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Examining discordance in blood culture and T2 positivity in the detection of candidaemia: modelling the odds of blood culture and T2 discordance as a function of candidaemia risk factors

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Background: The T2Candida® Panel (T2) is rapid molecular diagnostic that detects 5 *Candida* species (*C. albicans*/*C. tropicalis*, *C. glabrata*/*C. krusei*, and *C. parapsilosis*) directly from whole blood samples in patients candidemia with excellent sensitivity and negative predictive value. Henry Ford Health System implemented both T2 in 2015 and BacT/Alert Virtuo® (bioMérieux, Inc., Durham, NC) blood culture (BC) system in 2019 for the detection of pathogens, including *Candida* causing bloodstream infection (BSI). In practice, there are discrepancies in test results when employing both tests simultaneously. We evaluated the potential factors associated with discordance between these two tests for the detection of candidemia.

Materials/methods: We screened all patients who had a T2 performed since implementation of the Virtuo system in February 2019 through August 2019, focusing on patients who had discordant results between the two testing methodologies. This study reports the types of discrepancy seen between the two tests, the turn-around times (TAT), and frequency of risk factors for candidemia in these patients. Finally, we performed a univariate analysis modeling the odds of discordant T2/BC results as a function of risk factors for candidemia.

Results: A total of 675 T2 tests were performed during the study period. Only 33 (5%) T2s were positive. Of these, 23 (70%) were discordant (T2+/BC-) and 10 (30%) concordant (T2+/BC+). Three patients had T2-/BC+. The most common *Candida* species found in blood by both culture and T2 were *C. albicans* (5), followed by *C. glabrata* (4). Blood culture TAT was 15 hours faster detecting bacteria than yeast, on average (P=0.3918). T2 was 40 hours faster than BC in detecting candidemia. The vast majority of our patients presented in septic shock (72%), had intravascular devices (94%), were exposed to broad spectrum antimicrobials (92%), or had corticosteroids administered (50%). Univariate analysis showed no statistical association between candidemia risk factors and discordant test results.

Univariate Logistic Regression				
Modeling odds of Discordant Result as Function of Risk Factors of Candidemia				
Risk Factor	Odds Ratio Point Estimate	95% CI		P value
TPN	3.888	0.417	36.273	0.2334
Surgery on ICU Admission	0.857	0.132	5.552	0.8715
Multifocal Candida Colonization	0.675	0.16	2.851	0.5928
Severe Sepsis or Shock	3.333	0.715	15.535	0.1252
Recent Major Abdominal Surgery	1.255	0.261	6.036	0.7769
Dialysis Needed	3.888	0.417	36.273	0.2334
Corticosteroids Administered	0.769	0.185	3.191	0.7178
Antibiotic Days	1.03	0.988	1.075	0.1649
Number of Intravascular Devices	1.388	0.845	2.28	0.1952

Conclusions: Discordant T2/BC results were mostly a function of T2 being more sensitive than BC, despite the implementation of an enhanced BC system to increase yield. Traditional risk factors for candidemia did not predict discordance in testing results.

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