Failure to detect *Helicobacter pylori* in nasal mucus in *H pylori* positive dyspeptic patients

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Abstract

Stomach biopsies and samples of nasal mucus were cultured in patients with dyspeptic symptoms who underwent endoscopy to evaluate the possible route of transmission of *Helicobacter pylori* (*H pylori*). 42 patients were examined. For each patient two biopsies from the stomach corpus and antrum were taken and, before endoscopy, one nasal swab was obtained. Biopsy samples were tested for urease test, microbiological culture, and histological examination. The nasal swab was processed for microbiological examination. *H pylori* was not found in the nasal mucus of any of the patients, including the 36 who had *H pylori* in gastric biopsies.

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Keywords: *Helicobacter pylori*, nasal mucus, dyspeptic patients.

The evidence for *Helicobacter pylori* (*H pylori*) as a gastrointestinal pathogen is now very strong,¹ so there is a possible role for *H pylori* in the development of gastric cancer.² How *H pylori* is transmitted is not yet defined. There is no known animal reservoir and the organism is likely to be spread from person to person.³ Attempts to identify natural reservoirs other than the stomach have so far proved unsuccessful.⁴ The organism has been detected on rare occasions in dental plaque and saliva.^{5,6} Because of overgrowth by normal autochthonous microbes in these environments, detection of *H pylori* is not easy and the results obtained up to now have probably underestimated the true prevalence of the organism in the oral cavity. However, these sporadic findings make it unlikely that the mouth is a natural reservoir.

Recently a paper from the Gambia reported that *H pylori* could be isolated from human faeces.⁷ There may be times when the organism can be transmitted by the faecal-oral route. Epidemiological data from other countries suggest, however, that this route of transmission is not the major one.¹

It is known that *H pylori* lives in the mucus layer⁸ and modifies the structure of the normal mucosal surface, facilitating colonisation. The constant finding of *H pylori* in the mucus layer has led us to search for the organism in the nasal mucus. The aim of the present study was to investigate the presence of viable *H pylori* in the nasal mucus in dyspeptic patients.

Methods

Forty two outpatients with dyspeptic problems (24 men, 18 women; mean age 44 years, range 29-53 years) were studied.

Six biopsies, three from the antrum and three from the corpus, were taken from each patient. One biopsy from each location was drawn for a CLO test (Delta West). One biopsy from the antrum and one from the corpus for bacterial culture were placed in 0.4 ml of brucella broth (BB, Biolife Italiana). The other specimens were fixed in 10% buffered formalin and embedded in paraffin for routine histopathological examination; 5 mm thick sections stained with haematoxylin and eosin (H and E) and the Giemsa procedure were examined. All examinations were performed blind.

Stomach samples were processed microbiologically within 1 h. Biopsies for culture were trimmed with a razor, homogenised, and cultured on chocolate agar plus 1% IsoVitaleX (CA) (Becton Dickinson) and campylobacter selective medium (CSM) (Unipath). Plates were incubated under a gas mixture consisting of 85% N₂, 10% CO₂, and 5% O₂ in Campy Pak-Jar (Unipath) at 37°C for 5 d. Typical *H pylori* colonies were identified by standard methods.⁹

The nasal sample was taken with vigorous swabbing and was soaked in 0.4 ml of brucella broth (Biolife) for bacterial culture. The sample was mixed and 100 µl aliquots of the solution were cultured on CA and CSM. Plates were incubated in a controlled atmosphere at 37°C for 5 d. A 0.3 ml aliquot of the remaining solution was added to 0.3 ml of a solution containing BB plus 5% of fetal calf serum (FCS, Seromed, Biochrom) and 0.4% of Skirrow supplement (Unipath) and incubated under micro-aerobic conditions at 37°C for 24 h. After this, 100 µl aliquots were cultured as described before.

Results

The results are given in the table. *H pylori* was recovered in the biopsies of 36 of the 42 patients examined. *H pylori* infection was found in 77% of patients with active gastritis, 96% with duodenal ulcer, 100% with gastric ulcer, and 33% where there was no gastritis. In two cases, *H pylori* isolated in the gastric antrum was not found in the corpus. In one duodenal ulcer patient, histological examination revealed a helicobacter-like microorganism in the corpus but this result was not confirmed by the microbiological culture and CLO test. All samples of nasal mucus were negative on both direct and enrichment microbiological culture.

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Results of laboratory investigation in dyspeptic patients for H pylori, n(%)

	H pylori detection with						
Clinical condition (number of patients)	Culture of biopsy		CLO test		Histology		Culture of nasal mucus
	antrum	corpus	antrum	corpus	antrum	corpus	
Active gastritis (13)	10(77)	9(69)	10(77)	9(69)	10(77)	9(69)	–
Duodenal ulcer (24)	23(96)	22(92)	23(96)	22(92)	23(96)	23(96)	–
Gastric ulcer (2)	2(100)	2(100)	2(100)	2(100)	2(100)	2(100)	–
No gastritis (3)	1(33)	1(33)	1(33)	1(33)	1(33)	1(33)	–

Discussion

This report shows the absence of viable *H pylori* in the nasal mucus, an environment not yet investigated for the presence of this organism. These results were obtained with a selective method of isolation, and further attempts to characterise *H pylori* from a colonised environment such as dental plaque (unpublished data) did not confirm the presence of the organism. All suspect colonies were examined with catalase, hippurate and oxidase tests but in no case was *H pylori* confirmed.

It is difficult to isolate such a fastidious strain as *H pylori* in a highly colonised environment.⁶ Microbiological isolation techniques in this environment produce less evidence of *H pylori* than more sensitive techniques such as reverse transcription-polymerase chain reaction (RT-PCR).⁵ Furthermore, unsuitable conditions for *H pylori* induce its morphological conversion from the bacillary to the coccoid form.¹⁰ This "dormant" morphology is not culturable in vitro and the strain can thus be camouflaged.

In conclusion, we could not confirm the presence of viable *H pylori* in nasal mucus, but we cannot exclude the possibility that this site may act as a transient ecological niche for the strain. More sensitive techniques such as RT-PCR should be conducted to confirm whether

H pylori is indeed harboured in this environment.

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