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Oxidase & Coagulase Test: Rapid Identification Methods for Candida species

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ABSTRACT: Purpose: In the hospital environment, Candida albicans and non albicans species commonly colonises the respiratory, oral mucosa, urinary tract, blood stream that causes infections in ICU and immunocompromised patients. Hence, the purpose of the study was to find out the prevalence of Candida species and their rapid identification methods from various clinical samples of a tertiary care hospital in western Odisha.

Methods: All isolates were selected from clinical isolates of Candida and examined by lactophenol cotton blue(LCB) mount and inoculated on SDA & MHA plates. Germ tube test was done for identification of yeast followed by oxidase and coagulase test from SDA & MHA plates.

Results: During the one year study period from Nov 2019 to Oct 2020, a total of 165 yeast isolates were recovered from various clinical samples(blood, urine, sputum) were studied, out of which most isolates were from blood samples followed by sputum samples.

Conclusion: Due to lack of specificity and time consuming by conventional identification methods, there is a need to evaluate alternative test for rapid identification of Candida species.

Key words: SDA- Sabouraud's dextrose agar, MHA- Mueller Hinton agar, LCB- lactophenol cottons blue

I. INTRODUCTION:

Candidiasis is caused primarily by C. albicans and less frequently, by other species eg: C. prasilosis and C. tropicalis. The disease itself generally takes 2 forms: superficial(mucosa) and invasive(disseminated). C. albicans can infect virtually every tissue in the human body, by far the most common manifestation of candidiasis are superficial lesions of the mucosa surfaces.[1]

In addition to clinical signs and symptoms, which are generally sufficient to enable diagnosis, candidiasis may be confirmed either by a positive potassium hydroxide(KOH) wet mount, Gram stained smear, or a calcoflour stain of specimens obtained from the lesion by swabbing or scrapping.[2]

C. albicans is the predominant cause of invasive fungal infections.[3]

Concern is rising about the high incidence of infections caused by non albicans species and the emergence of antifungal resistance.[4]

II. MATERIALS AND METHODS:

The present study was carried out in the Department of Microbiology of a tertiary care hospital in western Odisha. In the study period (Nov 2019- Oct 2020) 165 yeast samples were collected aseptically and processed further for isolation of Candida species according to standard microbiological protocols. The clinical isolates were subjected to microscopic examination by LPCB mount, gram staining , germ tube test and cultured on SDA and MHA plates. Oxidase and coagulase test were performed . Also sugar assimilation and fermentation tests were done for speciation of Candida..

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III. RESULTS:


Fig 1


Fig 2


Fig 3

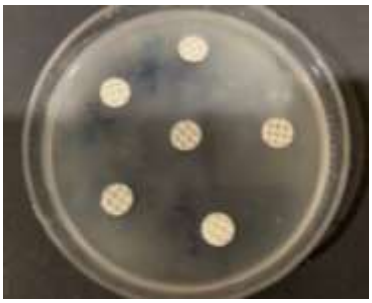
Fig 4

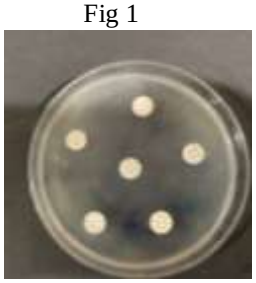
Fig 5


Fig 6

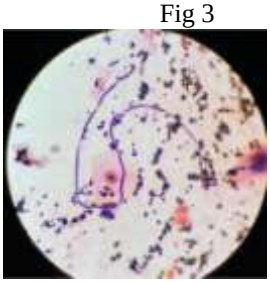
Fig 7

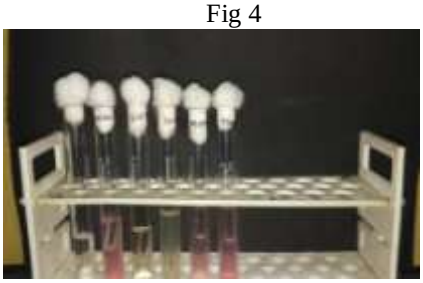
Fig 8

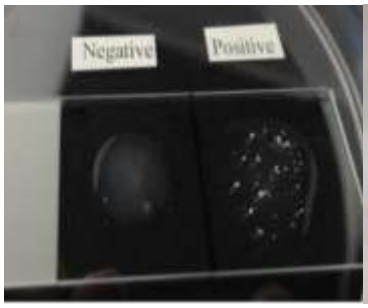

Fig. 9


Fig. 10

Fig 1: growth of Candida albicans on SDA.
Fig 2,3,4,5: sugar assimilation test.
Fig 6: Growth of various isolates of Candida spp on CHROM agar.
Fig 7: Gram stain appearance of Candida spp.
Fig 8: sugar fermentation test.
Fig 9: Coagulase test.
Fig 10: Oxidase test.

Table no. 01

Yeast species	No.of isolates	Oxidase test	Coagulase test	%positive (oxidase test)	%positive (coagulase test)
C.albicans	97	2/97	59/97	2.06	60.82
C.dubliniensis	11	0/11	0/11	0	0
C.tropicalis	34	1/34	28/34	2.94	82.35
C.glabrata	23	0/23	19/23	0	79.16

Table no. 02

Yeast Species	No. of isolates	Oxidase test	Coagulase test	%positive (oxidase test)	%positIive (coagulase test)
C.albicans	97	97/97	71/97	100	73.19
C.dubliniensis	11	11/11	10/11	100	90.90
C.tropicalis	34	34/34	31/34	100	91.17
C.glabrata	23	21/23	19/23	91.30	82.60

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IV. DISCUSSION:

The oxidase test was positive in 3 out of 165(1.81%) isolates of Candida grown on SDA and 163 out of 165(98.78%) on MHA, which is nearly similar with the study of Afreen et al[7] who tested 35 yeast isolates where positive oxidase on SDA & MHA were nil and around 94.28% respectively. The coagulate test was positive in 106 out of 165(64.24%) isolates of Candida grown on SDA and 131 out of 165(79.39) on MHA, which is almost similar with the study of Afreen et al[7] who tested 35 yeast isolates where positive coagulase test on SDA and MHA were
51.42 are 65.71% respectively.

V. CONCLUSION:

We conclude that there is a significant prevalence of candidiasis in various clinical wards. It is a serious challenge for clinicians for treatment of serious and immunocompromised patients. Conventional methods used for identification of various Candida species is quite time consuming. Hence, alternative and rapid methods may be helpful in early identification and prompt treatement may be ensured.

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