Reply to Zhuo and Zhong

To the Editor—We thank Drs Zhuo and Zhong for their evaluation of our manuscript and appreciate the opportunity to clarify our findings [1, 2]. The respondents express concerns that the study design unfairly biases the BACTEC blood culture media because they believe it compares 2 BACTEC bottles to a single BacT/Alert bottle, thereby providing additional opportunity for the BACTEC media to grow organisms. In our institution,
it is the standard of care to collect an anaerobic and an aerobic bottle per blood culture order. For this study, we added a single BacT/Alert aerobic bottle, providing a blood culture set consisting of 3 bottles: a BACTEC aerobic, a BACTEC anaerobic, and a BacT/Alert aerobic bottle. Comparisons for the published study were made only between aerobic BACTEC and BacT/Alert bottles. Any growth obtained in anaerobic blood culture media was excluded from the evaluation for the very reasons the respondents suggest, namely, because it provides additional blood volume in favor of one of the blood culture systems.

The respondents also suggest that differences in fill volumes between the systems confounded our findings. We agree that fill volume is one of the most important variables determining blood culture yield, and this has been substantiated in other clinical studies [3,4]. Despite this, in clinical practice we often encounter collections with blood volumes lower than the recommended standard of 8–10 mL (category 1 in our study). In one of the most frequently cited head-to-head blood culture studies, only 45% of the bottles collected met the inclusion criteria of ≥8 mL of blood per bottle [5]. This experience is typical of any blood culture study but also serves as a reference to highlight the success we encountered in obtaining recommended collection volumes. In our study, 60%–70% of the bottles were filled at 8–10 mL of blood (category 1, Supplementary Figure 3 [1]), making our fill volume compliance higher compared to that of other published studies [1].

Despite fill volumes favoring the BACTEC system for optimally filled bottles (8–10 mL; category 1, Supplementary Figure 3 [1]) by 10%, the BacT/Alert system recorded a higher percentage of fill volumes in all other bottle fill categories (<5 mL, 5–8 mL, or >10 mL; Supplementary Figure 3 [1]), suggesting that fill volumes were not a significant confounder in our series. Furthermore, as shown in Supplementary Figure 4 [1], if both of the bottles of a paired BACTEC and BacT/Alert set had the same fill volume regardless of the category, BACTEC isolated 63% of the overall growth. When the bottles of a paired set had different fill volumes, BACTEC isolated a similar 66% of the growth, which was not statistically different (P = .499). If differences in fill volumes were a confounder, one would expect to see large differences in isolation rates when fill volume categories were analyzed (Supplementary Figure 4), which was not observed in our study.

Randomizing the order of inoculation of the bottles was done in order to minimize effects of one system from preferentially identifying low-level bacteremia. We agree with the respondents that the BACTEC system isolated a higher number of contaminants (P = .016); however, we contest that this was not a consequence of “preferential drawing order” but rather a consequence of overall higher yield of recovery by the BACTEC system, which also isolated more pathogens and indeterminates. We acknowledge that BACTEC and BacT/Alert bottles require different adaptors during blood culture draw due to different bottle shapes. This fact may or may not have influenced contamination rates in our series as the extra step required introduces a further manipulation during blood culture collection.

Note

Potential conflicts of interest. Both authors: No reported conflicts.

Both authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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