NOTES

Evaluation of a New Selective Medium, BD BBL CHROMagar MRSA II, for Detection of Methicillin-Resistant Staphylococcus aureus in Stool Specimens

Nancy L. Havill* and John M. Boyce1,2

Hospital of Saint Raphael1 and Yale University School of Medicine,2 New Haven, Connecticut

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We compared the recovery of methicillin-resistant Staphylococcus aureus (MRSA) on a new selective chromogenic agar, BD BBL CHROMagar MRSA II (CMRSAII), to that on traditional culture media with 293 stool specimens. The recovery of MRSA was greater on the CMRSAII agar. Screening of stool samples can identify patients who were previously unknown carriers of MRSA.

Active surveillance cultures to identify patients colonized with methicillin-resistant Staphylococcus aureus (MRSA) are recommended as part of an intensive program to control the spread of the organism in health care settings (10, 14). Although the anterior nares are currently the most common site from which to obtain culture specimens to test for MRSA colonization (4, 7, 13, 15), other sites, including the intestinal tract, can be potential sources of unrecognized colonization by this organism (1, 2, 6). Patients with S. aureus (including MRSA) colonization of the intestinal tract are associated with greater contamination of health care workers’ hands and the environment (3). Patients with intestinal colonization by MRSA and concurrent diarrhea contaminate their environment to a significantly greater extent than patients colonized at other body sites (5). Screening stool samples for MRSA can detect patients who are previously unknown carriers and who may not otherwise be cared for using contact precautions, which could potentially lead to increased health care-associated transmission and subsequent MRSA infections (1, 2, 6). It has also been suggested that undetected intestinal colonization by MRSA could be the cause of persistent colonization or recolonization in patients after successful decontamination (8, 11).

The use of chromogenic agars has been shown to increase sensitivity and decrease the time to detection of MRSA compared with traditional culture methods (9). However, to date, all currently available chromogenic media used for screening patients for MRSA are recommended only for use with specimens from the anterior nares. We evaluated a new selective and differential chromogenic medium, BD BBL CHROMagar MRSA II (CMRSAII) (BD Diagnostics, Sparks, MD), for its ability to detect MRSA in specimens from multiple body sites, including stool specimens, as part of a large multicenter trial (14a). We report on the evaluation of this medium for detection of MRSA from stool samples collected at our institution.

The study was conducted during the period from December 2007 to February 2008 at a 500-bed university-affiliated hospital. A total of 293 stool specimens collected from all wards in the hospital and submitted to the laboratory for Clostridium difficile toxin assay (CDT) were included in the study. Stools were not rejected on the basis of specimen consistency. The specimens were inoculated onto colistin-nalidixic acid (CNA) agar and immediately afterward onto CMRSAII. The plates were incubated in ambient air at 36°C and examined at 24 h (range, 18 to 28 h), and if negative, they were reincubated and examined at 48 h (range, 36 to 52 h). CMRSAII was incubated in the dark to avoid exposure to light. Colonies morphologically consistent with S. aureus recovered on CNA plates were confirmed as S. aureus with a positive coagulase test (Staph aureux, Remel, Lenexa, KS) and confirmed as MRSA by cefoxitin disk diffusion. Mauve-colored colonies present on CMRSAII at 24 and 48 h were presumed to be MRSA and were confirmed as S. aureus with a positive coagulase test. A cefoxitin disk diffusion test was performed if MRSA was not recovered from the CNA plate. Differences in proportions were analyzed using McNemar’s test.

MRSA was recovered from 62 (21.2%) of 293 stool specimens. The recovery rate was 60/62 specimens (96.8%) for CMRSAII and 47/62 (75.8%) specimens for CNA media (P = 0.004) (Table 1). Of the 60 MRSA isolates recovered on CMRSAII, 44/60 (73.3%) of MRSA isolates were identified at 24 h and 14/60 (26.7%) at 48 h, whereas the traditional culture method took between 48 to 96 h to confirm an isolate as MRSA. When CMRSAII

<table>
<thead>
<tr>
<th>CNA agar result</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMRSAII result</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>No. of specimens</td>
<td>15</td>
<td>231</td>
</tr>
</tbody>
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* Corresponding author. Mailing address: Hospital of Saint Raphael, 1450 Chapel St., New Haven, CT 06511. Phone: (203) 789-5115. Fax: (203) 789-4247. E-mail: Nhavill@srhs.org.

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was compared with cefoxitin disk diffusion, the overall agreement was 97.3% (285/293) at 24 h and 99.9% (291/293) at 48 h. Compared to cefoxitin disk diffusion, CMRSAII had a sensitivity of 84.6% (44/52) at 24 h and 96.8% (60/62) at 48 h and a specificity of 100% at both 24 and 48 h. Traditional culture had a sensitivity of 90.4% (47/52) at 24 h and 75.8% (47/62) at 48 h and a specificity of 100% at both 24 and 48 h compared to the cefoxitin disk diffusion method (Table 2). The sensitivity of the traditional culture method at 48 h was lower than that at 24 h because additional stools were positive on CMRSAII at 48 h and were confirmed by cefoxitin disk diffusion, but none of these were positive at 48 h on traditional media. No false-positive results were identified on CMRSAII after 48 h of incubation.

For 17 (33.3%) of the 51 unique patients positive for MRSA, the stool isolate was the first MRSA isolate recovered from the patient, as determined by an electronic chart review. Only four (23.5%) of these patients had a positive CDT and were already subject to contact precautions. Six (35.3%) of the 17 patients had negative nasal MRSA surveillance cultures as part of our active surveillance program. Patients who are at risk for Clostridium difficile diarrhea by virtue of prior hospitalization or antibiotic therapy are also at increased risk of colonization with other multidrug-resistant organisms, including MRSA (12). Screening of stool samples that have been sent to the laboratory for CDT assay would increase the likelihood of recovery of MRSA compared to screening of all stool samples. MRSA-positive stools were reported and phoned to the nurse to ensure prompt implementation of contact precautions.

Our study has several limitations. Our study represents data collected from a single hospital and may not be representative of all patient populations. This study was conducted within a relatively small time period of 3 months and may have shown different results if conducted over a longer time period, although these results are consistent with previous data collected at our institution over a period of 1 year (6). A broth enrichment method was not included as part of the reference method, which may have increased the yield of MRSA 9 to 25% (13), although this method delays the reporting of MRSA for an additional 24 h. Screening of stool samples is only one part of our intensive surveillance program, and we have limited resources available to perform such tasks. Although CMRSAII may have less sensitivity than an agar-based method with broth enrichment, it is easy to use, has a faster turnaround time, and requires minimal technician time.

In conclusion, we found CMRSAII to be a reliable screening medium to detect MRSA in stool specimens. Recovery of MRSA was greater on CMRSAII than on traditional CNA media. Additionally, CMRSAII has the ability to identify MRSA 24 to 48 h earlier than the CNA agar screening method. Our study confirms results of previous studies demonstrating that screening of stool samples for MRSA can detect patients who are not previously known to be carriers of MRSA (1, 2, 6). These findings further substantiate the rationale for including intestinal screening as part of an infection control surveillance strategy. It is possible the increased cost of the chromogenic method may be offset by the cost savings in reduced transmission of MRSA, but further studies are necessary. Rapid identification of MRSA along with prompt institution of contact precautions may prevent further transmission of this organism in the health care setting.

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REFERENCES


