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MUCORMYCOSIS

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▶ Rhino-orbital-cerebral mucormycosis

- ▶ The most common clinical presentation of mucormycosis is rhinoorbital-cerebral infection, which is presumed to start with inhalation of spores into the paranasal sinuses of a susceptible host. Hyperglycemia, usually with an associated metabolic acidosis, is the most common underlying condition.
- ▶ A review of 179 cases of rhino-orbital-cerebral mucormycosis found that 126 (70 percent) of the patients had diabetes mellitus and that most had ketoacidosis at the time of presentation. There are rare reports of rhino-orbital-cerebral mucormycosis in the absence of any apparent risk factors .



The infection usually presents as acute sinusitis with fever, nasal congestion, purulent nasal discharge, headache, and sinus pain.

All of the sinuses become involved, and spread to contiguous structures, such as the palate, orbit, and brain, usually progresses rapidly over the course of a few days.

However, there have been some reports of rhino-orbital-cerebral mucormycosis with an indolent course that progresses over the course of weeks. The hallmarks of spread beyond the sinuses are tissue necrosis of the palate resulting in palatal eschars, destruction of the turbinates, perinasal swelling, and erythema and cyanosis of the facial skin overlying the involved sinuses and/or orbit.

A black eschar, which results from necrosis of tissues after vascular invasion by the fungus, may be visible in the nasal mucosa, palate, or skin overlying the orbit.



Signs of orbital involvement include periorbital edema, proptosis, and blindness

Facial numbness is frequent and results from infarction of sensory branches of the fifth cranial nerve.

Spread of the infection from the ethmoid sinus to the frontal lobe results in obtundation.

Spread from the sphenoid sinuses to the adjacent cavernous sinus can result in cranial nerve palsies, thrombosis of the sinus, and involvement of the carotid artery.

Hematogenous spread to other organs is rare unless the patient has an underlying **hematologic** malignancy with neutropenia.

geographic distribution :

worldwide -food -soil- organic debris
an acute infection characterized by inflammation and vascular invasion and thrombosis.

affinity for arterial invasion nasal or sinus infection and direct extension to the brain
rapidly fatal MUCORMYCOSIS.

RISK FACTORS

- Diabetes patients often have no previously recognized history of diabetes mellitus when they present with mucormycosis
- Immunosuppression: Neutropenia, steroids, bone marrow transplant
- Trauma / burns subcutaneous infection in immunologically normal individuals
- Nosocomial settings via direct access through IV catheters, SC injections, or maceration of the skin by a moist dressing
- Iron overload, Deferoxamine therapy

COVID -19:

time of presentation: variable but usually around 3rd week of onset of symptoms of Covid – 19.

Reasons for increase in mucormycosis in Covid – 19 patients:

- 1. Hyperglycemia due to uncontrolled pre-existing diabetes and high prevalence rates of mucormycosis in India per se.
- 2. Rampant overuse and irrational use of steroids in management of Covid – 19.
- 3. New onset diabetes due to steroid overuse or severe cases of Covid – 19 per se.
- 4. Prolonged ICU stay and irrational use of broad spectrum antibiotics
- 5. Pre-existing co-morbidities such as hematological malignancies, use of immunosuppressants, solid organ transplant etc.
- 6. Breakthrough infections in patients on Voriconazole (anti – fungal drug) prophylaxis.



SIGNS AND SYMPTOMS:

- 1. Facial pain, pain over sinuses, pain in teeth and gums .
- 2. Paraesthesia / decreased sensation over half of face.
- 3. Blackish discolouration of skin over nasolabial groove/ alae nasii.
- 4. Nasal crusting and nasal discharge which could be blackish or blood tinged •
- 5. Conjunctival injection or chemosis.
- 6. Periorbital swelling.
- 7. Blurring of vision / diplopia.
- 8. Loosening of teeth / discoloration of palate / gangrenous inferior turbinates.
- 9. Worsening of respiratory symptoms, hemoptysis, chest pain, alteration of consciousness, headache.

CLINICAL MANIFESTATION of RHINOCEREBRAL MUCORMYCOSIS

- Unilateral headache - behind the eye .
- Facial pain
- Eye swelling (Proptosis) + visual disturbance •

Necrotic lesions on the hard palate or nasal mucosa

- ENT symptoms :
 - Nasal congestion
 - Black discharge
 - Acute sinusitis
 - Epistaxis
- Systemic symptoms:
fevers



Clinical progression of rhinocerebral mucormycosis :

- Stage I: Infection of the nasal mucosa
- Stage II: Infection of the sinuses.
- Stage III: Orbital involvement (orbital apex syndrome, superior orbital fissure syndrome).
- Stage IV: Cerebral involvement in which intracranial spread occurs via one of the following routes:
 - Ophthalmic artery
 - Superior orbital fissure
 - Cribriform plate



TREATMENT:

- 1) early initiation of therapy
- 2) Rapid reversal of underlying predisposing risk factors, if possible
- 3) surgical debridement, when possible
(Aggressive antifungal treatment) 1.5 mg/kg/d
- 4) Duration? Up to 3mo after clearance of symptoms



A review of 208 cases of rhino-orbital-cerebral mucormycosis published in the literature between 1970 and 1993 found the following frequency of symptoms and signs:

- Fever – 44 percent
- Nasal ulceration or necrosis – 38 percent
- Periorbital or facial swelling – 34 percent
- Decreased vision – 30 percent
- Ophthalmoplegia – 29 percent
- Sinusitis – 26 percent
- Headache – 25 percent



IMAGING FINDING

Stage 1 and 2: sinusitis and orbital infection

1- Homogenous opacification of the sinus cavity

2- bony erosion

3- soft tissue infiltration of the deep face, obliteration of normal fat planes in the infratemporal fossa, pterygopalatine fossa, pterygomaxillary fissure.

4- the first sign of invasive fungal sinusitis is obliteration of periantral fat.

5- MRI:

T1 iso to low

T2 low signal



STAGE 3: INTRACRANIAL INVASION

- 1-The most common sign of it is leptomeningeal enhancement.
- 2-cerebritis
- 3-abscess
- 4-infarction



PROGNOSTIC VALUE OF IMAGING

Poor prognosis if:

- 1-brain involvement
- 2-orbital Involvement
- 3-increase in number of sinuses involvement
- 4-sphenoid or frontal sinus infection
- 5-bilateral sinus infection
- 6-palate Involvement



RADIOLOGIC FINDING IN CNS

The three most frequent finding are:

- 1-cavernouse sinuse thrombosis
- 2-brain infarction
- 3-Internal carotid artery occlusion

The inferior parts of the frontal lobes usually is primary parenchymal involvement



RECOMMENDATIONS FOR TREATMENT OF CNS MUCORMYCOSIS

SURGICAL TREATMENT

Debridement of extracranial site of infection:
Sinus debridement using endoscope for early and open surgery for extensive disease.

CONSIDER INDICATIONS FOR NEUROSURGERY:

- 1-Increased ICP (E.G.hemispheric stroke)
- 2-obstructive hydrocephalus
- 3-compression of spinal cord

ORBITAL INVOLVEMENT

Usually through ethmoid and maxillary sinus and NLD

Through bony destruction

Orbital compartment syndrome

Angioinvasion and ischemia

Combine mechanisms



OCULAR MUCORMYCOSIS

Symptoms and sign

Lid and periorbital swelling

Fungal eyelid abcess

Ptosis

Chemosis

Corneal edema

Decreased vision

Orbital cellulitis

Orbital abscesses

Fungal vitritis

Fungal endophtalmitis



INDICATION FOR ORBITAL EXENTRATION IN ORBITAL MUCORMYCOSIS

1-LOSS OF CONTRAST ENHANCEMENT(SEVER AND DIFFUSE OR APICAL)

2-ABNORMAL ORBITAL EXAMINATION

A photograph of a misty forest path, overlaid with a color gradient that transitions from purple on the left to green on the right. The text "THANK YOU FOR YOUR ATTENTION" is centered in the middle of the image.

THANK YOU FOR YOUR ATTENTION



