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**Paper Poster Session**

**Lab automation**

### **Laboratory evaluation of the BacT/ALERT® VIRTUO™ automated blood culture system**

Flora Marzia Liotti<sup>1</sup>, Giulia Menchinelli<sup>1</sup>, Giulia De Angelis<sup>\*1</sup>, Barbara Fiori<sup>1</sup>, Tiziana D'inzeo<sup>1</sup>, Flavio De Maio<sup>1</sup>, Maria Federica Ventriglia<sup>1</sup>, Maurizio Sanguinetti<sup>2</sup>, Teresa Spanu<sup>3</sup>

<sup>1</sup>*Università Cattolica del Sacro Cuore, Rome, Italy*

<sup>2</sup>*Institute of Microbiology - Università Cattolica del S. Cuore, Roma, Italy*

<sup>3</sup>*Catholic University of Rome, Rome, Italy*

**Background:** Blood culture (BC) remains the gold standard for diagnosing bacteremia. Over the decades, improvements in culture media and the availability of software-assisted, automated growth detectors have enhanced the recovery of bloodstream pathogens and decreased the time to detection (TTD) of microbial growth. The BacT/ALERT® VIRTUO™ Microbial Detection System (VIRTUO, bioMérieux) is a recently developed automated BC instrument which uses a new algorithm for the colorimetric detection of microbial growth.

We performed an *in vitro* study to evaluate the TTDs of the most common bacterial species responsible for bacteremia with the VIRTUO in comparison to BACTEC FX (BACTEC, Becton Dickinson) and BacT/ALERT® 3D systems (BacT/ALERT, bioMérieux).

**Material/methods:** We used 90 clinical blood isolates, including 8 species of Gram-negative bacteria and 10 species of Gram-positive organisms. For each species, 5 strains were tested in duplicate. The media used with the BACTEC were the Plus Aerobic/F, Plus Anaerobic/F, and Peds Plus/F (pediatric), while BacT/ALERT FA Plus (aerobic), FN Plus (anaerobic) and PF Plus (pediatric) were used with the BacT/ALERT and the VIRTUO systems. Each bottle was inoculated with 8 ml (4 ml for pediatric bottle) of fresh, whole blood containing 4-8 CFU/ml of organism and immediately incubated in the instruments. A workflow analysis was performed by hands-on time and motion studies (amount of time and number of steps for loading and unloading BC bottles, respectively) for the BACTEC and the VIRTUO. The analysis was conducted on 200 BC bottles that were incubated in each system.

**Results:** Out of the 1620 BC bottles used in this study, 1560 (96.3%) had bacterial growth detected by the automated BC systems. Overall, the mean  $\pm$  SD TTD was faster in the VIRTUO instrument ( $11.8 \pm 3.3$  h) than in the BacT/ALERT ( $13.9 \pm 3.4$  h) and the BACTEC ( $13.7 \pm 3.7$  h). In particular, means  $\pm$  SD TTDs of aerobic bottles incubated in the VIRTUO, the BacT/ALERT and the BACTEC were  $11.6 \pm 2.8$  h,  $13.6 \pm 2.8$  h, and  $13.4 \pm 3.1$  h, respectively; those for anaerobic vials were  $12.3 \pm 4.3$  h,  $14.6 \pm 4.5$  h, and  $14.5 \pm 4.6$  h, respectively, while those of pediatric BCs were  $11.6 \pm 2.7$  h,  $13.5 \pm 2.7$  h and  $13.2 \pm 3.3$  h, respectively. The BACTEC required more hands-on time than the VIRTUO (31.2 min vs 13 min) for loading and unloading 200 bottles. The total processing steps for VIRTUO and the BACTEC were 4 and 11, respectively.

**Conclusions:** The VIRTUO performed better than the BACTEC in terms of TTD, hands-on time, and number of steps for loading and unloading bottles, although further efforts are needed to evaluate its overall performance in different settings.