

## Rapid detection of helicobacter pylori by endoscopic brush cytology and comparison with histopathology

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### Abstract

**Objectives:** The main objective of this study was to assess antral brush cytology as an alternate approach for the diagnosis of *H. pylori* infection as compared to histopathology.

**Methods:** 75 cases with diagnosis of antral gastritis underwent endoscopic antral biopsy as well as antral brushing cytology was included irrespective of age and sex. Cytological slides were stained with Giemsa stain & biopsy slides were stained with H&E and Giemsa stain. Correlation was done between cytological smear slides and biopsy slides.

**Results:** Among 75 cases, *H. pylori* were positive in 55 (73.4%) cases of biopsy specimens while in brush cytology it was positive in 48 (64%) cases. In 45 (60%) of 75 cases, *H. pylori* was seen in both biopsy and brush cytology.

**Conclusion:** Endoscopic brush cytology provides an accurate, inexpensive and easy technique in the rapid detection of *H. pylori* infection.

**Key words:** Brush cytology, *H. pylori*

Gastritis is simply defined as inflammation of gastric mucosa<sup>1</sup>. *Helicobacter pylori* are gram negative, spirally shaped, unipolar multiflagellate bacteria, discovered by Warren and Marshall<sup>2</sup> in 1983. It colonizes antral gastric epithelium<sup>3</sup>. *H. pylori* accorded a major role in case of antral gastritis<sup>4</sup>. The outstanding importance of this field of research, namely multiple roles of this bacterium, has led to new and deeper efforts to develop the most reliable and easy techniques to diagnose *H. pylori*<sup>5</sup>.

Our study is centered on cytological diagnosis of *H. pylori*. At the same time, histopathological diagnosis of *H. pylori* have been evaluated. Taking histopathological examination of biopsy specimens as gold standard we have also checked sensitivity of cytological detection of *H. pylori* in brush smear.

### Materials and methods

This prospective study included 75 cases with a clinical and endoscopic diagnosis of gastritis during one year period. Endoscopic brushing smear as well as gastric biopsy was taken from 75 patients.

Endoscopic antral brushing was done with Fujinon video endoscope ED-310XT using fiberoptic brush. Cells that adhere to the brush were smeared with a circular motion on glass slide over an area of 2 cm in diameter. The smears were air dried and made ready for Giemsa stain. Biopsy specimens were stained with H&E and Giemsa stain.

**Table 1:** Gastritis and *H. pylori* in biopsy

### Results

Out of 75 cases histopathologically 55 (73.3%) cases and cytologically 48 (64%) cases were positive for *H. pylori*. Both cytologically and histologically 45 (81.8%) cases were positive for *H. pylori*. *H. pylori* grade 1+ was found in 27 (49.1%) cases, grade 2++ in 19 (34.5%) cases and grade 3+++ in 9 (16.3%) of cases (Table 1).

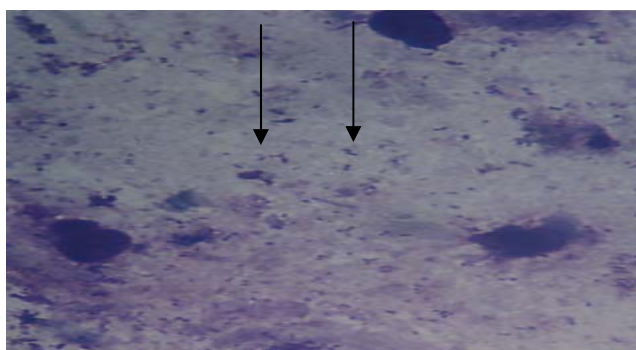
Both biopsy and brush was positive in 45(60%) cases, biopsy and brush was negative in 17(22.6%) cases. Brush positive but biopsy negative in 3 (4%) cases, so false positive is 3 (4%). Only brush negative in 10 (13.3%) cases, so false negative in 10 (13.3%) cases. (Table: 3)

*H. pylori* grade 1+ was positive in both biopsy and brush cytology in 27 cases, grade 2++ in biopsy 19 (34.5%) cases but in cytology 13 (28.9%) cases and grade 3+++ in biopsy 9 (16.4%) cases but in cytology 5 (11.1%) cases. So cytologically, *H. pylori* was more easily detectable when density was low.

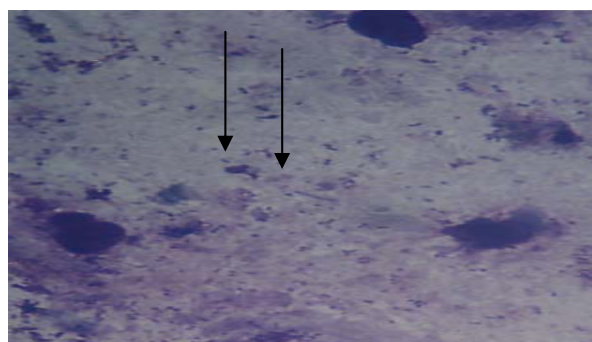
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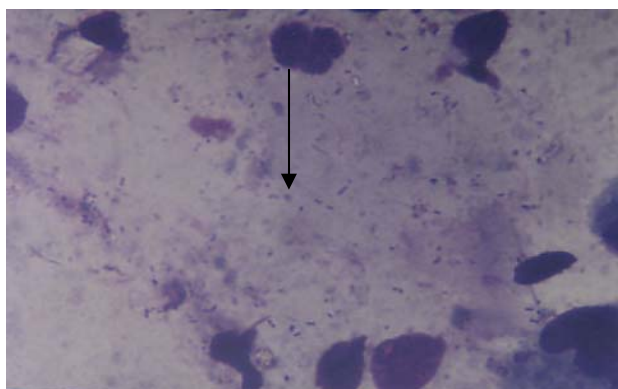
H. pylori density	No of cases	
	Biopsy (%)	Cytology (%)
Grade 1+	27 (49.10%)	27 (56.2%)
Grade 2++	19 (34.50%)	14 (29.1%)
Grade 3+++	9 (16.30%)	7 (14.5%)
Grade 4++++	0 (0.00%)	0 (0.00%)



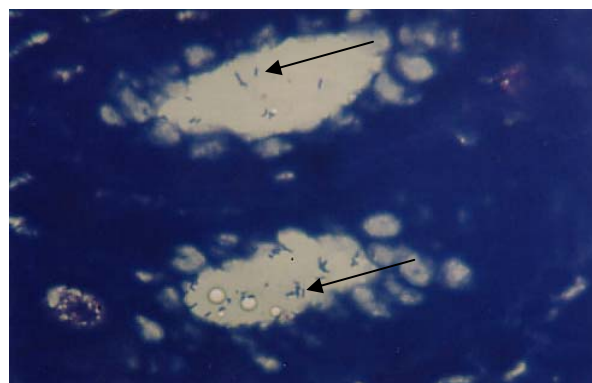
**Fig 1:** Brush smear showing *Helicobacter pylori* (X 1000 Giemsa stain).



**Fig 2:** Showing *Helicobacter pylori* in brush smear ( X 1000 Giemsa stain).



**Fig 3:** *H Pylori* in Giemsa stain (X 1000 Brush Smear)



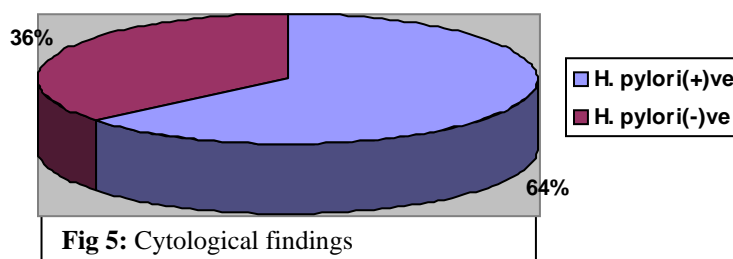
**Fig 4:** Showing *Helicobacter pylori* in biopsy (X 1000Giemsa stain)

**Table 2:** Comparison of endoscopic brush cytology with biopsy

	Biopsy positive (%)	Biopsy negative (%)	Total (%)
Brushing positive	45 (60%)	3 (4%)	48 (64%)
Brushing negative	10 (13.3%)	17 (22.6%)	27 (36%)
Total	55 (73.3%)	20 (26.6%)	75 (100%)

**Table 3:** Cytologically *H. pylori* was positive in 48 (64%) cases

Cytological finding	Frequency	Percentage
H. pylori(+ve)	48	64%
H. pylori(-)ve	27	36%



**Table 4: Correlation of grading in biopsy and brush cytology in *H. pylori* positive cases**

H. pylori density	Biopsy	Cytology
Grade 1+	27 (49.1%)	27 (60%)
Grade 2++	19 (34.5%)	13 (28.9%)
Grade 3+++	9 (16.4%)	5 (11.1%)
Total	55 (100%)	45 (100%)

### Discussion

Gastritis is one of the common condition and *H. pylori* infected gastritis is the commonest condition in Nepal<sup>6</sup>. Correlative studies of 75 cases were done between cytological and histological findings of *H. pylori* infection.

In Nepal there are no data available on different endoscopic findings causing gastritis. Like wise no study has been carried out on association of *H. pylori* with gastritis and ability of different tests to diagnose *H. pylori*. Our study is centered on cytological diagnosis of *H. pylori*. At the same time, histopathological diagnosis of *H. pylori* have been evaluated. We also checked sensitivity of cytological diagnosis of *H. pylori*. Out of 75 cases, histologically *H. pylori* seen in 55 cases (73.3%), cytologically *H. pylori* was found in 48 cases (64%). World wide incidence has shown that *H. pylori* infected gastritis is the most common condition (70% to 80%)<sup>7</sup>. 3 (5.4%) cases were found cytologically *H. pylori* positive but histologically *H. pylori* negative. Presence of artifact in cytological smear might have been taken as *H. pylori* due to which the cytological smear were positive for *H. pylori*. Cytologically 10 (28.2%) cases were *H. pylori* negative but histologically positive for *H. pylori*. 2 cases which

were normal in endoscopy, but histology and cytology showed gastritis and were positive for *H. pylori*. In a study of Narvaez et al found *H. pylori* was identified on the cytologic smears but not on the biopsy specimens<sup>8</sup>.

In this study, *H. pylori* was positive both in antral biopsy and brush cytology in 45 (60%) cases. Patwari et al found that detection of *H. pylori* was highest from antral biopsies and brushings<sup>9</sup>. Prof Sharma et al also found that brush cytology had the maximum chance of detecting *H. pylori*<sup>10</sup>. Another study by Huang Ms et al found 59 of 103 patients (57%) were diagnosed as positive for *H. pylori* organisms using brushing by cytology<sup>11</sup>. The overall frequency of *H. pylori* positive cultures from the brush collected material was higher compared with cultures from biopsy samples.

In this study, *H. pylori* grade I (+) was seen in 27 (49.1%) cases of which almost all the cases positive by cytology in 27(56.2%) cases. In one study, Dalla Liberar et al.<sup>12</sup> found that brush cytology was more sensitive than histology, for the assessment of *H. pylori* infection particularly when the density of bacteria is low. Current study also revealed similar result, showing grade I (+) *H. pylori* was positive in biopsy comprising 27 (49.1%) of which all of 27

(60%) cases were *H. pylori* positive in brush cytology.

In this study taking histopathology as confirmatory gold standard, sensitivity and specificity of brushing smear cytology was 81.8% and 85% respectively. Different studies by different authors worldwide have shown that brush cytology is more sensitive than histology particularly when the density of the bacteria is low<sup>13</sup>. In support of this statement this study has shown the same result.

#### **Conclusion:**

As far as different tests to diagnose *H. pylori* are concerned cytological test being positive in highest number of cases, more economical and faster and feasible<sup>14</sup>. Gastric brushing cytology provides on accurate, inexpensive and easy technique in the rapid detection of *H. pylori* infection.

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