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 T2Bacteria 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 antimicrobial treatment is a significant contributor to increased mortality. Therefore, taking into consideration diagnostic stewardship, there is a need for rapid identification of pathogens directly from a whole blood specimen.

The Panel identifies five common bacteria known to cause bloodstream infections in a dialysis patient with decreased responsiveness and AMS started on zosyn and vancomycin.

The percent positivity of the T2B for patients meeting criteria was 33% (3/9).

The T2B was able to rule out relapsing E. coli bacteremia in an oncology patient who started on zosyn and AMS started.

The T2B Panel resulted in Improved time to: Appropriate antibiotics and bacteremic bundle.

Study Design

Study Design: February 11 – March 31, 2019 (Interim analysis 9/48 from previous study is ongoing)

Prospective interventional study of ED patients 0700 – 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 PLUS Suspected Source of Infection

3. Written informed consent

ID Pharmacists Test/Intervention Timetable

1. 1300: Patient admits to PE and DMD antimicrobial intervention
2. ≤ 1300 or 1300 ≤ 1530 NEXT DAY antimicrobial intervention

Exclusion Criteria:

No microbiology/late consult staff available.

Outcomes:

- Primary: To determine if the results from the T2Bacterial panel facilitated timely modification of empiric therapy

Conclusion

The positivity percent of the T2B for patients meeting criteria was 33% (3/9).

The T2B Panel resulted in improved time to: Appropriate antibiotics and bacteremic bundle.

Taking into consideration diagnostic stewardship, there is little information available on which patients would benefit from the most this test.

Methodology

Purpose

The purpose of this study is to determine the clinical and financial impact of the T2Bacterial® Panel in early septic patient identification and antimicrobial optimization in select septic patients presenting to the Emergency Department.

Study Enrollment

- Patients screened for T2Bacterial® Panel N = 234
- Excluded N = 172
- Patients entered for T2Bacterial® Panel N = 62
- Criteria met for T2B testing N = 9

Results

<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 Ceftazidime</td>
<td>Changed ceftazidime to merropenem (88% versus 99%)</td>
<td>Negative</td>
<td></td>
<td></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>Positive for MRSA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Staphylococcus aureus and Pseudomonas aeruginosa

- Initiated MRSa contact precautions
- Obtained ID consult for Staph aureus bacteremic bundle

Staphylococcus aureus

- Set vancomycin high trough goal of (15-20)
- Obtained MRSa contact precautions
- Obtained ID consult for Staph aureus bacteremic bundle

Positive for MRSA

Disclosures

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