



Research Article

PROFILE OF PATIENTS WITH CANDIDEMIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Abstract: *Candida* has emerged as an important cause of nosocomial blood stream infections (BSI). *Candidemia* is a life threatening infection causing high mortality in admitted patients. The most common risk factors are use of intravenous catheter, followed by prolonged antibiotic use, immunosuppression, invasive procedures. The most common species isolated was *Candida albicans*, but recent literature suggests “non-*albicans candida*” (NAC) as a major cause of candidemia.

Aim and Objective: The aim was to study the profile of patients with candidemia.

Material and Methods: This study was carried out in the department of Microbiology, Dayanand Medical College and Hospital for a period of one year (jan-dec 2017) in patients >18 yrs admitted in the hospital. Blood culture was taken from the patients clinically suspected with sepsis. Demographic details, risk factors and outcome within 30 days of admission were recorded in a pre-designed proforma. Patients with blood culture positive for growth of yeast were included in the study. Identification and antifungal susceptibility was done in VITEK 2 System.

Results: A total of 92 patients who had candidemia were studied and prevalence was found to be 1.6/1000 admitted patients in the hospital. Among all the isolates obtained, NAC 66.3% were predominant than *Candida albicans* (33.7%). *Candida tropicalis* was (47.8%) predominant among NAC. Correlation of risk factors with outcome was studied and profile of discharged patients along with hospital stay showed significant difference (p-value < 0.002). Maximum mortality was seen during first week of hospitalisation.

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INTRODUCTION

Fungemia is the presence of fungi in blood. The most common type is candidemia or systemic candidiasis which is caused by *Candida* species.

Candida has emerged as an important cause of nosocomial BSI. According to the data provided by the Centre for Disease Control and Prevention (CDC), *Candida* species are ranked fifth among hospital-acquired pathogens and fourth among BSI pathogens.^[1-5] In Europe, it ranks amongst the ten most frequently isolated pathogens.^[3-6] In a recent survey of intensive care units (ICUs) worldwide, the prevalence of candidemia was found to be 6.9 per 1000 patients.^[7] In India, a New Delhi based study gave a prevalence rate of 18% while another study from AIIMS Delhi, reported a lower prevalence rate (6%)^[1] however, the actual prevalence of candidemia in India is not well known due to lack of availability of data from various other parts of our country.

Candidemia remains a life threatening complication in hospitalized patients with prognosis comparable to septic shock. Candidemia represents 5-10% of all nosocomial

infections. It manifests late in the course of disease, so early presumptive or empirical antifungal treatment has been shown to improve prognosis.

Candidiasis covers a wide range of diseases from more superficial and milder clinical manifestations such as oesophageal or oropharyngeal candidiasis to serious infections including BSI and disseminated candidiasis. Invasive Candidiasis (IC) encompasses severe diseases such as candidemia, endocarditis, central nervous system infections, endophthalmitis, and osteomyelitis.^[2] Blood stream infections by *Candida* are increasingly common and often are associated with high mortality rates. Recently, an important increment in the frequency of non-*albicans* species of *Candida* such as *C. glabrata*, *C. krusei*, *C. tropicalis* and *C. parapsilosis* as cause of candidemia is seen.^[8]

Risk factors for IC may be assigned into two groups: host-related factors and health-care-associated factors. The leading host-related factors are immunosuppressive diseases, neutropenia, age and a deteriorating clinical condition due to underlying diseases.^[2,7,9,10] The most common health-care-associated risks are indwelling intravascular catheter use, total parenteral nutrition, surgical interventions, improper use of antimicrobial drugs and long hospital or ICU stay due to invasive interventions, hyperalimentation fluids, indwelling

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urinary catheters, parenteral glucocorticoids, respirators, abdominal and thoracic surgery, cytotoxic chemotherapy, and immunosuppressive agents for organ transplantation.^[5,2]

As the early signs and symptoms, suggestive of invasive fungal infections are easily missed due to the associated comorbid conditions, so it is important to rapidly identify the causative organism. Many regions in the world are witnessing a surge in “non-albicanscandida” spp., which have diverse virulence and susceptibility profiles. *Candida albicans* are found to be more resistant than “non-albicans candida”. This study was done, to know the disease burden, speciation of the *Candida* causing disease, correlating it with risk factors and outcome in patients with candidemia.

MATERIAL AND METHODS

This prospective study was approved by institutional ethic committee and was carried out in the Department of Microbiology, Dayanand Medical College and Hospital (1500 bedded tertiary care hospital) for a period of one year. All the patients of > 18 years with candidemia were included. All the data enlisted in the pre designed Proforma (Name, Age, Sex, CR number, clinical diagnosis, date of admission, risk factors etc.) was collected. Blood samples for culture received in the Microbiology laboratory were included and processed as per standard protocol. The inoculated blood culture bottles were loaded in the Bactec or Bac-T/Alert microbial detection system and incubated for a maximum period of 7 days or till the bottle was indicated positive by the system. Smears were prepared from positive flagged bottles and subculture was done on blood agar. Blood culture positive for growth of yeast were included. Isolates were identified and antifungal susceptibility was done using VITEK 2 SYSTEM .Outcome of the patients was studied in terms of discharge/death within 30 days of admission of the patient. Statistical data analysis was done using chi square and p values.

RESULTS

This one year study was conducted in the department of Microbiology, DMCH, Ludhiana. Prevalence was found to be 1.6/1000 admitted patients in the hospital and in the ICU’S (4.58/1000 admitted patients). A total of 17504 blood samples for blood culture were received in the laboratory, out of which 92 patients were found to be positive for candidemia. Paired blood samples were received in 35.9% (33) of patients and 72.7% (24/33) yielded paired isolates. Male patients (65%) were found to be predominant .The mean age of the patients with candidemia was observed to be 51.79 years. Majority of the patients (74%) were from various ICU’s and remaining (26%) from various wards. Among the various yeast isolates *Candida tropicalis* was found to be most common (47.8%) followed by *Candida albicans* (33.7%). Overall “non-albicans candida” (66.3%) was found to be more common than *Candida albicans* (33.7%). (Figure 1)

Among all the risk factors studied intravenous catheterisation and urinary catheterisation were found to be present in 96.7%patients followed by sepsis in 91.3% patients. High mortality was seen in patients with non-albicans candida than *Candida albicans* and 62% patients of candidemia died and 38%were discharged in satisfactory condition. Among various risk factors studied sepsis (p value ≤ 0.003) and intubation (p value ≤0.009)were found to be statistically significant.(table1).

Table 1 Correlation of the risk factors with the outcome of the patients

Risk factors	Outcomee		Total	Chi-square value	p-value
	Discharged	Died			
Cannulation	34 97.1%	55 96.5%	88	1.668	0.434
Central line insertion	15 42.9%	34 59.6%	49	2.456	0.117
Urinary catheterization	34 97.1%	55 96.5%	89	0.029	0.864
Intubation	13 37.1%	37 64.9%	50	6.74	0.009
Sepsis	28 80.0%	56 98.2%	84	9.092	0.003
Total parentral nutrition	9 25.7%	10 17.5%	19	0.883	0.347
Haemodialysis	4 11.4%	9 15.8%	13	0.34	0.56
Neutropenia	0 0.0%	1 1.8%	1	0.621	0.431
Steroid use	13 37.1%	28 49.1%	41	1.26	0.262
Diabetes mellitus	4 11.4%	10 17.5%	14	0.629	0.428
Malignancy	1 2.9%	4 7.0%	5	0.73	0.393

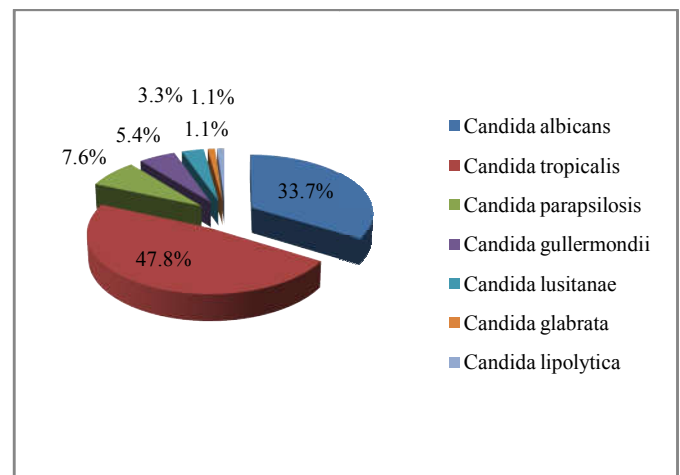


figure 1 Distribution of *Candida* species in patients with candidemia (n=92)

Candida tropicalis was found to be most common among all the *Candida* species isolated i.e 47.8% followed by 33.7% patients with *Candida albicans*. Overall non-albicans candida was found to be more common than *Candida albicans*

Amongst the profile of discharged patients studied, the most common risk factor was found to be cannulation(97.1%). The most common isolated species were *Candida albicans* and *C.tropicalis* ,42.9%each respectively. Antifungals were given in 71.4% of the patients.(Table2)

Table 2 Profile of the discharged patients

		DISCHARGED(35)	
Age group	18-30	11	31.4%
	31-40	4	11.4%
	41-50	8	22.9%
	51-60	7	20.0%
	61-70	5	14.3%
	More than 70	0	0.0%
Sex	Female	12	34.3%
	Male	23	65.7%
Risk factors	Cannulation	34	97.1%
	Central line insertion	15	42.9%
	Urinary catheterization	34	97.1%
	Intubation	13	37.1%
	Tracheostomy	3	8.6%
	Severe/	1	2.9%
	Total parentral nutrition	9	25.7%
	Sepsis	28	80.0%
	Haemodialysis	4	11.4%
	Neutropenia	0	0.0%
	Steroid use	13	37.1%
CULTURE	Diabetes mellitus	4	11.4%
	Malignancy	1	2.9%
	<i>Candida Albicans</i>	15	42.9%

	<i>Candida Glabrata</i>	0	0.0%
	<i>Candida Guilliermondii</i>	1	2.9%
	<i>Candida Lipolytica</i>	0	0.0%
	<i>Candida Lusitaniae</i>	1	2.9%
	<i>Candida Parapsilosis</i>	3	8.6%
	<i>Candida Tropicalis</i>	15	42.9%
Patients with paired blood sample	No	24	68.6%
	Yes	11	31.4%
Fundus Examination	NAD	8	22.9%
	No	27	77.1%
Antifungal	No	10	28.6%
	Yes	25	71.4%
Total		35	100.0%

Amongst the discharged patients, the most common risk factor was cannulation (97.1%). The most common isolated species were *Candida albicans* and *C.tropicalis*, 42.9%each respectively. Antifungals were given in 71.4% of the patients.

Significant difference (p-value<0.002)was observed in duration of hospital stay of discharged patients, as maximum patients were discharged after 2 weeks of hospital stay whereas, maximum mortality was seen during first week of hospitalization (figure 2)

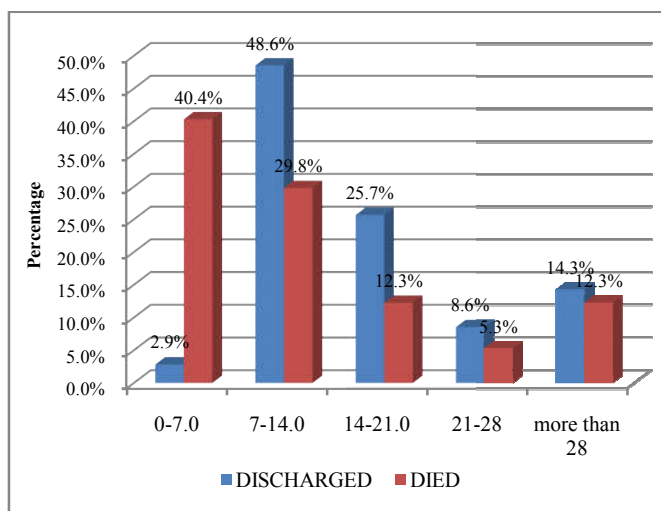


Figure 2 Duration of hospital stay of patients (n=92)

Significant difference (p-value<0.002)was observed in duration of hospital stay of discharged patients, as maximum patients were discharged after 2 weeks of hospital stay whereas, maximum mortality was seen during first week of hospitalisation

DISCUSSION

Candidemia is a life threatening infection in intensive care unit (ICU) patients. The positivity percentage of candidemia was found to be 0.5% in our study . Prevalence was found to be 1.6/1000 admitted patients in the hospital and in ICU'S (4.58/1000 admitted patients). In a recent survey of intensive care units (ICUs) worldwide, the prevalence of candidemia was found to be 6.9 per 1000 patients.⁽⁷⁾

In our study, candidemia was found to be predominant in male patients (65.2%) than in female patients (34.8%).The male to female ratio is 1.87:1. The mean age of the patients with candidemia was observed to be 51.79 years. In a study done by Chakrabarti A *et al* adult candidemia patients were considerably younger (mean 49.7 years) than in other countries which is comparable to our study.^[11]

In our study majority of the patients (74%) were from various ICU's and remaining (26%)from various wards .In comparison a study by Chander J *et al* observed that 88.9% patients with candidemia were admitted to the ICU, while only 11.1% occurred in patients in other hospital wards.⁽¹²⁾

Among all the species of *Candida*, *Candida albicans* earlier was the predominant cause of invasive fungal infections but recently “non-albicans candida” (*NAC*) has been on the rising trend in causing candidemia. In our study the observation was *NAC* (66.3%) was found to be more common than *Candida albicans* (33.7%). Among *NAC*, *Candida tropicalis* was found to be most common 47.8% and *Candida parapsilosis* was 7.6% ,which is almost comparable to the observation by different authors reporting *Candida tropicalis*(38.7%)^[13](41.6 %) ^[11](40.8%), ^[12] *Candida parapsilosis*(10.9%)^[11] and (20.3%)^[13] respectively. *Candida albicans* was isolated in 33.7% patients in our study, whereas it was reported less frequently (13.7%)^[13] and (20.9%)^[11] in different studies.

Among all the risk factors studied, intravenous catheterisation was found to be present in 96.7% of patients with candidemia which is distinct to a study by TakV *et al* (20.4%). The central venous catheterisation is a high risk for acquiring candidemia due to direct access into the blood stream was observed in 53.3% patients whereas different studies in literature showed 75.8% and 74.0 % of patients having CVC as risk factor.^[13,14] Urinary catheterisation as risk factor (75.9%)^[11] was observed in a study conducted at 27 ICU'S of India which was in contrast to present observation of 96.7%.Sepsis was observed in 91.3% of our patients which is by far ,much higher than the other studies conducted by Eggimann Pet *al* and Guery BP *et al* who observed sepsis in the range of 8% - 30% and 23% - 38%, respectively^[15,16] Intubation, was seen in 54.3% of our patients which is in concordance with the observation done by Chakrabarti A *et al*(52.9 %) ^[11]. Among the other significant risk factors, Total parenteral nutrition was found to be given in 20.7% of our patients, and it is complementary to the observation by Tak Vet *al*% ^[13]where 23.6% of patients on TPN developed candidemia, but was at variance to the observation by a different study in which it was on lower side (13.4 %) ^[11]Outcome was studied in terms of discharge or death within 30-days of admission. 62% of patients who were studied had a fatal outcome while 38% were discharged under satisfactory condition. The primary cause of death was not due to candidemia, although candidemia added to the risk of fatal outcome. In a study conducted by Tak V *et al* the observation was that, 68 out of the 157 patients (43.31%) had a fatal outcome.^[13]

Hospital stay-Significant difference (p-value<0.002)was observed in duration of hospital stay of discharged patients, as maximum patients were discharged after 2 weeks of hospital stay whereas, maximum mortality was seen during first week of hospitalisation.

CONCLUSION

In our study, candidemia was prevalent in the patients with sepsis. There is very high mortality in these patients, even when the candidemia was the secondary diagnosis.

Conflict of interest-None

Acknowledgement-None

Highlights

- Among 92 patients with candidemia, maximum number was from ICU'S (73.9%) and mean age of the patients was 51.79±17.45 years.
- *Candida tropicalis* was most common among all the *Candida* species isolated 47.8%.

- Intravenous catheterisation, urinary catheterisation and sepsis were found to be major risk factors.
- Outcome and hospital stay showed significant difference among discharged and patients who died.

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