JOURNAL OF CLINICAL MICROBIOLOGY, Aug. 2000, p. 3131–3132 Vol. 38, No. 8
0095-1137/00/$04.00+0

Letters to the Editor

Evaluation of the BACTEC MGIT 960 and MB BAC/T Systems for Routine Detection of *Mycobacterium tuberculosis*

Dr. Alcaide and colleagues have recently reported an evaluation of the BACTEC MGIT 960 (Becton Dickinson) and MB/BacT (Organon Teknika) systems for recovery of mycobacteria from clinical specimens (1). We have recently completed a similar evaluation at the University College Hospital Galway.

Our evaluation was conducted on 493 specimens submitted between November 1999 and February 2000. There were 365 respiratory tract specimens and 128 nonrespiratory tract specimens (including pleural fluid, urine, and cerebrospinal fluid). Sputum samples were predigested with an equal volume of Sputasol (Oxoid) following centrifugation at 3,000 × *g* for 15 min. A slide was prepared from the sediment for microscopy, and the remaining sediment was decontaminated with 4% aqueous NaOH for 20 min followed by neutralization with 14% KH_2PO_4. Following centrifugation, the sediment was resuspended in approximately 1 ml of neutralization buffer and 0.5 ml of material was inoculated into each of the two systems. Bronchoalveolar lavage specimens were treated in a similar manner. Urine specimens were concentrated by centrifugation, and the deposit was decontaminated with 2.5 ml of 5% sulfuric acid for 30 min. Other contaminated specimens were decontaminated with 4% NaOH followed by neutralization. Slides for microscopy were stained with Auramine O. Antimicrobials were added to the culture vials prior to inoculation (PANTA for BACTEC MGIT 960 and MAS [MB/BACT antibiotic supplement] for MB/BacT). Cultures were incubated for 6 weeks. From positive cultures, a smear was stained by the Ziehl-Neelsen method. Chocolate agar media were inoculated to check for contamination with bacteria other than mycobacteria.

Isolates of mycobacteria were identified by conventional methods (2, 3). In total, 18 isolates (18 in MB/BacT; 16 in BACTEC MGIT 960) of *M. tuberculosis* were obtained. The 16 specimens positive in both systems were from the respiratory tract and were positive on microscopy. The two isolates detected only in the MB/BacT system after 28 days of incubation were pleural biopsy and pleural fluid specimens (same patient) and were negative on microscopy. These results are consistent with those of Alcaide et al., indicating no significant difference in the isolation rate of *M. tuberculosis* between the BACTEC MGIT 960 and the MB/BacT systems (1).

Four MOTT (mycobacteria other than *M. tuberculosis*) isolates (one *M. kansasii* and three *Mycobacterium avium-M. intracellulare*) were detected. The *M. kansasii* isolate was detected only in the BACTEC MGIT 960 system; the *M. avium-M. intracellulare* isolates were detected in both systems. The numbers of MOTT isolates are small, and we note that Alcaide et al. found that the MB/BacT was significantly better than the BACTEC MGIT 960 at isolating *M. kansasii*.

The mean times to detection (TTD) of a positive culture of *M. tuberculosis* were 8.5 days (range, 4 to 23 days) in the BACTEC MGIT 960 system and 13.4 days (range, 2 to 39 days) in the MB/BacT system. This is consistent with the finding of Alcaide et al. that the mean TTD is significantly shorter in the BACTEC MGIT 960 than in the MB/BacT culture system. In this study, the contamination rate was 8.5% in the BACTEC MGIT 960 system, similar to the results described in previous reports (5). The contamination rate of 25% in the MB/BacT culture system is high relative to the results of Alcaide et al. and others (1, 4) and resulted in contamination with staphylococci or streptococci in 5 of 18 (28%) cultures positive for *M. tuberculosis*. In our experience, both systems are effective in isolating mycobacteria; however, the BACTEC MGIT 960 system is preferable to the MB/BacT system in particular because of lower contamination rates and also because of a superior mean TTD for *M. tuberculosis*. Since much of the contamination was due to staphylococci and streptococci, it is possible that the routine addition of vancomycin to the MB/BacT system may reduce the contamination rate.

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Authors' Reply

The findings of Dr. Whyte and colleagues are similar to the results we reported previously for the detection of *Mycobacterium tuberculosis* by the BACTEC MGIT 960 and MB/BacT systems (1). Although no significant differences in the isolation rate of *M. tuberculosis* were found by Whyte et al., the MB/BacT system was better at isolating this species (100%) than the BACTEC MGIT 960 system (88.9%). Surprisingly, only two *M. tuberculosis* isolates were obtained from smear-negative specimens, and they were only recovered in the MB/BacT system. This fact might explain the short mean time to detection observed in this study, especially with the MGIT 960.

The contamination rate was the greatest difference between the study of Whyte et al. and other comparison studies (1, 2, 5). A bacterial overgrowth rate of ≥9% in the MB/BacT system was initially reported when the original antibiotic supplement was used (4). Since 1998, a revised supplement with vancomycin has been introduced by the manufacturer, and it has practically resolved this problem. However, the contamination rates obtained in the study of Whyte et al. are among the highest reported for the MB/BacT system (25%). This wide variation with the results of other studies may reflect the different antibiotic supplement and digestion-decontamination procedure used by the authors. Interestingly, despite the high rate of contamination found by Whyte et al., the MB/BacT system showed a better recovery rate for *M. tuberculosis* than the MGIT 960 system did. In our experience with 3,823 clinical specimens collected between July 1999 and April 2000, the contamination rate was 4.2% for the MB/BacT system and the percentage of positive cultures was >7.7%. We have followed the conventional *N*-acetyl-L-cysteine-NaOH digestion-decontamination procedure (3), and the MB/BacT antibiotic supplement was added only to the bottles for culture of nonsterile specimens, as recommended by the manufacturer. Therefore, we think the bacterial overgrowth in the MB/BacT system is not, at present, a significant problem.

In conclusion, both the MGIT 960 and the MB/BacT are efficient systems for the isolation of mycobacteria in a clinical laboratory, which could replace the radiometric method.

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