Mucor and Rhizopus

Mucor and Rhizopus are fungi that cause the disease mucormycosis. These fungi are widely distributed in nature and typically infect the immunocompromised population. Major predisposing factors include patients with leukemia and diabetic ketoacidosis as excess ketones and glucose aid in the proliferation of these organisms. These fungi form irregular nonseptate hyphae with branching at wide angles, typically over 90 degrees. The most common sites of invasion are the nasal sinuses and the lungs. In diabetics, the fungus can spread from the nasal sinuses to the orbit and penetrate the cribriform plate into the brain. This condition is referred to as rhinocerebral mucormycosis and can cause a front lobe abscess in the brain. Invasion into the vascular network can cause local tissue necrosis causing a characteristic black necrotic eschar on the face.

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Characteristics

Fungi
Fun-guy
Mucor and rhizopus are both fungi.

Irregular Non-septate Hyphae
Nun Scepter
These fungi form non-septate hyphae that are irregularly wide, which can help identify the organisms.

Branching Wide Angles over 90 degrees
Branching Angle Over 90 Degrees
These fungi branch at wide angles over 90 degrees, which can help differentiate these organisms from Aspergillus, which branch at acute angles.

Signs and Symptoms

Leukemic Patients
Luke-key
Leukemic patients are at high risk for mucormycosis because white blood cells have a key role in killing the fungi during an infection.

Proliferate due to excess ketones and glucose
Ketone-key and Glue-bottle
Individuals with diabetic ketoacidosis are at increased risk for mucormycosis, especially with spread from the nasal sinuses to the orbit and brain. People with diabetic ketoacidosis are at increased risk because the organism proliferates in environments with excess ketones and glucose.

Diabetic Ketoacidosis (DKA)
Dyed-beads-pancreas with Key-to-acidic-lemon
Individuals with diabetic ketoacidosis are at increased risk for mucormycosis, especially with spread from the nasal sinuses to the orbit and brain. People with diabetic ketoacidosis are at increased risk because the organism proliferates in environments with excess ketones and glucose.

Rhinocerebral frontal lobe abscess
Abscess guy on frontal lobe of rhino
The fungus can spread from the nasal sinuses to the orbit and penetrate the cribriform plate into the brain, giving rise to rhinocerebral mucormycosis. Inside the brain, the organisms can form abscesses in the frontal lobe or cause cerebral infarction if the fungi invades arteries and produces thrombosis.

Penetrate cribriform plate into brain
Crib Brain
The fungus can spread from the nasal sinuses to the orbit and penetrate the cribriform plate into the brain, giving rise to rhinocerebral mucormycosis.

Black Necrotic Eschars on Face

Black Eschars on rhino's face

Invasion into the vascular network can cause local tissue necrosis causing a characteristic black necrotic eschar on the face. An eschar is a piece of dead tissue that sloughs off the skin.