FUNGAL UROPATHOGENS ASSOCIATED WITH CANDIDURIA

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Abstract

This study was aimed to know the prevalence of fungal uropathogens in a study center in Kashmir, India. 492 Urine Samples were directed to Microbiology lab for evaluation of Candiduria. 151 samples showed positive results for fungal Candiduria. Out of 151 hosts 80 were immunocompromised with different ailments and 71 were healthy hosts. Among Candida species Candida albicans were isolated from 102 hosts and Non-albicans Candida species from 49 hosts.

Keywords: *Candida albicans, non-albicans Candida species, Germ tube test, Corn meal agar, immunocompromised hosts.*

Introduction

Urinary tract infection is the invasion of sterile urinary system by pathogens and the most prevalent diseases with diverse etiology.(Mama M, Manilal A*et al.,*) All over the world fungal Urinary tract infections are commonest among the Hospital acquired infections. *Candida albicans* known to be the most common isolate responsible for nosocomial fungal UTI. Studies show that with the elevated fungal UTI cases appearance of antifungal resistant by Candida species especially to azoles due to efflux activity that decreases the drug sensitivity have been reported.(PayamBehzadi, ElhamBehzadi*et al.,*), (SrujanaMohanty*et al*.,) Candida species are considered as opportunistic pathogens , as they are considered as normal flora in human body. In the last decade infections with Candida albicans and non-albican species have elevated. (Vanessa Dias) Recent research shows that there is shift in prevalence of non-albicans Candida species during the last decades. (Devi LSet al.,)

Material and Methods

The study was performed in the department of Microbiology at Dr. Qadri's Hematology Centre and Clinical Laboratory, Srinagar, Kashmir, over a period of 1 year.

Specimen collection and processing

Urine samples were collected by standard mid-stream "clean-catch" method and were processed within 2 hours after collection. Sterile, wide-mouthed, glass or plastic jars, beakers was provided to the patient.

Culture and interpretation

All urine specimens brought to the microbiology laboratory were examined at once, or placed in a refrigerator at 4^0 C until they could be examined. The examination procedure included the following steps:

Wet mount examination:

Examination of urine specimens was done microscopically at low and high power to detect pus cells, epithelial cells, casts, crystals, bacteria and yeast cells.

Culture

Aseptically transfer the specimen to a suitable medium such as Sabouraud Dextrose agar with Chloramphenicol and incubate at 37^0 C. The presence of at least 10^5 colony-forming units (CFU)per ml in a clean-catch midstream urine specimen is considered clinicallysignificant for the diagnosis of urinary tract infection. (J. Vandepitte., *et al*., 2003)

For further identification of Candida species, germ tube test and corn meal agar were used to examine the morphological characteristics of the Candida species.

HiChrome^{TM}Candida Differential Agar

A Chromogenic differential culture medium is used to isolate and identify clinically important yeast species, particularly *C.albicans*, (forming yellow-green, blue-green colonies) *C.tropicalis*, *C.krusei etc.*The pure culture was seeded onto the HiCrome media and incubated at 37 Degree for 48 hours. The media was observed for characteristic color change as per HiMedia technical data. (Fig 1&2)

IDENTIFICATION

Germ tube test

Principle

This is a rapid test for the presumptive identification of *C.albicans*. The Candida albicans strain produce germ tube from yeast cells when placed in a liquid culture medium and incubated at 37^{o} C for two hours. It distinguishes *C. albicans* from other candida species .A germ tube is a filamentous extension of a yeast cell that is about half the width and 3-4 times the length of parent cell.

True germ tube produced by *C. albicans* has no constriction at the neck (i.e the base wherein the hyphal extension connects with the parent cell

Procedure

An isolated colony of yeast to be tested is suspended in an eppendorf containing 0.5ml of serum. Then incubated at 37^{o}C for 2 hours. After incubation, a drop of the yeast serum is suspension is placed on a microscope slide, covered with a cover slip and inspected microscopically for the presence of germ tube. (R. Ananthanarayan, *et al.*, 2009) (Fig 3)

Corn Meal Agar

Principle

Cornmeal agar is a nutrient deficient medium and provides an ideal environment for yeasts to form pseudohyphae. Some species of yeast develop characteristic morphological features in this culture medium.

Procedure

Make three parallel streaks ¼ in or in 1cm, apart into the surface of corn meal agar, holding the inoculating wire at about 45^{o}angle.Layed a cover slip on the surface of the agar, covering a portion of the inoculated streaks .Incubated the inoculated plates at 37^{o}C for 48 hours .After incubation, the inoculated plate is examined microscopically through the cover slip and the growth pattern is observed. (R. Ananthanarayan, *et al.*, 2009)

FIG 1: *Candida tropicalis*as blue color colonies on HiCrome Agar

FIG 2: *Candida albicans*as light green colonies on HiCrome Media

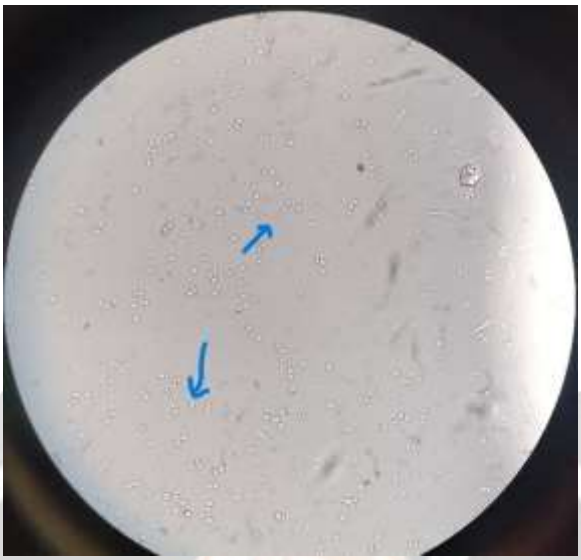

FIG 3: Germ tube test showing presence of germ tube in *Candida albicans*

Observation and results

From April 2021-March 2022, out of 492 urine specimens sent to microbiology lab for evaluation, 151 were positive for Candiduria. Overall occurrence of fungal UTI observed was 151(30.69%) out of which, Candida albicans 102 (67.54%) were commonest isolates followed by non-albicans Candida species 49(32.45%). Among non-albicans Candida *tropicalis* 16(32.65%) was the most common isolate followed by Candida *glabrata* 14(28.57%), Candida *parapsilosis* 11(22.44%), Candida *krusei* 7(14.28%) and Candida *spherica*1 (2.04%). It was also seen that males 79 (52.31%) had higher Candiduria as compared to females 72 (47.68). Also the rate of fungal urinary tract system infections were higher in immunocompromised hosts specifically suffering from Diabetes mellitus 40 (50.0%).

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