Identification of *Helicobacter pylori* by Endoscopic Crush Cytology

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Abstract

**Background:** Gastric crush cytology is employed in a variety of situations including diagnosis of malignant disease and the detection of *Helicobacter pylori* infection.

**Objective:** To evaluate the usefulness of gastric crush cytology in the detection of *H pylori* infection.

**Methods:** Gastric biopsy specimens from 50 patients of gastric or duodenal peptic ulceration were studied by gastric crush cytology, histopathology, bacteriologic culture and rapid urease test and results of various methods compared.

**Results:** Thirty seven patients had *H pylori* demonstrable in crush smears and 28 in histopathological sections. In 15 patients, the organism was detected by cytology alone and in 6 samples by histopathology alone. There was concordance of 76% between these two morphological techniques. The organism could be cultured from 22 biopsy specimens and urease test was positive in 37 specimens.

**Conclusion:** Gastric crush cytology is a useful method for detection of *H pylori* infection. *(Indian J Gastroenterol 1993; 12: 45-46)*

**Key words:** Peptic ulcer, rapid urease test, stomach.

Introduction

Various laboratory tests employed for detection of *Helicobacter pylori* infection include serology, bacteriologic culture, urease test, histopathological and cytolical procedures. Crush smears of endoscopic biopsies of the gastroduodenal region have previously been used in the diagnosis of malignant disease with 95.2% success rate. This technique has not been routinely used in the diagnosis of *H pylori* infection in spite of its simplicity. We, therefore, studied the usefulness of gastric crush smears in the detection of *H pylori* infection.

**Methods**

Fifty consecutive patients with peptic ulcer (duodenal 44, gastric 6) who underwent diagnostic endoscopy were included in the study. Four gastric biopsy specimens were obtained from within 3 cm of the pylorus at the time of index endoscopy. One biopsy sample was crushed between two glass slides to prepare a smear which was studied by a cytologist after staining with Giemsa stain. Another sample was processed for histological examination. Besides hematoxylin and eosin staining, sections were stained with Giemsa stain and examined for the presence of *H pylori*.

For bacteriologic tests, two biopsy specimens were placed in sterile normal saline and processed within an hour of collection. One bit of tissue was ground with 0.2 mL of thioglycolate broth in a mechanical tissue homogenizer; one drop of homogenate was inoculated on Columbia blood agar base No 2 (Oxoid) containing 7% defibrinated sheep blood, and incubated at 37°C in an anaerobic jar containing 5% oxygen, 10% carbon dioxide and 85% nitrogen. The rest of the homogenate was added to 0.5 mL of rapid urea broth (phosphate buffered saline 0.01 M, pH 7.2 containing 6% urea and phenol red indicator) and color change observed after 30 minutes. Culture plates were observed daily from days 3 to 7 and any suspected *H pylori* colony was confirmed on the basis of gram stain morphology, oxidase and urease positivity.
and nalidixic acid resistance.

The microbiologist, pathologist and cytologist were blind to each others' observations.

Results
Forty one (62%) patients had *H. pylori* detected by one or more of the four methods (Fig). Rapid urease test (RUT) and cytology were positive in 37 patients each. There was a perfect correlation between these tests since both these tests were positive in the same 37 patients.

Twenty two patients with positive culture had positive RUT and cytology as well; 15 of them had *H. pylori* detected at histology. Twenty eight patients had *H. pylori* demonstrable at histology. Of these, four patients had the organism detected only at histology. The other 24 patients with histological evidence of *H. pylori* had positive RUT as well as cytological evidence of the organism.

Thirty seven (84.1%) of 44 patients with duodenal ulcer were positive for *H. pylori* by one or more methods while four (66.6%) of the six with gastric ulcer had evidence of this infection. There was concordance of 75.6% between the identification of *H. pylori* in crush smears and in tissue sections and a concordance of 59.9% between the combined morphological techniques and bacteriological culture.

Discussion
All the tests available for the diagnosis of *H. pylori* infection suffer from some drawbacks. The fastidious nature of this organism and a number of other factors like the use of topical anesthesia or simethicone and recent use of antibiotics or H2 receptor antagonists make the organisms difficult to culture.1,2,3 Urease tests have the advantage of being quick but have variable specificity from 39% to 97%.4,5,6 Histology has the advantage of identifying the organism as well as inflammatory changes in the gastric mucosa. However, this method is time-consuming and patchy distribution of *H. pylori* may lead to sampling errors.

Lately, a number of cytological techniques have been used to identify *H. pylori*. Imprint smears prepared from gastric biopsies have been shown to have a high concordance (83%) with bacteriological culture,7 and 100% sensitivity.8 It is conceivable that there is a chance of sampling error but the distribution of *H. pylori* is more uniform in the antrum than in the body and fundus.9 Other workers9,10 have commented on the usefulness of brush cytology, with the advantage of a wider area of sampling. Crush smears of antral biopsies have also been used, with good results. In preparing imprint or touch smears, only the superficial part of the biopsy sample is harvested on the slides; crush smears, on the other hand, represent the whole biopsy tissue.

In our study, *H. pylori* was identified in gastric crush smears in 37 (74%) of 50 patients, and in 15 (30%) patients morphological identification of the organism was made by this method alone. Concordance rates of 76.5% between the morphological identification of *H. pylori* in smears and in tissue sections and of 59.9% between the combined morphological techniques and bacteriological culture were observed. These results highlight the usefulness of gastric crush cytology in the detection of *H. pylori* infection.

References