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A Retrospective Review of Candidemia Patients in a Tertiary Center, Saudi Arabia, Western Region

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1. Introduction

Candida species is part of the normal flora in human body, mucus membrane of the upper respiratory tract, gastrointestinal and female genital tract (1), But it began to be a potent pathogen in the last four decades, not only in immunocompromised and critically ill patients but also in the general population (2).

Candida was considered the world's leading cause of fungal infection, the fourth causing bloodstream infection following Staphylococcus and Enterococcus species (3), with high mortality rates, morbidity, length of stay, and economic costs. (4, 5).

Candida generally contains more than 154 species, of which 17 are known to cause human infection (6, 7), While candida Albicans in the past were considered to be the most common and significant pathogen causing invasive candidemia, Over the last two decades, non-candida Albicans species have trended rapidly (8, 9).

Diabetes mellitus, chronic liver disease, chronic renal disease, cardiovascular, neurological disability, previous or current use of antibiotics, prolonged hospitalization, solid and hematological malignancies, extreme age, use of steroids, central and PICC lines, all known to be risk factors for candidemia (10).

in Saudi Arabia, several papers identified the epidemiological changes of candidemia over the years (11, 12). The purpose of this study was to identify and assess candida species and their associated factors in candidemia patients.

2. Methodology

King Abdulaziz Medical city is 751-bed tertiary center in Jeddah, Saudi Arabia, retrospective review study, all patients with candidemia admitted to KAMC in Jeddah, Saudi Arabia between January 2016 to December 2019 were included with no exclusion criteria.

The study was approved by the ethical committee of the king Abdul Aziz medical city (KAMC).

Data

The data were obtained from the hospital database (BESTCARE) by trained doctors, using data sheets constructed from similar previous studies. Data about chronic diseases (hypertension, diabetes, chronic kidney disease, liver disease, cardiovascular disease, cerebrovascular events, malignancy), dialysis, presence of neutropenia, previous hospitalization within 90 days, devices use such as (central line, peripheral line, mechanical ventilation), surgical intervention, Medication use (antibiotics, antifungal, steroids, immunosuppressants within 30 days), candida species, and multifocal colonization.

Definitions:

recent hospitalizations defined as the patient treated in an acute care hospital for more than 48 hours in the last 90 days (13), prolonged antibiotics infusion either continuous or extended infusion over 2-4 hours.

Statistical analysis:

Standard descriptive statistics were used to analyze patients' characteristics at baseline. All continuous variables were expressed as mean and standard deviation (SD). Categorical data were presented as percentages. For the unadjusted analysis, univariate logistic regressions were run. logistic regression was used to describe the relationship between candidemia and the other dependent factors. Data were analyzed using Microsoft Excel (Microsoft Inc.) IBM SPSS statistics 21 for windows.

3. Results

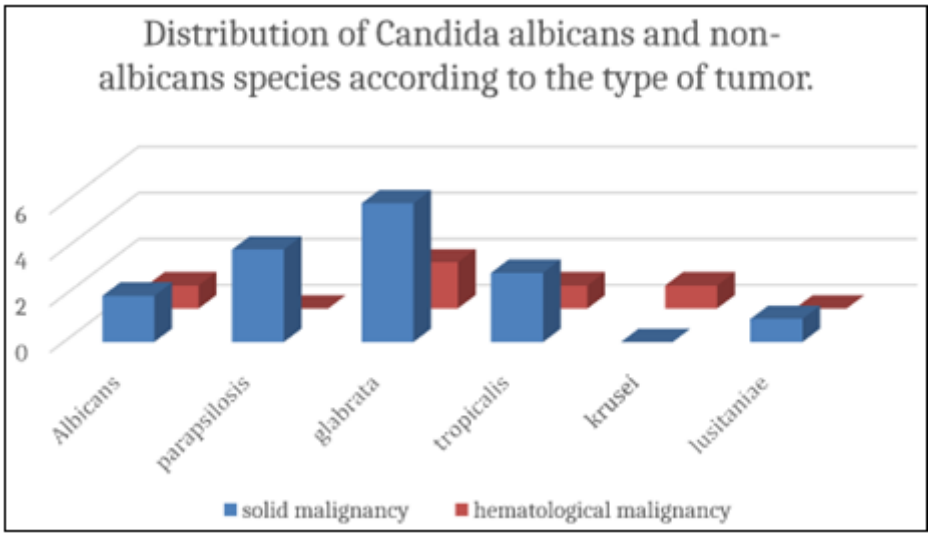
Fifty-eight patients records were recruited from 2017 to 2019 January, twenty-seven of them were male (46.6%), half of the patient is above 60 years old, 8 (13.8%) patients less than 5 years old, 19 (32.8%)of them between 16 and 59 years with a mean of 51.5 years. Thirty-seven (63.8 %) were in the ICU. Comorbid conditions were found in 52 (88%) and 7 (11.8%) were not known to have any medical illness before.

Only 22 (37.9%) found to have multifocal candida colonization, fifteen of them were ICU patients. Twenty-one (36.2 %) diagnosed with malignancy ((figure1)), 47 (81%) on central line, 10 (17.2%) on TPN, seventeen (29.3%) post OP eight of them were intra-abdominal, broad-spectrum antibiotics were used in 54 (93%) of the patients.

Eight types of candida were found; albicans 9 (15.5%), parapsilosis 20 (34.5%), glabrata 16 (27.6%), tropicalis 6 (10.3%), lusitaniae 4 (6.9%), metapsilosis, guilliermondii, krusei 3 (5.1%).

No statistical difference between candida Albicans and Non-albicans in gender, age classes, malignancy types, multifocal candida colonization, being post-op, previous antibiotics use, or prolonged antibiotics infusion.

		Albicans (%)	Non albicans (%)	total
Age classes	Less than 5 years	2 (3.4)	6 (10.3)	8 (13.8)
	5 to 15 years	1 (1.7)	1 (1.7)	2 (3.4)
	15 to 60 years	2 (3.4)	17 (29.3)	19 (32.8)
	More than 60 years	4 (6.9)	25 (43.1)	29 (50)
Gender	Male	5 (8.6)	22 (37.9)	27 (46.6)
	Female	4 (6.9)	27 (46.6)	31 (53.4)
Ward of admission	ICU	4 (6.9)	33 (56.9)	37 (63.8)
	Medical	2 (3.4)	5 (8.6)	7 (12.1)
	Surgical	1 (1.7)	4 (6.9)	5 (8.6)
	Palliative	0 (0)	1 (1.7)	1 (1.7)
	Hematology	1 (1.7)	3 (5.2)	4 (6.9)
	Oncology	1 (1.7)	2 (3.4)	3 (5.2)
	pediatric	0 (0)	1 (1.7)	1 (1.7)
Comorbid conditions	Diabetes	4 (6.9)	16 (27.6)	20 (34.5)
	CKD	1 (1.7)	7 (12.1)	8 (13.8)
	CVD	2 (3.4)	12 (20.7)	14 (24.1)
	malignancy	3 (5.2)	18 (31)	21 (36.2)
Multifocal candida colonization		2 (3.4)	20 (34.5)	22 (37.9)
Central line		7 (12.1)	40 (69)	47 (81)
TPN		1 (1.7)	9 (15.5)	10 (17.2)
Mechanical ventilation		5 (8.6)	36 (62.1)	41 (70.7)
Post-surgery		2 (3.4)	15 (25.9)	17 (29.3)
Broad spectrum antibiotics		8 (13.8)	46 (79.3)	54 (93.1)
Prolonged antibiotics infusion		0 (0)	3 (5.2)	3 (5.2)
Previous hospitalization		8 (13.8)	44 (75.8)	52 (89.6)
Neutropenia		2 (3.4)	3 (5.2)	5 (8.6)
Total		9 (15.5)	49 (84.5)	58 (100)



4. Discussion

1) Candida species:

Our results suggest that a great shift to Non-albicans candidemia 84.5% compared to 65.9% in Al Thaqafi study (11), 47 % in Altawfiq study, and 61.3% in Omrani study (14) all in Saudi Arabia. And in comparison with international studies 41.3% in Sozio study (10) and 41.6% in Bassetti Study (15).

Candida Parapsilosis was the leading cause of candidemia in our study by 34.5% followed by Glabrata 27.6%, Albicans 15.5% then Tropicalis 10.3% comparing the finding with Al Thaqafi study (11) 10 years ago in the same center Albicans 34.1%, Tropicalis 15.5%, parapsilosis 11.9% then Glabrata 9.1% noticing that the shift even among the Non-Albicans pathogens. Relating the local studies finding to the studies worldwide candida Albicans still the most common cause of candidemia in Bassetti study (15), parapsilosis 19.5%, tropicalis 9.3% and glabrata 8.3%, in another study done by Hachim showed that Albicans 38.3%, glabrata 23.6%, parapsilosis 17.3%, Krusei 11.7 and tropicalis 7.4%.

2) Malignancy:

Our research finds that 36.2% of the cases diagnosed with malignancy, unlike Al Thagafi study (11) there is no statistical significance between Albicans and Non-albicans in malignancy, and no specifics species associated more with hematological rather than solid malignancy.

3) Multifocal colonization:

We find that 37.9% of the patients with multifocal candida colonization more with ICU patients, that consistent with other global studies (16, 17, 18).

4) Association factors:

The most common factors associated with candidemia in our study are being older than 60 years, ICU admission, previous hospitalization, broad antibiotics use, and central line, similar findings with other studies (10, 11, 15, 16).

5. Limitations

The study has many limitations because of the retrospective design, we cannot determine if these are risk factors because no control group, we did not include other potential risk factors; HIV, or outcome like mortality or discharged.

6. Conclusion

The changing epidemiology still going, now the leading cause of candidemia is candida parapsilosis, a larger study with a control group, susceptibility testing and other potential risk factors to be included to help in clinical practice.

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