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MYCOLOGICAL STUDY OF VARIOUS PULMONARY INFECTIONS IN DIABETIC PATIENTS.

Microbiology

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ABSTRACT

AIM: To isolate and identify the fungal isolates from various clinically diagnosed cases of pulmonary infections with history of diabetes mellitus.
MATERIAL AND METHODS: Sputum samples from various clinically diagnosed cases of pulmonary infections with history of diabetes mellitus were studied for fungal isolates. Samples were tested in the laboratory for fungus by potassium hydroxide preparation (KOH preparation) and fungal culture.
RESULTS: Out of the total of 100 sputum samples , sixty two samples (62%) were positive for fungus. Out of these positive samples, Aspergillus species (50%) was found to be the commonest isolate followed by Candida species (38.7%), Rhizopus species (9.7%) and Mucor species (1.6%).
CONCLUSION: Following Aspergillus species and Candida species, the third leading fungal isolate in various pulmonary infections is Rhizopus species, especially in diabetic patients. Mycological examination aids in the diagnosis of various pulmonary infections for their effective management.

KEYWORDS

Pulmonary Infections, Fungal Isolates, Diabetes Mellitus

INTRODUCTION

Besides the pulmonary infections of bacterial origin, fungal isolates are also commonly observed more often in patients admitted in the hospital. Among the immuno-compromised patients, the most common fungus causing infection is the Candida species. The most common cause of pulmonary infections is still Aspergillus species, but there has been a rise in infections due to other fungi, namely Mucor and Rhizopus. The infection caused by these fungal species is known as Mucormycosis (previously called zygomycosis). Various risk factors are associated with it like a central venous catheter, diabetes mellitus, receiving parenteral nutrition, broad-spectrum antibiotics or post surgical procedure or hemodialysis.

MATERIAL AND METHODS

The study was conducted on 100 sputum samples received from various clinically diagnosed cases of pulmonary infections with history of diabetes mellitus and admitted in the in-patient department of Medicine, Adesh Medical College and Hospital, Haryana. The samples were collected aseptically and transported immediately to the microbiology laboratory and processed for the isolation of fungus. Samples were tested in the laboratory for examination of fungus by potassium hydroxide preparation (KOH preparation) and fungal culture.

Potassium hydroxide preparation of sputum specimens which showed budding yeast cells were suggestive of Candida species. The septate hyaline hyphae of filamentous fungi seen suggested *Aspergillus species.* Specimens showing many broad, aseptate fungal hyphae with right-angle branching were suggestive of Rhizopus species.

Fungal culture was done and the culture plates were examined for fungal growth on Sabouraud dextrose agar. The isolates were identified by macroscopic and microscopic morphological characteristics using the standard methods[1].

The yeast isolates were identified on the basis of colony characteristics and further by germ tube production, morphology on corn meal agar (HiMedia), HiCrome Candida agar (HiMedia), urease test, carbohydrate fermentation tests and assimilation tests using yeast nitrogen base agar (HiMedia). Moulds were identified on the basis of colony characteristics on Sabouraud dextrose agar and morphology on lactophenol cotton blue preparation. Identification of all the fungal isolates was confirmed by Vitek 2 (automated culture).

RESULTS

Out of total 100 sputum samples of diabetic patients suffering from various pulmonary infections, sixty two samples (62%) were positive for fungus in direct microscopy and culture. Out of sixty two positive samples, Aspergillus species (50%) was found to be the commonest isolate as shown in Table 1. This was followed by Candida species (38.7%), Rhizopus species (9.7%) and Mucor species (1.6%).

Our study showed that there were 12 Candida albicans isolates. Among the Non-albicans Candida, there were 3 isolates of C. dubliniensis, 2 isolates of C. glabrata, 4 isolates of C. parapsilosis and 1 isolate of C. tropicalis. It was found that 7 isolates were of Rhizopus oryzae and 1 isolate was of Rhizopus microsporeus.

Table1: Percentage of various fungal isolates in 62 culture positive cases

Organisms	Number of samples	Percentage
Aspergillus fumigatus	16	25.8
Aspergillus flavus	9	14.5
Aspergillus niger	6	9.7
Candida albicans	14	22.6
Candida dubliniensis	3	4.8
Candida glabrata	2	3.2
Candida parapsilosis	4	6.5
Candida tropicalis	1	1.6
Rhizopus oryzae	5	8.1
Rhizopus microsporeus	1	1.6
Mucor species	1	1.6

DISCUSSION

The main risk factors behind fungal infections are immunosuppressive conditions like diabetes mellitus, haematological malignant disorders and a prolonged steroid treatment. Diabetic patients have suppressed immunity due to excessive accumulation of sugar and thus are more prone to fungal infections. Following Aspergillus species and Candida species, the third leading cause of invasive fungal infections are members of the order mucorales. The most frequently isolated species are Rhizopus oryzae, Rhizopus microsporeus and Absidia corymbifera[2].

Among different categories of zygomycosis, the most commonly occurring is the rhino-orbital-cerebral type which is succeeded by Pulmonary zygomycosis with common presenting symptoms like productive cough, increase in body temperature and pleuritic chest pain and it has been mostly associated with a predisposing determinant[3]. Radiological diagnosis is supportive and chest radiographs show involvement of the upper part of the chest in nearly half of the patients[4].

Antifungal drugs should be included in the routine drugs of diabetic patients. Early screening of the patients is important in the control and management of the infection. Mostly patients respond well to the anti fungal treatment like Amphotericin B etc.

CONCLUSION

Patients who are critical and do not respond to even high end antibiotics must be suspected and detected for fungal infections.

Timely diagnosis is very essential for the start of antifungal treatment. It helps in curing the systemic fungal infections which otherwise may prove to be fatal.

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