 26(52%) and negative in 24(48%) perforated peptic ulcer patients. Similarly, when rapid urease test was performed in perforated peptic ulcer patients, 28(56%) cases were positive and 22(44%) were negative.,

In this study among all 50 patients Giemsa staining and rapid urease test were positive in 27(54%) patients and both the tests were negative in 23(46%) of the patients. Rapid urease test was alone positive in 28(56%) of the cases. Among all the 50 perforated peptic ulcer cases both Giemsa staining and Serology were positive in 26(52%) of the cases and both were negative in 22(44%) of the patients. Giemsa staining was alone positive in 27(54%) of the patients.

Table 3: Follow up of perforated peptic ulcer patients

Follow up	No. of cases	Percentages
No complication	46	92%
Enterocutaneous fistula	2	4%
Surgical site infection	1	2%
Death	1	2%
Total	50	100%

In this present study, on postoperative follow up 46(92%) of the patients had not developed any complications, 2(4%) developed enterocutaneous fistula, 1(2%) had surgical site infection with organism *E. coli*, and 1(2%) died due to septicemic shock.

Discussions:

Helicobacter pylori (HP) is a gram-negative microaerophilic bacterium that infects the epithelial lining of the stomach. The discovery of HP as a cause of peptic ulcer disease in 1983 resulted in a change of what was once a difficult and debilitating disease into one that could be reliably cured with a course of antibiotics, albeit with escalating concerns due to mounting antibiotic resistance [10]. Colonization with *H. pylori* is not a disease in itself but a condition that affects the relative risk of developing various clinical disorders of the upper gastrointestinal tract and possibly the hepatobiliary tract. Testing for *H. pylori* therefore has no relevance by itself but should be performed to find the cause of an underlying condition, such as peptic

ulcer disease, or for the purpose of disease prevention, such as in subjects with familial gastric cancer [11].

In this present study, most of the cases 16(32%) were in age group of 31-40 years. 12(24%), 9(18%) and 6(12%) cases were in age group of 41-50, 51-60 and 61-70 years respectively. This finding was consistent with the study by Dogra et al with the highest incidence in the age group of 31-40 years [12].

In this present study, 30(60%) cases were males and 20(40%) cases were females. The ratio of male and female was 3:2. Mean age of male patients was 47.24 ± 17.65 years and mean age of female patients was 45.78 ± 16.73 years. This corroborates with various other studies done by Reinbach et al, Khan et al, Aman et al, Dogra et al, Rehmani et al. [13,14,15,16]. It is contrasting to the study by Kaffes et al, who found it to be more common in females [17].

In this present study, most common presenting symptom was epigastric/ upper abdominal pain, almost all 50 (100%) cases had it. Guarding/rigidity were

present in almost all cases. This is consistent with the other studies [18]. Intraoperatively 35(70%) patients had Pre-pyloric perforation, 15(30%) patients had in D1 i.e., first part of duodenum. This is in contrast to the studies in the literature, like the study done by Shah et al which mentioned that most common site was first part of duodenum or pre-pyloric [19]. All patients with perforated peptic ulcer included in our study underwent exploratory laparotomy with Graham's omental patch closure.

In this present study, the frequency of *H. pylori* was found to be 28(56%) among the 50 participants; showing moderately high incidence of *H. pylori* infection in perforated peptic ulcers. These results are in agreement with studies by Reinbach et al and Chowdhary et al, whose studies showed 47% (statistically insignificant) and 0% incidence respectively [20,21]. This is in contrast to the various studies in the literature. For example, indigenous studies by Sebastian et al reported an infection rate as high as 83% in a small group of acute perforated peptic ulcer, Sharma et al found a prevalence rate of 61% among 44 patients from Chhattisgarh region [22].

Gastric or duodenal ulcers (commonly referred to as peptic ulcers) are defined as mucosal defects with a diameter of at least 0.5 cm penetrating through the muscularis mucosa. Gastric ulcers mostly occur along the lesser curvature of the stomach, in particular, at the transition from corpus to antrum mucosa [23]. Duodenal ulcers usually occur in the duodenal bulb, which is the area most exposed to gastric acid. In Western countries, duodenal ulcers are approximately fourfold more common than gastric ulcers; elsewhere, gastric ulcers are more common. Duodenal ulcers in particular occur between 20 and 50 years of age, while gastric ulcers predominantly arise in subjects over 40 years old. Both gastric and duodenal ulcer

diseases are strongly related to *H. pylori*. In initial reports from all over the world in the first decade after the discovery of *H. pylori*, approximately 95% of duodenal ulcers and 85% of gastric ulcers occurred in the presence of *H. pylori* infection [24]. Several cohort studies estimated that the lifetime risk for ulcer disease in *H. pylori*-positive subjects is 3 to 10 times higher than in *H. pylori*-negative subjects [25] and that 10 to 15% of *H. pylori*-positive subjects developed ulcer disease during long-term follow-up. These data came from studies in developed areas of the world. It is unknown whether *H. pylori*-positive subjects in developing countries have similar disease risks. Introduction of *H. pylori* eradication regimens completed the evidence for a causal relation between *H. pylori* and ulcer disease by showing that eradication of this bacterium strongly reduced the risk of recurrent ulcer disease [25].

In this present study, Giemsa staining of the biopsy samples showed Helical bacteria in 27(54%) out of 50 cases. This method has an accuracy rate of 78% in detecting *H. pylori* [16]. This method was considered gold standard and used in almost all studies for the detection of *H. pylori* in perforated peptic ulcers [12,15,18].

In this present study, serological analysis of 26 patient 26(52%) with perforated peptic ulcer was positive for *Helicobacter pylori*.

In this present study, frequency of *H. pylori* by rapid urease test was found to be 28(56%). This is a less commonly used method in various studies for detection of *H. pylori*. All biopsy proven studies had positive rapid urease test, but also had a few false positive [19, 20]. This is consistent with our study.

Postoperatively, one patient developed entero-cutaneous fistula, which was managed conservatively. One patient

developed superficial surgical site infection, with pus culture from wound site growing *E.coli* organism. Patient was followed up for a period of 6 months. Patient with *H. pylori* positive results were given triple drug therapy for *H. pylori* eradication. No recurrence was documented in any of the 50 cases. No re-operation was required.

An observational cross-sectional study on 166 adults in Portugal found a higher prevalence of *H. pylori* in adults with a lower consumption of vegetables and fruits and higher consumption of fried food; in addition, lower frequency of handwashing before going to the bathroom and well water consumption was also found to be risk factors, whereas no association was demonstrated with tobacco, alcohol, coffee or other dietary factors [21]. The relationship of *H. pylori* seroprevalence and CagA seroprevalence to a number of dietary factors was addressed in a study of 294 adult asymptomatic blood donors in Bulgaria [22]. Frequent (>5 days per week) honey consumption was associated with both reduced *H. pylori* seroprevalence (OR, 0.68; 95% CI, 0.473-0.967) and reduced CagA IgG seroprevalence (OR, 0.65; 95% CI, 0.486-0.859). Frequent (>5 days per week) yoghurt consumption was also associated with lower CagA positivity (OR, 0.56; 95% CI, 0.341-0.921) [5].

Gastric colonization with *H. pylori* induces histologic gastritis in all infected individuals, only a minority develop any apparent clinical signs of this colonization. It is estimated that *H. pylori*-positive patients have a 10 to 20% lifetime risk of developing ulcer disease and a 1 to 2% risk of developing distal gastric cancer [23, 24, 25]. The risk of development of these disorders in the presence of *H. pylori* infection depends on a variety of bacterial, host, and environmental factors that mostly relate to the pattern and severity of gastritis [11].

Conclusions:

We have found the preponderance of peptic ulcers in middle aged male population, pre-pyloric region being the commonest site of perforation. There has been a higher prevalence of *H-pylori* infection in patients with perforated peptic ulcers in our study.

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