A Study Of Opportunistic Mycosis In Pulmonary Diseases In A Tertiary Care Hospital

Dr S.Krishnamurthy, Dr. Khalid Rashid, Dr Kausar Fatemi, Dr T.Sabarinathan
Associate Professor, CAIMS,Bommakal,Karimnagar

Abstract : **Background and Objectives**: Opportunistic mycotic infection in pre-existing lung diseases like tuberculosis, lung abscess, COPD are overlooked by chest physicians due to the paucity of mycological investigation facilities. **Methods** : one hundred and fifty sputum samples were studied for opportunistic mycotic infections from inpatients of pulmonary disease in a tertiary care hospital. Sputum were subjected to Gram's staining and culture on SDA with Chloramphenicol. **Results:** 99 fungal isolates were recovered from these samples. Out of these 99 fungal isolates 56(56.57%) were Candida species and 43(43.43%) were of Aspergillus species, of these Candida albicans was the predominant isolate followed by Candida tropicalis. **Conclusion:** Aspergillus fumigatus was the predominant isolate among Aspergillus species. [Krishnamurthy S et al NJIRM 2013; 4(6) : 88-90]

Key Words: opportunistic infection, mycosis, pulmonary

Author for correspondence: Dr. S. Krishanamurthy, CAIMS, Bommakal, Karimnagar
Email: drkhalid74@rediffmail.com

Introduction: Spores of opportunistic fungi are ubiquitous in nature. Saprophytic fungi grows well in many habitats and are commonly found on stored hay or grain, decaying vegetation, soil, dung and various organic debris. Inhalation of spores probably occurs regularly although disease is uncommon. Direct transmission from person to person does not occur[1].

The immune status of the host is usually the most important determinant of opportunistic mycotic infections rather than intensity of exposure to the fungal spores. The opportunistic mycotic infections of lung are more common in a) Pulmonary disease due to tissue destruction like tuberculosis, lung abscess, cystic disease of lung, chronic obstructive pulmonary diseases which comprises of chronic bronchitis, bronchiectasis, Asthma and emphysema[2] b) Immunosuppression either by disease or drug induced c) Diabetes mellitus[3]. The common opportunistic fungi which cause pulmonary mycosis are divided into two groups (a) Endogenous mycosis caused by Candida species especially Candida albicans[4](b) Exogenous mycosis caused by inhalation of spores of Aspergillus species, Rhizopus species, Penicillium species.

By themselves pulmonary mycosis are not grossly damaging, but where superimposed on pre-existing lung diseases there impact on the morbidity and mortality patterns renders them vitally important. Fungus is usually not looked for by most chest physicians as one of the etiological possibilities, partly because facilities for special mycological investigation are lacking[5]. Hence the present study is attempted to establish mycotic etiology in pre-existing lung disease by laboratory diagnostic procedures so that it can offer valuable information to the clinician in deciding the management of such cases.

Material And Methods: The present study of "Opportunistic mycosis in chronic pulmonary infections" was undertaken on in-patients at Institute of tuberculosis and chest disease hospital, Hanamkonda and Mahatma Gandhi memorial hospital, Warangal. Ethical clearance from institutional ethical committeewas taken up for this study and informed consent was taken up from each patient. A detailed case history was recorded regarding the age, sex, occupation, presenting history, duration of illness and use of any antibiotics, steroids, cytotoxic drugs and immunosuppression. Past history of any diabetes, HIV/AIDS, and malignancy was taken.

Selection of cases: For convenience of study and discussion cases were divided into pulmonary tuberculosis, lung abscess, cystic diseases of lung and Chronic pulmonary diseases. Sputum were obtained from the patients in a clean sterile, wide mouthed, screw capped glass bottle, in early morning, after vigorously washing the mouth with plain water and after a bout of cough. The sputum smeared on clean glass slide was stained by Gram's method and presence of yeast, yeast like, filamentous fungi was noted. Isolation was perfomed by inoculation in Sabourad's dextrose agar media with Chloramphenicol (50mg per ml).

One medium was incubated at 37^0c and other at room temperature for 24-72 hrs. Cultures were incubated for 7-10 days before discarding it. Indentification and speciation was done by Germ tube production (Renolds- Braude Phenomenon)[6], Chlamydospore production, Biochemical sugar fermentation test. Identification and speciation of Aspergillus species was done by macroscopic characteristics of colony[7], Microscopic morphology with Lactophenol cotton blue, slide culture method.

Results: A total number of 150 sputum were collected from patients of chronic pulmonary infection to know the incidence of opportunistic fungi. The number of sputum positive for fungi was 99(66%). Out of total 150 patients 114(76%) are males, 36(24%) were female and male to female ratio was 3:1 out of 99 fungal isolates 56(56.57%) were candida species and 43(43.43%) were Aspergillus species.

Table 1: The age wise incidence of opportunistic fungi

Sr	Age group (yrs)	Total no of Samples	No of positive for fungi	Opportunistic fungal isolated	
				Candida	Aspergillus
1	0-20	18	7	2(28.57%)	5(71.5%)
2	21-40	72	50	28(56%)	22(44%)
3	41-60	49	35	22(63%)	13(37%)
4	>60	11	7	4(57%)	3(43%)

Of 56 Candida species isolated Candida albicans predominated with 47(83.93%) isolates followed by Candida tropicalis with 9(16.07%). Relative incidence of various Aspergillus species is shown in table 4.

Table:2: The incidence of opportunistic fungi in chronic pulmonary disease

Sr	Clinical groups	No of sputum collected	No of sputum positive	Percentage
1	Pulmonary tuberculosis	84	61	72.62%
2	Lung abscess	17	12	70.58%
3	COPD	49	26	53.06%

Discussion: Association of opportunistic fungi with chronic broncho-pulmonary diseases was well reported in literature. Gopakrishnaet al[8]reported 57 fungal isolated out of 100 sputum examined, B K Gupta et al[9] reported 87 fungal isolate in 160 sputum examined. In our study out of 150 sputum 99 fungal isolates were isolated. The present study showed male sex predominance of about (3:1), this was also observed by Shivananda G[10].

Table:3: The incidence of opportunistic fungi in chronic pulmonary disease

Sr	Clinical group	No of sputum positive	No of sputum positive	Candida species	Aspergillus species
1	Pulmonary tuberculosis	84	61	33(54.1%)	28(45.1%)
2	Lung abscess	17	12	10(83.33%	2(16.67%)
3	COPD	49	26	13(50%)	13(50%)

Table 4: Relative incidence of various Aspergillus species

Total no of sputum	No of positive for fungi	Aspergillus (Total isolates)	Aspergillusfumigatus	Aspergillusniger	Aspergillus flavus	Aspergillusterreus
150	99	43(43.43%)	19(44.19%)	18(41.86%)	4(9.3%)	2(4.6%)

Shivananda G[10]reported more number of cases in patients between 35 to 64 years age group. Anna L Njundaet al[11] reported 73.5% case in age group of 21-50 years. In the present study higher incidence was noticed among people in the age group of 21-60 years. This could be due to the fact that tuberculosis is more prevalent in this age groups. Gopikrishna et al[8] reported fungi in 72% cases of pulmonary tuberculosis , 45% in suppurative lung diseases and 33% in COPD , B K Gupta et al[9] reported fungi in 58% cases of pulmonary tuberculosis, 83% in lung abscess and 34.7% in COPD. In our study a 72.62% isolates of fungi was isolated from pulmonary tuberculosis, 70.50% in lung abscess and 53.06% in COPD. Of Candida sp most of the workers reported a predominance of Candida albicans followed by Candida

tropicalis[8,9,12]. Our study is in line with most workers. However Anna L Njundaet al[11] reported C.tropicalis 7.5% as predominant isolate followed by C.krusei 7.5% and C.albicans 6%. Of 160 sputum studied 43(43.43%) isolates were Aspergillus species. Among Aspergillus species Shivanandanet al[10] reported Aspergillusfumigatus 29.23% as commonest isolate followed by Aspergillusniger 6.4%, Aspergillusflavus 4.61%. in the present study Aspergillusfumigatus 44.19% was the predominant isolate followed by Aspergillusniger 41.86%, Aspergillusflavus 9.3%. The predominace of Aspergillusfumigatus in the sputum correlates well with similar studiesAnna LNjunda et al[11] and Kurhade et al[13].

Conclusion: 150 patients with chronic chest infection for more than three months admitted into a tertiary referral hospital were examined for pulmonary mycosis. Morning sputum samples were collected from these patients among 99 fungal isolates 56 were Candida species and 43 were Aspergillus species. Incidence was highest 66% in case of pulmonary tuberculosis.Among Candida species Candida albicans and among Aspergillus species Aspergillusfumigatus was predominant isolate.

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