Original Article

Prevalence of Candida species in nosocomial candiduria infection in a tertiary care hospital.

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ABSTRACT

Nosocomial infections constitute a serious public health problem, and are among the major cause of morbidity and mortality in human, leading to increased hospitalization time and, consequently generation high cost of patient treatment. It was a Prospective study including laboratory investigations and observational analytical design, which was carried out in the Rama Medical Collage Hospital & Research centre, Kanpur, UP. The study was conducted from January 2016 to December 2016. Urine specimens were collected as midstream morning sample or from the port of the Catheter. In the present study period, 100 culture positive from the urine sample, from the patients more than 48hrs of hospital stay have been taken. Out of them 13 (13%) were positive for candida and others 87(87%) were positive for bacterial isolation. In the bacterial isolation Gram negative bacteria are found predominantly whereas Gram positive bacteria are less common. Among the Gram negative bacterial isolates Escherichiacoli (42.52%) constituted majority followed by klebsiellaspp (28.73), Citrobacterspp (10.34, pseudomonas (6.89), Enterococcus fecalis(5.74), Enterobacter aerogenes (3.44), MRCONs (2.29) repectively in catheterised patients. Out of 13 candida species 5 (38.4%) were Candida tropicalis emerged as the predominant fungal pathogen followed by candida albicans 3 (23.07%) and less prevalence of Candida krusei 1(7.69%) and candida dubliniensis 1 (7.69%). As result hospitalized patients in critical wards need to major attention for a better control of infection.
INTRODUCTION

The term health associated infection, health care associated infection, hospital acquired infection, hospital associated infection, hospital infection or nosocomial infection (nosocomial, means hospital) defined as infection developing in patients after admission to the hospital, which was neither present nor in the incubation period at the time of hospitalization. Nosocomial infections constitute a serious public health problem, and are among the major cause of morbidity and mortality in human, leading to increased hospitalization time and, consequently generation high cost of patient treatment These infections are frequently opportunistic and are associated with microorganism of low virulence and patients with impaired immunity. The majority of nosocomial infections are endogenous in nature they involve patients own microbial flora which may invade the patient’s body during some surgical or instrumental manipulation. Exogenous sources are from hospital environment, staff of patients. In any hospital, the four most common HAIs encountered are urinary tract infection (UTIs) 33% pneumonia 15% surgical site infection 15% blood stream infection 13%. Urinary tract infection are the most common HAIs nearly 90% of UTIs caused by bacteria and only 10- 15% are caused by fungi. Most hospital fungal infections are caused by the yeasts of the genus Candida, candida albicans is the most common yeast isolated in patients with UTIs however, there are reports of changing pattern with a rising prevalence of non albicans Candida. Polymicrobial infections, not only with bacteria but also with several yeast species occur in 5%-10% of candida UTIs. Circumstances, C. glabrata appears to be a frequent pathogen, often in combination with candida albicans and sometimes with other Candida species. Candiduria is seldom encountered in healthy individuals. The prevalence of candiduria is higher among hospitalized patients with indwelling devices and account for around 10 to 15% of nosocomial urinary tract infection. The recent increase in candiduria has been attributed to zseveral factors such as anatomical urinary tract abnormalities, comorbidities, abdominal surgery, ICU admission, broad spectrum antibiotics, diabetes mellitus, increase age, female sex, and indwelling urinary drainage device. Catheterization is one of the most important aspect of modern medical practice, urinary catheter to monitor urine output is also an important cause of nosocomial urinary tract infection.

MATERIAL AND METHODS

INCLUSION CRITERIA

All candida isolates from patients with urinary catheters in Rama hospital more that 48hrs of admission,

- Male
- Female
• All the age group were included in this study.

EXCLUSION CRITERIA

• Patients in hospital less then 48 hours
• Patient demographics
• Underlying diseases,
• Date of admission
• Location of the patient at time of infection
• Therapy

STUDY DESIGN

Prospective study including laboratory investigations and observational analytical design.

STUDY PERIOD

Rama Medical Collage Hospital & Research centre, Kanpur, UP.

STUDY PERIOD

The study was conducted from January 2016 to December 2016.

SAMPLE COLLECTION

Urine specimens were collected as midstream morning sample or from the port of the Catheter. And the sample were repeated after 24hrs and immediately send to the microbiology laboratory for microbiological examinations, culture, identifications and Antifungal sensitivity. If any delay sample should be placed in refrigerator at 8°C.

PROCESSING OF SAMPLE

All urine samples will inoculate on CLED (Cysteine Lactose Electrolyte Deficient Agar). And incubated at 37°C for overnight, next day organism indentified of the basis of colony morphology, colonies of Candida were appear small, rough and white, for confirmation we were performed gram staining [Annexure-2]

PROCEDURE OF GRAM STAINING

In the gram staining the Candida seen purple colour oval shaped organism.[6]

PROCEDURE OF GERM TUBE TEST ,SDA (Sabouraud Dextrose Agar) and
CHROM agar was performed.

RESULTS

In the present study period, 100 culture positive from the urine sample, from the patients more than 48hrs of hospital stay have been taken. Out of them 13 (13%) were positive for candida and others 87(87%) were positive for bacterial isolation. In the bacterial isolation Gram negative bacteria are found predominantly whereas Gram positive bacteria are less common. Among the Gram negative bacterial isolates Escherichia coli (42.52%) constituted majority followed by klebseilla app (28.73), Citrobacterspp (10.34, pseudomonas (6.89), Enterococcus fecalis(5.74), Enterobacter aerogenes (3.44), MRCONs (2.29) respectively in catheterised patients.

Out of 13 candida species 5 (38.4%) were Candida tropicalis emerged as the predominant fungal pathogen followed by candida albicans 3 (23.07%) and less prevalence of Candida krusei 1(7.69%) and candida dubliniensis 1 (7.69%).

NOSOCOMIAL ISOLATES

<table>
<thead>
<tr>
<th></th>
<th>NUMBER OF ISOLATES</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candida species</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td>Other isolates</td>
<td>87</td>
<td>87%</td>
</tr>
</tbody>
</table>

Out of 100 nosocomial UTI 87% were bacterial and 13% were found to be positive for fungal isolates.

DISTRIBUTION OF FUNGAL AND BACTERIAL ISOLATES
### AGE AND GENDERWISE DISTRIBUTION OF ALL THE ISOLATES

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>MALE n (%)</th>
<th>FEMALE n (%)</th>
<th>TOTAL n=13</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>11-20</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>21-30</td>
<td>00</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>31-40</td>
<td>01</td>
<td>04</td>
<td>05</td>
</tr>
<tr>
<td>41-50</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>51-60</td>
<td>03</td>
<td>01</td>
<td>04</td>
</tr>
<tr>
<td>&gt;60</td>
<td>00</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>TOTAL</td>
<td>04</td>
<td>09</td>
<td>13</td>
</tr>
</tbody>
</table>

Among all 13 candida tha isolates 04 (30.7%) were male and 09 (68.3%) were female. And positivity were high in age of 31 to 50 while the low positivity seen in below 20 year of age.

### SPECIESWISE DISTRIBUTION OF CANDIDA

- **Candida isolates**: 13%
  - Total isolates: 87
<table>
<thead>
<tr>
<th>Candida species</th>
<th>Number of isolates</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candida tropicalis</td>
<td>05</td>
<td>38.4%</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>03</td>
<td>23.07%</td>
</tr>
<tr>
<td>Candida glabrata</td>
<td>03</td>
<td>23.07%</td>
</tr>
<tr>
<td>Candida krusei</td>
<td>01</td>
<td>7.69%</td>
</tr>
<tr>
<td>Candida dubliniensis</td>
<td>01</td>
<td>7.69%</td>
</tr>
</tbody>
</table>

In the present study non albicans candida species are high in number (76.93%) as compare to Candida albicans (23.2%). Out of all non albicans candida, Candida tropicalis were highest in number with 05 (38.4%) followed by Candida glabrata (23.07%), Candida krusei (7.69%), Candida dubliniensis (7.69%).

**INTERPRETIVE CRITERIA FOR SUSCEPRIBILITY OF ANTIFUNGALS**

The interpretive criteria for the Fluconazole, Nystatin, Amphotericin B, Ketoconazole, Itraconazole, and Clotrimazole, and Clotrimazole disk were indicated in the table-

**INTERPRETATION OF ZONE SIZE**

<table>
<thead>
<tr>
<th>Antifungal drugs</th>
<th>Sensitive (S)</th>
<th>Dose dependent</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>&lt;15</td>
<td>10-14</td>
<td>&lt;9</td>
</tr>
<tr>
<td>Nystatin</td>
<td>≥25</td>
<td>17-24</td>
<td>&lt;16</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>≥19</td>
<td>15-18</td>
<td>≤14</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>≥30</td>
<td>23-29</td>
<td>≤22</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>≥16</td>
<td>10-15</td>
<td>≤9</td>
</tr>
<tr>
<td>Clotrimazole</td>
<td>≥20</td>
<td>12-19</td>
<td>≤11</td>
</tr>
</tbody>
</table>

**SPECIESWISE INTERPRETATIONS OF ANTIFUNGAL DRUGS**
### Risk factors for nosocomial candiduria, catherization are the most common risk factor, normal commensals gains ready access to urinary tract in the presence of indwelling catheter. Antibiotic administration was done in all the patients which was most common risk factor diabetes in the most common, diabetes predisposes to candiduria by enhancing fungal growth in the presence of glycosuria in the vulvovaginal area in female and in periurethral area in men, followed by post-surgical stay in the hospital.
CONCLUSION

1. It is concluded that Candida colonization has a considerable prevalence among the hospitalized patients, especially in the patients with indwelling catheters. And the prevalence is relatively high in Intensive Care Unit (61.53%). Proper infection control practices should be implemented of the critical care unit.

2. As result hospitalized patients in critical wards need to major attention for a better control of infection.

3. It is suggested by the current study that controlled surveys must be undertaken to optimize antifungal therapy based on characteristics of candida strains. This study shows the rise of non albicans Candida particularly Candida tropicalis.

4. This study will help to shed light on question of whether candiduria is a condition that should be treated aggressively or it is a surrogate marker of poor outcome. And also differentiate between true pathogen and colonizers.

5. This study furnished much needed information on various species of candida causing nosocomial urinary tract infection and their antifungal susceptibility pattern in this region. Hence species level identification of condida and their antifungal resistance pattern will help in accurate treatment and present resistance.

6. The increase in resistance to fluconazole is a matter of great concern as it is the most commonly used azoles for the treatment of candiduria.

DISCUSSION

In the present study, we observed 100 positive isolates with growth in urine sample. Out of them 87% were bacterial isolates and 13% were fungal isolates. In our study the overall prevalence of candiduria is 13% which was comparatively higher to the result of other study done by Meena Mishre et al [7] with 10.5% and comparatively lower to the study done by Zarei Mah Moudabadie et al [8] and Mythreyi et al [3] with 16.5% and 26% of prevalence rate. In our study the prevalence rate is low may be we have taken only true pathogen, which was confirmed by repeat sampling.

The prevalence of candiduria caused by the species other than C. albicans was surprisingly high in our study, our study showed that isolation rare of non albicans candida was 76.93% which is higher than Candida albicans 23.7% this finding is in concordance with the study done by Yashavanth R et al with 69.7% of non albicans and 3.30% of aalbicans [7].

In several studies have shown that candiduria is more frequently is female than male [6], similarly in our study we found that candiduria were more common among females (69%) than males (31%). Because of candida colonization in vulvo vestibular area females are more prone to UTI.
Urinary tract infection as a result of Candida species are become increasing common in hospital settings. The introduction of more efficient diagnostic methods, new techniques in surgery and transplantation, antibiotics and chemotherapeutics more potent and novel materials for prostheses, catheters, catheters and probes significantly increased the life expectancy and quality of life of critically ill patients, on the other hand, hospital acquired infection emerged as important iatrogenic complication. In general invasive fungal infection are associated with high morbidity and mortality, difficulties in diagnosis, antifungal resistance, length of hospital stay and increased hospital cost. This study was cone to study the biofilm as a virulence marker for the Candida species in nosocomial candiduria. The prevalence of Candida spp. Was 13% with 100 positive isolates. The species wise distribution among the candida isolates was Candida tropicalis (38.4%), Candida albicans (23.07%), Candida glabrata (23.07%), Candida subliniensis (7.69%), and Candida krusei (7.69%). The present study revealed the emergence of nosoomial candiduria in which non albicans species are replacing the Candida albicans species. Biofilm productions were seen positive in 69.23% in all the candida isolates. In the present study Amphotericin B were found to be the most sensitive drug and Clotrimazole and Itraconazole were found to be the most resistant drug against Candida infection.

In the present study period, 100 culture positive from the urine sample, from the patients more than 48hrs of hospital stay have been taken. Our of them 13 (13%) were positive for candida and others 87(87%) were positive for bacterial isolation. In the bacterial isolation Gram negative bacteria are found predominantly whereas Gram positive bacteria are less common. Among the Gram negative bacterial isolates Escherichia coli (42.52%) constituted majority followed by klebsiella app (28.73), Citrobacterspp (10.34, pseudomonas (6.89), Enterococcus fecalis(5.74), Enterobacter aerogenes (3.44), MRCONs (2.29) repsectively in catheterised patients.

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REFERENCES-


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