

Poster # 344

HENRY FORD HEALTH

Outcomes of Patients with Staphylococcus aureus Bacteremia Detected with the VersaTREK vs Virtuo Blood Culture Systems: A Retrospective Study

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Background

- Prior studies evaluating the sensitivity blood cultures utilizing Virtuo versus VersaTREK blood culture systems have suggested increased sensitivity with the Virtuo system.
- Studies evaluating if this increased sensitivity effects patient outcomes are lacking.
- **Aim:** Evaluate the effect of replacing VersaTREK system with Virtuo system on patient outcomes in those with *Staphylococcus aureus* bacteremia.

Methods

- Observational cohort study performed at Henry Ford Hospital, Detroit, MI.
- **Primary Outcomes:** Assessed differences in:
  1. Mortality due to *Staphylococcus aureus* at 14, 30, and 90 days.
  2. Length of stay.
  3. Readmission for recurrence of *S. aureus* bacteremia within 30 days.
- **Secondary Outcomes:** Assessed differences in:
  1. Length of therapy.
  2. Rates of diagnostic imaging tests.
  3. Length of bacteremia.
- **Inclusion Criteria:** All patients with positive blood cultures for *S. aureus* between 3/1/18 and 9/30/18 (VersaTREK system) and 3/1/19 and 9/30/19 (Virtuo system).
- **Exclusion Criteria:** Patients transferred from an outside facility with ongoing *S. aureus* bacteremia.
- **Statistics:** Data were analyzed using SPSS for Macintosh. Pearson’s chi-square test and Mann-Whitney u-test were used to compare the study arms. A two tailed p <0.05 was considered statistically significant.

Results

- Demographics of the study populations were equal. (Table 1.)
- More patients in the Virtuo arm had persistent bacteremia (38% vs 23% p<0.001). (Table 2.)
- Median length of bacteremia was significantly longer for patients in the Virtuo arm (2 vs 1 day; p=0.01). (Table 2.)
- No differences between the two groups for any other outcome. (Table 3)

Table 1. Patient Demographics

Characteristic	VersaTREK N=267	Virtuo N=404	p value
Age, median (IQR)	62 (49 – 73.5)	65 (53 - 76)	0.16
Sex, no. (%)			
Female	130 (48.7)	176 (43.6)	0.19
Male	137 (51.3)	228 (56.4)	0.19
Race/Ethnicity, no. (%)			
Asian	1 (0.4)	2 (0.5)	0.82
Black	68 (25.5)	121 (30.0)	0.21
Other	16 (6.0)	17 (4.2)	0.30
White	182 (68.2)	264 (65.3)	0.45
CCI, median (IQR)	3 (2 – 5)	3 (1 – 4)	0.06
Abbreviations: CCI, Charlson Comorbidity Index; IQR, interquartile range.			

Table 2. Length of Staphylococcus aureus Bacteremia and Patient Care Characteristics

	VersaTREK	Virtuo	p value
Persistent bacteremia, <sup>a</sup> no. (%)	60 (22.5)	153 (37.9)	<0.001
Length of bacteremia, days, median (IQR)	1 (1 – 2)	2 (1 – 4)	0.01
Infectious Disease consult, no. (%)	238 (89.1)	358 (88.6)	0.83
Length of treatment, no. (%)			
<2 Weeks	40 (15.0)	70 (17.3)	0.42
2 Weeks	43 (16.1)	73 (18.1)	0.51
3 Weeks	3 (1.1)	0 (0)	0.03
4 Weeks	59 (22.1)	85 (21.0)	0.74
6 Weeks	100 (37.5)	152 (37.6)	0.96
>6 Weeks	11 (4.1)	10 (2.5)	0.23
None	11 (4.1)	14 (3.5)	0.66
CT scans per patient, mean (range)	1.0 (0 – 7)	0.9 (0 – 5)	0.58
MRIs per patient, <sup>c</sup> mean (range)	0.5 (0 – 4)	0.4 (0 – 4)	0.11
Echocardiography performed, no. (%)			
TTE	103 (38.6)	139 (34.4)	0.27
TEE	14 (5.2)	19 (4.7)	0.75
Both TTE and TEE	100 (37.5)	171 (42.3)	0.21
None	50 (18.7)	75 (18.6)	0.96

<sup>a</sup>Defined as culture positivity for 3 or more days.

Table 3. Outcomes of patients with Staphylococcus aureus bacteremia detected with VersaTREK and Virtuo blood culture systems.

	VersaTREK	Virtuo	p value
Recurrence of bacteremia, <sup>a</sup> no. (%)			
No	194 (72.7)	309 (76.5)	0.68
Yes, within 14 days	3 (1.1)	2 (0.5)	0.32
Yes, within 30 days	2 (0.7)	8 (2.0)	0.23
Death due to bacteremia within 90 days of diagnosis, no. (%)	72 (27.0)	108 (26.7)	0.95
Length of stay, days, median (IQR)	8 (6 – 14)	10 (6 – 15)	0.24
Readmission within 30 days, no. (%)	4 (1.5)	8 (2.0)	0.64
<sup>a</sup> 68 patients were excluded from analysis in the VersaTREK arm and 85 patients were excluded from the Virtuo arm due to patient death <14 days from diagnosis.			

Conclusions

- The Virtuo blood culture system allows for more frequent detection of prolonged bacteremia and patients in the Virtuo arm had longer overall lengths of bacteremia.
- Despite this, patient outcomes did not differ.
- Increased sensitivity of the Virtuo system may come with the cost of more frequent identification of skin colonization which could lead to overuse of antibiotics and placement of invasive lines of antibiotic administration.
- Future, prospective studies are needed to assess these issues further.

Limitations

- Retrospective cohort study.
- Single Center
- Did not assess other blood culture systems.

Visual Abstract



No author disclosures in relation to this topic.

References

