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Increasing Cases of Orbital Mucormycosis in Recent Years

Prof. Dr. Halit OĞUZ[1,2], Uz. Dr. Ömer Faruk YILMAZ[2]

1Istanbul Medeniyet University School of Medicine, Department of Ophthalmology, Istanbul
2 Göztepe Prof. Dr. Süleyman Yalçın City Hopital, Eye Clinic, Istanbul

Abstract

Mucormycosis is a uncommon but aggressive and lethal fungal infection, which can rapidly spread especially in immunosuppressed patients. In recent years, there has been a serious increase in the number of orbital mucormycosis cases and publications. Mucormycosis prevalence in India is approximately 70 times more than the prevalence in developed countries. Diabetes mellitus, immunosuppression and trauma are major risk factors. Recently, COVİD-19 disease is common. COVID-19 infection and its treatment lead to immunosuppression, this has made patients vulnerable to secondary infections, including mucormycosis. Ophthalmologists should be aware of the possible vision threatening complications.

Mucormycosis is a quickly progressive and deadly infection caused by fungi. Mucormycosis manifests itself in cutaneous, pulmonary, gastrointestinal, or disseminated form. In recent years, there has been a significant increase in the number and publications of orbital mucormycosis cases in pubmed screening. Mucormycosis prevalence in India is approximately 70 times more than the prevalence in developed countries.(1) Fungi such as mucor, rhizomucor and rhizopus are responsible for mucormycosis. Fungi and spores are found in soil, inhaled air, decaying fruits and vegetables, animal feces and paranasal sinuses in healthy individuals. The most common causes of mucormycosis infection in humans are fungal spores in the air, ingestion, and direct inoculation. Under favorable conditions, fungi multiply rapidly and leading to an invasive infection, particularly in the immunocompromised host. Neutrophils play an important role in providing immunity against fungal infections. Conditions such as cancer chemotherapy, malignancy, ocular trauma and immunosuppression can lead to severe neutropenia. Other risk factors include; intravenous drug abuse, solid organ transplantation, bone marrow transplantation and steroids or immunosuppressive therapy. Because of immunosuppressed conditions, these patients are prone to develop serious opportunistic infections.(2)

The disease mostly occurs in people with diabetes mellitus or other predisposing systemic conditions. Diabetes mellitus and immunosuppression are major risk factors. New risk factors are post-pulmonary tuberculosis and chronic kidney disease. In addition, trauma is a serious risk factor for rhino-mucormycosis. Moreover, COVID-19 infection and its treatment lead to immunosuppression, this has made patients vulnerable to secondary infections, including mucormycosis. The disease pattern of COVID-19 can range from mild to life-threatening pneumonia with associated bacterial and fungal infections. Ophthalmologists should be aware of the possible vision threatening complications. Besides the appropriate risk

Corresponding author: Prof. Dr. Halit OĞUZ İstanbul Medeniyet Üniversitesi Göztepe Prof. Dr. Süleyman Yalçın Şehir Hastanesi Göz Hastalıkları Kliniği 34722, Kadıköy-İstanbul E-posta: oguzhe@yahoo.com

classification, the suspicion of mucormycosis is important for mortality. (3) Morbidity and mortality are still high due to late presentation and diagnosis. In conclusion, the number and importance of orbital mucormycosis cases has increased in recent years due to the emergence of new risk factors and difficulties in treatment. (1)

Symptoms of rhino-orbitocerebral mucormycosis include facial pain and paresthesia, periorbital and nasal swelling, proptosis, external and internal ophthalmoplegia, vision loss, and diffuse necrosis of facial bones. Sinusitis is more common in patients with uncontrolled diabetes and immunosuppression. Most patients have a prolonged fever. Necrotic scars in the nasal cavity are present in 50% of patients. The infection spreads to the orbit through the lamina papyracea. Extension of mucormycosis to the orbit can lead to orbital, subperiosteal abscess and orbital or preseptal cellulitis. Orbital involvement of mucormycosis may cause II, III, IV and VI cranial nerve paresis, ptosis, proptosis, visual impairment and blindness. Intracranial complications include cavernous thrombosis, sagittal sinus thrombosis, epidural and subdural abscess,

If undiagnosed and untreated, mucormycosis can lead to progressive necrosis and can be fatal. Mucormycosis is comparatively rare in the maxillofacial region. Mucormycosis in the facial region manifests as skeletal necrosis with or without soft tissue involvement. Mucormycosis in the head and neck region usually spreads to the paranasal sinuses by direct spread from the nose or maxillary bone. The disease progresses aggressively, leading to extensive facial bone and soft tissue necrosis. Colonization of mucor hyphae in blood vessels leads to necrosis as a result of thrombus formation. Orbital and cerebral involvement are common in advanced cases. Fungal infections require rapid surgical intervention and long-term antifungal therapy. Despite aggressive treatment, the mortality rate is over 80%. (2)

CT and MR are very important to detect the spread of mucormycosis. MRI provides better visualization of soft tissue cavernous sinus, optic canal, and meningeal involvement. In the follow-up of ocular mucormycosis, cranial CT or MRI is highly recommended to determine if sinusitis is present.
The definitive diagnosis of mucormycosis is made histopathologically. Sample can be taken from skin and mucous membranes. Histopathological examination of biopsy presents some difficulties. Culture results are often negative and therefore not always reliable for definitive diagnosis. Mucormycosis filaments are difficult to distinguish from those of Aspergillus and transverse cuts can be mistaken for yeast or spores. (4). Mucorals cannot be detected with fungal stains such as gomorimethenamine silver or periodic acid-schiff stain, whereas they can be detected with hematoxylin and eosin (5). Acetate hyphae with a right-angled branching pattern are characteristic of mucormycosis. Mucormycosis is confirmed by the detection of blackish necrotic tissue in the affected area (2). Genetic tests such as conventional PCR, real-time PCR, PCR high resolution melt analysis and RFLP-PCR have been tested.

Mucormycosis treatment includes surgical intervention as well as antifungal agents. Posaconazole, amphotericin B or its lipid formulations are currently used in the medical treatment of mucormycosis. Posaconazole and isavuconazole may be administrated as maintenance therapy. The duration of treatment is about six months. Resection should be complete until the healthy margin is reached. Hyperbaric oxygen has a fungistatic effect and provides revascularization of ischemic tissue. Cytokines and hyperbaric oxygen as adjuvants to medical treatment are under assessment. (5)

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