



HISTOPATHOLOGICAL FEATURES IN ORBITAL MUCORMYCOSIS PATIENTS – POST COVID INFECTION

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ABSTRACT **Introduction:** Mucormycosis is an opportunistic devastating fungal Rhino-orbital -cerebral infection. it spreads through spores through the nasal route. other clinical manifestations are cutaneous, gastrointestinal, bone & joint infection, and disseminated Mucormycosis **Aims:** To know the type of inflammation, spread, fungal species in specimens of post covid mucormycosis patients who underwent surgery **Methods & Materials:** This Hospital-based Retrospective study included 50 patients referred to the tertiary care center. Demographic features, predisposing conditions, and clinical features were obtained from medical records. The tissue sections were subjected to histopathological examination. **Results:** The study material included 50 patients. males 68% (mean age:53yrs), females 32% (mean age :49.43%). The clinical syndromes included Rhinomucormycosis in 18%, Rhino orbital disease in 52%, Rhino orbital cerebral disease in 22%, cerebral mucormycosis in 2% of patients. vascular invasion seen in 72%, mixed neural and vascular invasion seen in 18% of patients. Suppurative inflammation was seen in 56%, suppurative granulomatous inflammation was seen in 56% of patients. broad aseptate irregularly branched hyphae s/o mucor seen in 82%, mixed mucor, and aspergillus seen in 2%, no evidence of fungal elements in 16%. **Conclusion:** vascular invasion is the main mode of invasion, neural invasion seen in the advanced stage of disease, indicating the importance of Neurological assessment in post covid patients. Suppurative granulomatous inflammations are common association seen in histopathological sections of advanced-stage disease patients.

KEYWORDS : Post covid mucormycosis, vascular invasion, neural invasion, necrosis

INTRODUCTION

Mucormycosis is an opportunistic devastating fungal rhino orbital cerebral infection. The fungalepidemic of lethal rhino orbital cerebral mucormycosis during the covid 19 pandemic encompassed several ophthalmic manifestations which when diagnosed late are neglected resulted in cerebral invasion, ultimately leading to death.

Rhinocerebral mucormycosis is the most common form of the disease³. The infection spreads rapidly from sinus to orbit, cavernous sinus, and cranium, and if not diagnosed early and treated promptly, results in death⁸. The identification of risk factors, clinical features, and radiological findings increases the possibility of an early diagnosis, which may prevent progressive tissue invasion, reduce the need and/or extent of surgical resection, and improve survival⁸.

However, clinical features and imaging studies are nonspecific. Definite diagnosis requires the demonstration of characteristic hyphae in tissue or recovery of the organism in the culture. The yield of organisms in culture is sub-optimal. Hence, histopathological examination plays a critical role in establishing the diagnosis and provides evidence of tissue invasion

AIMS:

- To study the histological features in post covid invasive rhino-orbital-cerebral mucormycosis

OBJECTIVES

- to determine the type of inflammation (suppurative/granulomatous/absent)
- Invasion into soft tissues
- Type of spread (Angio/perineural)
- Presence of necrosis/infarction/fungal morphology.

MATERIALS AND METHODS:

- This is a hospital-based retrospective study
- Institutional ethics committee approval was taken.
- Tissue sections from 50 patients with invasive mucormycosis were included in the study.

- Demographic features, predisposing conditions, and clinical features were obtained from medical records.
- Tissue sections were reviewed with hematoxylin and eosin (H&E), Gomori's methenamine silver (GMS), and periodic acid Schiff (PAS).

Inclusion criteria

- Medical, surgical and Histopathological reports of post covid mucormycosis patients were included in the study

Exclusion criteria

- Patients with other infections were excluded from the study

Statistical analysis:

Data was analyzed with Microsoft excel and SPSS (statistical package for social sciences) version 25. Results were expressed in terms of mean, percentages, and depicted as tables, graphs.

RESULTS

Totally 50 patients fulfilling the inclusion criteria were included in the study. The study material included males 68% (mean age:53yrs), females 32% (mean age :49.43%). The clinical syndromes included Rhinomucormycosis in 18%, Rhino orbital disease in 52%, Rhino orbital cerebral disease in 22%, cerebral mucormycosis in 2% of patients, Rhino cerebral disease in 6%.

In Rhino mucormycosis patients, Suppurative inflammation seen in 88.88 % and suppurative granulomatous in 11.11 %, Fungal colonies seen only in 55.55 % of samples all are suggestive of mucor (broad aseptate irregularly branched hyphae.) No evidence of vascular/neural invasion.

In patients with Rhino orbital mucormycosis, the inflammation is suppurative with the predominance of neutrophils in 50%, suppurative granulomatous with predominance of neutrophils, lymphocytes, foreign body giant cells in 50%. Vascular invasion seen in 84.61% of patients. Mixed vascular neural invasion seen in 15.38%, no evidence of vascular/neural invasion in 7.7%, Periocular tissue invasion in

57.69 %, necrosis & ulceration seen in 100%, globe invasion 11.53% & Mucor fungal colonies seen in 92%, no evidence of fungal colonies in 7.69%. In patients with Rhino orbital cerebral mucormycosis, the inflammation is suppurative in 9.09%, suppurative granulomatous in 90.90%. Vascular invasion seen in 90.90% of patients, mixed vascular & neural invasion seen in 9.09% of patients, Periocular tissue invasion 100 %, necrosis & ulceration seen in 100%, mucor fungal colonies seen in 72.72%, Aspergillus colonies in 9.09 % no evidence of fungal colonies in 18.18%.

In Rhino cerebral patients the inflammation is suppurative granulomatous in 100%. Vascular invasion seen in 100% of patients. Necrosis & ulceration seen in 100%, mucor fungal colonies seen in all 100% cases.

In cerebral disease patients, the inflammation is suppurative granulomatous with the vascular invasion of fungal hyphae, areas of necrosis and hemorrhage are seen. mucor fungal colonies were isolated from the specimen.

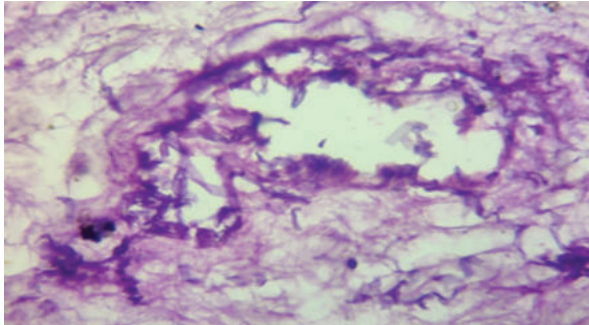


Figure 1: Section Showing blood vessel with broad aseptate Fungal hyphae in lumen and wall - Angioinvasion (H and E X 40)

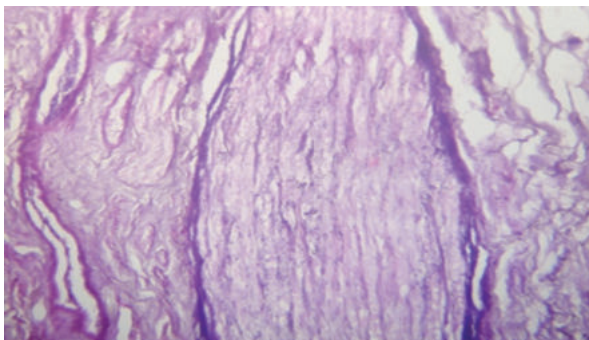


Figure 2: Section Show segment of nerves with perineural invasion by broad aseptate hyphae consistent with mucor species (H and E Stain X 40)

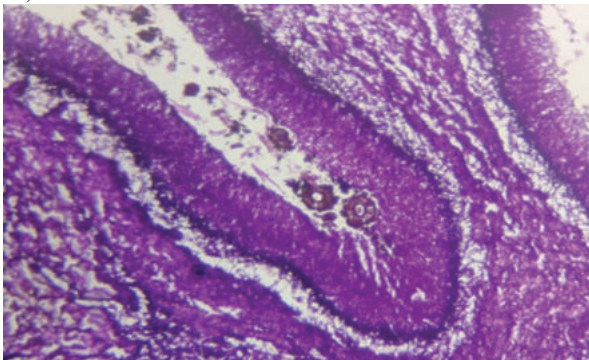


Figure 3: Section Show mixed infection with aspergillus and mucor (H and E X 40)

DISCUSSION

Of the total 50 patients, males are 68% (mean age :53 years), females are 32% (mean age :49.43%). Similar results were found in studies conducted by A Bhansali et al (males are 65.71%, females 34.28%) and Sundaram et al (males are 66%, females are 34%) Of the total 50 patients no of patients with orbital involvement 37(74%). of these males are 25(67.56%) and females are 12 (33.33%).

In this study mean age of the study population was 47.66 years. A similar result was seen in a study conducted by Bhansali et al with the mean age of the study population being 47.3 years.

In this study Inflammation was seen in almost all the cases, of this suppurative inflammation was seen in 44%, suppurative granulomatous inflammation in 56%, in contrast, to study conducted by Sundaram et al. in their study predominantly suppurative inflammation was seen in 83.33%, this may be due to large sample size in our study Necrosis with or without infarction was seen in all samples in the present study this is in concordance with the results of Sundaram et al study.

In this study, angioinvasion was demonstrated in only 72% of samples. In Sundaram et al study Angioinvasion was seen in 83.33% of samples. The less percentage in the present study may be due to the involvement of very early stage disease patient's-rhino Mucor mycosis 18% in the study population, whereas it was zero in other studies. Angioinvasion facilitates the dissemination of fungus from the site of infection to distant sites.

In the present study, the mixed neural and vascular invasion was seen in 18% of samples, whereas it was 50% in a study conducted by Sundaram et al. the less percentage in the present study may be due to the large sample size, the inclusion of early-stage disease patients in the sample. In all tissue specimens with neural invasion, vascular invasion is also present, indicating vascular invasion is the main invasive pathway, neural invasion is seen in advanced diseases.

The morphology of the fungus was delineated on H and E, GMS, and PAS in all the samples. In the present study mucor fungal species were identified in 82%, no evidence of fungal species in 16%, mixed mucor and aspergillus fungal colonies were seen in 2%.

CONCLUSION

- Vascular invasion is the main mode of invasion. Along with it, neural invasion is seen in the advanced stage of disease, indicating the importance of Neurological assessment in post covid patients.
- Suppurative granulomatous inflammations were common association seen in tissue sections of advanced-stage disease patients.
- Mucor was the most common pathogen isolated from tissue samples. Aspergillus was isolated in patients with advanced stage of disease.

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