

## Original Research Article

# Frequency of *Helicobacter pylori* in perforated peptic ulcer cases in a tertiary rural hospital

Dinesh Kumar Sathanantham<sup>1</sup>, Prakash Dave<sup>1\*</sup>, P. M. Beena<sup>2</sup>, Sreeramulu P. N.<sup>1</sup>

Department of Surgery, Department of Microbiology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India

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### \*Correspondence:

Dr. Prakash Dave,

E-mail: [prakdave@rediffmail.com](mailto:prakdave@rediffmail.com)

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### ABSTRACT

**Background:** *Helicobacter pylori* infections have proven to be associated with gastritis and peptic ulcer, adenocarcinoma, gastric lymphoma. But its association with peptic ulcer perforations has not been completely proved. This study is intended to find out the association and give clarity of the pathology. The objective of the study was to observe the presence or absence of *H. pylori* in perforated peptic ulcer disease by obtaining biopsy from ulcer margin for rapid urease test, giemsa staining as well as serological method (antibodies IgA and IgG)

**Methods:** This is an observational non-blinded study carried out in all cases of perforated peptic ulcer reporting in surgical wards, Emergency Department of the medical college during 2016-2018. Biopsy was taken from the ulcer margin and the tissue was subjected to histo-pathological examination, rapid urease test and blood sample was sent for serological examination.

**Results:** Of the 46 patients participated in our study, 41 (89.1%) happened to be male, 5 (10.9%) were female. Only 2.2% of the patients were positive for *H. pylori* and remaining 95.7% were negative for *H. pylori*. The difference in the age group and *H. pylori* infection was found to be not statistically significant ( $p > 0.05$ ).

**Conclusions:** In our study, frequency of *H. pylori* in perforated peptic ulcer cases was found to be only 2.2% which proves that there may be other contributing factors in perforated peptic ulcer cases, which need to be further evaluated.

**Keywords:** Peptic ulcer, Perforated peptic ulcer, Peritonitis, *H. pylori*, Giemsa

### INTRODUCTION

Peptic ulcers are defined as erosions in the gastric (or) duodenal mucosa that extend through the muscularis mucosae.<sup>1</sup> In the earlier days, peptic ulcers were believed to be caused by stress, dietary factors and increased gastric acid secretion till as late as 1983, when Warren and Marshall discovered the association between *Helicobacter pylori* and peptic ulcers.<sup>2</sup>

Approximately 50% of the world population is infected with *H. pylori*.<sup>3</sup> Range of prevalence declines from well-developed countries to developing nations. A systemic

review of global prevalence showed figures as high as 48.5% having been infected with *H. pylori*. African countries rank highest with the prevalence of as high as 70.1%.

One of the major life threatening complication of peptic ulcer disease is peritonitis due to perforation of duodenal/gastric ulcer, which is managed by an emergency procedure of omental patch repair and peritoneal toilet to a definitive procedure (done conventionally) of vagotomy and gastrojejunostomy or pyloroplasty in the later stages.

*H. pylori* is a gram negative and micro-aerophilic organism that can cause chronic gastritis, gastric, duodenal ulcers and gastric adenocarcinoma.<sup>5</sup> The role of *H. pylori* in the etiopathogenesis of chronic peptic ulcer has been well established, but its importance in the pathology of perforated peptic ulcer is still conflicting.

## METHODS

### Source of data

A sample of 46 patients fulfilling the inclusion criteria were selected for this study from Department of General Surgery of R. L. Jalappa Hospital and Research Centre, Tamaka, Kolar attached to Sri Devaraj Urs Medical College between December 2016 and June 2018.

### Type of study

A prospective observational study.

### Inclusion criteria

Patients diagnosed with perforated peptic ulcer of ages 18-75 years, undergoing emergency laparotomy were included in our study.

### Exclusion criteria

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

46 patients fulfilling the criteria framed were included in our study after obtaining a written & informed consent, was elicited followed by general and systemic examination. The study was a non-blinded study at every levels.

A brief data on the special investigations done for the *H. pylori* study.

### Serology

ELISA test (Calbiotech, USA diagnostic kit) for detection of IgA and IgM antibodies is used. 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.

### Rapid urease test

The biopsy specimen from the perforated peptic ulcer margin were placed in Rapid urease test broth (HiMedia)

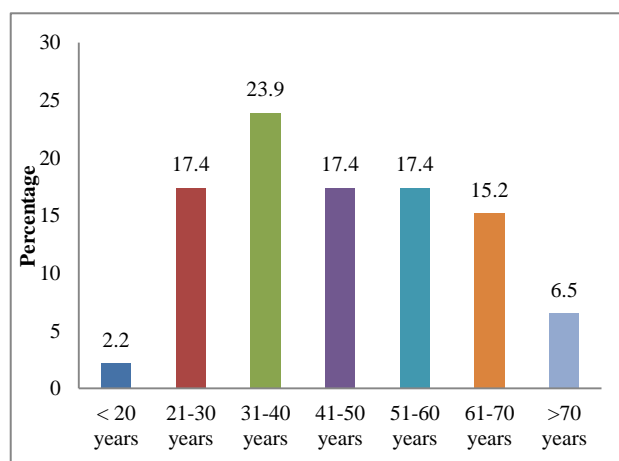
containing 2% urea solution with phenol dye red as indicator, the change in color to pink within 4 hrs will be taken as positive.<sup>11</sup>

### 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.

## RESULTS

The present study was done as an observational non-blinded study among 46 perforated peptic ulcer patients to find out the frequency of Helicobacter Pylori infection in perforated peptic ulcer patients undergoing surgery in Sri Devaraj Urs Medical College Hospital, Tamaka, Kolar.



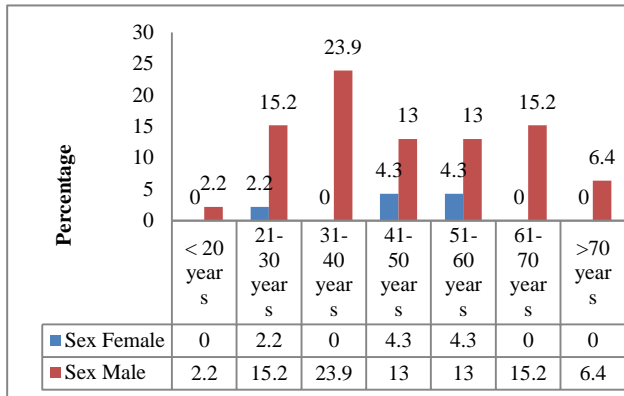
**Figure 1: Age group of the participants.**

Among the total 46 participants in this study there were 11 (23.9%) participants in the age group of 31-40 years, 8 (17.4%) participants in the age group of 41-50 years and 8 (17.4%) participants in the age group of 51-60. Each in the age range of 61-70 years there were 7 (15.2%), 3 (6.5%) patients above 70 years of age. One (2.2%) patient was aged 9 years (Figure 1).

Of all the study participant 41 (89.1%) patients were males and 5 (10.9%) patients were females.

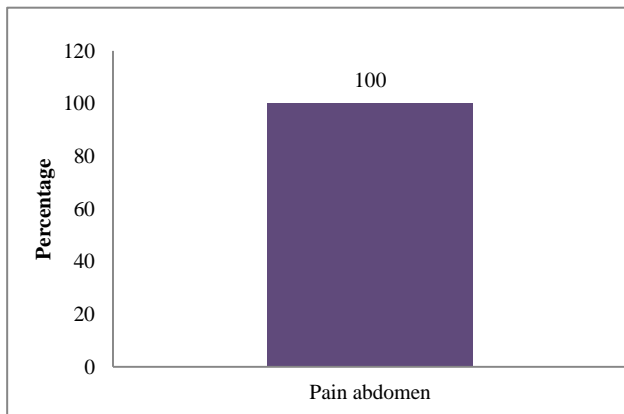
In the current study of case of perforated peptic ulcer on the age group and sex wise distribution, was (2.2%) (n=1) of male below 20 years of age. Between 21-30 years there was (n=1) (2.2%) female and (n=7) 15.2% male patients. Of the 11 patients in the age group of 31-40 years all (n=11) 23.9% were males. In the age range of 41-50 years there were (n=2) (4.3%) females and (n=6) 13% males. Same frequency was noted for age group 51-60 years. In the age group of 61-70 years (n=7) 15.2% were males. No female cases were recorded within one

group above 70 years of age all (n=3) 6.4% cases were males as mentioned in Figure 2.



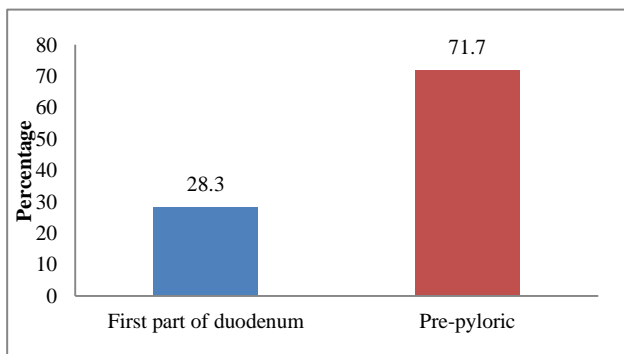
**Figure 2: Proportion of male and female subjects in each age group.**

In the present study the mean age of women was found to be 48 years with standard deviation (SD) of 12.2 years. And in men the mean age was 46.98 years with SD of 16.99 years.



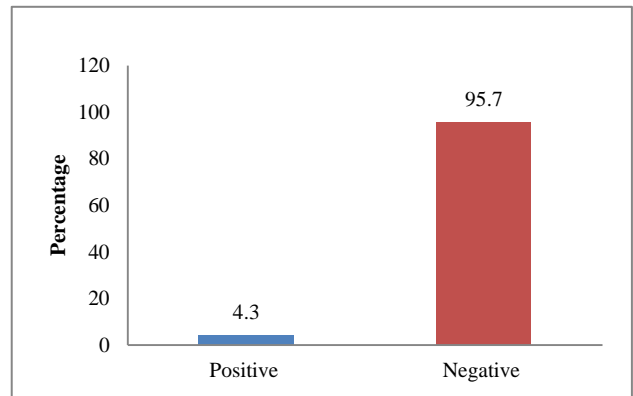
**Figure 3: Clinical presentation of the participants.**

In this study of all the 46 patients with perforated duodenal ulcer all 46 (100%) patients the chief clinical presentation was pain abdomen (Figure 3).



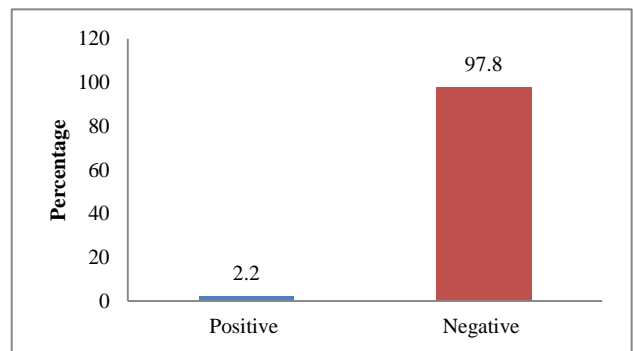
**Figure 4: Site of perforation.**

Among all the study participants in (n=33) 71.7% of the site of peptic ulcer perforation was in pre pyloric region and for (n=13) 28.3% of patients the perforation was in the first part of duodenum (Figure 4).



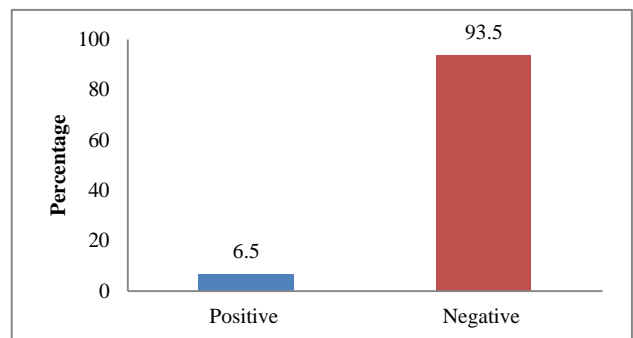
**Figure 5: Proportion of cases positive for H. pylori by Giemsa stain.**

On biopsy with Giemsa staining (n=44) 95.7%, biopsy samples were negative for H. pylori whereas (n=2) 4.3%, samples were positive for H. pylori (Figure 5).



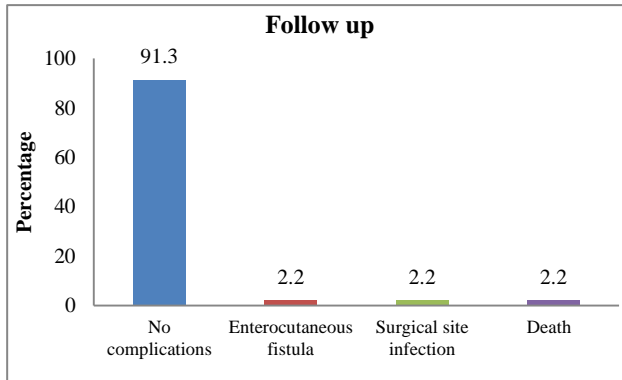
**Figure 6: Proportion of cases positive for H. pylori by serology.**

In the present study, the serology results for IgA and IgM antibodies were positive in 2.2% of the participants and negative in 97.8% participants (Figure 6).



**Figure 7: Proportion of cases positive for H. pylori by rapid urease test.**

Rapid urease test was found to be positive in 3 (6.5%) of the perforated peptic ulcer cases for *H. pylori* and negative among 43 (93.5%) of the cases (Figure 7).

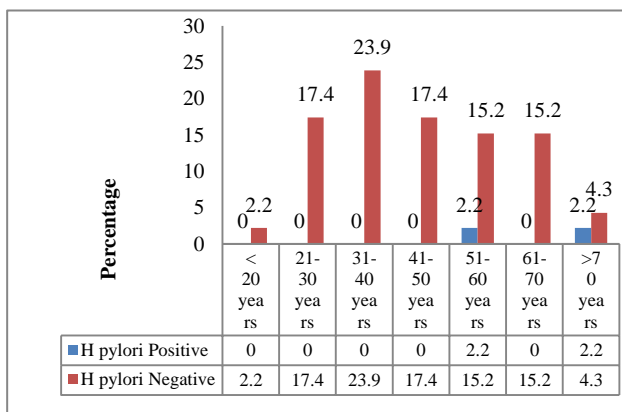


**Figure 8: Proportion of patients with complications.**

On postoperative follow up (n=42) 91.3% of the participants did not develop any complications, (n=1) 2.2% developed enterocutaneous fistula, (n=1) 2.2% had surgical site infection with organism *E. coli*, (n=1) 2.2% patient was lost to follow up due to discharge against medical advice, (n=1) 2.2% died due to septicemic shock (Figure 8).

In this study among 46 patients Giemsa staining and rapid urease test were positive in (n=2) 4.3% participants and both the tests were negative in (n=43) 93.5% of the patients. Rapid urease test was alone positive in (n=1) 2.2% of the cases.

Among the 46 perforated peptic ulcer cases both Giemsa staining and Serology were positive in (n=1) 2.2% of the cases and both were negative in 97.9% of the patients. Giemsa staining was alone positive in (n=1) 2.2% of the patients.

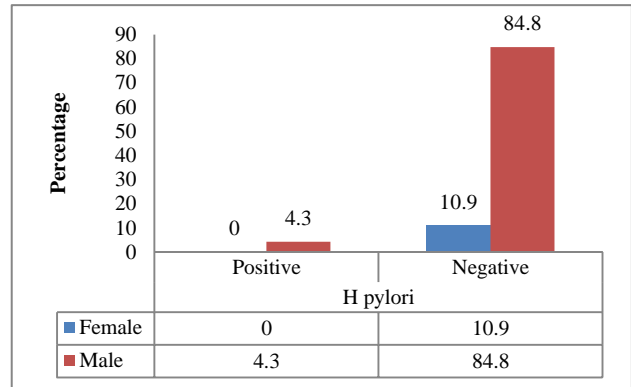


**Figure 9: Age group wise distribution of *H. pylori* cases.**

In this study *H. pylori* was positive in (n=1) 2.2% of the patient in the age group of 51-60 years and (n=1) 2.2% of the patients in the age group of more than 70 years. All

other patients were negative for *H. pylori* infection. The difference in the age group and *H. pylori* infection was found to be not statistically significant ( $p>0.05$ ) (Figure 9).

Among 2 cases who were positive for *H. pylori* infection both the cases were found to be males (Figure 10).



**Figure 10: Gender wise distribution of *H. pylori* cases.**

Among the (n=2) 4.3% cases that were positive for *H. pylori* infection, did not develop any complications after surgery. No patients with complications were found positive for *H. pylori* in this study. The difference was found to be not statistically significant ( $p>0.05$ ).

**DISCUSSION**

Perforated peptic ulcer still remains one of the major emergencies faced by general surgeons in day to day practice. Research for its prevention and cure has been carried out over a long time to reduce morbidity and mortality. The discovery of *H. pylori* by Warren and Marshall in the pathogenesis of Peptic ulcer disease has revolutionized the treatment of the same. But its association with perforated peptic ulcer is still conflicting; with varied studies giving difference of opinion.<sup>6,7</sup>

This study was conducted in the department of Surgery, at Sri Devaraj Urs Medical College, Tamaka, Kolar. 46 cases with Perforated Peptic ulcer in the age group of 20-70 years were included in the study. Patient who received treatment for *H. pylori* eradication were excluded from the study. All these cases were stratified according to age, sex, presenting symptoms, elicited signs, type of surgical intervention, histopathology, microbiological tests and serology.

During the 19 month period, 46 patients were enrolled in our study. Most of the patients were in the middle age group (30-50 years) as consistent with the other studies done by Dogra et al with the highest incidence in the age group of 31-40 years.<sup>8</sup>

Perforation in peptic ulcer was more common in males and comparatively less common in females. Our study also had similar findings with male preponderance of 89.1% and females 10.9%. This corroborates with the other studies by Reinbach et al, Khan et al, Aman et al, Dogra et al, Rehmani et al.<sup>3,6,9-12</sup> It is contrasting to the study by Kaffes et al, who found it to be more common in females.<sup>13</sup>

Most common presenting symptom among the cases in our study was epigastric/ upper abdominal pain, almost all 46 (100%) cases had it. Guarding/rigidity were present in almost all cases. This is consistent with the other studies.<sup>11</sup>

Intraoperatively 71.7% patients had Pre-pyloric perforation, 28.3% patients had in D1 i.e., first part of duodenum (a sample intra-op photograph as shown in Figure 2). 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.<sup>14</sup>

All patients with perforated peptic ulcer included in our study underwent exploratory laparotomy with Graham's omental patch closure. No definitive surgery was undertaken in any of the cases.

In our study, the frequency of *H. pylori* was found to be only 2.2% among the 46 participants; showing low incidence of *H. pylori* infection in perforated peptic ulcer. These results are in agreement with studies by Reinbach et al and Chowdhary, whose studies showed 47% (statistically insignificant) and 0% incidence respectively.<sup>6,15</sup>

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.<sup>16</sup>

Other studies conducted in different parts of the world namely Debongie et al showed a prevalence of 56%, NG et al on the other hand, found a 70% infection rate, a study conducted in Hong Kong by Chu et al reported infection rate of 47%, thus a varied picture of incidence in different regions of the world has been noted by various works.<sup>17,18</sup>

### **Giemsa**

Giemsa staining of the biopsy samples in our study showed *Helical bacteria* in only 2 (4.3%) out of 46 cases. This method has an accuracy rate of 78% in detecting *H. pylori*.<sup>12</sup> This method was considered gold standard and used in almost all studies for the detection of *H. pylori* in perforated peptic ulcer.<sup>8,9,11,12,19,20</sup>

### **Serology**

Serological analysis of one patient (2.2%) with perforated peptic ulcer out of 46 was positive; a test which has shown a prevalence rate of 68% (Aman) to 66.6% (Hussain), our study used both IgA and IgM for the analysis.<sup>10,14</sup>

### **Rapid urease test**

Frequency of *H. pylori* by rapid urease test was found to be 6.5% (3 out of 46).<sup>17</sup> 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.<sup>19</sup> 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 grew *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. One was lost to the follow-up, as the patient requested discharged against medical advice. No recurrence was documented in any of the 45 cases. No re-operation was necessary.

Thus in our study, association of *H. pylori* with perforated peptic ulcer was not present, significantly indicating a different pathogenesis and risk factors in the natural history of perforated peptic ulcer. The prevalence of pre-pyloric ulcer more than the duodenal ulcer can indicate a different etiology associated with perforation in this community.

In this context, a larger study with bigger sample size with inclusion of other confounding factors like use of NSAIDs, steroids, smoking and alcohol is indicated to establish the association between *H. pylori* or other factors with perforated peptic ulcer.

### **CONCLUSION**

According to our study the evidence of infection by *H. pylori* as shown by demonstration of IgG and IgA antibodies to the organism was found to be 2.2% and histological evidence by Giemsa staining was 4.3% and by rapid urease test was 6.5%. Thus the frequency of *H. pylori* infections seems to be very low in the studied patient population of perforated peptic ulcer.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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