

A prediction guide for patients with diarrhea detected non-*C. difficile* diarrhea and reduced culturing of stools

Bauer TM, Lalvani A, Fehrenbach J, et al. Derivation and validation of guidelines for stool cultures for enteropathogenic bacteria other than *Clostridium difficile* in hospitalized adults. *JAMA*. 2001 Jan 17;285:313-9.

QUESTION

In hospitalized patients with diarrhea, how effective is a modified 3-day rule for selecting those to have stool cultures to detect nosocomial diarrhea caused by enteropathogenic bacteria other than *Clostridium difficile* (EPB)?

DESIGN

The rule was derived by a retrospective chart review and a prospective cohort study. The rule was validated by a retrospective chart review.

SETTING

4 academic health care centers in Germany, Switzerland, Spain, and the United Kingdom.

PATIENTS

The derivation samples consisted of 1735 hospitalized patients ≥ 18 years of age (mean age 49 y, 51% women) with diarrhea who had stool cultures done (1182 who had chart reviews and 553 who were assessed prospectively) and 68 who had positive results on stool culture done > 72 hours after admission for EPB. The validation sample (mean age 59 y, 53% men) consisted of 65 hospitalized patients who had positive results for EPB on stool culture, 56 who were involved in 2 nosocomial *Salmonella* outbreaks, and 213 who had stool cultures done.

DESCRIPTION OF PREDICTION GUIDE

To identify predictors of stool culture positivity for EPB, data were collected on recent family history of diarrhea, recent travel outside of Europe, symptoms or signs of enteric illness, reason for doing the stool culture, preexisting comorbid conditions, use of immunosuppressive drugs, nosocomial diarrhea (diarrhea > 72 h after admission), and peripheral neutrophil count.

MAIN OUTCOME MEASURES

Number of patients with sporadic or epidemic nosocomial diarrhea caused by EPB.

MAIN RESULTS

3416 stool cultures were obtained from the 1735 patients who had stool cultures done in the first derivation sample; of these, 34 stool cultures were positive for EPB (17 *Salmonella* species, 10 *Campylobacter* species, 6 *Yersinia* species, and 1 enterohemorrhagic *Escherichia coli* case). Of the 68 patients in the second derivation sample who had positive results for EPB on stool culture done > 72 hours after admission, 33 had nosocomial diarrhea. More patients with EPB were identified from stool cultures obtained ≤ 72 hours after admission than from those obtained > 72 hours after admission (3.3% vs 0.5%, $P < 0.001$). Patients from whom EPB were

isolated > 72 hours after admission had the following characteristics: community acquired diarrhea, age ≥ 65 years with preexisting comorbid disease, neutropenia, HIV infection, and non-diarrheal manifestation of enteric infections. These characteristics were used to develop the modified 3-day criteria. In the first derivation sample, such criteria would have detected 92% (12 of 13) of EPB compared with 46% (6 of 13) by culturing only for *C. difficile* > 72 hours after admission and would have reduced total culturing by 52%. In the validation samples, 2 of 65 (3.1%) patients with EPB would have been missed. The mean rate of stool cultures in 2 of the validation cohorts that could have been avoided by the modified 3-day rule was 54%.

CONCLUSION

The modified 3-day rule of selecting hospitalized patients with diarrhea for bacterial stool culture reduced total stool culturing and detected non-*Clostridium difficile* bacterial enteropathogens.

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COMMENTARY

Several studies have shown low yields of stool cultures for EPB in hospitalized patients with diarrhea (1). Therefore, recommendations have been made to avoid culturing stools from inpatients after the third hospital day (2, 3). However, this "3-day rule" may miss cases of EPB occurring in high-risk patients. The study by Bauer and colleagues was designed to develop a modified protocol for culturing stools from hospitalized adults and to determine whether application of such a guideline would be sensitive and cost-effective. The yield of stool cultures was similar to that previously reported (3.3% of stools obtained within the first 3 d vs 0.5% of stools obtained > 3 d after admission). Using the modified criteria, 92% of enteric pathogens were detected, and 48% of submitted stools would have been cultured. In contrast, with the conventional "3-day rule," fewer specimens would have been cultured (18%), but only half (46%) of the pathogens would have been identified.

The study provides evidence that stools from inpatients hospitalized for > 3 days should not be cultured unless certain clinical condi-

tions exist. Validation of these results in pediatric patient populations would be useful. Another important question that will have to be addressed is how to implement such a policy. The clinical information needed is rarely available to laboratory personnel, so the decision would have to be made by physicians or ward nurses.

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