change (signed rank test, $p=0.0006$). The headaches started on the first or second day that the subjects took decaffeinated coffee and lasted for one to six days, with a mean duration of 2.3 days. Subjects also reported falling asleep more easily when they were consuming decaffeinated coffee (mean scores 88 v 85; paired t test mean difference 3.0, 95% confidence interval 0.2 to 5.8). Thus caffeine affected quality of sleep even in moderate coffee drinkers.

Comment

Our results indicate that many moderate consumers of coffee develop headaches caused by caffeine withdrawal lasting two to three days after they switch to decaffeinated coffee. The result was not influenced by subjective expectations as most subjects were unable

to recognise the switch. Thus caffeine withdrawal headache is not restricted only to high consumers. Clinicians should be aware of caffeine withdrawal as a possible cause of headaches, especially when ingestion of caffeine is erratic.

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A simple method to detect *Helicobacter pylori* in gastric specimens

R E Schneider, M Torres, C Solis, L Passarelli,
F E Schneider, M Vettorazzi

Gastroenterology and Microbiology Services, Hospital General de Enfermedad Común del IGSS, 9 Calle 7-55 Zona 9, 01009 Guatemala, Guatemala

R E Schneider, MD, chief of gastroenterology service
M Torres, MA, chief of microbiology service
C Solis, MD, gastroenterologist
L Passarelli, MD, gastroenterologist
F E Schneider, MD, tutorial trainee in gastroenterology service
M Vettorazzi, QB, tutorial trainee in microbiology service

Correspondence to: Dr Schneider.

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Most diagnostic tests for the presence of *Helicobacter pylori* (formerly *Campylobacter pylori*) in the stomach either require histological examination of samples of the gastric mucosa epithelium obtained by gastroscopy (brushing or biopsy)¹ or detect urease activity in the gastric lumen.² We report our experience of using a modified gelatin capsule containing a nylon string to collect gastric specimens.

Patients, methods, and results

The study protocol was approved by our institution's human subjects committee, and each patient gave his or her written consent to participation. Sixty adult Guatemalans (39 men and 21 women aged 21-67 (mean 46) were studied.

The length of the string contained in weighed gelatin capsules (Enterotest, Hedeco, United States) was reduced to 68 cm. Patients swallowed the sterilised string device at 7 am after overnight fasting, and it was recovered four to five hours later. We obtained smears from the mucus on the distal 10 cm of the string before placing the string in a tube with 1 ml of urea broth (Difco, United States).³ The next day biopsy specimens from the gastric mucosa were obtained by gastroscopy (four from the antrum, two from the corpus, and two from the fundus). Mucus smears and cultures (campylobacter media, E Merck, West Germany) were obtained from one antral biopsy

specimen, and another was placed in a tube with 0.5 ml of urea broth and crushed with the base of a sterile swab stick.⁴ The remaining specimens were sent for histopathological studies. Smears were stained with Gram and fuchsin stains. We used standard methods for culturing and identifying *H pylori*. Any colour change (to purple) in the urea broth cultures was assessed after incubation for 24-48 hours at 36°C. Histological sections were stained with Giemsa. Patients were classified as positive for *H pylori* if the organism was isolated from cultures of biopsy specimens or spiral organisms were present in histological sections, or both.

Two patients were unable to tolerate the swallowed string device. The table shows the results from the other patients. Biopsy cultures and histological sections were negative for *H pylori* in 19 cases. In one case mucus smears obtained from the string and biopsy specimens yielded negative results but the urea broth test yielded a positive result; this was due to large amounts of bacteria in the gastric mucus. In three cases mucus smears (two from the string, one from a biopsy specimen) gave false negative results owing to scant material. The three false negative results of urea broth tests on string specimens were caused by bile deeply staining the broth and masking any changes in colour. Slight to moderate staining with bile did not interfere with the reaction. No explanation was found for the two false negative results of urea broth tests on biopsy specimens. The sensitivity, specificity, and predictive value of a positive result of tests on the string specimens were similar to those obtained with antral mucosa biopsy specimens.

Comment

The viability of the organisms recovered with the string device is not known, and we are currently investigating this. Evidently, however, the string is an inexpensive, rapid, and effective method of detecting *H pylori* in gastric contents. It will be of great help in following up patients after treatment or in cases in which samples of gastric mucosa cannot be obtained by endoscopy.

Results of analysing gastric specimens obtained by biopsy or with string device for *Helicobacter pylori*, using smear staining and urea broth

	String				Biopsy			
	Smear		Urea broth		Smear		Urea broth	
	Positive*	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Patients positive for <i>H pylori</i> (n=39)	37	2	36	3	38	1	37	2
Patients negative for <i>H pylori</i> (n=19)		19	1	18		19	1	18
Sensitivity (%)		95		92		97		95
Specificity (%)		100		95		100		95
Predictive value of positive result (%)		100		97		100		97

*Patients were classed as positive for *H pylori* if the organism was detected in cultures of biopsy specimens or in histological sections, or both.

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