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Use of the BACTEC 9240 System with Mycosis-IC/F Blood Culture Bottles for Detection of Fungemia

A recent study by Horvath et al. (5) assessed the use of BACTEC Plus Aerobic/F and Anaerobic/F blood culture (BC) bottles with the BACTEC 9240 system to detect yeasts in a simulated-candidemia model. The authors concluded that further research was needed to optimize the recovery of *Candida* spp. from this automated BC system because of the high rate of false negatives and the long time to detection (TTD), especially for *Candida glabrata*. We wish to comment on this study and report our own experience.

Firstly, a key point in fungal BCs is what components are included in the medium. Indeed, the difficulty of detecting some fungal species in traditional BC vials, because of their slow growth and/or weak production of CO_2, has been reported in several studies (2, 8). A selective fungal medium, BACTEC Mycosis IC/F (Becton Dickinson, Sparks, Md.), was developed to achieve optimum recovery of yeasts and fungi from blood (3; N. Fujihara, T. Saito, S. Takakura, T. Kudo, Y. Iinuma, and S. Ishiyama, Abstr. 43rd Intersci. Conf. Antimicrob. Agents Chemother., abstr. M-1024, p. 461, 2003). The better performance of Mycosis IC/F is due to (i) a lysing agent which releases phagocytosed fungal cells; (ii) the addition of components which are essential to fungal growth, such as carbohydrates and yeast extract; (iii) and antibiotics that suppress bacterial overgrowth in blood samples containing both fungi and bacteria (R. Grillot, H. Fricker-Hidalgo, B. Lebeau, H. Pelloux, J. Croizé, C. Recule, and P. Ambroise-Thomas, Abstr. 39th Intersci. Conf. Antimicrob. Agents Chemother., abstr. 975, p. 562, 1999). The mean time to yeast detection for simulated BCs (3), using the Mycosis IC/F medium, was 29.03 ± 13.99 h instead of 73.92 ± 56.74 h with aerobic Plus F medium ($P = 0.0001$). In the Grenoble (France) teaching hospital, we routinely use the European Community-labeled Mycosis IC/F medium commercially available in Europe. The fungal bottle is added to the traditional BC set when it is used for patients at risk of fungal infections. From January 2002 to November 2003, 11 episodes of candidemia out of 52 were due to *C. glabrata* (36 positive fungal bottles out of 118). They were detected with a mean TTD of 25.13 h. The importance of the fungal medium has also been proved in the diagnosis of disseminated infections due to filamentous fungi such as *Fusarium* spp. (4, 6).

Secondly, some points of the study of Horvath et al. may be criticized. Why perform this study with anaerobic bottles while the limited anaerobic growth capabilities of yeasts of medical interest are well known? (7). Moreover, the authors suggest the performance of terminal blind subcultures on the basis of the patient population to avoid a high rate of false negatives. This cannot be recommended in a routine mycology laboratory because of the delay in obtaining the final result, labor cost, and risk of exposure to infectious material.

According to the international consensus, defining opportunistic invasive fungal infections on a single BC yielding *Candida* species or other yeasts is a criterion of proven invasive fungal infection (1). Consequently, optimal conditions to rapidly and reliably detect yeasts and fungi from blood are crucial in the early diagnosis of invasive mycosis, a major cause of mortality in immunocompromised patients. Thus, we conclude that the aerobic Mycosis IC/F bottle monitored by BACTEC 9240 clearly enhances the sensitivity for fungemia detection and reduces the TTD.

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Authors' Reply

We agree with the comments of Fricker-Hidalgo and colleagues regarding the use of specific mycology media with the BACTEC 9240 automated blood culture system to enhance the recovery of yeasts. Our more recently published study (1) evaluated the recovery of *Candida* spp. in the BACTEC 9240 system using another specific mycology medium, BACTEC Myco/F Lytic (Becton Dickinson and Company, Sparks, Md.). As one would suspect, the Myco/F Lytic medium proved superior to either the standard aerobic or anaerobic media, as did BACTEC Mycosis-IC/F. Although these specific mycology media improve the recovery *Candida* spp., their routine clinical use has several limitations. Use of mycology medium requires that additional blood be obtained from patients, the use of an increased amount of laboratory space (including valued incubator space), and the additional costs of processing and pur-

chasing bottles. The fungal medium bottles alone cost approximately three times more than standard aerobic or anaerobic medium bottles. Because of these limitations, many hospitals do not routinely employ specific mycology medium for blood culture. Our previous study (2), being commented upon in their letter, specifically evaluated candidemia detection using a standard blood culture set of aerobic and anaerobic media. In most instances, anaerobic medium was found to be inferior to aerobic medium, as suggested. However, the anaerobic medium proved to be useful in the recovery of *C. glabrata*, which had a shorter time to recovery in anaerobic versus aerobic medium (22.14 ± 2.47 h versus 120.89 ± 35.33 h, respectively). In patients at high risk for candidemia, use of one of the mycology media with the BACTEC 9240 system appears quite reasonable. However, if mycology medium is not available, our study supports terminal subculture as a potentially useful adjunctive step in these high-risk patients.

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