

Imaging Role in Rhinoorbital Cerebral Mucormycosis Diagnosis in Post Covid Patients Attending Teaching Govt Medical Hospital

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Received: 25-02-2024 / Revised: 23-03-2024 / Accepted: 26-04-2024

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Conflict of interest: Nil

Abstract:

COVID-19 pandemic in India is a part of worldwide pandemic of coronavirus disease 2019 caused by severe acute respiratory distress syndrome coronavirus 2(SARS-CoV-2). First cases of covid 19 were reported in January 2020 in Kerala. Rhino-orbito-cerebral mucormycosis (ROCM) is considered as a rare invasive infection caused by class phycomycetes fungi involving immunocompromised patients who have developed COVID-19 infection in the recent past, arising from nasal and sinus mucosa, spreads rapidly to orbit and brain. India reports about 50,000 cases of covid associated mucormycosis so far. Men are more commonly affected than women. For managing this fatal condition multispecialty approach involving Ophthalmology, ENT, Neurosurgery Dental Surgery, Medical and Radiology departments are involved. CT & MRI are imaging modality of choice for establishing a correct diagnosis & guiding therapeutic decisions. Early suspicion, rapid diagnosis, and initiation of treatment are the most important factors that determine prognosis in the management of mucormycosis. CT useful in preoperative planning for determining sinonasal anatomy, extent of disease, and in directing the surgical approach. The acquisition time is shorter and less expensive and more widely available. MRI is a multiplanar imaging modality, does not involve radiation exposure, is a safer imaging modality in patients requiring multiple follow-up degradation is its disadvantages. Making a prompt diagnosis is fundamental for the patient's safety. The above study is conducted in government general hospital, Guntur for a period of 3 months from June 2021 to August 2021.

Keywords: COVID Infection, Rhino Orbital Cerebral Mucor Mycosis, CT and MRI Scan.

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Introduction

Rhino-orbito-cerebral mucormycosis (ROCM) is considered as a rare invasive infection caused by class phycomycetes fungi involving immunocompromised patients, arising from nasal and sinus mucosa, spreads rapidly to orbit and brain. This fungal infection can rapidly progress in individuals who are immunologically or metabolically compromised such as patients who have developed COVID-19 infection in the recent past.

The clinical presentation in the early stages is non-specific with low grade fever, headache, facial pain, nasal discharge, nasal obstruction and crusting. The disease progresses rapidly within a period of a few hours to days leading to cranial nerve palsies and features of CNS involvement. Early imaging is helpful in assessing the extent of involvement of this lethal disease which requires prompt and aggressive treatment. Early suspicion, rapid diagnosis, and initiation

of treatment are the most important factors that determine prognosis in the management of mucormycosis. Imaging forms the cornerstone of management in patients with rhino-orbit-cerebral mucormycosis (ROCM). The objective of this study is to evaluate role of imaging in diagnosis of Rhino orbital Cerebral Mucor mycosis in post covid patients.

Materials and Methods:

The study was carried out at the Departments of Ophthalmology and Radiodiagnosis, Guntur medical college Hospital Guntur. AP

Inclusion Criteria: Age: 18 to 70 years, clinical features suggestive of mucormycosis, patient with past h/o COVID-19 infection, and Rhinoorbital cerebral form of mucormycosis and patient willing to give consent for study.

Exclusion Criteria: Other forms of mucormycosis

except room and patient with no past h/o COVID 19 infection.

Sample size: we prospectively observed the plain CT and Gadolinium contrast enhanced MRI of Paranasal sinuses, orbit and brain for 40 patients with clinical suspicion of ROCM.

Ethical approval was obtained for the study from the Ethics committee of the institute and written informed consent was taken from the Patients or from their guardians.

Procedure: All patients with clinical suspicion of ROCM guidelines for diagnosis, staging and management [1] by Ophthalmologist are followed late In Radiology Department underwent noncontrast CT

with GE Bright Speed 16 slice CT machine.

MR imaging was done with siemens 1.5T scanner. T1 and T2 weighted images, T1 weighted images after injection of IV kontras [2].

Clinical information about the Presentation management, evolution of disease was recorded. Data was entered in Microsoft Excel 2010 and statistical analysis was done using IBM SPSS V 24.00.

Results

In CT all patients had mucosal thickening in paranasal sinuses. Osseous involvement was noted in 35% patients.

Table 1: Involvement of Paranasal sinuses

	No of cases	%
Maxillary sinus	30	75
Ethmoid sinus	22	55
Sphenoid sinus	16	40
Frontal sinus	8	20

Most commonly involved sinus is maxillary sinus followed by ethmoid, sphenoid, frontal sinus.

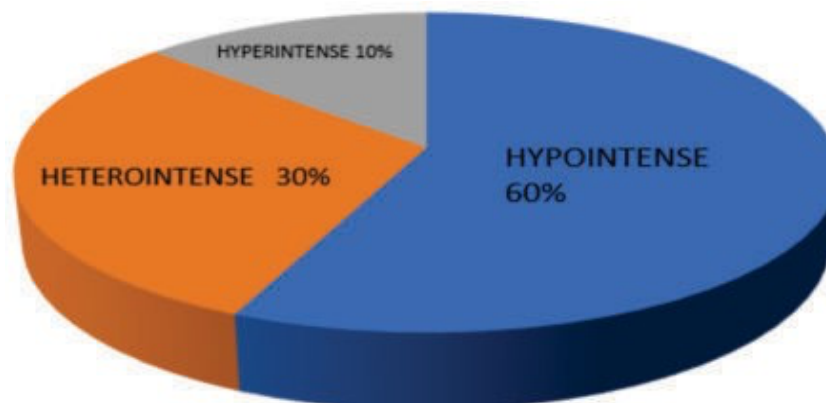


Figure 1: Signal characteristics of Paranasal Sinuses in T2W

Most common pattern is hypointense followed by heterointense, hyperintense.

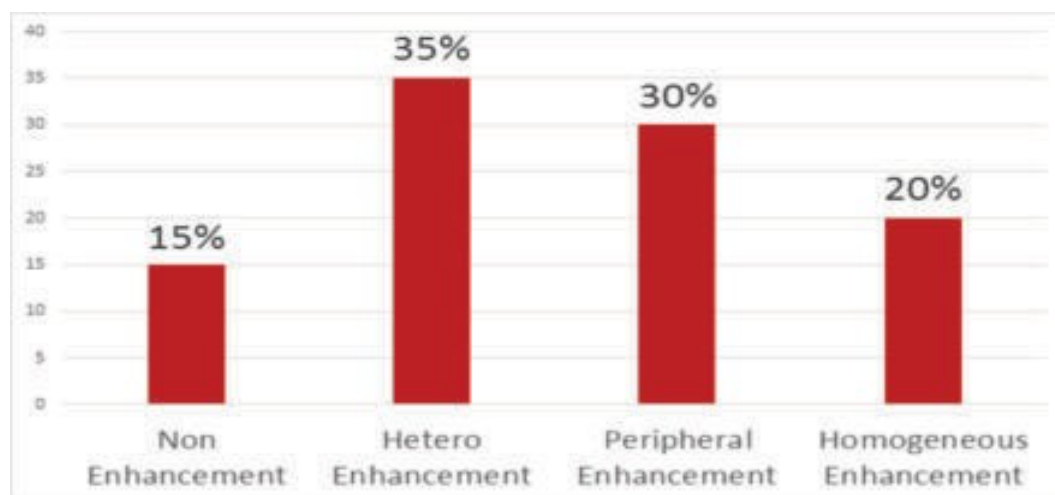


Figure 2: Post contrast enhancement of paranasal sinuses

Out of 40 cases 35% cases showed heterogenous enhancement followed by peripheral enhancement in 30%, homogenous enhancement in 20%, nonenhancement in 15% cases.

Table 2: Involvement of extra sinus structures

	Number	Type of involvement
Orbit	24 (60%)	Orbital cellulitis
Face	20 (50%)	Soft tissue infiltration and fat stranding
Pterygopalatine fossa	14 (35%)	Fat stranding
Skull base	6 (15%)	Erosion, Lytic destruction
Cavernous sinus	8 (20%)	Thrombosis
Brain	6 (15%)	Abscess (4), Infarcts (2)

Out of the evaluated 40 cases 60% cases showed orbital involvement, 50 % cases showed involvement of soft tissues of face, 35% showed extension into pterygopalatine fossa, 15% cases showed involvement of skull base, 20% cases showed involvement of cavernous sinus, 15 % cases showed intracranial extension in the form of Abscess, Infarcts.

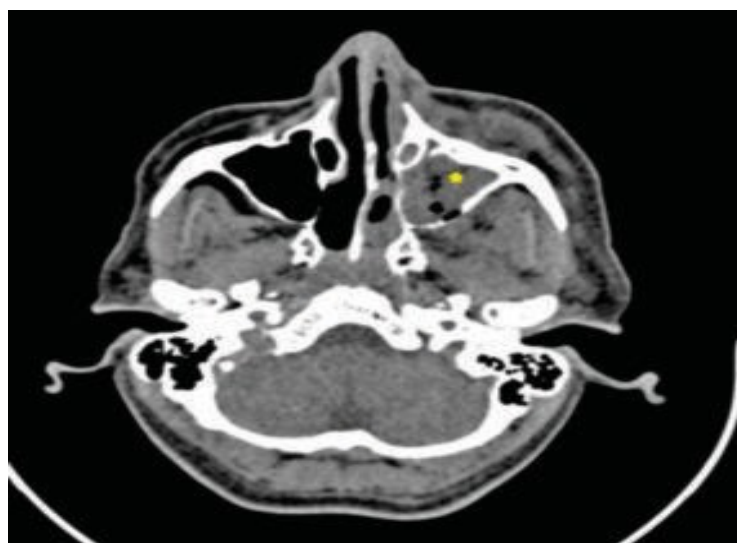


Figure 3: Ct axial section of a 62yr old male patient showing hyperdense soft tissue density in left maxillary, ethmoid and sphenoid sinuses with few airfoci and obliteration of left periantral and premaxillary soft tissue planes and erosion of bony sinus walls with pterygopalatine fossa involvement



Figure 4 a: A 71 year old female patient diagnosed with ROCM

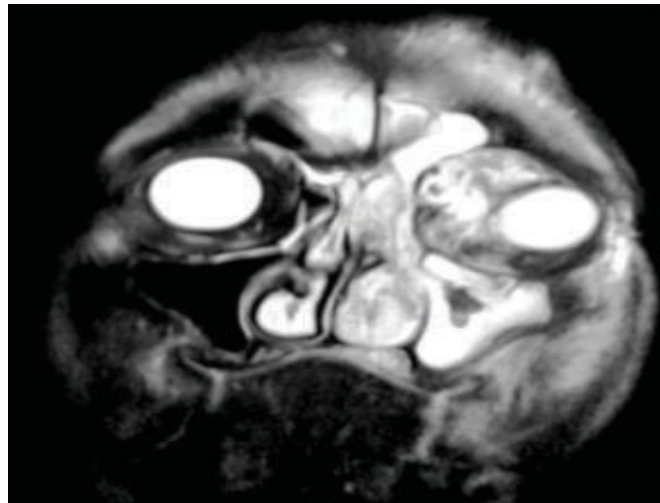


Figure 4 b: T2-weighted coronal magnetic resonance imaging of the same patient shows hyperintense signal intensity along peripheral left maxillary and frontal sinuses, left nasal turbinates are swollen. Left orbital hyperintense signal intensity lesion is seen medial to eyeball, displacing it laterally

Discussion: Mucormycosis is an invasive fungal infection caused by inhalation of the spores of the Phycomycetes fungi, most commonly belonging to the genera *Mucor*, *Rhizopus* and *absidia*. ROCM is considered as an emerging rapidly disseminating fungal infection when associated with immunocompromised conditions and carry fatal prognosis with cavernous sinus involvement.

Hence, radiologists should evaluate the extension and involvement of invasive fungal sinusitis which can lead to early diagnosis and timely management with antifungal agents and surgical debridement further helps to reduce morbidity and mortality. In patients with suspected ROCM, rapid and accurate diagnosis of fungal etiology is the cornerstone of successful treatment. The most important imaging features that indicate a possible fungal cause are the demonstration of spread beyond the sinus walls and presence of angioinvasion. The presence of necrosis in the involved structures can be elegantly demonstrated on contrast-enhanced MRI. It provides better visualization of periantral and infratemporal fossa extension, orbital soft tissue involvement, and skull base invasion [3,4]. The wide range of contrast mechanisms available on MRI permit detection of imaging signs, which are difficult or even impossible to demonstrate on CT. Examples of such features include cavernous sinus involvement, vascular invasion, perineural spread, optic nerve infarction, and differentiation of cerebral parenchymal invasion from infarction [5].

Conclusion

Based on our study imaging of rhino orbital cerebral mucormycosis show heterogeneous variable T2W

signal intensity, different enhancement patterns and involvement of different sinuses, also presented with extrasinus involvement. CT and MRI are invaluable tools which are complementary to clinical evaluation in assessing the extent of the disease and diagnosis of complications [6].

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