Clinical Performance of T2Bacteria® Panel on Whole Blood for Early Identification of bloodstream infections in a tertiary care teaching hospital

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Background

- At our institution, a nursing screening tool was developed to identify patients presenting to the Emergency Department with possible sepsis.
- The electronic tool utilizes a patient’s vital signs, mental status, and physical findings in triage to identify patients requiring provider notification and ordering of Septis Triage labs including blood culture (BC).
- Many early warning sepsis screening tools demonstrate high sensitivity however low specificity.
- Positive blood cultures are beneficial for antibiotic streamlining however most bottles are negative.
- A 6-month internal retrospective blood culture report determined an overall positive blood culture rate of 0.09% (798/8,541 bottles incubated).
- Previously published literature report positive blood culture rates of approximately 30% in critically ill patients with septic shock.
- Inappropriate selection of empiric antibiotic treatment is a significant contributor to increased mortality. Therefore, accurate timely identification of patients with blood stream pathogens may be helpful.
- T2Biosystems® currently offers the T2B® Panel, which provides sensitive detection of specific sepsis-causing bacterial pathogens directly from a whole blood specimen in approximately 3.5 hours.
- The panel’s high sensitivity allows for organism identification as low as 1 CFU/mL compared to 100 to 1,000 CFU/mL.
- The Panel identifies five common bacteria known to cause bloodstream infections in a Tertiary Care Teaching Hospital – Staphylococcus aureus, Enterococcus faecium, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, and Staphylococcus epidermidis.
- Taking into consideration diagnostic stewardship, there is little information available on which patients would benefit from the most test from this Panel.

Purpose

The purpose of this study is to determine the clinical and financial impact of the T2Bacteria® Panel in early diagnostic stewardship.

Methodology

**Study Design:** Prospective interventional study of ED patients 07/00 – 1530 M-F Study Sample:
- Adult patients presenting to ED with possible sepsis
- ED Pharmacist eligibility screening criteria
  1. Age ≥ 18 years of age
  2. Sepsis order set ordered by provider and Severe Sepsis Risk defined as ≥ 2 SIRS Criteria
  3. Written informed consent
- ID Pharmacist Testing/Intervention Timeline
  1. 1300 CKD patients on dialysis received antimicrobial intervention
  2. Inclusion Criteria
     - Previous literature report positive blood culture rates of approximately 30% in critically ill patients with septic shock.
     - Inappropriate selection of empiric antibiotic treatment is a significant contributor to increased mortality.
     - T2B was able to identify one patient with negative blood cultures.
     - Staphylococcus aureus bacteremia.

**Criteria met for T2 testing N = 9**

<table>
<thead>
<tr>
<th>Pt #</th>
<th>Admission Diagnosis</th>
<th>T2B Result</th>
<th>Infectious Disease/Pharmacist Interventions</th>
<th>Blood Culture Results</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HCAP vs. ASpiration Pneumonia Started on Cefazidime, Vanc, CD</td>
<td>Changed cefazidime to meropenem (88% versus 99%)</td>
<td>Discontinued clindamycin</td>
<td>Negative</td>
<td>WBC declined from 25 to 10 next am</td>
</tr>
<tr>
<td>2</td>
<td>Sepsis in a dialysis patient with decreased responsiveness and AMS started on zosyn and vancomycin</td>
<td>Set vancomycin high trough goal of (15-20)</td>
<td>Obtained ID consult for Staph aureus bacteremic bundle</td>
<td>Positive for MRSA</td>
<td>Vancomycin DOT 7 days</td>
</tr>
<tr>
<td>3</td>
<td>Sepsis in a dialysis patient who became unresponsive started on zosyn and vancomycin</td>
<td>Set vancomycin high trough goal of (15-20)</td>
<td>Obtained MRSA contact precautions</td>
<td>Positive for MRSA</td>
<td>Vancomycin continued</td>
</tr>
</tbody>
</table>

**Study Enrollment**

- Patients screened for T2Bacterial® Panel N = 234
- Criteria met for T2B testing N = 9
- Excluded N = 172
- Positive N = 3
- Negative N = 6

**Results**

**Disclosures**

The individuals of this presentation have received research support from T2 Biosystems in the form of instrumentations and reagents.