A451 - Assessing the volume of blood taken for blood culture and culture positivity – do we need to take less blood?

TM Mann¹; M Salim ²; S Haider ²; AH Mayo¹; KK Kaye²
¹Assuta medical center, Department of Intensive Care, Ashdod, Israel, ²Detroit Medical Center, Department of Medicine, Detroit, United States

Introduction:
It is commonly accepted that larger blood culture (BC) volumes (BCV) increase the yield of true positive cultures, and optimally 20 cc of blood should be obtained per set (2 bottles). Only scarce data exists on the matter of optimal BCV. It is unknown what is the minimal volume that is acceptable for BC. The objective of this study was to determine the association between BCV and the rate of positive BC.

Methods:
Blood taken for cultures in BD BACTEC Plus Aerobic/F negative bottles was collected from ICUs and acute care floors at 8 hospitals at the DMC over 6 months. Blood volume was estimated automatically from blood background signal data in the BD BACTEC FX instrument. Cultures were analyzed for each bottle. Data was summarized for every month as the average volume and number of cultures taken and rate of positive BC for every unit. Units were classified according to unit type (ICU, Medicine, Surgery, Mixed, Emergency Department (ED), Organ/BMT or "other" which did not fit the previous categories) and analyzed as a group.

Results:
A total of 23795 cultures were taken in 84 units. There is a positive association between BV and positive BC rate for ED and “other” units (IRR=1.27, p=0.006 for the ED, IRR=5.00, p<0.001 for “other” unit). All other units had no association between BV and positive BC rate (fig 1). Secondary analysis, excluding Pediatric units, gave very similar results. When comparing BV between unit types, the ED and “other” unit had significantly lower BV (2.4 ml in the ED and 3.5 ml in “other” unit compared to 4.9 ml in the ICU, 4.7 ml in surgery, 4.2 ml in mixed and 7.7 ml in BMT).

Conclusion:
The correlation between BV and positive BC rate is probably limited to units taking very low BV for cultures. Units taking volumes above 4 ml show no improvement in positive BC rate when higher volumes are taken. Better prospective studies should be done to further establish the minimal BCV needed and spare unnecessary blood loss to hospitalized patients without compromising BC yield.

Image:
correlation of blood culture positivity rate with blood culture volume by unit type