Pharmacotherapy of Mucormycosis

About :

Mucormycosis (sometimes called Zygomycosis) is rare but serious fungal infection caused by group of mould called mucormycetes. These fungi lives in environment, particularly in soil and in decaying organic material exa leaves, compost pile or rotten wood.

Types and Clinical Features of Mucormycosis

1] Rhinocerebral mucormycosis : Most common in patient with diabetes with renal transplants. Also occur in neutropenic cancer patient and Haematopoeitic stem cell transplant or solid organ transplant recipient.

Symptoms may include : Unilateral facial swelling, Headaches, nasal or sinus congestion or pain, serosanguious nasal discharge, and fever

As infection spread : ptosis, protosis, loss of extraocular muscles function and vision disturbance may occur.

Useful Diagnostic signs : Necrotic black lesions on hard palate or nasal turbinate and drainage of black pus.

2] Pulmonary Mucormycosis :

Generally occur in patient with hematological malignacy or proofound neutropenia.

Symptoms are non-specific includes fever, cough, chest pain and dyspnea.

Angioinvansion result in tissue necrosis, which may ultimately lead to cavitation and / or hemoptysis.

3] Cutaneous mucormycosis :

May be primary or secondary.

Primary infection usually caused by direct inoculation of fungus into disrupted skin and is most often seen in patient with burns and other form of skin trauma and in immunosuppressed patient. Symptoms – Acute inflammation with pus, abscess formation, tissue swelling and necrosis. lesions may appear red and indurated & often progress to black eschars.

Secondary infection : generally seen when pathogen spread hematogenously ; lesions typically begin as erythematous, indurated and painful cellulitis and then progress to an ulcer covered with a black eschar.

4) Gastrointestinal mucormycosis :
Less common than other clinical forms.
Believed to result from ingestion of the organism.
typically occur in malnourished patient or premature infants.
Stomach, colon and ileum are most commonly affected.
Symptoms : Non-specific abdominal pain and distension, nausea, and vomiting are most common. Gastrointestinal bleading may occur.
Most common form among neonatals and difficult to dignose partly because of its clinical resemblance to necrotizing enterocolitis, far more common disease.

5) Disseminated Mucormycosis :
May follow any of the form of mucormycosis described above but usually seen in neutropenic patient & pulmonary infection.
Common site of spred is brain but spleen, heart, skin & other organ may be affected.

Etiological agents :
Mould belonging to order Mucorales, most commonly Rhizopus species. Other includes mucor species, Cunninghamella bertholletiae, Apophysomyces species and Lichtheimia (formerly Absidia) species.

Transmission :
Occur through inhalations, inoculation, oro ingestion of spores from the environment.
Healthcare association outbreak have been linked to adhesive bandage, wooden tongue depressors, hospital linen, negative pressure rooms, water leaks, poor air filter, non-sterile medical devices & building construction.
Community outbreak onset associated with trauma sustained during natural Disasters.

Risk Groups :

Risk groups with mucormycosis include person with.

(I) Uncontrolled diabetes.
(II) Hematopoietic stem cell transplant or solid organ transplant.
(III) Malignancy.
(IV) persistent neutropenia.
(V) Prolonged corticosteroid therapy.
(VI) Skin trauma, burns or surgical wounds.
(VII) Iron overload
(VIII) Malnourishment
(IX) Premature infants.

Diagnosis :

→ Require Histopathological evidance or positive culture from a specimen from site of infection.
→ Specimen from sterile body site offer stronger evidance of invasive infection compared to colonization.
→ Culture of Non-sterile site (e.g. sputum) may helpful in patient with infection that is clinically consistent with mucormycosis.
→ Experienced Pathological or microbiological assistance is often helpful as it is difficult to differentiate mucormycetes with other fungus in tissue.
→ Currently no routine serological tests are availble for mucormycosis.
→ DNA-based techinique are promising but are not yet fully standardized or commercially used.

Prevention :

→ Maintain personal hygiene
→ Use masks if visting dusty construction site.
→ Wear shoes, long trousers, long sleeve shirts and glove while handling soil (gardening), moss or manure.

Treatment :

→ Optimal therapy of mucormycosis involves reversal of predisposing condition (if possible), surgical debridement, and prompt antifungal therapy.

→ Lipid preparation of intravenous liposomal amphotericin B (5 10 mg/kg with higher dose given for CNS disease) first line.

→ Oral posaconazole (800 mg/day) or isavuconazole (200 mg every 8 hours for 1-2 days, then 200 mg daily thereafter).

→ Other azoles are not effective.

→ Control of diabetes & other underlying conditions, along with extensive repeated surgical removal of necrotic, non perfused tissue is essential.