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Case Report:
Mucor Mycosis in COVID-19 Patient on V- V ECMO

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Abstract

We are ECMO team from critical care department of Cairo University reporting first case of a 43 years old female COVID-19 patient on V-V. ECMO suffering from cutaneous Mucor mycosis on her chest wall, she had free medical history. Patient suffered from severe ARDS which needed V-V ECMO support for two months, patient was receiving steroids and received tocilizumab (Actemera) twice. Mucor mycosis was diagnosed by surgical pathology which is rate condition in such patients. Here condition started with a small lesion that appeared as dark spot on her left anterior chest wall and kept enlarging which raised suspicion of Mucor mycosis. Surgical biopsy was done and sent for pathology twice. Lesion kept enlarging and transformed into huge ulcer on her chest wall involving the muscles. We tried to use antifungals but this couldn't help, despite of all efforts lesion kept enlarging and involving cutaneous layers and deeper into the muscles.

Key Words: *COVID-19 - ARDS - ECMO - Mucomycosis.*

Introduction

A 43-YEAR- old female patient presented to the hospital with fever and dyspnea.

Clinically her GCS was 15. Temperature was 38.0°C, blood pressure 150/60mm Hg, pulse 80 beats per minute, respiratory rate 18 breaths per minute, oxygen saturation 60% on room air. There were scattered crackles in the lungs. Cardiac examination was unremarkable. An electrocardiogram showed sinus rhythm at a rate of 80 beats per minute with no abnormalities.

The patient was referred to the ICU. Laboratory analysis. CBC showed mild absolute lymphopenia TLC: 14000 and Lymphocytes 714 (6)%, the platelet count and prothrombin-time international normalized ratio were normal (INR:1), as were levels of sodium: 135, chloride 105, calcium 8, magnesium 2.5, total protein 8, Albumin 3.0, direct and total bilirubin 0.7, 1.7, aspartate aminotransferase 64, alanine aminotransferase 27. Nasopharyngeal swab for COVID-19 PCR [1] was positive.

Anteroposterior chest radiograph showed bilateral, interstitial infiltrations. Computed tomography (CT) of the chest showed bilateral ground glass appearance and crazy paving CORADS 5 which raised suspicion of COVID-19 infection [2].

Management:

Patient was managed initially on NIV CPAP, Hydroxychloroquine, Zithromax, PPI and Solumedrol 200mg/day but CPAP failed and patient was intubated and mechanically ventilated due to respiratory failure type I.

Patient was intubated for two weeks tried prone positioning, tocilizumab 2 doses 200mg each given day 10. Patient developed bilateral pneumothorax and chest tubes inserted.

Clinical decision and plan of management:

Decision was made after two weeks of mechanical ventilation to initiate V-V ECMO support, patient was connected on V-V ECMO with a configuration Right Femoral to Right central jugular vein but patient was still hypoxic so decision was made to insert another Left femoral access cannula to achieve adequate flow and oxygenation, heparin infusion was started to achieve target PTT 80 secs to prevent oxygenator and cannulas thrombosis.

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Patient suffered from recurrent attacks of pulmonary hemorrhages; bronchoscopy was done showing massive bronchial bleeding. Bilateral bronchial artery embolization was done successfully.

Oxygenators were changed five times over 40 days of ECMO support due to recurrent thrombosis.

Patient developed trachea-esophageal fistula; Gastrostomy was done successfully.

Day ten of ECMO support dark spot ulcerated lesion extending to the muscle on her Left anterior chest wall at the infraclavicular area not related to any intervention, repeated surgical debridement was done and pathology sent (Fig. 1).

Ulcer kept enlarging and patient started to be hemodynamically unstable developing Septic shock. (Fig. 2).

The histopathological features showed:

- The dermal blood vessels are invaded with broad non-septate hyphae, which branch irregularly at 90º.
- The invaded vessels are showing vasculitis, thrombosis and hemorrhage (Fig. 3).
- PAS stain highlights the hyphae within the blood vessels and adjacent tissues (Fig. 4).
- The diagnosis is hyphae attached to minute vessels suggesting Mucor mycosis and the patient died of Septic shock.

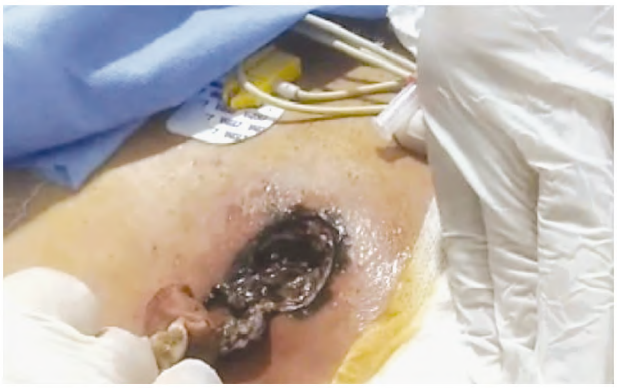

Fig. (1): Picture of the Ulcer on the anterior chest wall.

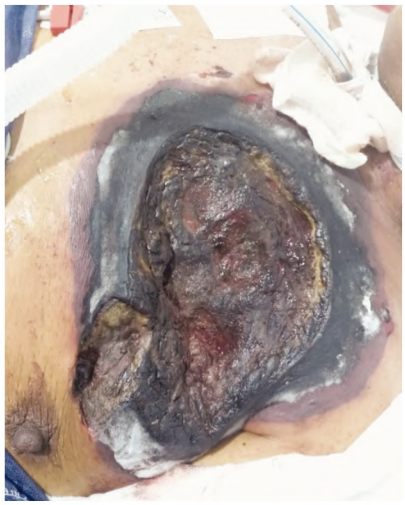

Fig. (2): Picture of the Ulcer.

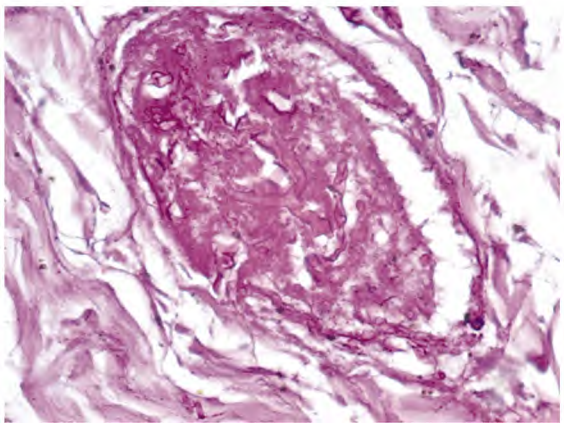

Fig. (3): The invaded vessels are showing vasculitis, thrombosis, and hemorrhage.

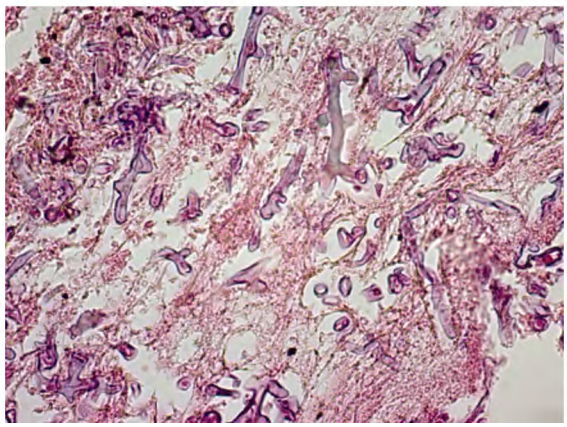

Fig. (4): PAS stain highlights the hyphae within the blood vessels and adjacent tissues.

Mucor mycosis:

Mucor mycosis (sometimes called zygomycosis) is a serious but rare fungal infection caused by a group of molds called mucoromycetes. These fungi live throughout the environment, particularly in soil and in decaying organic matter, such as leaves, compost piles, or rotten wood [3].

These forms of Mucor mycosis usually occur in people who have health problems or take medicines that lower the body's ability to fight germs and

sickness [4,7]. Mucor mycosis can also develop on the skin after the fungus enters the skin through a cut, scrape, burn, or other type of skin trauma.

Types of mucor mycosis:

- Rhino cerebral (sinus and brain) Mucor mycosis is an infection in the sinuses that can spread to the brain. This form of Mucor mycosis is most common in people with uncontrolled diabetes and in people who have had a kidney transplant [8,9].
- Pulmonary (lung) Mucor mycosis is the most common type of Mucor mycosis in people with cancer and in people who have had an organ transplant or a stem cell transplant.
- Gastrointestinal Mucor mycosis is more common among young children than adults, especially premature and low birth weight infants less than 1 month of age, who have had antibiotics, surgery, or medications that lower the body's ability to fight germs and sickness [10,11].
- Cutaneous (skin) Mucor mycosis: Occurs after the fungi enter the body through a break in the skin (for example, after surgery, a burn, or other type of skin trauma). This is the most common form of Mucor mycosis among people who do not have weakened immune systems.
- Disseminated Mucor mycosis occurs when the infection spreads through the bloodstream to affect another part of the body. The infection most commonly affects the brain, but also can affect other organs such as the spleen, heart, and skin.

Diagnosis:

A definitive diagnosis of Mucor mycosis typically requires histopathological evidence or positive culture from a specimen from the site of infection. Specimens from sterile body sites offer stronger evidence of invasive infection compared to colonization [12,13]. No routine serologic tests for Mucor mycosis are currently available, and blood tests such as beta-D-glucan or Aspergillus galactomannan do not detect mucoromycetes. DNA-based techniques for detection are promising but are not yet fully standardized or commercially available [14].

Treatment:

Amphotericin B, Posaconazole, and isavuconazole are active against most mucoromycetes. Lipid formulations of amphotericin B are often used as first-line treatment [15]. Medications active against Aspergillus such as voriconazole are not active against mucoromycetes, and there is some evidence to suggest that pre-exposure to voriconazole may be associated with increased incidence of Mucor mycosis in some patients [16,17]. In addition, surgical debridement or resection of infected tissue is often necessary, particularly for rhino cerebral, cutaneous, and gastrointestinal infections [15,18]. Control of the underlying immunocompromising condition should be attempted when possible [15]. The efficacy of other treatments such as hyperbaric oxygen therapy is uncertain but have been useful in certain situations [19].

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داء الغشاء المخاطى (الفطر الاسود) فى مرضى فيروس الكورونا المستجد على جهاز الأكسجه الغشائيه الخارجى

مريضه ٤٣ سنه بدون اى تاريخ مرضى اتت الى المستشفى تشتكى من حراره مرتفعة وصعوبه بالتنفس. بعد فحص المريضه وعمل التحاليل والفحوصات اظهرت الاشعه المقطعيه والمسحه بان المريضه مصابه بمرض فيرس كورونا المستجد.

عند انخفاض نسبه الاوكسجين تم وضع المريضه على جهاز التنفس الصناعى النافذ لمده اسبوعين كاملين واعطاء المضادات الحيوية واسعه المجال والكورتيزون وجرعتين من الأكتيمرا.

ثم تم التواصل معنا كفريق للايكمو وتم اتخاز القرار لوضع المريضه على الجهاز الايكمو لمساعدة الرئهو حدث نزيف رئوى وتم عمل اشعه تداخلية لاغلاق الشرايين المغذيه للشعب الهوائيه.

بعد عشره ايام من وضع المريضه على جهاز الايكمو ظهر قرحه على صدر المريضه تم عمل تنظيف عده مرات واخز عينه وتم تحليلها التى اظهرت وجود فطريات داء الغشاء المخاطى (الفطر الاسود). ورغم اعطاء المريضه اللازم من مضاد الفطريات ولكن لم تستفيد.