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Candidemia: Epidemiology, Risk Factors and Outcomes at a Tertiary Care Academic Hospital

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OBJECTIVES

- Evaluate the epidemiology of Candida, diagnosis and complications of Candidemia in a single hospital setting
- Identify the species of candida causing blood stream infection
- Characterize risk factors and co-morbidities.
- Evaluate the susceptibility of candida species to antifungals
- Evaluate incidence of mortality during hospitalization
- Treatment response & outcome during hospitalization

INCLUSION CRITERIA
- Patients 18 years of age and older
- Patients admitted from January 2009 to June 2013

METHODS

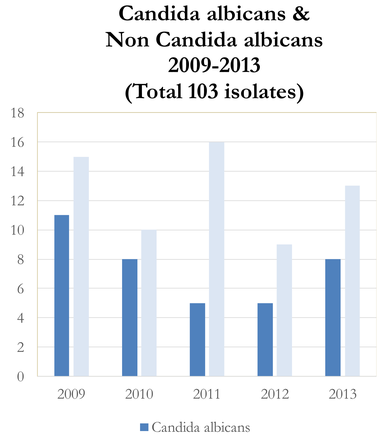
- Retrospective chart review was conducted at SLUH, a 356-bed teaching hospital, between January 2009 to June, 2013
- An episode of Candidemia was defined as at least one positive blood culture during a single hospitalization
- Candida species were isolated from blood using BACTEC Myco/F lytic culture and BACTEC plus Aerobic/F
- Candida species identification and antifungal susceptibility done using Vitek instrument
- Descriptive analysis was performed using Statistica

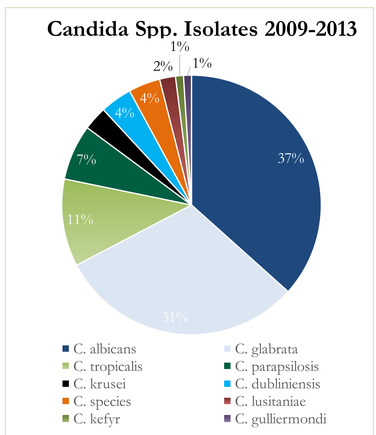
EXCLUSION CRITERIA
- Patients with readmission within 60 days
- Incomplete documentation

PATIENTS BASELINE CHARACTERISTICS

	2009	2010	2011	2012	2013
Age, Average (range)	59 (33-83)	50.8 (21-84)	55.2 (33-77)	53.7 (24-82)	51.5 (20-79)
Gender					
Male (%)	59.2	68.75	50	73.3	50
Race					
White	17 (62%)	13 (81%)	14 (70%)	7 (46%)	12 (66%)
Non white	10 (37%)	3 (19%)	6 (30%)	8 (54%)	6 (33%)
ICU stay in days average (range)	12 (4-43)	15 (12-35)	21 (2-83)	18 (2-24)	13 (4-45)
Length of total stay in days, average (range)	23 (14-73)	34 (7-121)	30 (3-83)	22 (6-79)	23 (4-45)

Risk factors	2009 (n= 27)	2010 (n= 16)	2011 (n= 20)	2012 (n= 15)	2013 (n= 18)	Total (n= 96)
CVC	23 (85%)	13 (81%)	19 (95%)	8 (53%)	8 (44%)	71 (74%)
Diabetes	9 (33%)	5 (31%)	6 (30%)	2 (13%)	2 (11%)	24 (25%)
AKI/ESRD	13 (48%)	8 (50%)	13 (65%)	7 (46%)	3 (16%)	44 (46%)
TPN/PPN	6 (22%)	5 (31%)	9 (45%)	3 (20%)	4 (22%)	27 (28%)
Bacteremia	14 (52%)	9 (56%)	12 (60%)	10 (66%)	8 (44%)	53 (55%)
Abdominal surgery (<30 days)	4 (15%)	5 (31%)	6 (30%)	1 (6.6%)	3 (16%)	19 (20%)
Broad spectrum antibiotics	23 (85%)	15 (94 %)	20 (100%)	12 (80%)	17 (94%)	87(91%)





YEAST National Surveillance Data (2004-2007)	# OF ISOLATES TESTED	AMPHO B			FLUCONAZOLE	VORICONAZOLE	POSACONAZOLE			CASPOFUNGIN	MICAFUNGIN
		MIC RANGE (mg/L)	MIC 50	MIC 90			MIC RANGE (mg/L)	MIC 50	MIC 90		
Candida albicans	2563	≤0.12->8	1	1	98	99	≤0.03->64	0.06	0.25	100	100
Candida glabrata	1449	0.5->8	1	1	86	94	≤0.03->64	0.5	1	100	100
Candida parapsilosis	1032	0.25-4	1	1	98	100	<=0.03-1	0.12	0.25	100	100
Candida tropicalis	523	0.5-2	1	1	99	99	≤0.03->64	0.12	0.25	100	100
Candida krusei	109	0.5-2	1	2	0*	99	≤0.03-1	0.25	0.5	99	99
Candida lusitaniae	76	0.5-2	1	1	100	100	≤0.03-0.25	0.06	0.12	100	100

Data in shaded boxes indicate % susceptible. *This species is intrinsically resistant

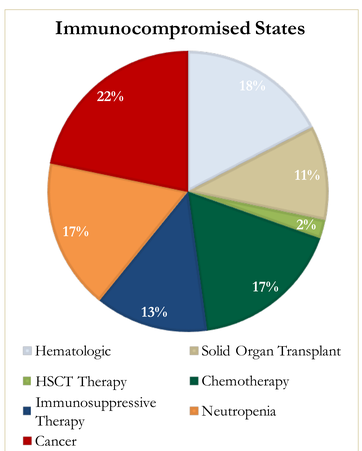
National surveillance data from Candida species isolated from sterile sites from 2004 to 2007 (JCM, 2010. 48:1270-1275).

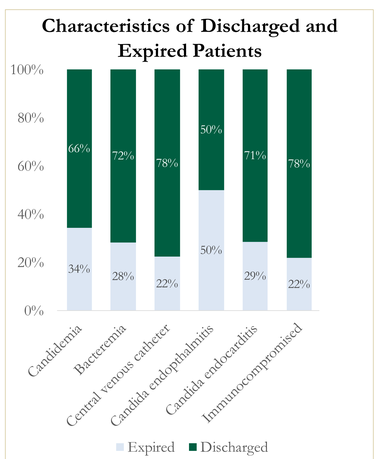
MIC 50 and MIC 90 indicate the concentrations at which 50% and 90% of the isolates were inhibited, respectively. For these organism/antimicrobial combinations, interpretive breakpoints do not exist.

Characteristics of Patients that Expired

	Candidemia (n=33)	Bacteremia (n=15)	CVC (n=4)	Endopthalmitis (n=3)	Endocarditis (n=2)	Immun-compromised (n=10)*
C. albicans	14(42%)	5(33%)	1 (25%)	1(33%)	1(50%)	2(20%)
C. glabrata	9 (27%)	7(46%)	1 (25%)	1(33%)	1(50%)	3(30%)
C. tropicalis	3(9%)	1(6%)	1 (25%)			2(20%)
C.krusei	1(3%)	1(6%)				1(10%)
C. parapsilosis	1(3%)		1(25%)			
C. dubliniensis	3(9%)	1(6%)		1(33%)		
C. kefyr	1(3%)	1(6%)				1(10%)
C guillermondi	1(3%)	1(6%)				1(10%)

*2 AML, 1 ALL, I Hodgkin's Lymphoma, liver/colon/esophageal ca, cholangiocarconima, neuro-endocrine tumor and one patient with heart transplant





Number (%) of Drug Sensitive Clinical Isolates of Candida*

	Fluconazole		Caspofungin		Voriconazole		Ampho b		Micafungin	
	S	R	S	R	S	R	S	R	S	R
C. albicans	13 (100%)		12 (100%)		12 (100%)		1 (100%)		1 (100%)	
C. glabrata	13 (87%)	2 (13%)	11 (92%)	1 (8%)	3 (100%)		4 (100%)		1 (100%)	
C. tropicalis	5 (83%)	1 (17%)	6 (100%)		5 (100%)		2 (100%)		1 (100%)	
C. krusei	2 (100%)		2 (100%)							
C. parapsilosis	2 (100%)		2 (100%)		2 (100%)					
C. lustaniae										
C. dubliniensis	2 (100%)									
C. kefyr	1 (100%)									
C. gulliermondi	1 (100%)		1 (100%)		1 (100%)					
C. species	1 (100%)									

*Antifungal susceptibility was done on 43 /103 (41.7%) of Candida species isolate

CONCLUSIONS

- Majority of the Candida isolates were non albicans species
- *C. glabrata* followed by *C. krusei* were the most common non-albicans isolate
- 14 patients (25%) with documented candidemia did not have ophthalmologic evaluations.
- Most common risk factor is broad-spectrum antibiotics followed by abdominal surgery and AKI CKD

CONCLUSIONS

- Susceptibilities should always be obtain on all Candida species
- The mortality in ICU patients who develop Candidemia remains high
- *Candida albicans* remained the most common isolate in our study despite current literature suggest rising non-albicans Candida isolates. We believe that this may be due to the lack of prior antifungal therapy in our population

ACKNOWLEDGEMENT
Sharon Frey, MD, Getahun Abate, MD, Marcia Sokol-Anderson , MD, Robin Chamberland, PhD