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Prevalence of Helicobacter pylori in gastroduodenal ulcer patients: A hospital based prospective study

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Abstract

Objectives: This present study was to evaluate the prevalence and positive predictive value in Geisma stain of Helicobacter pylori in gastroduodenal perforation patients.

Methods: A detail history, clinical examination and relevant investigation were performed to all gastroduodenal patients. And all patients managed with emergency laparotomy through midline and contaminated peritoneal fluid aspirated and the exact location and the size of perforation noted. Biopsies taken from the 3, 6, 9 o'clock positions and subjected to the Giemsa staining. Closure was done with live omental patch and peritoneal wash given and drain kept in pelvis. Patients positive for H. pylori were put on medical treatment.

Results: Data was analysed by using simple statistical methods with the help of MS-Office software. All data was tabulated and percentage was calculated.

Conclusions: Gastroduodenal perforation was commonly seen in elderly age group patients. Male was more preponderance than female. Duodenal perforation was more common than gastric perforation. H pylori had the high positive predictive value in Geisma stain for patients with gastroduodenal perforation. Hence, *H. pylori* infection is the initial or primary cause of the gastroduodenal ulceration. And, the high positive predictive value of Giemsa stain indicates potential for it being a screening test for H. pylori infections.

Keywords: gastroduodenal perforation, helicobacter pylori, Geisma stain, age group

Introduction

Gastrointestinal perforations constitute one of the commonest surgical emergencies encountered. Management of these patients continues to be highly demanding despite the advances made in diagnosis and surgical therapy. The etiological spectrum of perforation peritonitis in India differs significantly from its western counter parts [1].

Globally the incidence of peptic ulcer disease is said to have fallen in recent years. Also recent advances have taken place in both diagnosis and management of peptic ulcer disease, namely improvements in endoscopic diagnostic and therapeutic facilities, the increased use of proton pump inhibitors and *Helicobacter pylori* eradication therapies. In spite of all these, peptic ulcer perforation rates have remained unchanged [2] and therefore remain a major health challenge. The pattern of perforated PUD is said to vary from one geographical area to another, depending on some socio-demographic and perhaps environmental factors [3]. In a developing country such as ours, the patients presenting with perforated PUD are comparatively young with a dominant male preponderance [4, 5]. This is in contrast to the developed countries were the patient population with perforated PUD are mainly the elderly with less pronounced incidence differences between sexes. It is probable that the very strong association with smoking and alcohol among the young male population may account for the high incidence in developing countries. Certainly, in the West the high incidence is due to ulcerogenic drug ingestion amongst the elderly population [6]. At least half of the world's population are infected by *H. pylori* making it one of the most wide spread infections in the world. Actual infection rate vary from nation to nation; developing countries have a much higher infection rate as compared to the developed countries where rates are estimated to be around 25%. Despite high rates of infection in certain areas of the world, the overall frequency of *H. pylori* infection is declining [6].

Peptic ulceration occurs due to acid peptic damage to the gastro-duodenal mucosa, resulting in mucosal erosion that exposes the underlying tissues to the digestive action of gastro-duodenal secretions. This pathology was traditionally related to a hypersecretory acid environment, dietary factors and stress. However, the increasing incidence of the Helicobacter pylori infection, the extensive use of NSAIDs, and the increase in alcohol and smoking abuse have changed the epidemiology of this disease. Despite a sharp reduction in incidence and rates of hospital admission and mortality over the past 30 years [7, 8], complications are still encountered in 10–20% of these patients [9, 10]. Objectives of this present study was to evaluate the various risk factors in gastroduodenal perforation patients.

Materials & Methods

This present study was conducted in Department of Surgery, Government Doon Medical College and Hospital, Dehradun, Uttarakhand, India during a period from April 2019 to February 2020. Attendants/Entire subjects signed an informed consent approved by institutional ethical

committee of Government Doon Medical College, Dehradun. A total of 100 gastroduodenal perforation patients were enrolled in this study. All cases of gastroduodenal perforation with irrespective of age, sex and duration who reported in casualty were included in this study. Exclusion Criteria of this study were any history of trauma, small bowel and large bowel any history of trauma is excluded, and small bowel and large bowel perforation excluded.

A detail history, clinical examinations and relevant investigations were performed to all patients.

Investigations were performed like as X-ray plain shows air under diaphragm in 80% of cases. Ultrasound examination shows intraperitoneal free fluid. Computerised tomographic examination rarely needed. Serum amylase used for prognosis and is directly proportional to mortality. Obliteration of liver dullness as a result of collection of escaped gas under diaphragm. Detection of Helicobacter pylori Non-invasive: a) ELISA -100% sensitive, b) Urea breath test. Invasive: a) Rapid urease test. b) Histology haematoxylin and eosin and modified Giemsa and silver stains**,** c) Culture – difficult method**.** Abdominal paracentesis was done in suspicious cases in four quadrants. Two prognostic scoring systems were used as Boey's score and Mannheim peritonitis index to assess the stages of gastroduodenal perforation.

Procedures

All patients managed with emergency laparotomy through midline and contaminated peritoneal fluid aspirated and the exact location and the size of perforation noted. Biopsies taken from the 3, 6, 9 o'clock positions and subjected to the Giemsa staining. Closure was done with live omental patch and peritoneal wash given and drain kept in pelvis. Patients positive for H. pylori were put on medical treatment. Patients were followed up for a period of 6 months and medical therapy includes cap. lansoprazole 30 mg, tab. Tinidazole 500 mg, tab. clarithromycin 250 mg twice daily for 14 days.

Statistical Analysis

Data was analysed by using simple statistical methods with the help of MS-Office software. All data was tabulated and percentage was calculated.

Observations

This present study had included 100 total patients of gastroduodenal perforation. Out of total 100 patients. 75(75%) patients were males and 25(25%) patients were female. Male and female ratio was 3:1.

Table 1: Gender wise distribution of gastric duodenal perforation.

Age group (Years)	No. of patients	Percentage of patients
15-30	10	10%
31-45	34	34%
46-60	44	44%
61-75	12	12%

In this present study, most of the patients 44(44%) were in age group of 46-60 years. Second common age group of patients 34(34%) were 31-45 years.

Table 2: Showing the site of gastroduodenal perforation.

Type of perforation	H. pylori		Total (%)
	Positive	Negative	
Gastric	10	6	16(16%)
Duodenal	78	6	84(84%)
Total	88	12	100(100%)

In this present study, out of 100 patients, 88(88%) patients were positive for H Pylori. Among them 78% patients of duodenal perforation had positive for H pylori.

Table 3: Geisma stain for H Pylori in gastroduodenal ulcer patients.

H pylori	Giemsa	
	Positive	Negative
Present	82	9
Absent	0	9
Total	82(82%)	18(36%)

Discussions

Perforated gastric and duodenal ulcer is a common surgical emergency worldwide which is associated with high morbidity and mortality. Each year peptic ulcer disease (PUD) affects 4 million people around the world [11].

The discovery of H. pylori by Warren and Marshall in 1983, paved way to several studies highlighting the association between H. pylori and peptic ulcer diseases and carcinoma stomach [12]. It is now believed that 80% to 95% of duodenal ulcers and approximately 75% of gastric ulcers are associated with H. pylori infection. Infection with H. pylori has been shown to temporally precede ulcer formation, and when this organism is eradicated as part of ulcer treatment, ulcer recurrence is extremely rare [13]. These observations have secured the place of H. pylori as the primary causative factor in the pathogenesis of PUD.

In present study, 75(75%) of our subjects were male and 25(25%) were female, showing predominance of gastric and duodenal perforations in the male gender. More than half the patients, i.e., 84% were diagnosed to have duodenal perforation. The maximum number of patients, i.e., 44% were elderly (31 years to 45 years), followed by 34% of them being in the third to fourth decade of life.

H. pylori infection is almost always associated with an inflammatory response; however, peptic ulcer disease and gastric carcinoma occur only in a subset of individuals chronically infected with *H. pylori*. Presumably, both bacterial and host factors contribute to this differential response. The role of *H. pylori* as a gastric pathogen is dependent on virulence factors and pathogenic mechanisms. Virulence factors are those that allow *H. pylori* to survive in the hostile environment of the gastric lumen which includes its spiral shape, motility, adaptive enzymes, proteins, and ability to adhere to gastric mucosal cells and mucus [14]. Pathogenic mechanisms are those that lead either directly to disruption of the gastric mucosal barrier including its toxins like Vac A and Cag A and mediators of inflammation [15].

In present study, 88% of the gastroduodenal perforations, were positive for test result. Among gastric and duodenal perforations, 78% of duodenal perforations were positive for the test, where as 10 % of gastric perforations were positive for the test, whereas Aman *et al.* [16] shows
85.1% and Ng *et al.* [17] shows 70% and 4 gastric

perforations were positive. It was indicated of the presumed incidence of *Helicobacter pylori* infection in our study group. In a study conducted by Gisbert *et al*, [18] 62% of the patients with perforated peptic ulcer were infected by *H. pylori*, while the microorganism was detected in 87% of the patients without this complication [18]. Similarly, in an Indian study conducted by Dogra *et al*, from Pune conducted a study and found out that out of 50 cases of gastro duodenal perforation who underwent exploratory laparotomy, as many as 46 cases (92%) turned out to be positive for *H. pylori* and only four cases (8%) were negative for this infection.

In this study, Giemsa stain had high validity in detecting the H. pylori infection. 82 % patients were positive for H pylori in Giesma stain and 18 % were negative. Lofelld *et al*. conducted study on 302 patients with perforated peptic ulcers and found 78% accuracy in detecting H. pylori by Giemsa stain from biopsy sample [19].

H. pylori was detected by Giemsa stain which showed 91.3% sensitivity and 100% specificity [19]. Kumar *et al* found that rapid urease test as most sensitive diagnostic method [20].

Levi *et al*. reported increased gastrin levels due to *H. pylori* infection which induced increased gastric acid secretion leading to duodenal ulcer [21]. Eradication of *H. pylori* abolishes the hypergastrinemia suggesting that this is due to *H. pylori* infection [15].

Conclusions

This present study concluded that the gastroduodenal perforation was commonly seen in elderly age group patients. Male was more preponderance than female. Duodenal perforation was more common than gastric perforation. H pylori had the high positive predictive value in Geisma stain for patients with gastroduodenal perforation. Hence, *H. pylori* infection is the initial or primary cause of the gastroduodenal ulceration. And, the high positive predictive value of Giemsa stain indicates potential for it being a screening test for H. pylori infections.

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