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"CLINICOPATHOLOGICAL ANALYSIS OF SPECTRUM OF FUNGAL INFECTIONS (MYCOSIS) IN A TERTIARY CARE HOSPITAL"

Pathology

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ABSTRACT

Context (Background): Fungal infections also known as mycosis have a worldwide distribution. These are commonly seen in immunocompromised patients and in immunocompetent patients with history of trauma. Fungal infections are traditionally divided into superficial, subcutaneous, and systemic infection basing on the body part affected. Due to tropical climate Asia has high incidence of fungal infections. **Aims:** The aim of this study was to analyze of the clinicopathological characteristics of various fungal infections basing on their histomorphological features and their distribution according to age, sex & site of involvement. **Settings and Design:** This was a retrospective study done over a period of 4 years at a tertiary hospital. **Materials And Methods:** In this study we have analyzed spectrum of fungal infections in a tertiary care hospital basing on histomorphological characteristics. All the surgical specimens received were examined grossly, sections taken and histological slides were made stained with hematoxylin & eosin stain and PAS stain. **Statistical Analysis:** All the data were analyzed by using SPSS version 20.0 **Result:** A total of 45 cases studied which showed most common organism as Phaeohyphomycosis. **Discussion and Conclusion:** In recent years the rate of fungal infection is increasingly seen in immunocompetent adults also. For better management of the patients accurate diagnosis of the etiologic agent is very important for which histopathology serves as a rapid and cost effective tool.

KEYWORDS

Fungal Infections, Histomorphology, Phaehyphomycosis.

INTRODUCTION :

Mycosis is a disease caused by fungi. [1, 2] Different types of mycosis (fungal infections) are traditionally divided according to the part of the body affected such as:- Superficial, subcutaneous and systemic. [3,4]. Superficial fungal infections include common tinea of the skin and yeast infections such as pityriasis versicolor. [5] Subcutaneous types include eumycetoma, chromoblastomycosis and Phaeohyphomycosis [5,6] . Systemic fungal infections are more serious which include cryptococcosis, histoplasmosis, pneumocystis, aspergillosis and Mucor mycosis. [3]

Fungal infections have a worldwide distribution affecting more than one billion people every year. [7]

Fungal infections are more likely to occur in immunocompromised persons and in immunocompetent adults with history of trauma. [8] As cited in the literature of various case series it has been seen increasing cases of fungal infections in immunocompetent adults without history trauma.[9]

Due to tropical climate South Asia has a high incidence of fungal infections. There are very few studies in the literatures describing the clinicopathological features of fungal infections.

The aim of this study was to analyze of the clinicopathological characteristics of various fungal infections basing on their histomorphological features and their distribution according to age, sex & site of involvement.

MATERIALS AND METHODS :

Study design, duration and place of study – This was a retrospective study done over a period of 4 years from 2019 Jan to 2023 Jan in the department of pathology of a tertiary care hospital of West Bengal.

Clinicopathological features of fungal infections were analyzed retrospectively by histomorphology and clinical presentations. All the clinical details including age, sex, history of trauma, associated co-morbid conditions leading to weak immunity, occupation and demographic data all were obtained from the clinical records. Detailed clinical examination findings such as site involved and presenting complaint also were noted.

All the surgical specimens received were examined grossly, sections were taken and routine histopathological processing done. The slides were stained with Hematoxylin and Eosin. Special stain such as PAS (Periodic Acid Schiff) stain also used.

Inclusion Criteria –
All the histopathogical specimens diagnosed as of fungal infections were included in the study.

Exclusion Criteria –
Surgical specimen obtained by autopsy and specimens from COVID-19 patients were excluded from the study.

Ethical Clearance –
The study was approved by the Institutional Ethics Committee (IEC).

Statistical Analyses –
was done by software SPSS version 20.0. All the data were represented as number and percentage.

RESULT:

A total of 45 cases of fungal infections were studied over the period of 4 years. In our study fungal infections commonly affected in the age group of 51-70 years with a male predominance. History of trauma was present in 27 cases. Out of the co-morbid conditions Diabetes was seen most commonly (Table-1). The most common site of infection was foot (Table-2).The most common organism identified was phaeohyphomycosis (Table-3).Comparison with other studies was given in Table-4.

Table -1 Age & Sex of the patients, history of trauma and associated co-morbid conditions. n=45

		Number of cases	Percentage (%)
A.	Age (Years)		
	11-30	5	11.11%
	31-50	11	24.44%
	51-70	29	64.44%
B.	Sex		
	Male	32	71.11%
	Female	13	28.8 %

C.	History of Trauma		
	Yes	27	60 %
	No	18	40 %
D.	Associated Co-morbid conditions:		
	Diabetes	18	40 %
	Steroid Use	7	15.5 %
	Chemotherapy	3	6.66 %
	Organ Transplantation	2	4.44 %
	None	13	28.8 %
	HIV/AIDS	2	4.44 %

Table -2 Different site of involvement and clinical presentations n=45

	Sites of involvement	Number of cases	Percentage(%)
A.	CNS	2	4.44 %
	Nasal Cavity	6	13.33 %
	Maxilla	1	2.22 %
	Forearm	5	11.11 %
	Wrist	3	6.66 %
	Hand	9	20 %
	Leg	3	6.66%
	Ankle	2	4.44%
	Foot	14	31.11%
B.	Provisional Clinical Diagnosis		
	Sebaceous cyst	2	4.44 %
	Ganglion	11	24.44 %
	Dermoid cyst	4	8.88 %
	Abscess	7	15.5 %
	Soft tissue swelling	3	6.66 %
	Lipoma	2	4.44 %
	Dermatophytosis	4	8.88 %
	Nasal polyp	6	13.33 %

Table -3 Histopathological diagnosis n=45

	Frequency	Percentage(%)
Phaeohyphomycosis	13	28.8 %
Candida	9	20%
Eumycotic mycetoma	7	15.5%
Rhinosporidiosis	6	13.33 %
Dermatophytosis	4	8.88 %
Aspergillosis	3	6.66%
Mucor mycosis	2	4.44%
Cryptococcosis	1	2.22%

Table -4 Comparison with other studies in the literature

	Our study	Muniyappa Usha et al 10	Sidhaling reddy et al 11	M. Sridevi et al 12
Sex	M > F	M > F	M > F	M > F
Age	10-70 years	10-70 years	10-60 years	10-80 years
Common site	Foot	Maxillary sinus	Nasal cavity	Foot
Common histopathological diagnosis	Phaeohyphomycosis	Mucor mycosis	Rhinosporidiosis	Phaeohyphomycosis

DISCUSSION:

Fungal infections have a worldwide distribution with an estimated 1.7 million deaths reported in 2020. [13]

Diagnosis is generally based on signs and symptoms, microscopy, culture, histopathological examination and with the aid of medical imaging. [3] Out of this histopathology is a reliable method of identification, because microbiological examination cannot differentiate contamination from pathogenic fungi & some fungi cannot be cultured. Guarner & Brandt et al [14] have shown the difficulties in differentiating colonization & contamination of fungi.

In our study a total of 45 cases of fungal infections were analyzed over a period of 4 years. In this retrospective study all histopathological specimens which were diagnosed with fungal infections were categorized according age, sex, associated comorbid conditions, sites of involvement, clinical presentation and histopathological diagnosis.
In our study there was male predominance with a wide range of age group presentation. This was similar to the study by Muniyappa USha et al. [10] Most common site of infection was foot which was similar to the study by M. Sridevi et al. [12] Cultures are considered as the gold standard for the identification of etiologic agents but at times they may not be available or Positive. [15] In this scenario histopathology is important for accurate diagnosis of the etiologic agent.

In our study the most common histopathological diagnosis was Phaeohyphomycosis similar to the study by M. Sridevi et al. [12] Out of 45 cases it was diagnosed in 13 cases.

Phaehyphomycosis is an infection caused by phaeoid/dematiaceous or darkly pigmented fungi which have melanin in their cell wall. [17]In tissue sections they appear as brown/black in Hematoxylin & Eosin staining. (Fig 5) It causes wide variety of superficial, cutaneous, subcutaneous or systemic infections. [18] Fungal melanin is considered to be the virulence factor. The main differential diagnosis is chromoblastomycosis which is characterized by presence of golden-brown round bodies known as copper penny structures. These infections are life threatening especially in immunocompromised patients. [19] Clinically most commonly they are diagnosed as ganglion cyst or sebaceous cyst.

The next common fungal infection diagnosed was candida (9/45). (Fig 2&3) Candida can cause either superficial or deep invasive systemic infections especially in immunocompromised patients. In India recently the most commonly diagnosed species is candida tropicalis. [20]

Histopathology shows yeast forms intermingled with Pseudo hyphae. Invasion of tissues and blood vessels indicates invasive candidiasis which helps in differentiating from colonization. [21]

We had 7 cases of Madura mycosis (Eumycotic mycetoma) (Fig - 1). Eumycotic mycetoma is diagnosed as pigmented brown to black grains composed of micro-colonies of fungi.

We had 3 cases of aspergillosis. There are characterized by thin acute-angled dichotomous branched septate hyphae. (Fig- 4) Infection by aspergillus comprises three entities allergic bronchopulmonary aspergillosis (ABPA), chronic pulmonary aspergillosis/aspergilloma and invasive or systemic aspergillosis. [21] The most common differential diagnosis is Mucor mycosis which is characterized by irregular broad hyphae branched at right angle. Hyphae are folded and non-septate. It is commonly seen in immunocompromised patients and rare in immunocompetent adults.

We had 6 cases of Rhinosporidiosis which presented clinically as nasal polypoid tumor. They are diagnosed by round sporangium with endospores. This was in contrast to the study by sidhaling reddy et at [11] which showed Rhinosporiodiosis was the most commonly identified species.

We had 4 cases of dermatophytes which is characterizes by branched septate hyphae with spores that invade the stratum corneum, hair follicles, hair shafts and nails. These fungi are associated with severe neutrophilic inflammation of hair follicles or severe mononuclear inflammation in the form of Majocchi's granuloma .[21]

One case of cryptococcosis was diagnosed which is characterized by variably sized encapsulated yeasts with narrow based budding. The patient presented clinically with features of meningitis.

CONCLUSION:

In recent years the incidence of fungal infection is increasing in immunocompetent adults. The histopathological examination of the fungal infection provides prompt and accurate diagnosis and remains the only reliable means to identify certain fungal species. Since the invitro susceptibility to anti-fungal agents of different species are variable. Accurate diagnosis of the etiologic agent is very important for which histopathology serves as a rapid and cost-effective tool.

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Contribution Of Authors: All authors having equal contribution.

Conflicts Of Interest: None.

Financial Support: Nil

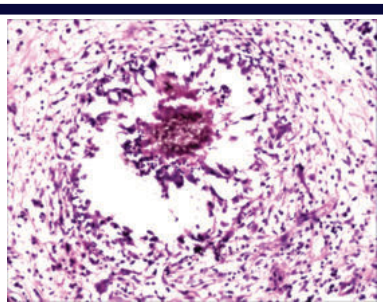

Fig 1: showing granulomatous lesions of eumycotic mycetoma (H&E,100X)

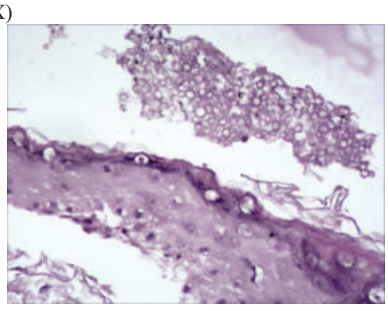

Fig 2- showing candida infection of mastoid cavity (H&E,100X)

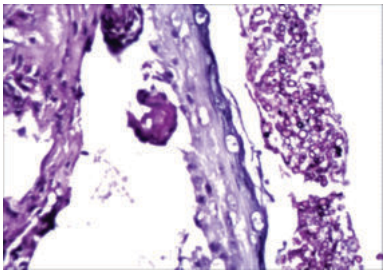

Fig 3- showing candida infection of mastoid cavity (PAS,100X)

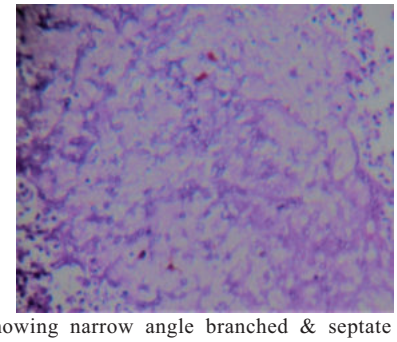

Fig- 4 showing narrow angle branched & septate hyphae of aspergillosis (H&E,100X)

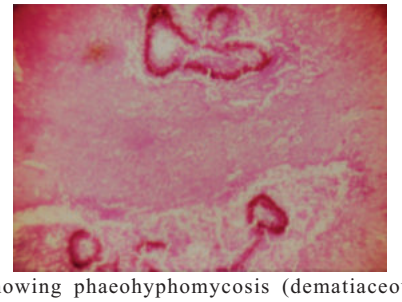

Fig 5 -showing phaeohyphomycosis (dematiaceous fungi) (H&E,100X)

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