Pandemic To Endemic (Mucormycosis)

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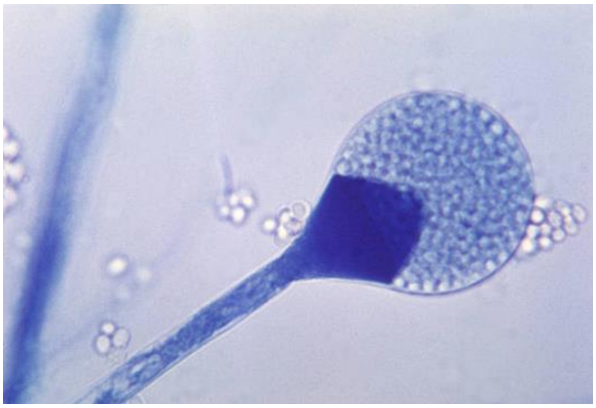
Abstract- *Throughout the history of mucormycosis, from the first case reported in 1885 by Paltauf, published by Gregory et al at the first discovery of rhino-orbital cerebral mucormycosis in 1943, in Harris' 1955 report of the first known survivor, little has changed the diagnosis and outcome of the disease. Although mucormycosis of any kind - cerebral, cutaneous, rhinocerebral, intestinal, or pulmonary - is still rare, it should be suspected in patients with diabetes or abstinence. The administration of amphotericin B, surgical reduction of infected tissue, correction of the underlying cause, and the use of HBO combination therapy remain standard.*

Keywords- Black fungus , Post-COVID Mucormycosis COVID-19 associated mucormycosis , CAM,Second waveIndia , COVID-19 , Mucormycosis , Rhino-orbital-cerebral, mucormycosis , Anti-fungal , Amphotericin , Staging , Mucormycosis , Organ damage , Diabetes , Immunosuppression , Steroids , Environmental pollution..

I. INTRODUCTION

Each year, an estimated 1.6 million cases of invasive fungal infections occur worldwide, resulting in an estimated 1.4 million p. Mucormycosis is an opportunistic infection caused by the fungus Mucorales, which is most frequently seen in compromised hosts, especially those with diabetes, malignancies, hematologic disorders, or other immune system disorders. Most cases of mucormycosis occur in patients with uncontrolled immunosuppression. Patients who are admitted to an intensive care unit and receive mechanical ventilation or have an indwelling catheter are also at increased risk for developing mucormycosis because of their increased reliance on medical devices that serve as a portal of entry for these fungi. For most patients, mucormycosis can be diagnosed by histopathologic examination of tissue from the infected organ or by detection of Mucorales DNA in a tissue biopsy specimen. Culture of the fungus from the bronchoalveolar lavage fluid of patients with pneumonia or from the blood of patients with disseminated mucormycosis can facilitate diagnosis. Therapy for mucormycosis has been somewhat limited. Amphotericin B deoxycholate (amphotericin B) and posaconazole are the preferred treatments for systemic mucormycosis. Unlike amphotericin B, posaconazole is active against other mucormycosis fungi, such as Mucor circinelloides and others. The most commonly used antifungal agent for mucormycosis treatment is amphotericin B. Currently, some patients develop hypersensitivity reactions to amphotericin B. Lipid formulations of amphotericin B are now used more frequently and show a higher cure rate Mucormycosis is a serious and life-threatening infection. Mortality rates for immunocompetent patients vary from 20% to 50%. Most cases of mucormycosis occur in patients with some form of immunosuppression. These patients have a high death rate (up to 90%). In addition, mortality is also high among patients with underlying diseases such as diabetes, uncontrolled blood pressure, or uncontrolled immune suppression. Mucormycosis occurs most frequently in patients with cancer and other diseases that weaken the immune sys tem. The risk of mucormycosis is also increased in patients who are receiving chemotherapy, especially those who have an impaired cell-mediated immune system, such as patients with acquired immune deficiency syndrome, leukemia, lymphoma, or solid tumors.



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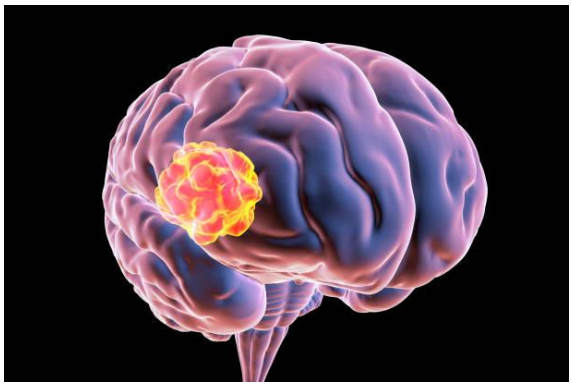
II. IDENTIFY, RESEARCH AND COLLECT IDEA

Mycosis, also known as “fungus meningitis,” is a rare fungus that spreads to the brain via the bloodstream. The fungus forms colonies throughout the brain and will cause wide-spread brain damage. The cause is unknown, but it is known to be contracted through inhalation of spores or via direct contact with either the infected skin or open wounds. Most cases of the disease occur in males older than the age of 20. It is a rare occurrence for an infection to form in the brain

and most of the time it is deadly. Infections usually occur through the inhalation of spores that are found in soil and water. The spores of the fungus can survive for decades in sub-freezing temperatures and can be found all around the world.This fungus has been found in nearly every form of life, including plants, and can grow on almost anything with a high sugar content.

1) Infection:

The fungus grows in slow moving blood vessels throughout the brain The fungus can quickly kill the brain tissue it infects, causing the patient to experience severe headaches, nausea, vomiting, seizures or epilepsy. There are no known survivors who are known to have survived the infection.



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2) Mortality:

Mucormycosis is one of the leading causes of death from invasive fungal infection in the western world. There is no known treatment for the infection and there is no known cure. If you find yourself in the presence of a patient who is suspected of developing the infection, you are to perform CPR and use an Auto-Defibrillator to provide positive cardiac output (stronger pumping action) during the pprocedure The two most common forms of the disease are an infection of rhinocerebral mucormycosis and pulmonary mucormycosis. Rhinocerebral mucormycosis is the more common form and accounts for approximately 95% of all ddiagnoses Pulmonary mucormycosis is rare and accounts for 5% of all diagnoses. Mucormycosis, the fungus responsible for Mucormycosis, can be found growing on a wide variety of food products. The disease has been reported in approximately 69 countries. In the US, approximately 15,000 people are diagnosed with the disease each year. Though most cases of infection occur in children and adults, it has been reported in children as young as five years old. In the US, the most common form of the infection occurs in the Midwest. Some of the symptoms of this infection include fever, cough, headache, nausea, vomiting, depression, weakness and diarrhea. Within 10% of people who develop infection will experience multiple symptoms, and 30% will experience symptoms that are similar to other infections. Unfortunately, there is no way to accurately detect the presence of the disease in the early stages, making the disease very dangerous The disease is commonly found in those who are immunocompromised due to HIV or conditions such as diabetes.

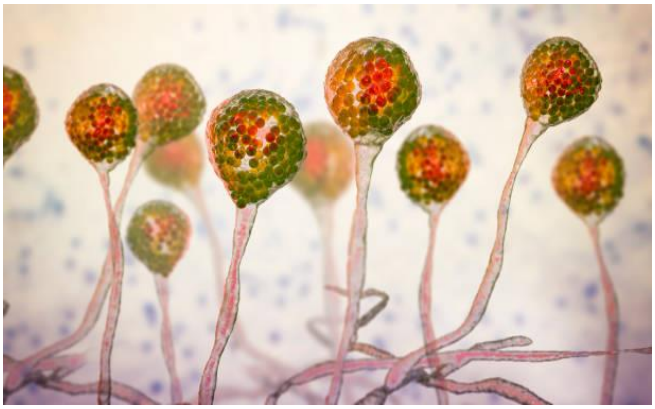
3) Diagnosis:

The disease can be difficult to diagnose correctly due to the dense growth pattern of the fungus within the brain. As there are no known symptoms during the early stages, the only way to determine if the patient has the disease is through imaging tests such as a Magnetic Resonance Imaging test (MRI) or Computerized Tomography. Blood tests can also detect the disease, and it can be determined that the patients immune system is deficient in the presence of a high fever along with signs of severe brain dysfunction In the early stages of the disease, patients usually have a normal EKG, and blood tests usually show a low white blood cell count, low albumin, low blood sugar, low blood urea nitrogen, low creatinine, elevated transaminases, an elevated creatine kinase, and a positive RPR.It is unknown when the fungus starts to invade the brain, but it is known to start forming within the first 24 hours. It also takes about 3-6 weeks for the symptoms to appear following exposure to the spores of the fungus.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

Mucormycosis is a fungal infection. It is a rare and dangerous infection caused by a fungus usually found in the soil. Mucormycosis is an infection caused by the fungus Mucorales. These are a group of fungi in the order Mucorales. They are characterized by the production of a sexual sporangium called fruit body. These are mostly found in soil. They are typically not airborne, but may be if the conditions are right. They are an opportunistic infection, meaning that they are not harmless. They are found mostly immunocompromised individuals. The most common individuals at risk are patients with chemotherapy, neutropenia, hematologic malignancy, and diabetes. These can be found in the respiratory system, digestive system, urinary tract, blood, brain, and lungs. They tend to be found in the lungs and blood. However, they may also be found in other locations.The first symptom is usually a sore or ulcer in the nose, throat, or mouth. It can also be a cough, difficulty

breathing, chest pain, painful swallowing, or a headache.The diagnosis is made by a Gram stain and positive culture. There is no cure for mucormycosis, but there are some treatments. These include liposomal amphotericin B, posaconazole and fluconazole. It is a difficult to treat infection. The most common symptoms are fever, chills, cough, shortness of breath, and chest pain.There are cases of aspergillosis, candidiasis, and histoplasmosis that were misdiagnosed as mucormycosis. They can easily be mistaken for each other.



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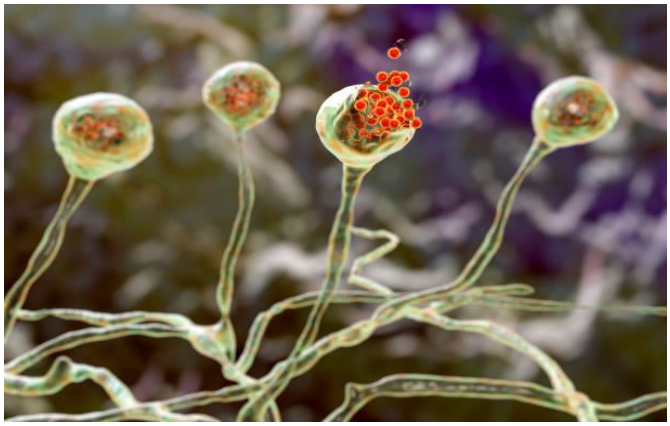

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IV. GET PEER REVIEWED

- Who is at the high risk for mucormycosis infection?
- Is mucormycosis related to covid 19?

V. IMPROVEMENT AS PER REVIEWER COMMENTS

Who is at the high risk for mucormycosis infection?

According to the Centers for Disease Control and Prevention (CDC), mucormycosis mainly affects people with health problems or those who are taking antiretroviral drugs. Factors that make a person more susceptible to mucormycosis include: Diabetes,Cancer Body transplants ,Stem cell transplantation Neutropenia (low number of white blood cells),Skin damage, drug use.

Is mucormycosis related to covid 19?

According to experts, a complex mix of substances makes hospitals and COVID-19 patients more likely to be at risk of infection with mucormycosis. Uncontrolled diabetes, immunosuppression by steroids, cold sores, prolonged stay in the ICU, voriconazole treatment, and traumatic complications such as cancer and organ transplants are believed to cause mucormycosis in COVID-19 patients.

Covid- 19 triggering mucormycosis

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VI. CONCLUSION

Mucormycosis is a disease that is rare but poses an important burden on immune compromised Patients. Newly developed medications have several pathogenesis but cure to mucormycosis is Still a challenge. Several methods have delayed the mortality but still posses a challenge in Curing mucorales. The clinical presentation is non specific, and early diagnosis target the Hisptopathology efficiency and it is time consuming. Direct examination of culture, molecular Diagnostic techniques, PCR and situ hybridisation offer an alternate to initiation the treatment. The management of mucormycosis depends on underlying factors such as injection of Antifungal agents, surgical intervention and timely dosage of antifungal therapy. Immunologic and metabolic profiling is the way to approach this black fungus i.e mucormycosis.

REFERENCES

[1] J.K. Yang, S.S. Lin, X.J. Ji, L.M. Guo Binding of SARS coronavirus to its receptor damages islets and causes acute diabetes. Acta Diabetol., 47 (3) (2010), pp. 193-199, 10.1007/s00592-009-0109-

[2] Almas, M. Ehtesham, T. Khedro, A. Haadi, A.R. Nabeel, S. Hussain, et al. The many faces of coronavirus disease 2019: COVID-19 and the liver Ann Med Surg (Lond), 64 (2021 Apr), p. 102224, 10.1016/j.amsu.2021.102224 Epub 2021 Mar 15. PMID: 33747505; PMCID: PMC7959700

[3] C.B.R. Reed, A. Ibrahim, J. Edwards, S. Filler, R. Robert Goldberg, et al.Combination polyene-caspofungin treatment of rhino-orbital-cerebral mucormycosis Clin. Infect. Dis., 47 (3) (2008), pp. 364-371

[4] T.T.K. Ogawa, I. Tojima, M. Shibayama, H. Kouzaki, M. Ishida, et al.Successful treatment of rhino-orbital mucormycosis by a new combination therapy with liposomal amphotericin B and micafungin Auris Nasus Larynx, 39 (2012), pp. 224-228