The MB/BacT Is a Sensitive Method of Isolating Mycobacterium tuberculosis from Clinical Specimens in a Laboratory with a Low Rate of Isolation

Roggenkamp and colleagues recently reported the results of their comparative evaluation of the MB/BacT and the BACTEC 460 (3). They observed a significantly lower recovery rate for Mycobacterium tuberculosis using the MB/BacT, and they commented that new diagnostic systems should be evaluated under conditions found in nonspecialized laboratories that have a low rate of detection of specimens positive for M. tuberculosis.

Our comparative study of these two systems (1) was performed in a nonspecialized hospital laboratory that processes approximately 5,000 specimens per year for mycobacterial culture, with 5.6% positive for mycobacteria and 1.5% positive for M. tuberculosis, similar to the numbers reported by Roggenkamp et al. We demonstrated that the MB/BacT detected the M. tuberculosis-M. avium complex at a rate that was not significantly different from that of the BACTEC 460. The numbers of specimens that were culture positive for mycobacteria in our study (44) were less than the 123 specimens positive in the study of Roggenkamp et al., and it is possible that with more specimens, differences may have been found. The decreased sensitivity of the MB/BacT system observed by Roggenkamp et al. could be due to differences in the specimens studied, the products used, and the methods. The epidemiology and presentation of patients with mycobacterial disease in Europe and the United States could differ and thereby influence the number of organisms in specimens. Our specimens were predominantly of respiratory origin, whereas the specimens in the Roggenkamp study included urine and gastric fluid, as well as samples from sterile sites. Among 23 specimens positive for M. tuberculosis in our study, 15 (65%) were smear positive, in comparison to 25 of 71 (35%) in the Roggenkamp study. Unlike Roggenkamp and colleagues, we screened all specimens with the more sensitive Auramine O fluorochrome as mandated by the College of American Pathologists (2). The MB/BacT detected all eight smear-negative M. tuberculosis-infected patients in our study. In a previous evaluation of the MB/BacT system, we had observed decreased sensitivity for nontuberculous mycobacteria and a high rate of nonmycobacterial contamination. The manufacturer subsequently revised the medium and the antibiotic reconstitution supplement. Our published study was performed with the revised reconstitution fluid and antibiotic supplement in which oleic acid was substituted for Tween 80 to reduce overgrowth of gram-positive bacteria. Roggenkamp and colleagues used the original supplement. We maximized the recovery of mycobacteria in the MB/BacT by staining contaminated bottles weekly for the full 6 weeks of incubation. Twelve of 33 (36%) of the mycobacteria not detected in the Roggenkamp study, 6 of which were M. tuberculosis, were due to bacterial contamination that may have been improved by using the revised antibiotic supplement that is now available.

In summary, the poor results obtained with the MB/BacT by Roggenkamp et al. might have been influenced by the type of specimens studied, how they were processed, and the growth medium and antibiotic supplement utilized. It would be interesting for them to do a study using the same type of experimental design and media as we reported in our trial of this instrument.

REFERENCES


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Author’s Reply

One topic—two studies—conflicting results? We think not! The designs of the two studies have to be considered when considering the different results. The study of Benjamin and colleagues was not designed to detect differences in sensitivity between the MB/BacT and the BACTEC 460 when used in routine laboratories.

As stated by the authors themselves, their comparative study was performed in a nonspecialized hospital laboratory that processes approximately 5,000 specimens per year for mycobacterial culture with 1.5% positive for M. tuberculosis. In their study, they included a selection of 488 specimens, which were collected over a 4-month period and 5% of which were culture positive for M. tuberculosis (1). Likewise, the high percentage of smear-positive specimens (65%) and the small number of specimens collected per patient (1.61) indicated that their study material was not representative for a routine laboratory. A study which excludes certain clinical specimens from analysis cannot determine the sensitivity of the assay in routine laboratories. As shown in both studies, the cultivation of mycobacteria from smear-positive specimens is not problematic when the MB/BacT and BACTEC 460 systems are used (1, 2). The detection of M. tuberculosis in smear-negative specimens (low quantity of mycobacteria) is important in analyzing the sensitivity of the named systems. Benjamin and colleagues presented only eight smear-negative specimens which were culture positive for M. tuberculosis. We included 46 in our study (2).

There is no doubt that the composition of the culture medium is highly important in the diagnostic of mycobacteria. Supplementation with vancomycin reduces contamination. However, vancomycin itself has antimycobacterial activity. Questions concerning the sensitivity of new culture media have to be answered in comparative studies in which one detection system is used and identical specimens are inoculated into different media that are to be compared.
Provided that the staining procedure is performed in the correct way, the Ziehl-Neelsen stain is as sensitive as Auranine O fluorochrome in detecting mycobacteria, although Ziehl-Neelsen staining is more time-consuming. Our coworkers are well trained, not only in microscopy and conventional cultivation procedures for mycobacteria but also in the operation of the MB/BacT system (course of instruction and periodical supervision by manufacturer coworkers).

REFERENCES


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