



Antifungal Sensitivity among Blood Cancer Patients treated in selected hospitals in Indore

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Introduction

Candida albicans is not the most prevalent type of yeast that may be found in countries that are part of the Western Hemisphere, contrary to popular assumption. It is possible that non-*albicans* *Candida* species will develop as a result of the selection of more resistant *Candida* species like *Candida glabrata* and *Candida krusei*. In contrast to *Candida glabrata*, *Candida krusei* possesses an innate resistance to the antifungal medication fluconazole. Antifungal medications are less successful against *C. tropicalis* than they would be against other types of fungi due to the fact that it may attach itself to inanimate objects like urine and vascular catheters. Both *Candida tropicalis* and *Candida albicans* are showing increased resistance to azole medications. Because of this, it is extremely vital to have efficient methods for detecting species, particularly ones that may determine fluconazole susceptibility and indicate early treatment possibilities. As a consequence of this, we decided to carry out this research in order to ascertain the antifungal receptivity of *Candida* species that had been isolated from the urine of hospitalised Blood Cancer Patients and the related risk factors. A comparison was made between the quick speciation approach and the conventional sugar fermentation processes. increased vaginal glycogen levels, making it possible for *Candida* to access additional fuel sources *Candida* and yeast cytosol cells are better able to adhere to vaginal epithelial cells when reproductive hormone receptors or systems are present, as this has been demonstrated. A significant number of Blood Cancer Patients who require long-term catheterization are asymptomatic, and as a result, they are unable to communicate symptoms such as increased frequency or dysuria. Those between the ages of 35 and 40 and those between the ages of 40 and 45 were the most likely to have no symptoms. Antibiotics were administered to 25 of the 50 Blood Cancer Patients who were diagnosed with asymptomatic candidiasis, and another 25 of the Blood Cancer Patients had their urinary tracts catheterized as a preventative measure. Mauricio Mathew and colleagues (2011) found that only 17% of subjects exhibited signs of a urinary tract infection (UTI). According to this research, men over the age of 50 had a significantly higher incidence of UTI symptoms, and 26% of them had symptomatic candiduria. It's possible that an increase in risk factors among older people was a contributing factor to the surge.

Methodology

This study found that 29 percent of Blood Cancer Patients required a longer catheterization procedure because they were unconscious. It was unable to determine whether or not they exhibited any symptoms. There were approximately 15 critically sick Blood Cancer Patients being treated in the intensive care unit (ICU), 7 Blood Cancer Patients undergoing neurosurgery, and 11 Blood Cancer Patients receiving medical treatment. This patient group was connected with the use of catheterization and antibiotic treatment for an extended period of time. There were 15% of cases in which fever was the predominant symptom, while there were 17% of cases in which dysuria was the primary symptom. Blood Cancer Patients who were catheterized for a urinary tract infection had a prevalence of 16.6% and 8%, respectively, of fever and dysuria. In the Paul A. Tet al study, only people who had candiduria were included as subjects. Those who are not catheterized are more likely to experience symptoms such as dysuria and urgency than Blood Cancer Patients who are catheterized. This is because catheterization prevents contaminated urine from infecting the urethral mucosa. If you suffer from irritable bladder syndrome or vesicoureteral reflux, a patent urinary catheter can help keep the urinary system from becoming squeezed. There were a total of 22 cases of urinary tract infections, five cases of pyelonephritis, and eight cases of cystitis. In our research, Blood Cancer Patients with nephrology participated in the trial at a rate of 18%.

Results

Diabetes, chronic kidney disease, and urinary tract infections were the three most common risk factors found in Blood Cancer Patients admitted to the medical unit. Antibiotics and catheterization were the risk variables that appeared most frequently in intensive care unit and surgical Blood Cancer Patients. In 84% of the cases, antibiotics were administered, and catheters were inserted in 75% of the Blood Cancer Patients. In contrast to the 99.6% of our Blood Cancer Patients who had catheterization as a risk factor, Uma Chaudary et al. included critically sick Blood Cancer Patients with candiduria in their analysis. Antibiotics alter the microbiota of the genito-urinary tract, which provides favourable conditions for the growth of *Candida* species. In addition, catheters contribute to the colonisation of non-albican *Candida* microorganisms on the surfaces of the catheters. The probability level of a relationship between nonalbican *Candida* spp. and the use of antibiotics was calculated to be 0.611. Diabetes came in second place with 42% of the votes, followed by chronic kidney disease (CKD), which received 37% of the votes. In third place was heart disease. According to Cl'audia CB et al report, 's the incidence of diabetes is somewhat greater than this research's (21.8%) finding. The term "Diabetes Capital of the World" is often used to refer to India. Insulin resistance, abdominal obesity, lower adiponectin levels, and higher C-reactive protein levels are more common among Indians than in other populations. According to the Diabetes Atlas 2007 published by the International Diabetes Federation, the number of people living with diabetes is expected to increase from 41.8 million in 2007 to 70.1 million in 2025. The drugs that fall within this category include oral and injectable steroids, tacrolimus, and mycophenolate mofetil, among others. These medications were utilised in the treatment of autoimmune illnesses such as SLE and RPGN. The fact that the majority of Blood Cancer Patients were dependent on long-term catheterization and antibiotic treatment constituted an additional risk factor. According to the results of a Chi-Square test, transplantation is one of the most significant risk factors for *C. tropicalis* candiduria. The p value for this test was 0.003. Chronic renal disease was the root cause of 35% of all urinary tract infections (CKD). In the study conducted by Stephen P. S., only 17% of Blood Cancer Patients indicated renal insufficiency, in contrast to the 18% who did so in the study conducted by Krcmery S et al. This might most likely be attributed to the fact that diabetes conditions were present in 50 out of every 100 individuals. These individuals are particularly susceptible to colonisation due to their glycosuria and inadequate phagocyte counts. People who have chronic renal disease have a higher risk of infection, which is made worse by uremia and hemodialysis (CKD). A dysfunctional immune system, an excess of iron, underlying diseases, insufficient albumin, and metabolic acidosis are all factors that contribute to this condition. There was no significant difference between those who had chronic renal illness and those who had *Candida albicans* or *Candida nonalbicans* *Candida* species ($p = 0.371$). 15% of the persons whose candiduria was investigated also had another kidney condition, such as calculi, BPH, neurogenic bladder, RPGN, hypospadiasis, phimosis, or prostate cancer. These conditions were responsible for their candiduria. Urine samples obtained via catheterization accounted up 74% of the total samples taken, whereas midstream urine samples were taken from 28% of the Blood Cancer Patients. A catheterization procedure was performed on the Blood Cancer Patients in 81.5 percent of the cases in the research conducted by Claudio CB, Artiaga K et al, and Arlene O.C et al. This is an example of a typical risk factor. Other species of *Candida* accounted for 86.7 percent of the isolates, whereas *C. albicans* was responsible for only 14.4 percent of them. 72.5 percent of the urine isolates that Manisha Jain and her colleagues tested revealed the presence of *Candida* species other than Albican *Candida*. The *C. tropicalis* population made up 62.25% of the total, followed by the *C. albicans* population at 14.2%, the *C. guilliermondii* and *C. krusei* populations at 8.1% each, the *C. parapsilosis* population at 5.7%, and the *C. kefyr* population at 5.7%. (1.7 percent). Researchers Manisha J et al. came to a similar conclusion. In her research, she found that 56.1% of the samples had *C. tropicalis* isolates, whereas 29.8% contained *C. albicans*. *C. albicans* was determined to be the predominant species by both Elza H.D. Silva et al. and Febre N et al. It accounted for 46 and 48.17 percent of the population, respectively. In the course of these experiments, more non-albicans *Candida* species were found. Over ninety-nine percent of the 98 urine samples that were analysed had a single isolated organism. The findings of Agarwal were in line with this conclusion. Determine the time and the date. The most common combination isolate was *C. krusei*, followed by *C. tropicalis* as the next most common. In point of fact, the hardier *C. krusei* was most likely responsible for the extinction of the species that were native to the area. *Candida* spp. was found in urine samples that had been catheterized as well as those that had not been catheterized. Additionally, a p-value of 0.005 was discovered to exist between non-Albican *Candida* species and catheterized individuals. Fungus is responsible for 27.2% of all infections that are connected with catheters. The capability of *C. tropicalis* to develop biofilms on catheters may facilitate increased colonisation in Blood Cancer Patients who utilise urological draining catheters. Antifungal medications were unable to enter *C. tropicalis* biofilms due to the huge hexosamine-rich matrix that they contained; in contrast, the matrix that was present in *C. albicans* biofilms was smaller and included more glucose. There is no clear explanation for why non-albicans *Candida* spp. have become so prevalent. It was only found in 6.8% of Blood Cancer Patients who had their catheters inserted, however it was found in 35.7% of midstream samples. Catheterized Blood Cancer Patients exhibited a 0.05 p value for *C. albicans* in midstream urine samples, which was significantly lower than the value seen in catheter-free persons. The assimilation method, which found 99.9% of all *Candida* species, was the most effective strategy for *Candida* speciation. There is a wide range of accuracy in species identification when using Hi-Chrom agar, from 84.3% all the way up to 99.9%. The sensitivity of the Hi-Chrom agar varied between species, which made reliable positive isolate identification difficult despite the fact that the p value was 0.482. With the exception of *C. tropicalis* (84.3%) and *C. guilliermondii* (84.9%), each of the three species of *C. parapsilosis* showed a sensitivity level of 99 percent. Chromagar has a sensitivity that was 86.7% effective. According to Chaudary and colleagues' research, different species of *Candida* are sensitive to between 87 and 100% of the Hi-Chrom agar. It is possible that the huge number of *C. tropicalis* isolates that were tested contributed to the greater

sensitivity of Hi-Chrom agar in our experiment compared to that which was shown by Baradhkar VP et al. On Hi-Chrom Agar, these species had a specificity rating of 100%; *Candida albicans* had a specificity rating of 95.7 percent, and *Candida tropicalis* had a specificity rating of 96.2 percent. The specificity of the *Clostridium albicans* test was 97.5%, the specificity of the *Clostridium tropicalis* test was 92%, and the specificity of the *Clostridium parapsilosis* test was 88%. Because of the extensive number of *C. parapsilosis* isolates that we looked at, the findings that we obtained are distinct from those of other investigations. Due to the high number of false positives, vivid green colonies are only able to detect *Candida albicans* 67% of the time. The identification of *C. tropicalis* was successful 94.8 percent of the time thanks to steel blue. It was possible to anticipate the presence of *C. parapsilosis*, *C. krusei*, and *C. guilliermondii* based on the presence of cream, dry pink colonies, and pale pink to purple. Throughout the course of this research, fluconazole resistance was discovered in 23.5% of the *Candida tropicalis* isolates and 18.2% of the *Candida albicans* isolates. As a consequence of this, Ariane Bruder-Nascimento and her colleagues found evidence of resistance in 17.2% of the *C. tropicalis* strains and 24% of the *C. albicans* strains. On the other hand, *C. albicans* was found to be extremely susceptible to the treatment by Ariane BN et al. Because of relatively minor variations in DD and MBD, 3.8% of SDD isolates were either sensitive or insensitive. According to the findings of their research, Barry A. L. and colleagues found that there was an 8.1% error rate. Only 76.9% of MBD isolates and 70.5% of DD isolates shown resistance to the antifungal medication itraconazole. These two species exhibited a higher level of itraconazole resistance compared to the others. Their findings are comparable despite the fact that 75.4% of the samples collected by Ariane B.N. and colleagues were sensitive. Because of MBD and DD incompatibilities, there was a minor mistake rate of 12.5 percent and a significant error rate of 1.9 percent. The MBD strategy was successful in its application to itraconazole. Although the MBD indicated that all of the isolates were sensitive, the DD error of 14.1% revealed that only 86.4% of the isolates were sensitive. Only the MBD test can determine whether or not an organism is susceptible to amphotericin B. Ariane BN and her colleagues saw similar phenomena and came to the same conclusions.

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