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IMPACT OF T2 CANDIDA PANEL ON SPECIES SPECIFIC ANTI-FUNGAL DE-ESCALATION

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INTRODUCTION AND OBJECTIVE

- Empiric antifungal treatment is recommended in patients (pts) with suspected candidemia
  - given the 20-50% associated mortality.
- Blood cultures (Bcx), the current "gold standard" for detection of candidemia will detect approximately 50% of candidemias and has a turn-around-time (TAT) of 2-5 days
- T2Candida Panel (T2) a magnetic resonance nano-diagnostic test done directly on blood samples, with an average TAT of 3-5 hours and detects:
  - *C. albicans/C tropicalis(CA/CT),*
  - *C. parapsilosis (CP),*
  - *C. glabrata/C. krusei (CG/CK).*
- Our hospital implemented a candidemia management protocol utilizing T2 to identify candidemia in high risk pts (figure1).
- Objective:
  - We examine the potential for antifungal stewardship by analyzing T2 species-specific result based antifungal de-escalation.

HENRY FORD HEALTH SYSTEM ALGORITHM FOR MANAGEMENT OF SUSPECTED CANDIDEMIA (FIGURE 1)

Patient with suspected candidemia
(persistent fever/clinical deterioration in a patient on adequate antibiotic therapy for≥ 72 hrs and Candida score ≥3)

↓

Obtain Blood cultures + T2MR

↓

Initiate empiric antifungal therapy if severe sepsis
ICU-anidulafungin; GPU-fluconazole

↓

BCx or T2MR assay positive
- Continue antifungal therapy
- Opthalmology exam
- ID consult
- Modify based on species and susceptibility tests

↓

BC & T2MR assay negative
- Stop antifungal therapy

METHODS:

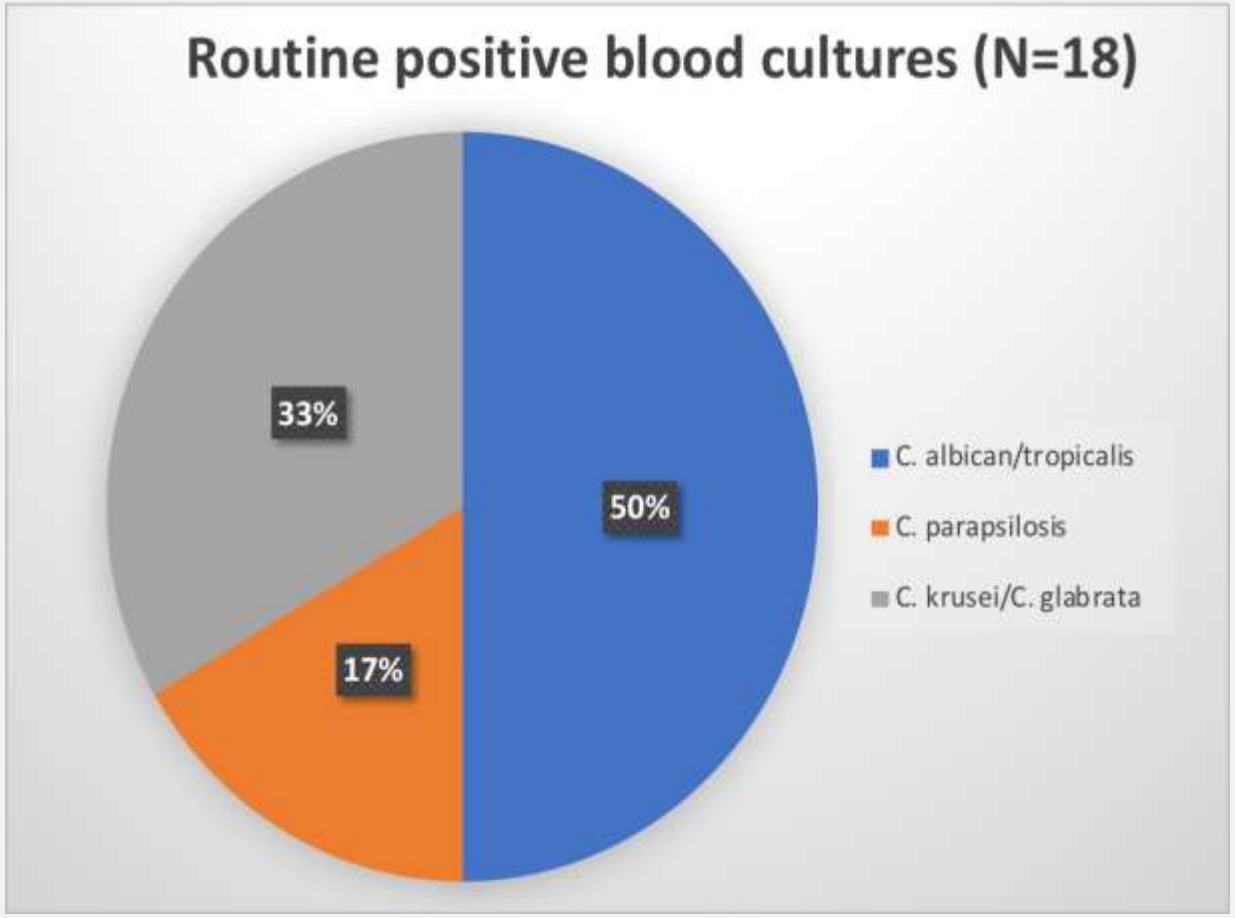
- Retrospective analyses were conducted on 70 T2 positive patients identified in 2016-2017 at Henry Ford Hospital which a tertiary care, 162 ICU beds hospital in an urban setting
- The primary endpoint:
  - time to de-escalation from echinocandin to fluconazole based on T2 species identified.
- Secondary endpoints included:
  - time to T2 positivity,
  - Mortality and identification of risk factors for mortality.
- Univariate logistic regression was used to determine association between risk factors and mortality.
- Multivariate logistic regression models were created using forward selection to model the odds of mortality.
- Time to de-escalation of echinocandins were modeled using Kaplan-Meier estimators.

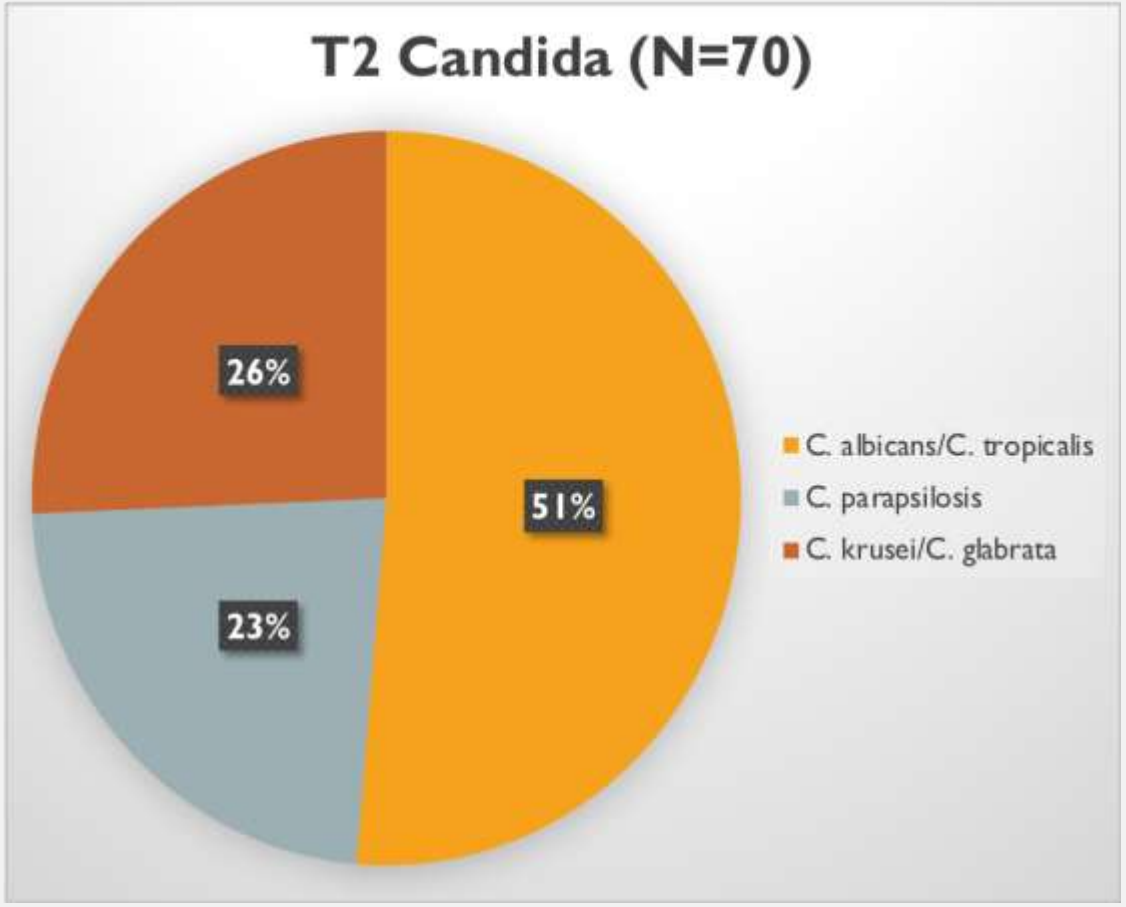
TABLE 1. DEMOGRAPHICS, RISK FACTORS, TREATMENT AND OUTCOMES OF T2 CANDIDA POSITIVE PATIENTS (N=70)

Demographics	
Age (Mean, years)	59
Male gender (%)	35 (50%
Race (%)	
White	40 (57%)
African American	26 (37%)
Asian	1 (1.5%)
Others	2 (3%)
Declined	1 (1.5%)
Risk factors (%)	
ICU	59 (84%)
Empiric antibiotics	53 (75%)
Central line	65 (93%)
Prosthetic devices	10 (14%)
TPN	22 (31%)
Hemodialysis	15 (21%)
Abdominal surgery within 30 days	24 (34%)
Malignancy on chemotherapy	9 (13%)
Transplant (%)	25 (36%)
Heart	2 (3%)
Lung	2 (3%)
Liver	7 (10%)
Intestinal	6 (9%)
MVT	2 (3%)
Hematopoietic stem cell	3 (4%)
Immunosuppression including glucocorticoids	28 (40%)

Clinical characteristics (%)	
Fever/hypothermia	34 (49%)
Neutropenia	9 (13%)
On pressors	30 (43%)
Chorioretinitis	7 (10%)
Endocarditis	2 (3%)
Microbiology	
Mean candida Score	2
Average TAT for T2 Candida (hours)	6
T2/Blood culture concordance	16 (29%)
Treatment	
Echinocandin as initial therapy (%)	58 (83%)
De-escalation (days)	29
Duration of treatment (mean, days)	17
Outcome	
30-day mortality (%)	29 (41%)
Readmission (%)	22 (31%)

MICROBIOLOGY: DISTRIBUTION OF CANDIDA SPECIES





RESULTS: PRIMARY END POINT ANTIFUNGAL DE-ESCALATION

- In T2 positive results for *CA/CT* or *CP (figure 3):*
  - 50% of pts were de-escalated to fluconazole therapy within 96 hours.
- In T2 positive result for *CG/CK (figure 3):*
  - 50% of pts were de-escalated to fluconazole in 20 days.

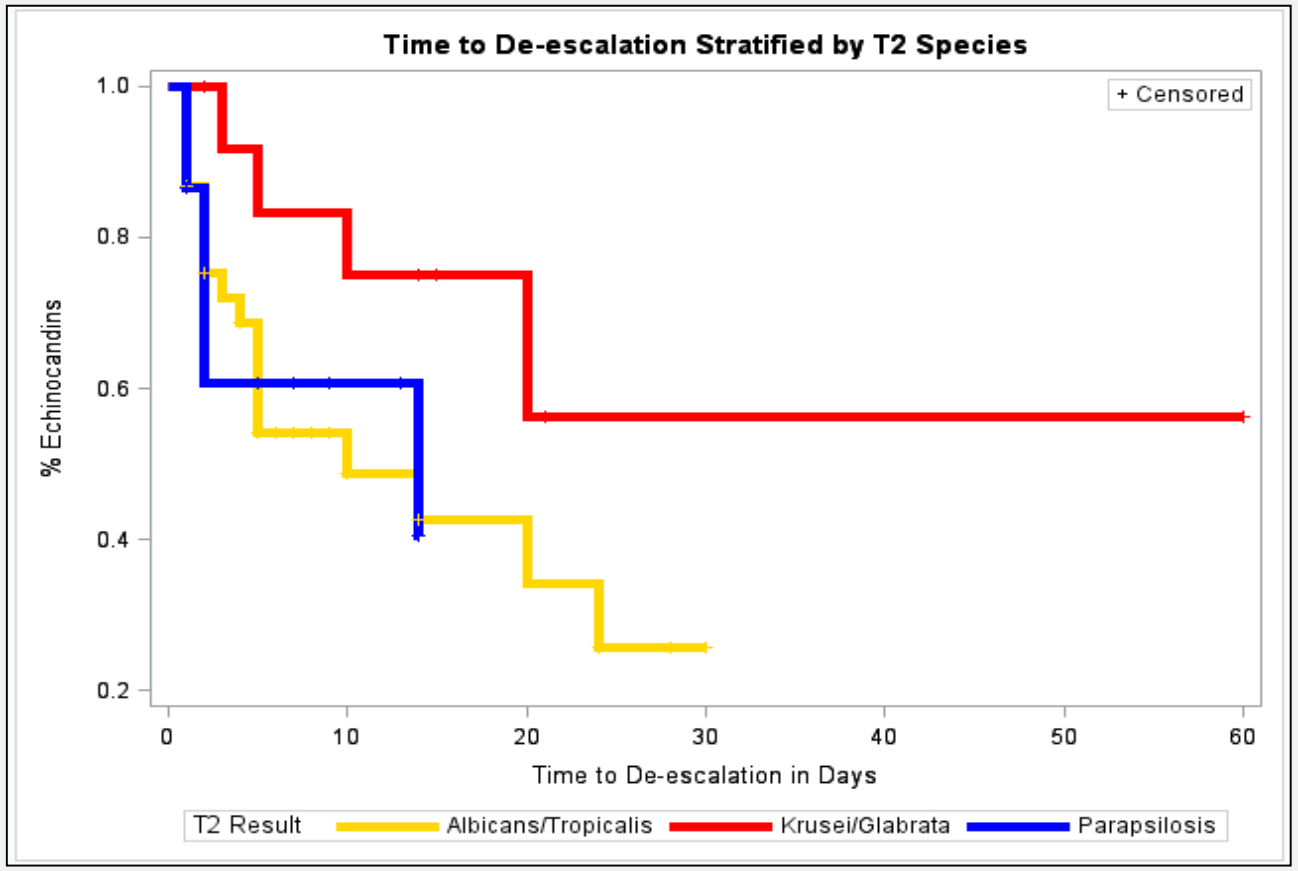


Figure 3

RESULTS: SECONDARY END POINT TURNAROUND TIME AND OVERALL MORTALITY

- The turnaround time (TAT) for T2 was:
  - 6 hours (3-12hrs)
- While the TAT for bcx on was 4 days (3-5 days)
- Overall mortality was 47% in the T2 positive cohort
  - This was unchanged over the study period.

RESULTS: PREDICTORS OF INVASIVE CANDIDIASIS

- Univariate analysis showed statistically significant associations (P<0.05) for predictors of invasive candidiasis (table 2a)

Table 2a. Univariate Analysis predicting odds of IC		
Variable	**Odds Ratio**	**P-value***
Abnormal WBC count (>15,000/<1,000)	3.73 (1.24 – 11.21)	0.018
Tachycardia (HR >90/min)	2.68 (1.00-7.19)	0.049
Hypotension (SBP <90)	3.36 (1.25 – 9.05)	0.016
Sepsis†	3.24 (1.21 – 8.69)	0.019
Hospital LOS	0.97 (0.95 – 0.99)	0.025

*p<0.05 significant

†sepsis diagnosis (leukocytosis ≥15,000/leukopenia <1,000, hypotension (SBP <90, tachycardia HR>90, fever >100.4°F)

RESULTS: PREDICTORS OF 30-DAY MORTALITY

- Univariate analysis showed statistically significant associations (P<0.05) between 30–day mortality and following (Table 2b):

Table 2b. Univariate Analysis predicting 30-day mortality		
Variable	**Odds Ratio**	**P-value***
Bcx/T2 disconcordance	3.78 (1.07 – 13.29	0.038
TPN	0.29 (0.09 – 0.87)	0.027
Tachycardia	3.66 (1.34 – 9.97)	0.011
Hypotension (SBP <90)	3.63 (1.35 – 9.81)	0.010
Sepsis†	5.13 (1.82 – 14.48)	0.002

*p<0.05 significant

†sepsis diagnosis (leukocytosis ≥15,000/leukopenia <1,000, hypotension (SBP <90, tachycardia HR>90, fever >100.4°F)

RESULTS: MULTIVARIATE ANALYSIS PREDICTORS OF ODDS OF 30-DAY MORTALITY

- Following factors (Table 3) when taken together fit the best model to predict odds of 30-day mortality (P<0.05). :
  - tachycardia,
  - age, and
  - presence of prosthetic devices

Table 3. Multivariate Analysis predicting odds of 30-day mortality

Variable	Odds Ratio	P-value*
Age	1.04 (1.01 - 1.08)	0.027
Presence of intracardiac devices	5.7 (1.06 – 30.4)	0.0427
Tachycardia	9.7 (2.6 -35.9)	0.0007

*p<0.05 significant

CONCLUSIONS

- T2 proved useful in promoting de-escalation of echinocandin to fluconazole therapy in pts with fluconazole-susceptible *Candida* species.
- The rapid TAT of T2 promotes timely de-escalation of enchinocandins.
- Overall mortality in patients with suspected candidemia remains unaffected despite rapid diagnostics and early empiric antifungal therapy

QUESTIONS?

THANK YOU!