ORIGINAL RESEARCH PAPER

Medical Microbiology

PREVALENCE OF MYCOTIC INFECTIONS IN A TERTIARY CARE CENTER IN HADOTI REGION OF SOUTHEASTERN RAJASTHAN: A RETROSPECTIVE 3 YEAR ANALYSIS

KEY WORDS: Fungal infections, non-albicans Candida, Aspergillus flavus, immunocompromised

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ABSTRACT

Back ground: Fungal infections are on a rise in recent years and they are a major cause of morbidity and mortality in immunocompromised and hospitalized patients. Patients with uncontrolled diabetes mellitus, organ transplant, use of invasive devices and broad spectrum antimicrobial agents are common risk factors. **Objective:** A retrospective analysis for a period of three years was undertaken to know the prevalence of common fungal infections in a tertiary care hospital in Hadoti Region of Southeastern Rajasthan. **Materials And Methods:** Clinical samples were collected from patients presenting with suspected fungal infections and were processed in microbiology laboratory Government Medical College Kota, Rajasthan, India. Direct microscopy was done with 10% KOH to visualize the presence of fungal elements and Gram staining was done for any suspected yeast infection. Nigrosin stain was done for cerebrospinal fluid. The samples were inoculated on Sabouraud's Dextrose Agar and kept at 22°C and 37°C. **Results:** A total of 735 samples with suspected fungal aetiology were included in the study out of which 176 were found to be positve. Maximum isolates were obtained from adults (78.98%). Males (59.10%) were more affected than females (40.90%). There were 176 isolates of which 02 were yeast, 72 were yeast-like fungi, and 102 were mould fungi. Dermatophytes (27.84%), C. albicans (24.43%) and non albicans Candida (15.34%) were the predominant fungal isolates. **Conclusion:** The predominant isolate obtained in this study were dermatophytes and Candida sp. The predominance of dermatophytes may be due to rural and agricultural background of most patients. An increase in fungal infections may also be due to an increase in the number of immunocompromised patients like AIDS, cancer and other critical illnesses in our hospital.

INTRODUCTION

Over the past few years, the incidence rate of mycotic infections has increased globally [1] especially in healthcare settings [2]. Mycotic infections range from superficial nail, skin or mucosal infections to other serious fungal diseases, which are responsible for increased morbidity and mortality [3]. Fungal isolates which were once considered as laboratory or environmental contaminants are now emerging as major pathogens. Some reasons for this are the emergence may be acquired immunodeficiency syndrome, increased incidence of diabetes mellitus, organ transplantation, chemotherapy and misuse/overuse of antimicrobials. The global burden of fungal disease has been estimated to be over 5.7 billion people (more than 80% of the world's population) [4].

Therefore, this retrospective study was undertaken to find out the prevalence of fungal infections and characterise the common fungal species isolated in this tertiary care center of Hadoti Region. This will help to find out magnitude of this problem and determine its burden on our healthcare system.

MATERIAL AND METHOD

A retrospective study was conducted in Department of Microbiology Government Medical College, Kota, Rajasthan from April 1, 2022 to March 31, 2025 to find the prevalence of fungal infections. All clinical specimens suspected of fungal infections sent to the Department of Microbiology for KOH mount, Nigrosin staining and fungal culture during this period were included in the study. These included OPD and IPD patients from Medicine, Gynaecology, Oncology and Skin Departments.

Nail clippings, hair and skin were obtained after cleaning the area with 70% alcohol and collected in sterile paper and sent to the laboratory. Sterile body fluids, tissues, pus, mucosal and vaginal swabs and urine were collected aseptically and transported in sterile containers or syringe. Sputum was collected and transported in sterile universal containers. Samples were examined by preparing wet mounts or by KOH mount. For examination of cerebrospinal fluid (CSF), Nigrosin stain and Gram stain were used. The samples were inoculated into two tubes of Sabouraud's dextrose agar and incubated at room temperature and 37°C. The tubes were examined on alternate days for the first 2 weeks and then twice weekly for the next 2 weeks. Isolates were identified based on the morphological details, the rate of growth, colour, texture and pigmentation of obverse and reverse. Microscopy of the growth was done using lactophenol cotton blue mount. Yeast isolates were identified by Gram stain, germ tube test and morphology on cornmeal agar. Hichrome yeast agar was also used for Candida isolates.

RESULTS

A total of 735 samples were collected from various departments were included in this study. Fungal isolates were obtained from 176 (24%) samples. The rest of the (559, i.e., 76%) samples were sterile [Table 1]. Rate of isolation was more in males and adults [Tables 2 and 3]. The highest rate of isolation was from skin/hair/nail (48.86%). This was followed by sputum (23.86%), body fluids/pus/tissue/mucosal & vaginal swabs (13.64%), urine (10.23%), blood (2.28%) and CSF (1.14%) [Table 4]. Among the isolates, 102(57.96%) were moulds, 72 (40.90%) were yeast-like fungi, and 2 (1.14%) were yeast (Cryptococcus neoformans). Dimorphic fungi were not isolated in this study [Table 5]. Yeast-like isolates included non-albicans. Candida and Trichosporon species. Trichophyton sp (25%) was most common isolate followed by Candida albicans (24.43%). Exophiala spp. was isolated from

a mycetoma case and Trichosporon species from urine. C. neoformans was isolated from CSF of two HIV patients. Among moulds, the most common was Trichophyton sp (25%) from skin/ hair/nail followed by Aspergillus flavus (9.66%). [Table 6].

Table 1 Distribution Of Total Samples

Total Number	Culture Positive	Culture Sterile
735	176 (24%)	559 (76%)

Table 2 Sex-wise Analysis

Gender	Number of samples	Number of isolates
Male	475 (64.63%)	104 (59.10%)
Female	260 (35.37%)	72 (40.90%)
Total	735	176

Table 3 Age-wise Distribution

Age Group	Total samples	No. of Isolates
Neonates (0-28 days)	10 (1.36%)	2 (1.14%)
Paediatric (29 days -18 yrs)	50 (6.81 %)	15 (8.52%)
Adults (up to 60 yrs)	590 (80.27%)	139 (78.98%)
Geriatrics (> 60 yrs)	85 (11.56%)	20 (11.36%)
Total	735	176

Table 4 Distribution Of Fungal Isolates From Various Samples

Samples	Blood	CSF	Body fluids/ pus/tissue/mucosal & vaginal swabs	Skin/ hair/nail	urine	sputum	Total
Fungal positivity	04 (2.28 %)	02 (1.14 %)	24 (13.64%)	86 (48.86 %)	18 (10.23 %)	42 (23.86 %)	176

Table 5 Number Of Fungal Isolates

Isolates	Number (%)
Moulds	102 (57.96%)
Yeast like fungi	72 (40.90%)
Yeast	02 (1.14%)
Dimorphic fungi	00 (0 %)
Total	176

Table 6 Spectrum Of Isolates Among Various Samples

Organisms	Blood	CSF	Body fluids/pus/tissue/mucosal & vaginal swabs	Skin/ hair/ nail	urine	sputum	Total
C. albicans	04		05	07	13	14	43 (24.43%)
Non-albicans Candida			04	05	11	07	27 (15.34%)
Trichosporon					02		02(1.14%)
Cryptococcus		02					02(1.14%)
A.flavus			02	10		05	17(9.66%)
A. fumigatus			02	08		03	13(7.39%)
A.terreus				04			04(2.27%)
Zygomycetes			01			12	13(7.39%)
Alternaria			05				05(2.84%)
Trichophyton sp				44			44(25%)
Microsporum sp.				05			05(2.84%)
Exophiala			01				01(0.57%)
Total	04	02	24	86	18	42	176

DISCUSSION

Fungal infections are mostly insidious and their diagnosis is often delayed due to co-existing illnesses.[5] We received a total of 735 samples in our laboratory out of which 176 were culture positive. Adults were mostly affected. This correlates with the studies done by Aggarwal et al [6] and Nawal et al [7]. A total of 86 (48.86%) cases were clinically diagnosed to have superficial fungal infection, which was also common in adults, as this is the age of maximum outdoor activity and agricultural background of people in this region of Rajasthan. In this study, the prevalence of dermatomycoses was 27.84%. Skin was the commonest site of superficial infection, followed by nail and hair. Among which Trichophyton sp (25%) was more common isolate. Similar findings were observed in the study by Mishra et al [8] and Goldstein et al [9]. C. albicans (24.43%) and non albicans Candida (15.34%) were next common isolates especially in critically ill and immunocompromised patients. This was similar to study done by Perlroth J et al [10]. In this study, C. neoformans was isolated from two CSF sample. The patients were HIV positive. Cryptococcal meningitis is known to be commonly associated with immunocompromised patients.[11]

CONCLUSION

Since therapeutic options are different for different types of fungal species and intrinsic resistance is common among Candida species, identification of fungal species is necessary to limit the drug resistance among the fungus. The present study highlights the importance of giving special consideration to mycotic infections in patients with chronic illnesses and immunocompromised status to protect them from serious infections.

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