INCIDENCES OF CANDIDA ALBICANS AND NON-ALBICANS AMONG CATHETER-ASSOCIATED URINARY TRACT INFECTION PATIENTS OF AKOLA CITY

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INTRODUCTION

Candida species are the most common cause of fungal infections worldwide. Candida species are normal microflora within the gastrointestinal tracts, respiratory tracts, vaginal area, and the mouth and it is sexually transmitted diseases. Candida is a yeast growth present in all females and is normally controlled by bacteria. Candida species differ in their antifungal susceptibility and virulence factors. The genus is composed of a heterogeneous group of organisms, and more than 17 different Candida species are known to be etiological agents of human infections. The yeast begins to invade and colonize the body tissues by releasing powerful chemicals into the bloodstream causing such varying symptoms as lethargy, chronic diarrhea, yeast vaginites, bladder infections, muscle and joint pain, menstrual problems, constipation, and severe depression. The medical term for this overgrowth is candidiasis. Candidiasis is responsible for 90% of the cases of infectious vaginites [1].

Candida species is a part of human microflora and it becomes pathogenic when certain conditions are present and cause an opportunistic infections [2]. The major etiological agent is Candida albicans, whereas different Candida species can cause a variety of infections including Candida tropicalis, Candida dubliniensis, Candida parapsilosis, Candida krusei, Candida guillermondii, Candida glabrata, and Candida kefyer which represent many clinical forms of candidiasis. Some of these species are encountered as secondary infections to another species, for example; Candida parapsilosis is secondary infection only when C. albicans as a cause of Candida endocarditic. Still other species of Candida have been occasionally isolated from clinical isolates such as Candida catenulate, Candida intermedia, Candida lambica, and Candida zeylanoides. These species are therefore not considered as agents of opportunistic infections [3].

Candida spp. is the third leading cause of catheter-related infections after coagulase-negative Staphylococci and Staphylococcus aureus. It is associated with high rates of crude mortality C. albicans and C. parapsilosis are the most frequent fungi in hospitalize patients and in hospital environments. They are also the species that most commonly produce biofilm, a characteristic that facilitates persistent infections, such as catheter-related candidaemia [4]. In view of this present study was undertaken to determine incidences of C. albicans and non-albicans among catheterized urinary tract infection (UTI) patients of Akola city.

METHODS

Collection of urine sample

Urine sample was collected from patients in different private and government hospital of Akola city. A total 60 catheter urine samples were collected from patient of all the age group and both sex who had indwelling urinary catheter. Samples were collected by puncturing the catheter tubing with a long-term indwelling catheters. About 2 ml urine samples were collected in a sterile urine container from catherized patients and transported immediately to the laboratory.

Isolation of Candida albicans and non-albicans

The urine sample which was collected then each urine sample was inoculated on to the HiCrome Candida differential agar; medium by four-way streaking, and the plates were incubated 37°C for 24-48 hrs and next day colonies were observed.

Identification of isolates

Gram staining and microscopic study was performed for the isolation of yeast culture from HiCrome Candida differential agar plates. Identification of isolates obtained in pure culture was based on gram...
staining, morphology, growth characteristics on selective media biochemical test, and germ tube.

RESULTS

The majority of the fungal catheter-associated UTIs (C-UTI) are caused by Candida spp. hence the present study was undertaken to highlight the presence of Candida in urine and possibility of infection of C-UTI. Candiduria brings morbidity and mortality if they are not properly diagnosed and treated.

In this prospective analysis study, a total of 60 clinical catheterized urine samples were collected. Species were isolates from 54 samples while 6 samples showed absence for any Candida species. The cultural, morphological, and biochemical characteristics of the isolates was determined by standard conventional methods. Apart from C. albicans among non-albicans, C. tropicalis, C. krusei, C. glabrata, and C. parapsilosis was probably identified.

Distribution of Candida spp. among different age groups was studied as shown in Table 1. It was found that age group of 61-70 years had the highest frequency of Candida spp. with a total of 15 (27.77%), followed by the age group 41-50 years with total of 13 (24.07%), then followed the age group of 51-60 years with total of 12 (22.22%), and then, followed the age group of 31-40 years with total of 8 (14.81%), and least in age group of 21-30 years were recorded which was 6 (11.11%).

The gender-wise distribution of occurrence of C. albicans and non-albicans was also studied (Table 2 and Fig. 1). In our present investigation, it was found 30 (55.55%) Candida species were isolated from male. Occurrence of Candida infection due to albicans and non-albicans among male was more, while in female the occurrence was less as only 24 (44.44%) Candida species were isolated. In the present study, it was found that incidences of C. albicans among UTI patient was more as total 35 (64.81%) C. albicans were isolated. While only total 19 (35.18%) non-albicans spp. were found to be isolated (Fig. 2). The prevalence of C. albicans and non-albicans was also studied it was found that C. albicans was predominant over non-albicans. The prevalence of C. albicans was 64.81%. Among non-albicans, C. krusei, and C. glabrata was predominant showing 11.11%. It was followed by C. tropicalis which showed 9.2% prevalence and least by C. parapsilosis which showed 3.7% (Table 3).

DISCUSSION

In the present study, a total of 54 Candida species were isolated from 60 urine samples collected from catheterized patients from various hospitals of Akola city. The age group-wise distribution of the Candida species isolated was studied (Fig. 3). It was found that more no of Candida species were isolated from age group 61-70 which were 15 (27.77%) while least were isolated from age group 21-30 years in which only 6 (11.11%) Candida species were encountered. This is in agreement with who reported highest isolation rate of Candida in age group above 60 years [5]. They also reported people above 40 years of age were highly infected with Candida species [6]. This finding however contradicted earlier research which reported frequency of Candida species (57%) within age group 26-35 years [7]. The reported C. albicans to be the most incriminated yeast isolates in UTI [8]. This finding however contradicted the earlier report of Okungbowa et al., who reported 54% incidence rate within age bracket 20-30 years in Northern Nigeria. 35% incidence rate was reported within age group 26-36 years in Benin City [9].

Among the Candida species isolated gender-wise distribution was also determined in the present study (Table 2). It was found that more

| Table 1: Isolation of Candida spp. from different age group |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| S. No. | Age group | C. albicans | C. tropicalis | C. krusei | C. glabrata | C. parapsilosis | Total (%) |
|-------|-----------|-------------|--------------|----------|------------|----------------|-----------|
| 1     | 21-30     | 2           | 1            | 2        | 1          | 0              | 6 (11.11) |
| 2     | 31-40     | 5           | 0            | 2        | 1          | 0              | 8 (14.81) |
| 3     | 41-50     | 8           | 2            | 0        | 2          | 1              | 13 (24.07) |
| 4     | 51-60     | 9           | 1            | 4        | 0          | 1              | 12 (22.22) |
| 5     | 61-70     | 11          | 1            | 1        | 2          | 0              | 15 (27.77) |
| Total |           | 35          | 5            | 6        | 6          | 2              | 54        |

C. albicans: Candida albicans, C. tropicalis: Candida tropicalis, C. krusei: Candida krusei, C. glabrata: Candida glabrata, C. parapsilosis: Candida parapsilosis
Table 2: Gender-wise distributions of *C. albicans* and non-albicans

| Gender  | Number of *Candida* spp. (%) |  |
|---------|------------------------------|---|
|         | *C. albicans* | Non-albicans | Total |
| Male    | 21 (38.88) | 9 (16.66) | 30 (55.55) |
| Female  | 14 (25.92) | 10 (18.51) | 24 (44.44) |
| Total   | 35 (64.81) | 19 (35.18) | 54 (90) |

*C. albicans*: Candida albicans

*C. tropicalis*: Candida tropicalis

*C. glabrata*: Candida glabrata

*C. parapsilosis*: Candida parapsilosis

Table 3: Prevalence of *C. albicans* and non-albicans from urine sample

| S. No. | Name of isolate | Total (%) |
|--------|-----------------|-----------|
| 1      | *C. albicans*   | 35 (64.81)|
| 2      | *C. tropicalis* | 5 (9.2)   |
| 3      | *C. krusei*     | 6 (11.1)  |
| 4      | *C. glabrata*   | 6 (11.1)  |
| 5      | *C. parapsilosis*| 2 (3.7)|

*C. albicans*: Candida albicans

*C. tropicalis*: Candida tropicalis

*C. krusei*: Candida krusei

*C. glabrata*: Candida glabrata

*C. parapsilosis*: Candida parapsilosis

no of *Candida* species were observed among male than female which showed similarity with other [12]. Among male and female both gender *C. albicans* was more predominant. This in concordance with the findings of Goyal et al. [5], and Ponmudi et al. [10] who reported rate of isolates of *Candida* species were more in females than in males.

The cultural, morphological, and biochemical identification of isolates reveals that the isolates belonged to *C. albicans*, *C. tropicalis*, *C. krusei*, *C. glabrata*, and *C. parapsilosis* (Fig. 4). Among the distribution of *C. albicans* and non-albicans, it was found that *C. albicans* were predominant than non-albicans. Mehta and Date [11] also reported more no of *C. albicans* than non-albicans from the urine samples from Tamil Nadu, India. Taffeng et al. [7] also reported similar high incidences of *C. albicans* (63.9%). Okungbowa et al. [8] also reported *C. albicans* to be the most incriminated yeast isolate in UTI. This finding however not supported by some studies who reported *C. glabrata* as the most common *Candida* species [9]. The increased incidences of non-albicans among UTI patients also reported non-albicans *Candida* species is a matter of concern [5].

Among the non-albicans *Candida, C. tropicalis* (9.2%) was the most common. This is similar to the findings [5] who also reported the same. Among the non-albicans *Candida, C. krusei* (11.11%) and *C. glabrata* (11.11%) was the most common. This is similar to the finding of who was also reported the same. Then, the non-albicans *Candida, C. parapsilosis* (3.7%) was the most common. This is corresponding to the other finding [12].

CONCLUSION

The incidences of *C. albicans* and non-albicans were high among catheter-associated UTI patients. The UTI due to *Candida* species was more in old age and among male. The *C. albicans* was the emergent pathogen of C-UTI than non-albicans species. The further study of species identification along with their antifungal susceptibility pattern can be helpful for better treatment.

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