Antifungal Susceptibility Profiles of Candida Albicans Isolated from University of Nigeria Teaching Hospital.

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ABSTRACT

Candida albicans is the most common species causing candidiasis particularly in immune compromised individuals as opportunistic mycoses. Five hundred samples were obtained from patients with apparent symptoms of candidiasis and 252 (50.4%) isolates were confirmed to be Candida albicans. Disk diffusion method was performed using seven antifungal agents: Ketoconazole (Keto), Itraconazole (Itrac), Voriconazole (Vori), Miconazole (Micoz), Ciclopirox (Ciclo), Terbinafine (Terbi) and Fluconazole (Flucz). The rate of susceptibility of isolates to each drug was as follows: Keto (58.0%), Itrac (50.0%), Vori (60.0%), Micoz (38.0%), Ciclo (24.0%), Terbi (12.0%) and Flucz (48.0%). Voriconazole showed greater activity than Cicloporox and terbinafine (P=0.022 and P=0.001), respectively. However, the activity of Vori was not significantly higher than those of Keto, Itrac, Micoz and Flucz (P=0.138, 0.451, 0.193 and 0.459), respectively.

KEYWORDS  
Candida, albicans, antifungal, susceptibility

Introduction

There are several species of Candida capable of causing candidiasis (candidosis, moniliasis or oidiomycosis). Candida species are yeast like fungi that can form true hyphae and pseudohyphae and are confined to human and animal reservoirs and frequently recovered from the hospital environment (Brooks et al., 2004). Being that they exist as normal flora of the skin, mucus membranes and gastrointestinal tract, they colonize the mucosal surfaces of all humans during or soon after birth, and the risk of endogenous infection is ever-present (Kourkoumpetis et al., 2010). Candidiasis is the most common systemic mycosis, and the species causing infection include Candida albicans, C. tropicalis among others (James et al., 2006). They are commonly encountered in immune-compromised individuals as opportunistic mycoses. Serious infections caused by Candida albicans are an increasing problem due to the immunosuppressive nature of surgery, Human Immunodeficiency Virus (HIV) infection, organ transplants and the treatment of malignancy (Guthrie et al., 2009). The susceptibility and incidence in patients with Acquired Immune Deficiency Syndrome (AIDS) are inversely correlated with the CD4 Lymphocytic count and are likely to develop oropharyngeal candidiasis (Srikumar and Nagaraja, 2010). The main virulence factors enabling them to establish infection include: surface molecules that permit adherence of the organism, elaboration of acid proteases a...
were incubated at 37°C for 24 hours. Any positive fungal isolate was used in streaking from the pool to four different areas of Sabouraud dextrose agar. The wire loop was sterilized and sterile nutrient broth were first spread on a position to seed Conkey agar and Sabouraud dextrose agar (SDA). The blood (200 ml) were used for all the samples. Standard methods for culturing as described by Brooks et al. (2004) were used for all the samples except blood, and plating on chocolate agar, blood agar, Mac Conkey agar and Sabouraud dextrose agar (SDA). The blood sample was aseptically introduced into signal blood culture system (Oxoid batch No BC0102M, Lot NO 838224) following standard blood culture procedure. This was then inoculated unto SDA slants, blood agar and Cystein lactose electrolyte deficient medium. The swabs that have been moistened with sterile nutrient broth were first spread on a position to seed the media (chocolate agar, blood agar, Mac Conkey agar and Sabouraud dextrose agar). The wire loop was sterilized and was used in streaking from the pool to four different areas of the medium for confluent growth. All the inoculated plates were incubated at 37°C for 24 hours. Any positive fungal isolate was identified using standard methods (Gram stain, germ tube formation and biochemical assays) to the species level (Srikumar and Nagaraja, 2010). Antifungal Susceptibility Testing: All Candida albicans isolates were tested against various antifungal agents manufactured by Rosco Diagnostica A/S, Taastrupgaardsvæj 30, DK- 2630 Taastrup Denmark. Disc diffusion method for susceptibility testing was used. The test was performed as described by Pfaller et al., 2005 and National committee for clinical laboratory standard (Malani and Kouffinan, 2007). Sterile Mueller-Hinton agar supplemented with 2% glucose and 0.5µg of methylene blue per ml at a depth of 4.0mm in petri dishes were used. The agar surface was inoculated by using a swab dipped in a cell suspension adjusted to the turbidity of a 0.5 Mac Farland standard. Tablets of Ketoconazole (Keto) 15 µg, Itraconazole (Itra) 8 µg, Voriconazole (Vori) 1 µg, Miconazole 10 µg (Micoz), Ciclopirox 50 µg (Cilo), terbinafine 30 µg (Terbi), fluconazole 25 µg (Flucz), were placed unto the surface of the plates and were then incubated at 37°C for 24hr. Inhibition Zone Diameter (IZD) were read and Zones of ≥17 mm were taken to be susceptible (Pfaller et al., 2005).

Statistical Analysis: This was carried out using SPPS package (version 15.0). Analysis of variants (ANOVA) was done and the values were considered at the 95% confidence limit and 0.05 probability level.

RESULTS
The 252 (50.4%) confirmed isolates of Candida albicans that were subjected to antifungal susceptibility tests using seven antifungal agents gave the following results.

The rate of susceptibility of isolates to each drug was as follows: Ketoconazole (58.0%), Itraconazole (50.0%), Voriconazole (60.0%), Miconazole (38.0%), Ciclopirox (24.0%), Terbinafine (12.0%) and Fluconazole (48.0%) (Figure 1). Their respective resistance percentage rates were as follows: 42, 50, 40, 62, 76, 88 and 52, respectively. Figure 2 shows the mean inhibition zone diameters. The mean IZDs was as follows Keto 8.12 mm, Itra 12.05 mm, Vori 12.26 mm, Micoz 8.28 mm, Cilo 5.47 mm, Terbi 2.06 mm and Flucz 12.26 mm.

DISCUSSION
The percentage susceptibility of voriconazole (60%) was high-
lates.

![Figure 2: Susceptibility rates of the antifungal drugs against the candida albicans iso-](image)

**REFERENCES**


