Routine Stool Culture for Enteric Pathogens

Background Information

Bacterial, parasitic and viral agents can cause infectious gastroenteritis. Approximately 48 million people become ill and 128,000 require hospitalization from foodborne diseases in the United States each year.1 Enterohemorrhagic *Escherichia coli* (EHEC) is one of the top five causes of foodborne illness requiring hospitalization in the United States.[1] Most clinical laboratories that perform enteric cultures on stool samples routinely include media and methods to rule out *Campylobacter* spp., *Salmonella* spp., *Shigella* spp., and EHEC. *Shigella*, which accounts for less disease prevalence in the U.S. (~14,000 cases/year), is highly infectious and its detection in all stool samples is important to prevent further disease from spreading person to person.

Clinical Indications

Stool samples from outpatients or patients hospitalized less than three days are accepted for detection of enteric bacterial pathogens. Most commonly, bacterial diarrhea will be caused by strains of *Salmonella, Shigella, Campylobacter* or EHEC. If patients have been in the hospital for longer than three days when their diarrhea occurs, the likelihood that it is being caused by one of these enteric pathogens is close to 0%, as a number of studies have shown.[2,3] *Clostridium difficile* toxin testing by PCR should be ordered for the evaluation of diarrhea in patients hospitalized more than three days.

Results and/or Interpretation

When stools are submitted for routine culture of enteric pathogens, cultures will be performed on selective media for the isolation of *Salmonella* spp., *Shigella* sp., and *E. coli* O157:H7. In addition, enzyme immunoassays (EIAs) will be performed for detection of *Campylobacter jejuni* and the Shiga toxin produced by *E. coli*. EHEC strains may produce both Shiga toxin 1 and Shiga toxin 2 or only one toxin (Shiga toxin 1 or Shiga toxin 2). Shiga toxin 1 produced by *E. coli* is similar to the toxin produced by *Shigella* dysenteriae type 1 strains. Therefore the EIA may yield a positive result in patients infected with *S. dysenteriae* type 1 strains, however, isolation of *S. dysenteriae* is rare in the U.S.[4,5,6]

Negative and Positive Results will be given for each pathogen, for example:

- Positive for *Salmonella* serogroup (A,B---), sent to state for serotyping
- Negative for *Shigella* and *E. coli* O157:H7 by culture
- Negative for *Campylobacter* by EIA
- Negative for Shiga Toxin 1 and 2 by EIA

Limitations of the Assay

Overgrowth with normal flora bacteria from the GI tract may limit the growth of any pathogens. Culture of stool samples after beginning treatment may limit detection. If less common bacterial pathogens, such as *Vibrio cholerae* or *V. parahemolyticus, Aeromonas/Plesiomonas,* or *Yersinia enterocolitica* are suspected, special requests for these cultures must be submitted with the stool sample.

Methodology

Placement of stool into Cary Blair transport media, which has a much longer allowable transit time is preferred. Alternatively, stool may be transported in a sterile container if received within 1 hour of collection. Cultures and EIA tests are performed seven days per week. When appropriate, isolates of enteric pathogens and Shiga-toxin EIA positive broth cultures will be submitted to Ohio Department of Health for confirmation and/or serotyping.

References

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3. Siegel DL, Edelstein PH, Nachamkin I. Inappropriate testing for diarrheal diseases in the hospital. *JAMA*. 1990; 263:979-82.
4. Granato PA, Chen L, Holiday I et al. Comparison of Premier CAMPY EIA, ProSpecT Campylobacter EIA, and ImmunoCard Stat!Campy tests with culture for laboratory diagnosis of Campylobacter enteric infections. *J Clin Microbiol*. 2010;48:4022-7.
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Test Overview

Test Name	Routine Stool Culture and EIAs for enteric pathogens
Ordering Mnemonic	STCUL
Reference Range	Negative for Salmonella, Shigella, Campylobacter, E.coli 0157:H7 and Shiga Toxin
Specimen Preparation	Place 5 ml stool in Cary-Blair transport media immediately after collection. Transport at refrigerated temperature.
Stability (in Cary-Blair transport media)	Ambient: 1 hour; Refrigerated: 72 hours; Frozen: Unacceptable
Billing Code	77142
CPT Code	87045; 87046; 87427(x2); 87449

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