Prevalence of non albicans candida species in a tertiary care hospital

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ABSTRACT

Introduction: Candida species are recognized as the most important fungal pathogens with significant contribution to the morbidity and mortality in critically ill patients. C. albicans is the leading cause of fungal infections until the recent emergence of non albicans Candida (NAC) infections, therefore transforming the current epidemiological trends.

Materials and Methods: The clinical samples received in the microbiology department were cultured on Sabouraud’s dextrose agar followed by identification and sensitivity testing of Candida species using automated VITEK 2-compact (biomerieux) instrument.

Results and Discussion: The present study also shows the prevalence of NAC species with C. utilis being the most significant isolate from neonatal blood cultures. C. utilis is generally considered as an industrial yeast with low virulence, hence occasionally reported from clinical samples. However, their clinical relevance should be interpreted with strong clinical and microbiological correlation.

Conclusion: Surveillance for emerging fungal pathogens is essential to monitor the changing epidemiological trends for controlling the spread of NAC species.

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1. Introduction

Candida species are recognized as the most important fungal pathogens with significant contribution to the morbidity and mortality in critically ill patients.¹ They are responsible for 9-13% of blood stream infections in neonates² and a significant proportion of these infections are nosocomial origin. The known risk factors are immunosuppression, use of broad spectrum antibiotics, prematurity and invasive devices. Although Candida albicans account for vast majority of infections, however, in recent past the emergence of non albicans Candida (NAC) species such as; C. tropicalis, C. parapsilosis, C. krusei, and C. glabrata are being increasingly reported throughout the world.³

The transition of Candida species from commensal to potent pathogen is facilitated by number of virulence factors such as; adhesion to host tissue, biofilm formation and secretion of hydrolytic enzymes.⁴ Most of these virulence markers are extensively investigated and recognized as the important attributes of C. albicans pathogenicity, however, very little is known about the pathogenic determinants for NAC species. Several of these NAC species are shown to exhibit intrinsic or acquired resistance to commonly used antifungal drugs, therefore increasing their incidence in recent times. Besides, drug resistant NAC species are responsible to cause a significant proportion of blood stream infections with increased mortality in critically ill cases such as cancer patients.⁵

Recently, there has been a change in the epidemiology of Candida infections, characterized by a progressive shift from a preponderance of C. albicans to NAC species, consequently having greater impact on the selection of appropriate therapy. In addition, the incidence and distribution of NAC species in our area is currently unknown. Therefore, the present study is highly essential to know the prevalence of NAC species from clinical specimens and antifungal susceptibilities of these isolates is

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currently imperative to guide optimal empirical treatment.

2. Materials and Methods

The various types of *Candida* species isolated from clinical samples received (past one year) for fungal culture and sensitivity in the department of microbiology, SVS medical college were included in the study. Samples were inoculated on two sets of Sabouraud’s dextrose agar and incubated at 37°C for 24-48hrs. After the incubation period, growth was preliminary identified as *Candida* based on the colony morphology and Gram staining. Samples showing significant growth characteristics such as; pure and predominant growth were processed further.

Once they are identified as *Candida*, further identification and antifungal susceptibility testing of different species of NAC were performed by automated VITEK 2-compact (biomerieux) instrument using VITEK® 2 YST and AST-YS08 respectively.

3. Results

A total of 96 *Candida* species were isolated from various clinical samples. Overall, the incidence of NAC species is significantly higher (90) than *C. albicans* (6). The various NAC species isolated includes; *C. utilis* (79 ; 82.3%), *C. tropicalis* (7 ; 7.3%) and *C. glabrata* (4 ; 4.2%), whereas, the incidence rate of *C. albicans* is relatively at low (6.2%) Table 1. A vast majority of the NAC species were isolated from blood (77) and urine (8) compared to their incidence in other clinical samples including endotracheal secretions (2), bronchoalveolar lavage (1), throat swab (1) and stool (1). However, the isolation of *C. albicans* from clinical specimens is limited to blood (5) and urine (1) only.

Majority of the NAC species (78) were isolated from newborns possibly because of immature defense mechanisms and more invasive devises, therefore, predisposing them to *Candida* infections. *C. utilis* is the predominant NAC species (74) isolated in our study especially from neonatal blood cultures. Although, the incidence of *C. albicans* in our study is significantly lower than the former, however, it is the second leading (5) cause of newborn blood stream infections Table 2.

Antifungal susceptibility testing of all the *Candida* species were performed by automated VITEK 2-compact instrument. All the species were found to be sensitive to the tested antifungal drugs such as; fluconazole, voriconazole, amphotericin, fluconosine and caspofungin; while drug resistance found in the study appears to be very insignificant (data not shown).

4. Discussion

*C. utilis* is extensively used in the food industry for its ability to perform nonethanolic fermentation reactions for production of acetaldehyde and many other useful organics. The clinical significance of *C. utilis* is often discounted possibly because of its low virulence, therefore rarely isolated and interpreted from clinical specimens. Although, infrequent, the opportunity of *C. utilis* being pathogenic has been found in the literature published from different parts of the world.

The incidence and clinical significance of *C. utilis* has been fairly associated to cause variety of infections including; catheter related bloodstream infections in patients with metastatic carcinoma of the bladder, neonatal candidemia, chronic urinary tract infection, fungemia in non-neutropenic patients and patients with acquired immunodeficiency syndrome.

In our study, *C. utilis* is the most predominant NAC species isolated from neonatal blood stream infections. As most of the species isolated were from inpatient samples, it also indicates the significance of *Candida* in the etiology of nosocomial infections. The role of environment and/or hospital staff are assumed to be potential source of infection. The significant changes that are occurring in the epidemiology of *Candida* infections could be due to the recent emergence of NAC species as reported from all over the world. However, the virulence markers that transform NAC species as potential blood stream pathogens is need to understand fully. Otherwise, uncertainty regarding the clinical relevance of an isolate of *C. utilis* will continue to trouble.

5. Conclusion

The study strongly reemphasizes the current scenario of changing epidemiology of Candida infections with a predominant shift towards NAC species. Strong clinical correlation and precise microbiological prediction are highly essential while establishing the clinical significance of NAC species to preclude the possibilities of being treated them as commensals in life threatening infections. Further, a stringent surveillance for emerging fungal pathogens is extremely important to monitor the changing trends in incidence, geographical distribution and antifungal susceptibility patterns, so as to limit the spread of NAC species.
Table 1: Prevalence of Candida species from clinical samples

<table>
<thead>
<tr>
<th>Species</th>
<th>Blood</th>
<th>Urine</th>
<th>ET</th>
<th>BAL</th>
<th>Stool</th>
<th>Throat swab</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. utilis</td>
<td>74</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>79</td>
<td>82.3</td>
</tr>
<tr>
<td>C. tropicalis</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td></td>
<td>12</td>
<td>7.3</td>
</tr>
<tr>
<td>C. glabrata</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>C. albicans</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>6.2</td>
</tr>
</tbody>
</table>

ET- endotracheal secretion; BAL- bronchoalveolar lavage

Table 2: Age wise distribution of different Candida species

<table>
<thead>
<tr>
<th>Species</th>
<th>New born</th>
<th>Up to 20yrs</th>
<th>21-40yrs</th>
<th>41-60yrs</th>
<th>Above 60yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. utilis</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. tropicalis</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>C. glabrata</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. albicans</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Conflict of Interest

None.

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References


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