Case Report

A case report of mucormycosis and myocardial infarction

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Received: 26 February 2019 / Accepted: 12 March 2019

Abstract

Mucormycosis is an aggressive and angioinvasive fungal infection which often spreads from the paranasal sinuses to the orbital or cranial area. Our case was a 52-year-old male patient with a history of diabetes mellitus (DM) and coronary artery disease (CAD). The patient, referred to the emergency department due to confusion and drowsiness, was admitted to the intensive care unit (ICU) with a diagnosis of diabetic ketoacidosis (DKA). During the physical examination in the ICU, samples were taken from the roof of the mouth with a preliminary diagnosis of mucormycosis. Amphotericin B was initiated to the patient. Inferior myocardial infarction (MI) developed in the follow-up and the patient died at the 20th hour of ICU admission. When the records of the patient were examined, it was determined that he was referred to the outpatient clinic for the examination three times in the last 15 days. In this paper, our aim is to review patients with mucormycosis and MI and to emphasize the importance of physical examination.

Keywords: diabetes mellitus, mucormycosis, myocardial infarction

Introduction

Mucormycosis is a common name given to diseases characterized by organ involvement and formed by Mucor, Rhizopus, or Absidia which are the Mucorales order of fungi with similar properties. The fungi of the Mucorales group have angiophilic characteristics and lead to an early invasion of blood vessels, vascular occlusion, infarction, and ischemia or hemorrhage [1]. The most common clinical form is rhinocerebral involvement. The infection starts at the nose, spreads by creating arterial thrombosis and necrosis, and is followed by a fulminant course. Mucormycosis is more common in patients with diabetic ketoacidosis (DKA), hematological malignancies, neutropenia due to immunosuppression, and in patients using broad-spectrum antibacterial agents [2,3]. The most common predisposing factor (60-80%) is diabetes mellitus [4]. In patients with DKA, fungal growth is accelerated, the more the fungus multiplies, the more vascular invasion it has. It increases ischemia and therefore acidosis and it creates a vicious cycle and usually results in death [5]. The most important point to be considered in the treatment of mucormycosis is an early diagnosis, controlling the problem that causes immune system disorder, systemic amphotericin B treatment, and surgical debridement of necrotic tissues [6]. The aim of this paper is to review the mucormycosis.
and its complications and to emphasize the importance of physical examination.

**Case**

A male patient who was diagnosed with diabetes mellitus (DM) at the age of 52 years and had poor self-care was admitted to the emergency department due to increased confusion and drowsiness. After the first examinations, the patient in whom DKA was determined was admitted to the intensive care unit (ICU). The Glasgow coma score of the patient was 6-7. In the physical examination, ecchymotic color changes were observed on the left side of the patient's face without a history of trauma, the left pupillary light reflex could not be received, and the left pupil was fixed and dilated. In the physical examination performed eight hours later, the lesions were more prominent (Figure 1a-b) and samples were taken from the patient's black necrotic lesions in palatum molle and palatum durum with a preliminary diagnosis of mucormycosis (Figure 2). Amphotericin B treatment was initiated by being consulted with infectious diseases.

![Figure 1a-b. Skin changes on the left side of the patient's face within 8 hours.](image)

![Figure 2. The black mucotic lesions located at palatum durum and palatum mole.](image)

Thickening was detected in the left ethmoid and maxillary sinus in magnetic resonance imaging (MRI) (Figure 3). First laboratory findings showed that HbA1c level was 11.4% and troponin was <0.01 pg/mL. However, troponin value was 23 pg/mL on repeated measurement upon the detection of DIII, aVF ST elevation and V2-6, D1-aVL ST depression in ECG at the 18th hour of ICU admission (Figure 4). Inferior myocardial infarction (MI) was considered and the patient was consulted with cardiology. Medical treatment was suggested to the patient since his general condition was impaired. The sudden cardiac and respiratory arrest at the 20th hour of ICU admission did not respond to resuscitation and so the patient died. When the patient's file was examined retrospectively, it was observed that the patient was admitted to three different polyclinics with pain complaints in the throat in the last 15 days. Procalcitonin was 0.50 and no proliferation was observed in blood, urine, and sputum culture. Septate/aseptate hyphae which were compatible with mucormycosis were observed in the samples taken from the mouth (Figure 5).

**Discussion**

Mucormycosis is diagnosed by clinical findings, imaging methods, mycological culture, and histopathological examination. The presence of fever, periorbital swelling, facial pain, and necrotic areas in the nasal mucosa in patients in whom the immune system was clinically
suppressed should suggest mucormycosis. Imaging methods can be used for diagnosis. Although the radiological findings of rhinocerebral mucormycosis are similar to bacterial sinusitis, soft tissue invasion and bone wall erosion can be detected in some cases [5]. In the MRI of our case, thickening in the ethmoid and maxillary sinus and an increase in the density filling the sinuses were detected (Figure 3). The main diagnosis of the disease is made by histopathological examination and proliferation in the culture. In our case, we could not obtain positive culture results, however, mucormycosis hyphae which were thick, aseptate, and branched in and under the stratified squamous epithelium were observed in the pathological samples taken from the roof of the mouth. This image was compatible with mucormycosis (Figure 5).

Medical and surgical treatment should be applied together in the treatment of mucormycosis. One of the most important factors to determine the success in treatment is the controlling of the underlying disease. Amphotericin B is the most commonly used drug in systemic antifungal treatment [7]. Only antifungal therapy is not sufficient to treat mucormycosis. A good surgical treatment plays an important role in decreasing mortality. In the successful treatment of mucormycosis, aggressive early surgical debridement of the infected tissue is crucial. Surgical treatment involves resection of the necrotic tissue in the involved area or orbital exenteration. In the presence of fungal invasion of the orbit, the orbital excretion is life-saving [8]. We started amphotericin B treatment, but our case died before performing a surgical procedure.

Mucormycosis may spread to all systems [9]. In recent years, it can be clearly seen how invasive this infection is in dead patients. In the pathological examinations performed by autopsy, it can be seen that mucormycosis can spread to all systems. Mucormycosis were determined in the myocardial biopsy of a patient diagnosed with cystic fibrous and bilateral lung transplantation, after he died at the age of 27 years in 2017 [10]. In postmortem multiple biopsy reports of renal transplant patients using immunosuppressive, the hyphae were observed in myocardial tissues, intestines, larynx, brains, and transplanted kidneys [11]. Although this infection was reported in 70% of hematologic patients, it could be higher than those in whom morbidity and mortality were reported [12]. Because premortal diagnosis was made in only 35% of the reported cases with mucormycosis. Considering that the autopsy could not be performed in all cases, it could be suggested that the rate may be higher. In our case, the diagnosis of mucormycosis was considered before the patient died, but the diagnosis was delayed due to the fact that oral examination could not be performed even though it gave symptoms by physical
examination. In our case, the left pupil was fixed and dilated and had no light reflex. Pupillary dilation is known to be indicative of poor prognosis that our case died in a very short time [13]. In the follow-up, a diagnosis of inferior MI was also made, but he died before angiography. Postmortem biopsies could not be obtained because the permission could not be received from the relatives of the patient. In summary, mucormycosis is an infection that is very aggressive and invasive in immunosuppressed cases and usually results in death with multiorgan involvement. Intraoral and nasal examination in the form of rhinocerebral involvement is of vital importance in terms of detecting lesions that can be helpful for diagnosis.

**Conflict of interest**

All authors declare that they have no conflict of interest.

**Funding**

There was no funding received for this paper.

**References**