

## Examination of Human Stomach Biopsies, Saliva, and Dental Plaque for *Campylobacter pylori*

SIGMUND KRAJDEN,<sup>1,2,3\*</sup> MILAN FUKSA,<sup>1</sup> JOE ANDERSON,<sup>3</sup> JOHN KEMPSTON,<sup>3</sup> ALDO BOCCIA,<sup>4</sup>  
CONSTANTIN PETREA,<sup>1</sup> CORA BABIDA,<sup>1</sup> MOHAMMED KARMALI,<sup>2</sup> AND J. L. PENNER<sup>2</sup>

Department of Microbiology<sup>1</sup> and Department of Dentistry,<sup>4</sup> St. Joseph's Health Centre, Toronto, Ontario M6R 1B5, and Department of Microbiology<sup>2</sup> and Department of Medicine,<sup>3</sup> University of Toronto, Toronto, Ontario M5S 1A1, Canada

Received 19 December 1988/Accepted 27 February 1989

To examine possible sources of *Campylobacter pylori* and to determine the routes by which it is transmitted to the human stomach, samples of dental plaque and saliva from 71 patients undergoing endoscopy in addition to stomach biopsies were collected and cultured on selective noninhibitory Skirrow medium. A total of 29 (40.8%) of the stomach biopsies yielded *C. pylori*. None of the saliva samples and only one of the dental plaque samples was found positive for *C. pylori*, and thus neither saliva nor dental plaque could be implicated as a significant reservoir of this organism.

Numerous groups of investigators worldwide have demonstrated convincingly that *Campylobacter pylori* can be cultured from human gastric mucosa from a large proportion of the population affected with acid-peptic disease (1, 3, 5, 7), but attempts to identify natural reservoirs for these organisms or the routes by which they are transmitted to the human stomach have been unsuccessful. With the objective of assessing the possibility that *C. pylori* could be harbored in the microaerobic environment of the dental plaque or in saliva contaminated with the organisms through association with ingested exogenous materials such as food or liquids, specimens of these two potential sources were examined for the presence of *C. pylori*, in addition to the routine investigations of the stomach biopsies. In this brief report, we describe the results of this investigation with 71 patients.

All 71 patients had been referred, on the basis of clinical grounds, for gastroesophageal endoscopy and biopsy. Saliva (2 to 3 ml) was collected in a sterile container prior to premedication (meperidine and atropine) for endoscopy. Under the supervision of a dentist, the two gastroenterologists collected dental plaque from the gingival side of the canine and molar teeth of each patient. Supragingival plaque was removed with gauze. Subgingival plaque was then collected with a standard dental curette. The tip of the curette was inserted to the bottom of the pocket or crevice to be sampled (at the junction of the tooth and gingiva), with the edge placed against the tooth surface. The plaque was then collected by one upward scrape of the tooth surface. The dental plaque and saliva were collected before endoscopy. Both the dental plaque and gastric biopsy were placed in 5 ml of normal saline and brought to the microbiology laboratory, as was the saliva, within 15 min of collection. A 1-ml sample of saliva was used for culture. The dental plaque was ground with a sterile mortar and pestle. The gastric biopsy specimens were finely minced with sterile scalpel blades. Matched samples of saliva, dental plaque, and gastric biopsy from each patient were inoculated onto 10% laked horse blood with Skirrow formula and incubated at

37°C in a microaerobic atmosphere (Campy PAK; Oxoid Ltd., Basingstoke, England) with examination after 5 days. One study has shown that the utilization of Skirrow medium optimizes the recovery of *C. pylori* from antral biopsy specimens (6) in part because of the suppression of competing flora.

The bacteria were identified as *C. pylori* with the Gram stain and tests for susceptibility to nalidixic acid and to cephalothin, oxidase, catalase, nitrate reduction, hippurate hydrolysis, and urease production in Christensen medium (2, 4).

*C. pylori* was recovered from the stomach biopsy specimens of 29 (40.8%) of 71 patients. This organism was also recovered from the dental plaque of one patient (whose gastric biopsy was also positive for *C. pylori*) but from none of the 71 samples of saliva. By culture and isolation methods currently in use, saliva could not be implicated as a reservoir or transmission vehicle for *C. pylori*. However, the finding that one patient with *C. pylori* in the stomach also harbored the organism in the dental plaque is important because subgingival dental plaque, therefore, cannot be discounted as a possible alternate site for the organism. This could indicate that present methods are inadequate for reliably isolating the organism from this site.

A more comprehensive search for the organism in this environment and other ecological niches within the gingival crevices ought to be conducted to elucidate precisely the extent of these sites as potential reservoirs for *C. pylori*.

We thank Ivette Monteith for secretarial assistance and Anne Osborne for technical assistance.

### LITERATURE CITED

1. Bohnen, J., S. Krajden, J. Anderson, J. Kempston, M. Fuksa, M. Karmali, A. Osborne, and C. Babida. 1986. *Campylobacter pyloridis* is associated with acid-peptic disease in Toronto. *Can. J. Surg.* **29**:442-444.
2. Buck, G. E., W. K. Gourley, W. K. Lee, K. Subramanyam, J. M. Latimer, and A. R. Dinazzo. 1986. Relation of *Campylobacter pyloridis* to gastritis and peptic ulcer. *J. Infect. Dis.* **153**:664-669.

\* Corresponding author.

3. **Drumm, B., P. Sherman, E. Cutz, and M. Karmali.** Association of *Campylobacter pylori* on the gastric mucosa with antral gastritis in children. 1988. *N. Engl. J. Med.* **36**:1557-1561.
4. **Goodwin, C. S., E. D., Blincow, J. R. Warren, T. E. Waters, C. R. Sanderson, and L. Easton.** 1985. Evaluation of cultural techniques for isolating *Campylobacter pyloridis* from endoscopic biopsies of gastric mucosa. *J. Clin. Pathol.* **38**:1127-1131.
5. **Jones, D. M., A. M. Lessels, and J. Eldridge.** 1984. Campylobacter-like organisms on the gastric mucosa: culture, histological and serologic studies. *J. Clin. Pathol.* **37**:1002-1006.
6. **Krajden, S., J. Bohnen, J. Anderson, J. Kempston, M. Fuksa, A. Matlow, N. Marcon, G. Haber, P. Kortan, M. Karmali, P. Corey, C. Petrea, C. Babida, and S. Hayman.** 1987. Comparison of selective and nonselective media for recovery of *Campylobacter pylori* from antral biopsies. *J. Clin. Microbiol.* **25**:1117-1118.
7. **Marshall, B. J., and J. R. Warren.** 1984. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. *Lancet* **i**:1311-1315.