Utilization of the T2 Candida Panel for rapid Candida species detection in a large community hospital

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Background

- The CDC states that candidemia carries a 35% mortality rate and is the 4th leading hospital-acquired bloodstream infection
- Blood cultures take 2-6 days to result and fail to identify 40-50% of Candida infections
- The T2 Candida Panel is a diagnostic test which utilizes whole blood to provide rapid (3-5 hours) species-specific detection of fungal pathogens
- The test detects five species of Candida (C. albicans, C. tropicalis, C. parapsilosis, C. krusei, and C. glabrata)
- T2 is also designed to provide:
  - 96.4% sensitivity and 99.4% specificity
  - Accurate results even with current antimicrobial therapy
  - Limits detection as low as 1 CFU/mL
- The T2 Candida Panel was restricted to two specialty departments, Infectious Disease (ID) and Oncology for use in specific patient populations

Methods

- The T2 Candida Panel was limited to patients with febrile neutropenia without observed cause
- Patients in the ICU for at least 72 hours, central venous line and unexplained fever, use of broad spectrum antibiotics, inpatient gastrointestinal bleeding, recent major surgery, total parenteral nutrition (TPN), neutropenia, renal/hepatic failure, and unexplained fever, use of broad spectrum antibiotics, inpatient gastrointestinal bleeding
- Continued evaluation of the utilization of T2 Candida Panel in a large community hospital

Purpose

- Continued evaluation of the utilization of T2 Candida Panel in a large community hospital
- Evaluation of true positives, average duration of therapy (DOT), and is the 4th leading hospital-acquired bloodstream infection
- Blood cultures take 2-6 days to result and fail to identify 40-50% of Candida infections
- The T2 Candida Panel is a diagnostic test which utilizes whole blood to provide rapid (3-5 hours) species-specific detection of fungal pathogens
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Results

<table>
<thead>
<tr>
<th>T2 Tests (n=345)</th>
<th>Positive T2 Results (n=34)</th>
<th>Negative T2 Results (n=311)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Culture (+)</td>
<td>Blood Culture (-)</td>
<td>Therapy not initiated</td>
</tr>
<tr>
<td>8</td>
<td>26</td>
<td>111 (36%)</td>
</tr>
<tr>
<td>14</td>
<td>309</td>
<td>129 (41%)</td>
</tr>
</tbody>
</table>

Evaluation of True Positives

<table>
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<th>T2 (+)</th>
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</tr>
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Positive

- Blood cultures identified 2 cases of fungal infections that were not detected by T2
- T2 identified 28 cases of fungal infections that were not detected by blood cultures
- T2 demonstrated a sensitivity similar to that found in published studies (94.4%)

Average DOT of Micafungin (n=128)

- Negative DOT: 8.7 days
- Positive DOT: 10.8 days

Discussion

- T2’s sensitivity claim of 96.4% and its superiority claim over blood cultures received FDA approval in 2015
- Of the patients with a positive T2 result 83/345 (24%) had a positive corresponding blood culture
- 129/311 (41%) of patients were able to avoid antifungal therapy initiation based on negative T2 results
- Negative T2 tests resulted in discontinuation of antifungal therapy in 71/311 (23%) of patients
- Two negative T2 results had a corresponding positive blood culture
- Of 36 true positives, T2 detected 34 (94.9%) positive results
- 111/311 (36%) antifungal regimens were not discontinued despite a negative T2 result
- 83/345 (24%) T2 results did not have a concurrently drawn blood culture
- Average time to de-escalation was 40.8 hours
- Negative T2 results decreased average duration of therapy of micafungin by 2.1 days

Conclusions

- At our facility the T2 Candida Panel demonstrated greater sensitivity to Candida infection and produced results much quicker when compared to blood cultures
- Despite the test’s rapid nature and high sensitivity, time to de-escalation remains at 2 days suggesting variations in physicians’ utilization of T2 test results

References