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Histopathological Characteristics of Subcutaneous Mycoses and Mycetoma: A Cross-sectional Study from Northeast India

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ABSTRACT

Background: Subcutaneous mycoses is a diverse category of fungal infections that affect the dermis and subcutaneous tissue. They are inoculated into the skin by transcutaneous trauma. As the causal agent endures and adjusts to the host tissue environment, the infection gradually advances. Histopathological examination is advantageous due to its low cost and ability to diagnose infections earlier than fungal culture.
Aims: To evaluate clinical profile and histopathological characteristics of subcutaneous mycoses and mycetoma.
Methods: Hospital-based cross-sectional study of 25 cases. Histopathology was performed using H&E; PAS and GMS stains.
Results: Chromoblastomycosis (68%) was the most common diagnosis. Characteristic histopathological features enabled definitive diagnosis.
Conclusion: Histopathology with clinicopathological correlation remains crucial for accurate diagnosis.

Keywords*: Post-transplant erythrocytosis; Kidney transplantation; RAAS inhibitors; Phlebotomy.*

INTRODUCTION

Subcutaneous mycoses constitute a distinct group of chronic fungal infections that primarily involve the dermis and subcutaneous tissue. These infections arise following traumatic implantation of fungi present in soil, decaying vegetation, or organic matter into the skin. Unlike superficial mycoses, subcutaneous mycoses are characterized by a slow, progressive course and may persist for years before patients seek medical attention. Systemic dissemination is uncommon but may occur in immunocompromised individuals.

The term “implantation mycoses” is often used to describe these infections, emphasizing their mode of acquisition. Minor, often unnoticed trauma such as thorn pricks, splinters, or abrasions during agricultural work provides an entry point for the causative organisms. Once inoculated, the fungi adapt to the host tissue environment and elicit a chronic inflammatory response, resulting in a wide spectrum of clinical and histopathological manifestations.

The most commonly encountered subcutaneous mycoses include chromoblastomycosis, sporotrichosis, and mycetoma. Less frequently observed entities include phaeohyphomycosis, lobomycosis, rhinosporidiosis, and subcutaneous zygomycosis.[1] The distribution of these infections varies geographically, with tropical and subtropical regions reporting the highest burden. In India, subcutaneous mycoses are frequently reported from coastal regions, the sub-Himalayan belt, and the northeastern states.[2]

Northeast India, characterized by its humid climate, heavy rainfall, dense vegetation, and predominantly agrarian population, provides an ideal ecological niche for several pathogenic fungi.[3,4] Despite this, published literature from this region remains limited, and most available data are in the form of isolated case reports or small series. Comprehensive clinicopathological studies are scarce.

Diagnosis of subcutaneous mycoses relies on a combination of clinical suspicion, direct microscopy, histopathology, and fungal culture. While fungal culture remains the gold standard for species identification, it is time-consuming, prone to contamination, and may yield false-negative results. Histopathological examination, on the other hand, is relatively inexpensive, widely available, and can provide rapid diagnostic clues through identification of characteristic tissue reactions and fungal elements. Special stains such as periodic acid–Schiff (PAS) and Gomori methenamine silver (GMS) enhance visualization of fungal structures and increase diagnostic yield.

The present study was undertaken to evaluate the clinical and histopathological spectrum of subcutaneous mycoses and mycetoma in patients attending a tertiary care center in Northeast India. By highlighting the characteristic histopathological features of these infections, this study aims to reinforce the importance of histopathology as a diagnostic tool in endemic regions.

AIMS AND OBJECTIVES

The present study was conducted with the following aims and objectives:

1. To study the incidence and clinical presentation of subcutaneous mycoses and mycetoma among patients attending the Department of Dermatology and Venereology of a tertiary care hospital in Northeast India.
2. To analyze the histopathological characteristics of subcutaneous mycoses and mycetoma using routine and special stains.
3. To correlate clinical findings with histopathological features in order to facilitate accurate diagnosis.

MATERIALS AND METHODS

Study Design and Setting: This was a hospital-based cross-sectional observational study conducted in the Department of Dermatology and Venereology of a tertiary care teaching hospital in Northeast India.

Study Population: All patients presenting with clinical features suggestive of subcutaneous mycoses or mycetoma during the study period were evaluated for inclusion. A total of 25 patients fulfilling the inclusion criteria were enrolled.

Inclusion Criteria:
1.Patients of any age and sex with clinically suspected subcutaneous mycoses or mycetoma.
2.Patients willing to provide written informed consent.

Exclusion Criteria:
1.Patients who had received prior antifungal therapy for the current condition.
2.Patients unwilling to undergo biopsy or provide consent.

Clinical Evaluation: Detailed history was obtained, including duration of disease, history of trauma, occupation, and associated symptoms. A thorough dermatological examination was performed, and findings were documented in a predesigned proforma.

Histopathological Examination: Skin biopsy specimens were obtained under aseptic conditions and fixed in 10% formalin. Sections were stained with hematoxylin and eosin for routine examination. Special stains including PAS and GMS were performed to demonstrate fungal elements.

Ethical Considerations: The study was conducted after obtaining approval from the Institutional Ethics Committee (IEC No: MC/190/2007/Pt-II/Sept.2022/42). Written informed consent was obtained from all participants.

RESULTS

Demographic Profile: The study included 25 patients, with a male-to-female ratio of 4:1. The majority of patients belonged to the 21–40-year age group. Most patients were engaged in agricultural or manual labor.

Occupation of patients	Chromoblastomycosis		Sporotrichosis		Mycetoma		Total	
	N	%	N	%	N	%	N	%
Unemployed	2	11.8	0	0	1	16.7	3	12
Housewife	2	11.8	0	0	2	33.3	4	16
Tea cultivator	5	29.3	0	0	2	33.3	7	28
Farmer, agricultural workers	6	35.3	2	100	1	16.7	9	36
Clerical work, shopkeepers	2	11.8	0	0	0	0	2	8
Total	17	100	2	100	6	100	25	100

Clinical Characteristics

Chromoblastomycosis was the most common diagnosis, followed by mycetoma and sporotrichosis. Lower limb involvement was predominant. A history of antecedent trauma was elicited in a significant proportion of patients.

Clinical Diagnosis	Number of cases	Percentage of cases
Chromoblastomycosis	17	68
Sporotrichosis	2	8
Mycetoma	6	24
Phaeohyphomycosis	0	0
Lobomycosis	0	0
Rhinosporidiosis	0	0

History of trauma	Chromoblastomycosis		Sporotrichosis		Mycetoma		Total	
	N	%	N	%	N	%	N	%
Present	10	58.8	2	100	5	83.3	17	68
Penetrating injury	7	41.2	2	100	1	16.7	10	40
Laceration								
Abrasion	2	11.8	0	0	3	50.0	5	20
	1	5.8	0	0	1	16.7	2	8
Cannot recall	7	41.2	0	0	1	16.7	8	32

In Chromoblastomycosis patients, verrucous plaques was the most common presentation (53%), followed by hyperkeratotic plaques (29.4%) and nodular cauliflower like growth (17.6%). In Sporotrichosis patients, 50% presented with linear hyperkeratotic plaques and nodules and 50% presented with a single hyperkeratotic plaque. Mycetoma patients, 66.7% patients presented with ill-defined swelling with few discharging sinuses and 33.3% patients presented with well-defined swelling with multiple discharging sinuses.

Majority of patients (84%) had a negative fungal culture. Fungal culture was negative in all cases of Chromoblastomycosis (100%) and all cases of Sporotrichosis (100%). Fungal culture was positive in 66.7% cases of Mycetoma.

Histopathological Characteristics
70.6% Chromoblastomycosis patients showed hyperkeratosis, 100% Sporotrichosis patients showed hyperkeratosis and only 16.7% Mycetoma patients showed hyperkeratosis.

53% Chromoblastomycosis patients showed acanthosis and 83.3% Mycetoma patients showed acanthosis. None of the Sporotrichosis patients showed acanthosis. 100% Sporotrichosis patients showed spongiosis and 35.3% Chromoblastomycosis patients showed spongiosis. Spongiosis was absent in all Mycetoma patients.

29.4% Chromoblastomycosis patients showed intraepidermal neutrophilic abscess and 66.7% Mycetoma patients showed intraepidermal neutrophilic abscess. All Sporotrichosis patients (100%) showed intraepidermal neutrophilic abscess.

76.5% Chromoblastomycosis patients showed pseudoepitheliomatous hyperplasia. Psudoepitheliomatous hyperplasia was absent in all cases of Sporotrichosis and Mycetoma.

70.6% Chromoblastomycosis patients showed presence of epithelioid granulomas, 100% Sporotrichosis patients showed presence of epithelioid granulomas and 66.7% Mycetoma patients showed presence of epithelioid granulomas.

64.7% Chromoblastomycosis patients showed presence of giant cells, 100% Sporotrichosis patients showed presence of giant cells and 66.7% Mycetoma patients showed presence of giant cells.

64.7% Chromoblastomycosis patients showed dermal lymphohistiocytic infiltrate, 100% Sporotrichosis patients showed dermal lymphohistiocytic infiltrate and 83.3% Mycetoma patients showed dermal lymphohistiocytic infiltrate.

23.5% Chromoblastomycosis patients showed dermal fibrosis and 83.3% Mycetoma patients showed dermal fibrosis. Dermal fibrosis was absent in all cases of Sporotrichosis.

Copper penny bodies were present in 64.7% Chromoblastomycosis patients.
Asteroid bodies were absent in all cases of Sporotrichosis.

Fungal hyphae was present in 66.7% cases of Mycetoma and slender filamentous bacteria was present in 33.3% cases of Mycetoma.

DISCUSSION

The present study highlights the clinicopathological spectrum of subcutaneous mycoses and mycetoma in Northeast India. The predominance of chromoblastomycosis and male preponderance observed in this study are consistent with previous reports from other endemic regions. Occupational exposure and environmental factors likely contribute to disease acquisition.

In our study, the incidence of Chromoblastomycosis was highest (68%) followed by Mycetoma (24%) and Sporotrichosis (8%). This is almost similar to the finding by Bhat et al where highest incidence was of Chromoblastomycosis (64%) followed by equal incidence of Sporotrichosis (16%) and Mycetoma (16%).[5]

In contrast to the study of Kaliyamoorthy S et al., where the common age group was 5160 years, in our study 44% of patients belonged to the age range of 21-40 years, followed by 40% to the age range of 41-60 years.[6]

In our study majority of patients of Chromoblastomycosis (35.3%) were farmers or agricultural workers by occupation which is in contrast to the finding by Shenoy MM et al where 45.4% patients were manual labourers.[7]

In our study, out of total patients, 68% had a history of trauma prior to the onset of the lesions. This is similar to the study by Verma S et al, where history of trauma was present in 76% cases.[8]

In our study majority of patients had lesions over lower limbs which may be due to the reason that most of the people in this region are outdoor workers who mostly walk barefoot or wear open sandals due to which they mostly acquire the infection over lower limbs.[9]

In our study, out of the total patients, fungal culture was positive in only 16% cases. This is slightly more than the finding by Muthuswamy RK et al, where fungal culture was positive in 7.4% patients.[10]

Clinical examination alone cannot be sufficient to diagnose the infection as the lesions can mimic other cutaneous diseases and can lead to a diagnostic dilemma. Though identification of fungal pathogen in culture gives confirmatory diagnosis but it is time consuming and also has chances of contamination by other organisms which may lead to delay and confusion in diagnosis. The identification of characteristic fungal elements and tissue reactions enabled differentiation among various subcutaneous mycoses. Given the limitations of fungal culture, histopathology remains a rapid and cost-effective diagnostic modality.

Limitations

The study was limited by a small sample size and lack of molecular diagnostic techniques. Long-term follow-up data were not available for all patients.

CONCLUSION

Subcutaneous mycoses and mycetoma continue to pose diagnostic challenges in endemic regions. Histopathological examination, when integrated with clinical assessment, plays a crucial role in early diagnosis and appropriate management. Increased awareness and timely diagnosis can significantly reduce morbidity associated with these chronic infections.

No conflict of interest.

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