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Research Article

SPECIFICATION OF CANDIDA ISOLATES BY USING VARIOUS MEDIA

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ABSTRACT

Fungal infections are a growing medical problem requiring prompt diagnosis with species identification and early adapted antifungal therapy. Among the increasing fungal infections, candida species are the most common in the recent few decades. Fluconazole, a triazole derivative has become the drug of choice for the treatment of candidiasis in immunocompromised patients. Out of 210 candida isolates, sugar assimilation test and CHROM agar agree for species identification of 189 (90.00%) isolates. Species of 21 (10.00%) candida isolates were wrongly identified by CHROM agar. They include 5 isolates of C. albicans, 9 C. tropicalis, 2 C. glabrata, 3 C. parapsilosis and each isolate of C. guilliermondii C. kefyr.

Keywords :- Candida, Culture Media, Fungal Infections.

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INTRODUCTION

Fungal infections are a growing medical problem requiring prompt diagnosis with species identification and early adapted antifungal therapy.[1-4] Among the increasing fungal infections, candida species are the most common in the recent few decades.[5-9] Candida species colonize the mucosal surfaces of all humans soon after birth and the risk of endogenous infection is ever-present.[10,11] But the organism become pathogenic only when the normal bacterial flora is disturbed by antibiotics or other factors that produce fungal overgrowth.[12]

The strains of Candida albicans can be differentiated at the phenotypic level by physiological tests and by detection of phenotypically expressed macromolecular structures. For this various combined tests have been suggested. Of these combined methods, resistotyping and morphotyping are the most suitable methods which are easily available.[13]

Resistotyping was first developed for strain delineation, pathogenesis and epidemiological studies,[14] reported by McCreight and Warnock with modifications. This method is convenient and easy for biotyping of large number of C. albicans isolates.[15] Morphotyping has also been studied as an epidemiological tool. This is a method of evaluating fringe and surface characteristics of streak colonies, shown to have good discriminatory capacity. This method is able to relate strains of proven virulence with distinct morphotypes.[16,17] .

The genus Candida includes about 200 species but only few species have been isolated from humans.

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Nearly 20 species are considered to be significant pathogens causing various infections in the human beings.

Some of these species are Candida albicans, Candida tropicalis, Candida krusei, Candida glabrata, Candida guilliermondii, Candida parapsilosis, Candida lusitaniae, Candida kefyr, Candida rugosa, Candida dubliniensis, Candida viswanathii.

MATERIALS AND METHODS

The study was carried out in the Department of Microbiology. A total of 210 candida isolates of suspected cases of candidiasis from various clinical specimens were included in the study.

Laboratory methods used to diagnose candidiasis are Microscopy and staining, Culture based techniques, Serology diagnosis, Detection of fungal metabolites and Molecular methods.

Various media used for inoculation are Corn-meal Agar, Tetrazolium Reduction Medium and CHROM agar. Sugar assimilation and fermentation test. Carbohydrate fermentation tests Candida species ferment carbohydrates producing acid and gas, these are not reliable as compared to assimilation tests.[18] Carbohydrate assimilation tests The biochemical tests like sugar assimilation are of immense importance for the identification of the yeast isolates and the speciation of candida. This test detects the ability of isolate to utilize a specific carbohydrates a sole source ofcarbon when grown on a carbohydrate free medium. [19] .

RESULT AND DISCUSSION

Results of sugar assimilation test for speciation of candida isolates are shown in Table 1.

Table 1 shows speciation of candida isolates by sugar assimilation test. Out of 210 candida isolates, 125 (59.52%) were identified as C. albicans, 50 (23.84%) as C. tropicalis, 13 (6.19%) as C. glabrata, 8 (3.80%) as C. krusei, 6 (2.85%) as C. parapsilosis, 5 (2.38%) as C. guilliermondii and 3 (1.42%) were identified as C. kefyr.

Speciation of candida isolates depending on morphology on corn meal agar is shown in Table 2

Table 2 shows that, depending on morphology on corn meal agar, 118 (56.19%) candida isolates were identified as C. albicans, 52 (24.76%) as C. tropicalis, 13 (6.19%) as C. glabrata, 12 (5.72%) as C. guilliermondii, 06 (02.85%) as C. krusei, 05 (02.38%) as C. kefyr and 04 (01.91%) as C. parapsilosis.

Results of CHROM agar for speciation of candida isolates are shown in Table 3.

Table 3 shows speciation of all candida isolates by CHROM agar. Out of 210 candida isolates, 121 (57.61%) were identified as C. albicans, 54(25.71%) as C. tropicalis, 11 (5.23%) as C. glabrata, 08 (3.80%) as C. krusei, 07 (3.33%) as C. parapsilosis, 05 (2.38%) as C. guilliermondii and 04 (1.94%) were identified as C. kefyr. Sugar assimilation test is considered as a gold standard and other tests were compared with it.

Out of 210 candida isolates, sugar assimilation test identified 125 (59.52%) isolates as C. albicans and remaining 85 (40.47%) as non-albicans candida species. In contrast, germ tube test identified 118 (56.19%) isolates as C. albicans and 92 (43.81%) as non-albicans candida species.

Results of sugar assimilation test and corn meal agar were compared. Sugar assimilation test identified 125 (59.52%) isolates as C. albicans, while corn meal agar identified 118 (56.19%) isolates as C. albicans. 50 (23.84%) strains of C. tropicalis were identified by sugar assimilation test and 52 (24.76%) strains by corn meal agar test. Sugar assimilation test and corn meal agar both identified 13 (06.19%) strains as C. glabrata. The results of both the tests differed in few strains of C. krusei, C. parapsilosis, C. guilliermondii and C. kefyr for identification.

Comparison of results of sugar assimilation test and CHROM agar are shown in Table 4.

Out of 210 candida isolates, sugar assimilation test and CHROM agar agree for species identification of 189 (90.00%) isolates. Species of 21 (10.00%) candida isolates were wrongly identified by CHROM agar. They include 5 isolates of C. albicans, 9 C. tropicalis, 2 C. glabrata, 3 C. parapsilosis and each isolate of C. guilliermondii C. kefyr.

Table 1. Results of Sugar assimilation test

Candida species	No. of Isolates (%)
C. albicans	125 (59.52)
C. tropicalis	50 (23.84)
C. glabrata	13 (06.19)
C. krusei	08 (03.80)
C. parapsilosis	06 (02.85)
C. guilliermondii	05 (02.38)
C. kefyr	03 (01.42)
Total	**210 (100)**

Table 2. Speciation of candida isolates by corn meal agar

Candida species	No. of Isolates (%)
C. albicans	118 (56.19)
C. tropicalis	52 (24.76)
C. glabrata	13 (06.19)
C. guilliermondii	12 (05.72)
C. krusei	06 (02.85)
C. kefyr	05 (02.38)
C. parapsilosis	04 (01.91)
Total	**210 (100)**

Table 3. Results on CHROM agar

Candida species	No. of Isolates (%)
C. albicans	121 (57.61)
C. tropicalis	54 (25.71)
C. glabrata	11 (05.23)
C. krusei	08 (03.80)
C. parapsilosis	07 (03.33)
C. guilliermondii	05 (02.38)
C. kefyr	04 (01.94)
Total	**210 (100)**

Table 4. Comparison of sugar assimilation test and CHROM agar (n=210)

Candida species	Sugar assimilation +ve and CHROM agar +ve	Sugar assimilation +ve and CHROM agar -ve	Sugar assimilation -ve and CHROM agar +ve
C. albicans	116	09	05
C. tropicalis	45	05	09
C. glabrata	09	04	02
C. krusei	08	00	00
C. parapsilosis	04	02	03
C. guilliermondii	04	01	01
C. kefyr	03	00	01
Total	**189**	**21**	**21**

CONCLUSION

Over some decades, there is much advancement in medical field. Accompanying these; there has been increase in the variety of opportunistic infections caused by relatively avirulent organisms. Critically ill patients in medicine intensive care unit (MICU) and surgical intensive care unit (SICU) have been primary targets for opportunistic fungal infections particularly due to candida species. Out of 210 candida isolates, 125 (59.52%) were identified as C. albicans, 50 (23.84%) as C. tropicalis, 13 (6.19%) as C. glabrata, 8 (3.80%) as C. krusei, 6 (2.85%) as C. parapsilosis, 5 (2.38%) as C. guilliermondii and 3 (1.42%) were identified as C. kefyr. Depending on morphology on corn meal agar, 118 (56.19%) candida isolates were identified as C. albicans, 52 (24.76%) as C. tropicalis, 13 (6.19%) as C. glabrata, 12 (5.72%) as C. guilliermondii, 06 (02.85%) as C. krusei, 05 (02.38%) as C. kefyr and 04 (01.91%) as C. parapsilosis. Out of 210 candida isolates, sugar assimilation test identified 125 (59.52%) isolates as C. albicans and remaining 85 (40.47%) as non-albicans candida species. In contrast, germ tube test identified 118 (56.19%) isolates as C. albicans and 92 (43.81%) as non-albicans candida species. Out of 210 candida isolates, sugar assimilation test and CHROM agar agree for species identification of 189 (90.00%) isolates. Species of 21 (10.00%) candida isolates were wrongly identified by CHROM agar. They include 5 isolates of C. albicans, 9 C. tropicalis, 2 C. glabrata, 3 C. parapsilosis and each isolate of C. guilliermondii C. kefyr.

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