The Early Diagnosis of Campylobacter Enteritis by Wet-Mount Examination

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Campylobacter enteritis is now recognized as the most common acute bacterial diarrheal illness in man.[1-4] At the University of California, San Diego, Student Health Center, Campylobacter fetus subspecies jejuni has accounted for 25 percent of all cases of acute diarrheal illness and 90 percent of all cases of acute bacterial enteritis.[5] Obviously a presumptive diagnosis of Campylobacter enteritis determined by a test available in the office using a simple microscopic examination of an unstained wet-mount stool specimen would be highly desirable. In addition, knowing which stools to culture, based on microscopic examination, would be advantageous.

It is known that dark-field microscopy, phase-contrast microscopy, or a Gram stain of a stool specimen can sometimes permit a rapid diagnosis of Campylobacter enteritis by identification of the organism or its motility.[6-8] Others have shown a significant correlation of fecal leukocytes, seen with methylene blue stain, for Shigella or Salmonella enteritis.[9,10] It is thought that Campylobacter enteritis, presenting as an inflammatory diarrhea, should demonstrate fecal leukocytes as well.

This prospective study was done to assess the value of using an unstained, wet-mount stool specimen examination for making either a presumptive or predictive diagnosis of Campylobacter enteritis. In addition, this study was done to determine whether the results of the wet-mount stool examination can serve as a guide for determining which stools should be cultured.

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Methods

During a recent eight-month period all stool specimens from patients with acute diarrheal illness were studied. All patients, 95 percent of whom were aged 18 to 25 years, were enrolled at the University of California, San Diego, and seen at the Student Health Center. Diarrhea defined as acute was of less than ten days' duration, with stools of watery, loose consistency, and with a frequency of at least twice normal.

Fresh stool specimens were submitted and evaluated within one-half hour; no rectal swabs were used. A wet-mount examination was prepared using one drop of tryptic soy broth mixed with a portion of the liquid stool on a glass slide. The field was scanned for leukocytes, erythrocytes, ova and parasites, and darting organisms, whose typical appearance is well-described elsewhere.[6,7] The degree of fecal leukocytosis was graded as heavy, greater than 15 white blood cells (WBC) per high power field (HPF); moderate, 5 to 15 WBC/HPF; few, 1 to 5 WBC/HPF; and rare, less than 1 WBC/HPF. A Hemoccult test was performed on all specimens. If fecal leukocytes or erythrocytes were seen or if a Hemoccult card was positive, the stool was cultured. Stool specimens were randomly cultured from ten patients with acute diarrhea who did not exhibit any fecal leukocytes or erythrocytes or have a positive Hemoccult test.

Stool specimens for isolating Campylobacter fetus subspecies jejuni were inoculated onto a selective plating medium of Campy-BAP and incubated at 42°C in a Campylobacter environment-chamber gas-generating kit. After incubation of

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the culture, the colonies were readily identified by their typical Gram stain, motility, and biochemical properties.[3,11] Confirmation of each positive Campylobacter culture was made by sending a subculture to the local public health department. The decision not to culture stool specimens with negative microscopic findings was based on previous experience and that of others.[3,5,12]

Results

A total of 267 specimens were evaluated, and 173 revealed some degree of fecal leukocytosis, red cells, or a positive Hemoccult; 166 revealed some degree of fecal leukocytosis. Of the 173 specimens plated for culture, 64 had Campylobacter fetus subspecies jejuni found on culture and 9 had either a Salmonella or a Shigella species isolate. All specimens with positive Campylobacter cultures had some degree of fecal leukocytes on the wet-mount examination. Only 50 percent of cultures for Campylobacter had a positive Hemoccult test, and 81 percent had erythrocytes seen on the wet-mount examination.

When wet-mount examination revealed a moderate or heavy range of fecal leukocytes, Campylobacter fetus subspecies jejuni was identified on culture in 55 percent. Finding five or more fecal leukocytes on the wet-mount examination revealed a 89 percent sensitivity and a 51 percent specificity for the early diagnosis of Campylobacter enteritis (Table 1). Darting organisms were seen in 32 percent (21/64) of all cases of Campylobacter enteritis. Finding darting organisms in the fecal smear was pathognomonic for Campylobacter enteritis with a 100 percent predictive value. The ten control stool specimens cultured from patients with acute diarrhea and negative microscopic findings all had no growth for bacterial pathogens.

Comment

This study confirms the value of performing a screening wet-mount examination on stool specimens of patients with acute diarrhea. In nearly one third of all cases of Campylobacter enteritis,

Table 1. Results of the Wet-Mount Examination for Fecal Leukocytes and Stool Cultures (n)

Fecal Leukocytes per HPF	Stool Culture Results		
	Campylobacter Positive	Campylobacter Negative	Salmonella or Shigella Positive
≥ 5 (n=112)	57	46	9
> 0 and < 5 (n=54)	7	47	0

darting organisms were seen on wet-mount examination. This finding has had 100 percent specificity for the presumptive diagnosis of Campylobacter enteritis. This study also shows that if fecal leukocytes are not seen on the wet-mount stool examination, the yield for a positive stool culture for Campylobacter is negligible, and with fewer than 5 WBC/HPF the diagnostic yield is low. On the other hand, when five or more fecal leukocytes are seen on the wet-mount examination, there has been an 89 percent sensitivity for identifying Campylobacter enteritis. Hemoccult testing and stool smear examination for erythrocytes were not so helpful in making a predictive diagnosis for Campylobacter enteritis.

Dark-field or phase-contrast microscopy of a stool specimen to identify the Campylobacter organism is not practical in the general primary care practice. Rather, a simple, quick, reliable method for making an early diagnosis of Campylobacter enteritis using light microscopy on an unstained, wet-mount stool specimen is highly favored. This study shows it is not necessary to stain a stool specimen slide to identify fecal leukocytes or darting organisms.

The wet-mount examination can serve as a guide to determine which stool specimens merit culturing. If any fecal leukocytes are seen on the wet-mount examination, the specimen should be cultured. At this health center finding five or more white blood cells per high-power field on the stool wet-mount has had a strong predictive value for bacterial enteritis, which is primarily due to Campylobacter. Furthermore, in one third of all cases of Campylobacter enteritis, the wet-mount examination has led to an immediate and accurate diagnosis. The use of this simple, inexpensive examination should be done routinely on all patients with acute diarrhea.

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