

Is *Helicobacter pylori* being treated appropriately? A study of inpatients and outpatients in a tertiary care centre

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BACKGROUND: *Helicobacter pylori* is causally associated with peptic ulcer disease and gastric cancer. Although effective treatment is available, studies have shown that patients with *H pylori* are often not well managed. Recently, there has also been increasing awareness of patient safety concerns arising from missed follow-up of abnormal test results.

OBJECTIVE: To examine whether inpatients and outpatients diagnosed with *H pylori* receive appropriate treatment.

PATIENTS AND METHODS: All patients who were diagnosed with *H pylori* by gastric biopsy in London, Ontario between January 1, 2004, and December 31, 2004, were identified. The hospital charts of these patients were reviewed. Outpatient office charts, clinic notes, pathology reports and endoscopy reports were also reviewed.

RESULTS: One hundred ninety-three patients were diagnosed with *H pylori* by gastric biopsy in 2004. Of the 193 patients, 143 (74%) were outpatients and 50 (26%) were inpatients. Overall, 89% of patients received treatment for *H pylori*. Ninety-two per cent of outpatients were treated, while only 60% of inpatients received treatment ($P < 0.001$). Among the inpatients, the pathology report was available in 40% of the cases before the patient was discharged from the hospital. After discharge from the hospital, 30% of inpatients received appropriate treatment and follow-up. There was no significant difference in treatment whether the patient was admitted to a medical or a nonmedical service.

CONCLUSION: *H pylori* is treated relatively poorly in inpatients compared with outpatients. Results of the present study reveal opportunities to improve delivery of care for inpatients on a number of different levels. More research is needed to ensure safety, effectiveness and timeliness in the test result management process.

Key Words: *Helicobacter pylori*; Inpatient; Outpatient; Treatment

Helicobacter pylori is a Gram-negative organism that infects the gastric mucosa of over one-half of the world's population (1). It was brought to the world's attention in 1984 when Marshall and Warren (2), two Australian investigators who recently won the Nobel Prize for their discovery, reported it as a causative agent for acute gastritis. *H pylori* is now known to be associated with peptic ulcer disease, gastric adenocarcinoma and gastric marginal zone lymphoma (3,4).

Helicobacter pylori est-il traité adéquatement? Étude sur des patients hospitalisés et non hospitalisés d'un centre tertiaire

HISTORIQUE : Un lien causal unissait *Helicobacter pylori* à l'ulcère gastro-duodénal et au cancer de l'estomac. Bien qu'il existe un traitement efficace, des études ont montré que chez les patients porteurs de *H. pylori* les interventions thérapeutiques laissent souvent à désirer. On constate aussi depuis peu qu'une attention plus grande est accordée à la sécurité des patients qui ne sont pas suivis après avoir obtenu des résultats anormaux aux tests de dépistage.

OBJECTIF : Vérifier si les patients porteurs de *H. pylori* qui sont hospitalisés ou non hospitalisés reçoivent un traitement adéquat.

PATIENTS ET MÉTHODES : Tous les patients ayant reçu un diagnostic de *H. pylori* par biopsie gastrique à London, en Ontario, entre le 1er janvier 2004 et le 31 décembre 2004, ont été recensés. Les dossiers hospitaliers de ces patients ont été passés en revue. Les dossiers des centres ambulatoires, les notes de clinique, les rapports de pathologie, les rapports d'endoscopie ont aussi été analysés.

RÉSULTATS : Cent-quatre-vingt-treize patients ont reçu un diagnostic de *H. pylori* par biopsie gastrique en 2004. Parmi les 193 patients, 143 (74 %) n'étaient pas hospitalisés et 50 (26 %) l'étaient. Dans l'ensemble, 89 % des patients ont reçu un traitement pour *H. pylori*. Quatre-vingt-douze pour cent des patients non hospitalisés ont été traités, contre 60 % seulement des patients hospitalisés ($p < 0,001$). Parmi les patients hospitalisés, les dossiers de pathologie étaient accessibles dans 40 % des cas avant leur congé de l'hôpital. Après leur congé de l'hôpital, 30 % des patients hospitalisés ont reçu un traitement et un suivi appropriés. On n'a noté aucune différence significative quant au traitement, selon que le patient avait été admis dans un service médical ou non médical.

CONCLUSION : Le traitement de *H. pylori* laisse relativement à désirer chez les patients hospitalisés, comparativement aux patients non hospitalisés. Les résultats de la présente étude mettent en évidence des lacunes à combler pour ce qui est de la prestation des soins aux patients hospitalisés, et ce, à plusieurs égards. Des recherches plus approfondies s'imposent pour augmenter la sécurité, l'efficacité et la rapidité du processus de prise en charge sur la base des résultats des tests.

Several position papers (5,6), including one by the National Institutes of Health (NIH), have established recommendations for the diagnosis and treatment of *H pylori* patients. However, few studies have been performed to determine whether these recommendations are being followed (7,8).

In the quality assurance literature (9), there has also been increasing attention given to medical errors arising from missed follow-up of abnormal test results. For instance, in one study by

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TABLE 1
Patient demographics

Characteristic	Result
Sex, %	
Men	50.8
Women	49.2
Age (mean), years	59.2
Patient type (mean), %	
Outpatient	74.1
Inpatient	25.9
Reason for endoscopy, %	
Dyspepsia	36.8
Active bleeding	19.7
Gastroesophageal reflux	15.5
Anemia workup	10.9
Radiological abnormality	4.2
Dysphagia	3.6
Other reason	9.3
Endoscopic finding, %	
Erythema or erosion	40.4
Ulcer	26.9
Normal	21.2
Nodule or polyp	5.7
Tumour	0.5
Other finding	5.2
Pathological finding, %	
Gastritis	83.9
Metaplasia	14.0
Carcinoma	1.0
Lymphoma	0.5
Normal	0.5

Haas et al (10), 31% of women with abnormal mammograms did not receive adequate follow-up. Another study (9) showed that up to 33% of women with abnormal Papanicolaou smears were 'lost to follow-up'. There have also been patient safety concerns arising from test results that return after patients have been discharged from the hospital (11).

The objective of the present study was to evaluate whether patients diagnosed with *H pylori* receive appropriate treatment. Treatment of inpatients and outpatients was also compared. The treatment of *H pylori* in inpatients was hypothesized to be suboptimal. Several factors (including timing of treatment, type of admitting service, duration of stay and availability of pathology report before discharge) were examined to explore where improved care is possible.

PATIENTS AND METHODS

Patient selection

Endoscopic procedures in London, Ontario (population 335,000) are performed at one of the three sites of two teaching hospitals (London Health Sciences Centre [University Hospital and Victoria Hospital] and St Joseph's Health Care). Pathology specimens from all three sites are examined at one department and entered into a centralized pathology database.

A search was performed on the pathology database using the following keywords: '*Helicobacter Pylori*', '*Helicobacter*', '*Pylori*',

'*H Pylori*', and '*H.P.*'. All reports between January 1, 2004, and December 31, 2004, in which patients were *H pylori*-positive, were compiled and reviewed.

Definitions and follow-up

The entire hospital chart including admission notes, progress notes, pathology reports, order sheets, discharge summaries and discharge dictations were reviewed. Data were collected in a standardized method. Office charts of the physician who performed the endoscopy were also reviewed. Pathology reports at the London Health Sciences Centre are not forwarded to other physicians unless specifically requested. Therefore, no other charts were reviewed.

Demographic data such as sex, age, and whether the patient was an inpatient or outpatient were noted. The stated reason for performing the endoscopy, endoscopic findings and pathological findings were also recorded. Treatment of *H pylori* was said to have occurred if appropriate antimicrobial therapy was prescribed or explicit instructions to do so were recorded.

For inpatients, the length of hospital stay, type of admitting service, timing of treatment and whether the pathology report was available before hospital discharge were also documented. Empirical treatment was defined as treatment that was initiated after the endoscopy but before the pathology report was available. Treatment before discharge was defined as treatment occurring as an inpatient only after the pathology report was available.

Data analysis

Discrete variables were calculated as counts and proportions and expressed as percentages. Continuous variables were measured as mean, standard deviation and median. χ^2 testing of discrete variables was performed.

RESULTS

Patient demographics (Table 1)

Over the study period, 1633 gastric biopsy specimens from upper endoscopy were accrued. Of these, 193 patients were *H pylori*-positive. There was an equal number of men (50.8%) and women (49.2%); the mean age was 59.2 years. Seventy-four per cent were diagnosed as outpatients and 25.9% were diagnosed as inpatients.

The most common stated reasons for evaluation of an endoscopy were dyspepsia (36.8%), active bleeding (19.7%), gastroesophageal reflux (15.5%), anemia workup (10.9%), radiographic abnormality (4.2%) and dysphagia (3.6%). The most common endoscopic findings were erythema or erosion (40.4%), ulceration (26.9%), normal endoscopy (21.2%), nodularity (5.7%) and tumours (0.5%).

H pylori treatment rate in inpatients and outpatients (Figure 1)

Of all patients diagnosed with *H pylori*, 89.4% received appropriate treatment. However, there was a discrepancy between rates of treatment of outpatients and inpatients. Outpatients received treatment 92% of the time, while inpatients diagnosed with *H pylori* were poorly treated, receiving therapy only 60% of the time ($P < 0.001$).

Characteristics of inpatient population (Table 2)

Inpatients diagnosed with *H pylori* were slightly older (mean age 69.9 years) than outpatients (mean age 55.4 years). There were also slightly more women (58%) than men (42%).

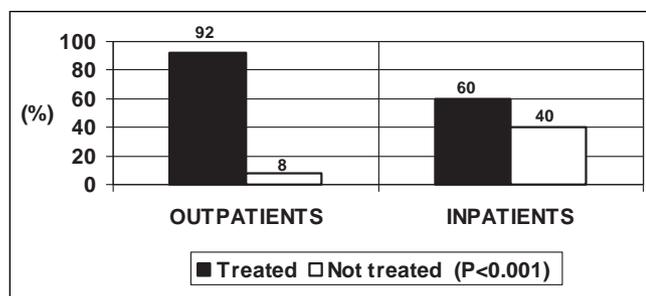


Figure 1) Helicobacter pylori treatment rate in outpatients and inpatients

Seventy-four per cent of patients were admitted under a medical service and 26% were admitted under a nonmedical service. There was no difference in the rate of treatment whether a patient was admitted under a medical (57%) or non-medical (62%) service. The average length of hospital stay was 8.4 days.

Of the 60% of inpatients who received *H pylori* eradication, 28% were treated empirically, 14% were treated based on positive pathology reported before discharge, 14% were treated on a subsequent clinic visit with the physician who performed endoscopy and 2% received a prescription over the telephone after discharge. Of note, the pathology report was available for only 40% of inpatients before they were discharged from the hospital.

DISCUSSION

As awareness about the role of *H pylori* in peptic ulcer disease and gastric carcinoma has increased, treatment rates have improved. Before the NIH conference in 1994, treatment rates were reported to be less than 2% (12). Shortly after the highly publicized NIH conference, two studies (7,8) reported *H pylori* treatment rates between 10% to 47%. More recent studies (13,14) reported *H pylori* treatment rates between 55% to over 90% for peptic ulcer disease. The overall rate of treatment in our study of 89.4% is consistent with the results above.

There was, however, a significant difference between treatment of outpatients and inpatients. Outpatients diagnosed with *H pylori* were well treated, receiving therapy 92% of the time. Some of the reasons stated for not treating outpatients included the patient moving away or changing contact information, failure to return to the clinic, multiple antibiotic allergies, advanced age and patient refusal. By comparison, inpatient treatment of *H pylori* was relatively poor. In our study, inpatients received therapy only 60% of the time. This is consistent with a recent study by Ilnyckj and Matthew (15) which reported that *H pylori* status was not considered in 55% of patients admitted for gastrointestinal bleeding.

There are several possible explanations for the poor rate of treatment in inpatients. First, the pathology report was available in only 40% of cases at the time of discharge. This is similar to data from another study (11) showing that approximately one-half of discharged patients had laboratory and radiological test results pending. More rapid pathology reporting may obviate this problem. However, among the 20 patients whose pathology results were available before discharge, only seven were prescribed treatment based on review of the pathology report. Alternatively, rapid urease testing at the time of endoscopy may help to provide a potential positive diagnosis

TABLE 2
Characteristics of the inpatient population

Characteristic	Result
Admitting service, %	
Medical	74.0
Nonmedical	26.0
Mean age, years	69.9
Sex, %	
Men	42.0
Women	58.0
Mean duration of stay, days	8.4
<i>Helicobacter pylori</i> treated, %	
Yes	60.0
No	40.0
Timing of treatment, %	
Empirical at endoscopy	28.0
Before discharge	14.0
Return to clinic	14.0
Phone after discharge	2.0
Pathology reported, %	
Before discharge	40.0
After discharge	60.0

soon after the endoscopy. There are several commercially available kits including PyloriTek (Serim Research Corp, USA) and CLOtest (Kimberly-Clark Health Care, USA) which have reasonable sensitivities and specificities and provide a result between 1 h and 3 h (16,17).

The second possible reason for poor rate of treatment in inpatients is a lack of close in-hospital follow-up. As noted above, only one-third of inpatients whose pathology results were available before discharge were treated. The initial management of patients requiring admission for peptic ulcer disease may be focused on stabilization and local therapy of any complications, to the detriment of diagnosis and treatment of the underlying disease process (7,15). This should not preclude treatment because many of the trials showing efficacy of *H pylori* eradication for prevention of bleeding recurrence were carried out in patients after their initial bleeding was controlled (18-20).

Finally, another possible reason for the undertreatment of inpatients is poor outpatient follow-up. In our study, a total of 21 of 50 inpatients received eradication therapy before discharge. Of the remaining 29 patients, only eight received treatment after discharge which occurred either by telephone or return to clinic. It has been suggested that discontinuity of care, especially in large teaching hospitals where admitting physicians, gastroenterologists and house staff frequently change services and work-hours are restricted, contributes to this problem and may lead to medical errors (11). In addition, paper-based documents are subject to being misfiled, lost or delayed (21). More vigilant follow-up including systems to keep track of pending and abnormal test results can help to resolve these issues (22). Some recommend empirical treatment for *H pylori* patients, especially those with duodenal ulcers (23,24). Analyses have shown this strategy to be cost-effective (25). The benefits of this would need to be balanced by the risks, which include drug reactions, the possibility of worsening dyspepsia and the

potential for *Clostridium difficile* infection. Finally, another possible method to ensure adequate outpatient follow-up would be to ask the patient to call in for their results if they have not heard back from the physician by a certain time period.

A potential limitation to our study is the underestimation of treatment rates. Although the entire inpatient and outpatient chart was reviewed, it is possible that treatment was prescribed by the admitting service or gastroenterology team but not recorded. It is also possible that another physician (eg, family physician) would have independently prescribed *H pylori* eradication to the patient, but this is unlikely because

pathology reports were not sent to other physicians unless explicitly requested. Finally, our results may not be generalizable to nonteaching hospitals where there are fewer issues surrounding fragmentation and discontinuity of care.

CONCLUSION

H pylori is treated relatively poorly in inpatients compared with outpatients. Results of the present study reveal opportunities to improve delivery of care for inpatients on a number of different levels. More research is needed to ensure safety, effectiveness and timeliness in the test result management process.

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