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Original Research Article

H. pylori and peptic ulcer perforation: prevalence of infection and role in surgical outcome

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ABSTRACT

Background: Perforated peptic ulcer is one of the most common surgical emergencies. Despite a definite association of *H. pylori* with peptic ulcer disease, its association with peptic ulcer perforation is still doubtful. The aim of the present study was to know the prevalence of *H. pylori* infection and its role in surgical outcome of patients.
Methods: This prospective observational study was carried out at a tertiary care hospital of north India for a period of two years and included 136 consecutive patients of perforated peptic ulcer who underwent emergency laparotomy. *H. pylori* infection was tested on ulcer margin biopsy using rapid urease test kit and confirmed on histopathological examination.
Results: 136 consecutive patients of perforated peptic ulcer were included in this study with mean age of 42.43 years and sex ratio of 11.4:1. *H. pylori* infection was present in fifty four percent (54%) of patients. There was no relationship of *H. pylori* infection with morbidity and mortality of patients.
Conclusions: *H. pylori* infection should be assessed at the time of primary surgical management on biopsy specimen using rapid urease test and confirmed on histopathological examination. All positive patients should be subjected to *H. pylori* eradication therapy.

Keywords: *Helicobacter pylori*, Peptic ulcer perforation, Perforated peptic ulcer, Prevalence

INTRODUCTION

Peptic ulcer disease is still a global health problem due to its high morbidity, mortality and economic loss.[1] Despite a decrease in incidence of peptic ulcer in recent years, especially in the West, incidence of Peptic ulcer perforation has not changed much.[2]

The association between peptic ulcer disease and *Helicobacter pylori* was established by Warren and Marshall in the landmark study in 1983.[3] This lead to a change in trend in the management of perforated peptic ulcer disease with an inclination towards simple patch closure of perforations followed by anti- *H. pylori* treatment regime (triple therapy).[4]

However, the relationship of *H. pylori* with peptic ulcer perforations is still a debatable matter among different authors.[5] Prior studies have attempted to demonstrate the association between the two but came out with conflicting results.[5]

The aim of the present study was to analyse the frequency of *H. pylori* in peptic ulcer perforation utilizing various testing methods and to find out its role in surgical outcome of the patients.

METHODS

The present study was a prospective observational study conducted at a tertiary care hospital of northern India.

The study was conducted for a period of two years between October, 2015 and October, 2017 and included consecutive patients of perforated peptic ulcer who presented to the emergency department after taking informed consent. This study was carried out after prior approval of the institutional ethical committee.

Sample size

All adult population (≥18 years of age) who presented with signs and symptoms and diagnosed as perforated peptic ulcer and who underwent emergency laparotomy, during the specified period of time, was taken as sample for the study.

Exclusion criteria

Patients who were managed conservatively or died before the surgery were excluded from the study. Patients belonging to pediatric age group (<18years) were also excluded from the study.

Emergency open explorative laparotomy was carried out in all the patients under general anaesthesia through a midline abdominal incision. The diagnosis was confirmed and intra-operative findings were noted. Biopsies were taken from margins of the perforated peptic ulcers. Testing of *H. pylori* was carried out intra-operatively using *H. pylori* rapid urease enzyme detection kit (PYLO DRYTM). Another biopsy sample was sent for histopathological examination using Giemsa stain.

Repair of peptic ulcer perforation was carried out with 3-4 simple interrupted sutures and omentoplasty with pedicled omentum. Patients who were positive for *H. pylori* were subjected to standard anti-*H. pylori* treatment regime (triple therapy) for two weeks and were followed in the post-operative period and after discharge of patients at 8 and 16 weeks post-operatively.

Statistical analysis

Data was analysed using SPSS (Statistical Package for Social Sciences) version 22.0. Categorical data were analysed using Chi-square test and Fischer's test and quantitative data were analysed using independent 't' test. P value of less than 0.05 was considered as statistically significant.

RESULTS

Demography

A total number of 136 consecutive adult patients were included in the study with mean age of 42.43±13.26 years. Twenty seven percent (27%) of patients were in the age group of 40-49 years followed by the patients in the age group of 30-39 years (24%). Ninety two percent of patients were males and male to female ratio in the study population was 11.4:1. Age-wise distribution of patients is depicted in Table 1.

Table 1: Age and sex distribution.

Age group (years)	Male	Female	Total	Percentage
<20	0	0	0	0
20-29	21	2	23	17
30-39	30	3	33	24
40-49	34	3	37	27
50-59	18	2	20	15
≥60	22	1	23	17
Total	125	11	136	100

H. pylori testing

In our study, biopsy materials were collected intra-operatively from the ulcer margins and all biopsy samples were subjected to *H. pylori* testing intra-operatively using rapid urease enzyme (RUT)-kit. Ninety patients (66%) were tested positive by RUT-kit and forty six patients were negative for *H. pylori* testing. Biopsy from ulcer margins were also sent for histopathological examination for confirmatory examination using Giemsa staining. However, only seventy three patients (54%) could be confirmed as *H. pylori* positive using the Giemsa staining. Results of *H. pylori* testing are depicted in Table 2.

Table 2: Results of *H. pylori* detection using different testing methods.

H. pylori	RUT		Giemsa	
	Positive	**Negative**	**Positive**	**Negative**
	90 (66%)	46 (34%)	73 (54%)	63 (46%)

Morbidity

Forty seven percent (47%) patients developed post-operative complications in our study population. Superficial wound infection was the most frequent complication which occurred in 42 patients (31%) followed by lung complication which was seen in 35 patients (26%). Half of the *H. pylori* positive patients (50%) developed post-operative complications while the rate of complications among *H. pylori* negative patients was only forty four percent (44%). However, this association was not statistically significant (p value-0.466)

Mortality

The mortality rate in the study population was twenty two percent (22%). The most common reason of death in our study population was septicaemia leading to multi-organ failure in 20 patients (66.6%). Thirty percent (30%) of *H. pylori* positive patients expired while the mortality rate in *H. pylori* negative group was only 12.5%. However, this

association of mortality and *H. pylori* was not statistically significant (p value- 0.097). The relationship of *H. pylori* with surgical outcome of patients is depicted in Table 3.

Table 3: Relationship of *H. pylori* with surgical outcome of patients.

Surgical outcome		*H. pylori*		Total	P value
		Positive	Negative		
Post-operative Morbidity	Present	36	28	64	0.466
	Absent	36	36	72	
Post-operative mortality	Present	22	8	30	0.097
	Absent	51	55	106	

DISCUSSION

The present study was carried out to know the prevalence of *H. pylori* infection among the patients of peptic ulcer perforation and to know whether its presence has any impact on the surgical outcome of patients. The study included 136 consecutive patients of PPU who were presented and managed surgically at a tertiary care hospital of north India for a period of two years.

In our study, the majority of the patients were males and belong to middle-age group which is in concordance with previous studies.[6] Dogra et al reported a sex ratio of 3:1 and mean age of presentation of 49.2 years with highest incidence in the group of 41-50 yrs.[7] Similarly, Chalya et al reported the peak incidence in 4th decade (31-40 years) and median age of 32.4 years.[8]

The prevalence of *H. pylori* infection came out to be 54% in our study population. There is marked disparity in previous reporting of *H. pylori* infection rates among different authors. The previous reported prevalence of *H. pylori* infection in past literature ranged from 0-100%.[9] However, the mean prevalence of *H. pylori* infection of different studies, as reported by Gisbert et al, was 68.1%.[9] There may be various factors responsible for these variable results. The utilization of different types and number of testing methods as well as intake of non-steroidal anti-inflammatory drugs have been suggested as reasons for variable results in previous studies.[9]

The rate of infectivity also varied with different testing methods utilized. In our study, Rapid urease test (RUT) was positive in 66% patients while only 54% of patients were confirmed as *H. pylori* positive on histopathological examination using Giemsa staining. RUT is based upon 'urease' enzyme of *H. pylori* which convert the reagent of kit into ammonia and thereby increasing the pH and changing the colour of pH monitor of the kit. In case of PUP, test results are highly sensitive but specificity is decreased due to contamination of other urease producing organisms like *Proteus*, *Pseudomonas* and *Klebsiella*.[10] For direct detection of *H. pylori*, histology is usually considered as gold standard method.[11] It is the first and preferred method in most clinical settings.[12]

Kumar et al reported 57% mean prevalence of *H. pylori* infection in PUP by utilizing three diagnostic methods (HPE, RUT, culture) and concluded Rapid urease test (RUT) to be the most sensitive method of *H. pylori* detection.[13] Lofelld et al reported 78% accuracy by Giemsa stain from biopsy sample in detecting *H. pylori*.[14] Reinbach et al and Dogra et al reported low infection rate of 47% and 42% respectively suggesting different pathogenesis of perforated peptic ulcers.[7,15] However, Gisbert et al reported a prevalence of 62% using urea breath test (UBT).[9] Studies which used culture for demonstrating organism have reported markedly low prevalence of infection which range from 0-20%.[7,13,16,17]

In our study, forty seven percent (47%) of patients developed post-operative complications and mortality rate was twenty two percent (22%). There was a trend of higher morbidity among *H. pylori* positive patients but it was statistically non-significant. *H. pylori* infection was also not associated with higher mortality of patients (p value- 0.097). Studies have also suggested other pathogenic factors responsible for perforated peptic ulcers. To the best of our knowledge, none of the previous studies have studied the role of *H. pylori* in the surgical outcome of PUP. We further suggest that the association of *H. pylori* in the surgical outcome needs further research with prospective studies involving larger sample size.

There are few limitations of our study. Firstly, patients who were managed conservatively or who expired before surgical intervention were excluded from the study as diagnosis of *H. pylori* infection was primary based upon ulcer marginal biopsy. Another limitation is that the prevalence of *H. pylori* infection was not studied in the pediatric age group population which could have affected the overall prevalence of infection in the population.

CONCLUSION

Perforated Peptic ulcer is a serious emergency condition commonly affecting midde-aged males and is associated with *H. pylori* infection. *H. pylori* infection should be assessed at the time of surgical management using rapid urease test and confirmed on histopathological examination of biopsy samples. All positive patients should be subjected to *H. pylori* eradication therapy.

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REFERENCES

1. Türkdoğan MK, Hekim H, Tuncer İ, Aksoy H. The epidemiological and endoscopic aspects of peptic

ulcer disease in Van region. East J Med. 1999;4(1):6-9.
2. Montalvo-Javé EE, Corres-Sillas O, César Athié-Gutiérrez C. Factors associated with postoperative complications and mortality in perforated peptic ulcer. Cir Cir. 2011;79:128-35.
3. Warren JR, Marshall B. Unidentified curved bacilli on gastric epithelium in active chronic gastritis. Lancet. 1983;321(8336):1273-5.
4. Gurleyik E. Changing trend in emergency surgery for perforated duodenal ulcer. J Coll Phys Surg Pak. 2003;13:708-10.
5. Gisbert JP, Pajares JM. *Helicobacter pylori* infection and perforated peptic ulcer prevalence of the infection and role of antimicrobial treatment. Helicobacter. 2003;8(3):159-67.
6. Ng EK, Lam YH, Sung JJ, Yung MY, To KF, Chan AC, et al. Eradication of *Helicobacter pylori* prevents recurrence of ulcer after simple closure of duodenal ulcer perforation: Randomized controlled trial. Ann Surg. 2000;231:153-8.
7. Dogra BB, Panchabhai S, Rejinthal S, Kalyan S, Priyadarshi S, Kandar A. *Helicobacter pylori* in gastroduodenal perforation. Med J DY Patil Univ. 2014;7:170-2.
8. Chalya PL, Mabula JB, Koy M, McHembe MD, Jaka HM, Kabangila R, et al. Clinical profile and outcome of surgical treatment of perforated peptic ulcers in Northwestern Tanzania: a tertiary hospital experience. World J Emerg Surg. 2011;6:31.
9. Gisbert JP, Legido J, Garcıa-Sanz I, Pajares JM. *Helicobacter pylori* and perforated peptic ulcer. Prevalence of the infection and role of non-steroidal anti-inflammatory drugs. Digest Liver Dis. 2004;36(2):116-20.
10. Siu LK, Leung WK, Cheng AF, Sung JY, Ling TK, Ling JM, et al. Evaluation of a selective transport medium for gastric biopsy specimens to be cultured for *Helicobacter pylori*. J Clin Microbiol. 1998;36:3048-50.
11. Wang YK, Kuo FC, Liu CJ, Wu MC, Shih HY, Wang SSW, et al. Diagnosis of *Helicobacter pylori* infection: Current options and developments. World J Gastroenterol. 2015;21(40):11221-35.
12. Rotimi O, Cairns A, Gray S, Moayyedi P, Dixon MF. Histological identification of *Helicobacter pylori*: comparison of staining methods. J Clin Pathol. 2000;53:756-9.
13. Kumar D, Sinha AN. *Helicobacter pylori* infection delays ulcer healing in patients operated on for perforated duodenal ulcer. Indian J Gastroenterol. 2002;21:19-22.
14. Loffeld RJ, Stobberingh E, Flendrig JA, Arends JW. *Helicobacter pylori* in gastric biopsy specimens. Comparison of culture, Modified giemsa stain and immune histo-chemistry: a retrospective study. J Pathol. 1991;165:60-73.
15. Reinbach DH, Cruickshank G, McColl KE. Acute perforated duodenal ulcer is not associated with *Helicobacter pylori* infection. Gut. 1993;34:1344-7.
16. Chowdhary SK, Bhasin DK, Panigrahi D, Malik AK, Kataria RN, Behra A, et al. *Helicobacter pylori* infection in patients with perforated duodenal ulcer. Trop Gastroenterol. 1998;19:19-21.
17. Tayal R, De A, Sundaravadanan S, Kumar M, Baveja S. Role of culture in cases of perforated peptic ulcers due to *Helicobacter Pylori*. Int J Sci Stud. 2015;3(3):24-7.

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