



MUCORMYCOSIS-A REPORT OF TWO CASES

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ABSTRACT

Mucormycosis refers to several different diseases caused by infection with fungi in the order Mucorales of the class Zygomycetes. It is an opportunistic infection affecting immunosuppressed individuals. Most mucormycosis infections are life-threatening. Manifestations of mucormycosis depend on the location of involvement. Tissue identification of these fungi is an indispensable diagnostic tool since it distinguishes the presence of the fungus as a pathogen in the specimen from a culture contaminant and is essential to define whether there is blood vessel invasion.

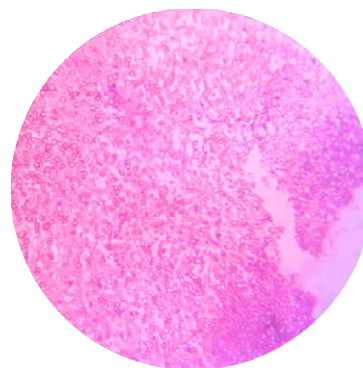
INTRODUCTION

Mucormycosis refers to several different diseases caused by infection with fungi in the order Mucorales of the class Zygomycetes. It is an opportunistic infection affecting immunosuppressed individuals. Most mucormycosis infections are life-threatening. The purpose of this report is to study the clinicopathological features of Mucormycosis.

Case Reports

Case I: A 60-year-old female presented with complaints of a nasal block and right-sided headache for two years, specimen from middle meatus of right nasal cavity sent for histopathological evaluation. Sections showed fragments of fungal masses and degenerating spicules of bone. Fungal hyphae were broad, irregular and branching at wide angles. No mucosal structure or inflammation was evident. Histology was consistent with mucormycosis eroding into the bone.

Case II: A 42-year-old female presented with complaints of left-sided headache for five years and foul-smelling nasal discharge, fungal balls were noted in the left maxillary sinus, excised and sent for histopathological evaluation. Sections showed necrotic and haemorrhagic material amidst which longitudinal and cross-sections of fungal hyphae were seen. The hyphae were broad, irregular and septate, branching at obtuse angles. Histology was consistent with mucormycosis.



Broad, Irregular Fungal Hyphae of Mucorales

DISCUSSION

Fungal infections are becoming increasingly common because of the expansion of at-risk populations and the use of treatment modalities which permit prolonged survival of these patients.^[1] Mucormycosis, also known as Zygomycosis, refers to the spectrum of diseases caused by infection with fungi belonging to the order Mucorales of the class Zygomycetes.^[2] Rhizopus species are the most common causative organisms. It is transmitted by ubiquitous, airborne asexual spores.^[3] The primary route of spread of the infection is by inhalation. It is an opportunistic infection affecting immunosuppressed individuals. Most mucormycosis infections are life-threatening.^[3]

Predisposing factors are neutropenia, corticosteroid use, diabetes mellitus, iron overload and breakdown of the cutaneous barrier.^[4] Diabetes is the single most common

predisposing illness associated with the development of Zygomycosis.^{[5][6]}

Mucoraceae are present as moulds in the environment; they become hyphal forms in tissues. Once the spores begin to grow, fungal hyphae invade the blood vessels resulting in tissue infarction, necrosis, and thrombosis. Neutrophils are the major host defense against these fungi.^[3]

Mucormycosis is classified based on anatomic localization as Rhinocerebral, Pulmonary, Cutaneous, Gastrointestinal and Disseminated.^{[7][8][9][10]}

Manifestations of mucormycosis depend on the location of involvement. The three primary sites of invasion are the nasal sinuses, lungs, and gastrointestinal tract, depending on whether the spores are inhaled or ingested.^{[7][8][9][10]}

Frozen tissue samples should be evaluated for signs of infection.^[11] A Biopsy specimen of the involved tissue is obtained for histopathological evaluation, which will confirm the diagnosis of mucormycosis. Culture of biopsy samples is necessary to determine the species.^[12]

Tissue identification of these fungi is a vital diagnostic tool. It differentiates the presence of the fungus as a pathogen in the specimen from a culture contaminant. It is essential to define whether there is blood vessel invasion.^[13] Rapid histologic evaluation of a frozen tissue section should be performed in order to initiate surgical and medical management for the infection straight away.

Tissues stained with haematoxylin and eosin or fungal stains show characteristic broad aseptate hyphae (approximately 6-25µm diameter). These hyphae are ribbon-like, non-pigmented and thin-walled. They often display irregular branching at 45-90°. Occasionally, they may be sparsely septate. The hyphae may vary in width, appear folded or crinkled, and be sparse or fragmented. When the lesions are exposed to air, thick-walled spherical structures may form at the ends of the hyphae. Vascular invasion and necrosis are the characteristic consequences of the infective process. Neutrophil infiltration, tissue infarction and vessel invasion are thus often observed. A granulomatous reaction may be seen.^[13]

Special stains with Periodic Acid-Schiff (PAS) or Grocott-Gomori Methenamine-Silver (GMS) can be used to highlight the fungal wall of organisms, allowing a better assessment of the morphology.^[13] The GMS technique is the best method for demonstrating hyphae in tissue due to the high contrast with negligible background impregnation.^[13]

Successful treatment of mucormycosis requires correction of the underlying risk factor(s), antifungal therapy and aggressive surgery.^[14]

The major morphological differentiation between Mucorales genera and other moulds is with other fungi that produce non-pigmented hyphae in tissue such as *Aspergillus* species, other hyaline septate moulds such as *Fusarium*, *Scedosporium* and *Candida* species.^{[14][15]} *Candida* shows Budding cells and Pseudohyphae whereas the hyphae of *Aspergillus* are narrow, septate, and uniform showing regular branching at acute angles (45°).^{[15][16]}

CONCLUSION

Mucormycosis is an opportunistic infection affecting immunosuppressed individuals. Most mucormycosis infections are life-threatening. Tissue identification of these fungi is an essential diagnostic tool since it distinguishes the presence of the fungus as a pathogen in the specimen from a culture contaminant and is indispensable to define whether there is blood vessel invasion. Special stains with Periodic Acid-Schiff (PAS) or Grocott-Gomori Methenamine-Silver (GMS) can be used to highlight the fungal wall of organisms, allowing a more precise assessment of the morphology.^[13] Successful treatment of mucormycosis is a multi-pronged approach requiring correction of the underlying risk factor(s), antifungal therapy and aggressive surgery.^[14]

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