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Arch Basic Clin Res 2023; 5(1): 222-225 · DOI: 10.5152/ABCR.2023.224874

Case Report

Fusarium Fungemia After Electric Burn: A Case Report

Elektrik Yanığı Sonrası Gelişen Fusarium Fungemisi: Olgu Sunumu

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Cite this article as: Ersoy Y, Doğan A, Duman Y, Fırat C. Fusarium fungemia after electric burn: A case report. *Arch Basic Clin Res.*, 2023;5(1):222-225.

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ABSTRACT

Fusarium bloodstream infections, which are mostly seen in immunosuppressive patients, are serious life-threatening infections. Here, we present a 35-year-old male patient who was being followed up for electric shock due to *Fusarium* fungemia, which developed while receiving antibacterial therapy. It was thought that the patient's central venous catheter, use of broad-spectrum antibiotics, and severe burn could be the most important risk factors. The patient was successfully treated by withdrawing the catheter and administering Liposomal Amphotericin-B 3 mg/kg daily for 3 weeks. Blood culture is critical in burn patients, and *Fusarium* infections should also be considered.

Keywords: *Fusarium*, burn unit, catheter-related bloodstream infection

ÖZ

Fusarium fungemileri, çoğunlukla immünosupresif hastalarda görülen ve hayatı tehdit eden ciddi enfeksiyonlardır. Burada, elektrik çarpması nedeniyle takip edilen ve antibakteriyel tedavi alırken *Fusarium* fungemisi gelişen 35 yaşında erkek hastayı sunuyoruz. Hastanın santral venöz kateterinin olması, geniş spektrumlu antibiyotik kullanımı ve şiddetli yanık olmasının en önemli risk faktörleri olduğu kanısındayız. Hasta, santral venöz kateteri çekilerek ve 3 hafta boyunca günde 3 mg/kg Lipozomal Amfoterisin-B verilerek başarılı bir şekilde tedavi edildi. Yanık hastalarından kan kültürü almak önemlidir ve kateter ilişkili kan dolaşım enfeksiyonlarında *Fusarium* fungemisi de akla getirilmelidir.

Anahtar Kelimeler: *Fusarium*, yanık ünitesi, kateter ilişkili kan dolaşım enfeksiyonu

INTRODUCTION

Burn patients constitute a risky patient group due to their high mortality and morbidity rates. These patients are very prone to infection due to the deterioration of their skin integrity and immune system. Infections are the cause of 75% of deaths in these patients.[1,2]

Fusarium species, an important plant pathogen, can occasionally cause infection in animals and humans. *Fusarium species* can cause serious opportunistic infections, which can progress with skin lesions such as onychomycosis, keratitis, endophthalmitis, and invasive fungal infections in humans, generally in immunocompromised patients who have hematological malignancies, hematopoietic stem cell transplantation, neutropenia, human immunodeficiency virus infection. It can cause serious bloodstream infections with high mortality in patients with a suppressed immune system.[2-4] *Fusarium species* are common saprophytic fungi that represent the third cause of invasive mold infection in humans overall, after *Aspergillus* and *Mucorales*. Even with appropriate and intensive therapeutic management, the mortality rate due to invasive *Fusarium* infection can be over 50%.[5,6] In burn patients, although it is occasionally encountered as a causative agent of wound infection, fungemia is rarely encountered in this patient group.[7]

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Geliş Tarihi/Received: October 5, 2022
Kabul Tarihi/Accepted: December 21, 2022
Yayın Tarihi/Publication date: January 31, 2023

In this case, *Fusarium* fungemia, which developed while being followed up with an electrical burn, and its treatment are presented.

CASE PRESENTATION

A 35-year-old male patient was admitted to the tertiary Adult Burn Intensive Care Unit due to an electric shock. There was second- and third-degree burn in the neck area, both upper extremities, anterior and posterior aspect of the trunk, and left thigh lateral with a ratio of 40% according to the total body surface area. It was learned that he was sent to our center by performing fasciotomy on both upper extremities and escharotomy on the trunk in the first center where he was followed up. The patient, whose general condition was poor and supportive treatments were started, was taken to a single room and followed up. An increase in density was observed in the posterior-anterior chest x-ray of the patient, who had complaints of dyspnea on the 3rd day of the follow-up, and an increase in acute phase reactants was detected. In addition, the patient's blood, urine culture, and complete urinalysis were studied. Empirically, meropenem 3 × 1 g and linezolid 2 × 600 mg treatment were started. The patient, who did not have a fever in the follow-ups and whose general condition recovered relatively, worsened again on the 12th day of his current treatment, and because of fever and the presence of a central catheter, fluconazole 800 mg loading and 400 mg/day maintenance treatment were added empirically with a preliminary diagnosis of fungemia. On the 27th day of his hospitalization, while he was receiving meropenem and fluconazole treatment, clinical worsening occurred, and *Fusarium spp.* growth was observed in the taken blood culture. Blood culture was performed with the Bac/T Alert 3D (Bio-Merieux, France) automated system. The blood culture with a positive signal was inoculated on sheep blood, EMB, chocolate, and Sabouraud 2% dextrose agar medium. After a 24- to 48-hour incubation, molds from the plate were stained with lactophenol cotton blue and examined (Figures 1-3).

The central venous catheter of the patient, who was started on liposomal amphotericin B at a dose of 3 mg/kg, was removed on the 3rd day of the treatment. Since no fungal or bacterial growth was detected in the wound debridement cultures, and there was no other focus, it was thought that it might be catheter-related *Fusarium* fungemia or that it might be caused by the burn area, although it could not be detected in the wound cultures. There was not any corticosteroid treatment before and after the fusariosis diagnosis. The patient, whose liposomal amphotericin B treatment was completed for 3 weeks, and whose control blood cultures did not show any growth, was discharged with full recovery after graft application for burn wounds and other treatments were completed.

MAIN POINTS

- Burn patients constitute a risky patient group for fungal infections.
- Catheter and antibiotic use in burn patients are important risk factors for fungal infections.
- *Fusarium* fungal infections should be considered in burn patients.

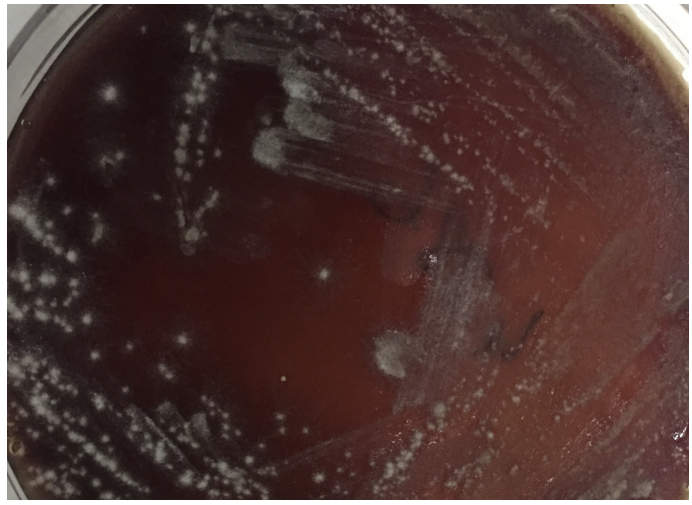


Figure 1. Growth of *Fusarium spp.* on blood medium passaged from a blood culture bottle.

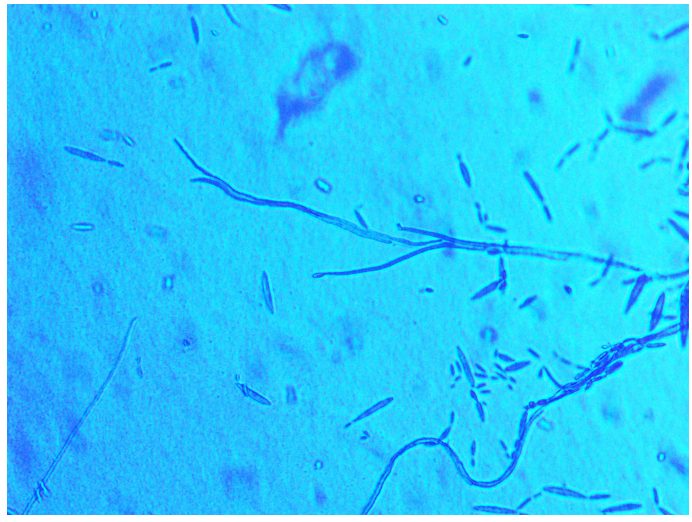


Figure 2. Microscopic examination of staining with lactophenol cotton blue.

DISCUSSION

Burn patients become vulnerable to many infections, especially bacterial infections. Fungal infections are the most

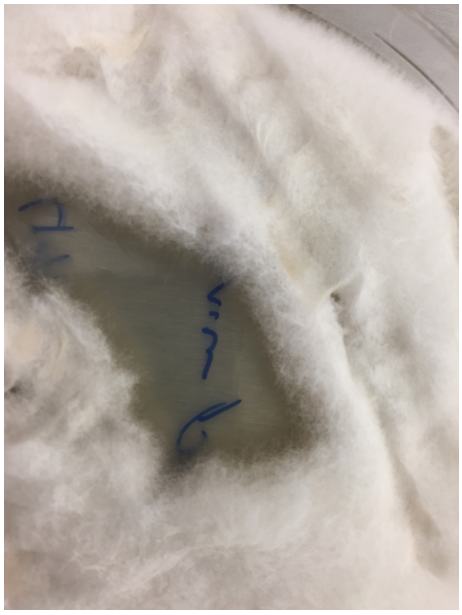


Figure 3. Reproduction image of *Fusarium spp*. on Sabouraud dextrose medium.

common infections after bacterial infections. Despite the availability of new antifungals, invasive fungal infections cause high morbidity and mortality in immunocompromised patients. Invasive fungal infections are caused by yeasts, especially *Candida species*, while *Aspergillus species* are the most common in molds.[1,8] Mortality rates of mold infections are generally higher than yeast infections. About 90% of invasive mold infections are caused by *Aspergillus species*, followed by *Mucarales* team members (*Mucormycosis*) and *Fusarium* and *Scedosporium species*. Invasive fungal infections develop in 17%-25% of patients in intensive care units. More than 10% of these infections are invasive mold infections.[1] *Fusarium spp. infection in burn patients is usually reported as wound infections.*[7,9] The isolations of *Fusarium* spp from blood were reported very rarely in this patient group. It was reported that it was isolated from blood in only 1 of 15 cases in which fusarium was found in the pediatric burn unit.[7] Here, we present a case with a bloodstream infection caused by *Fusarium* spp in Burn Unit.

Risk factors of fusarium infection usually were determined as trauma, major burns, and foreign body for non-immunosuppressed persons.[10] However, the data on risk factors are limited in burn patients, there were only case reports or a few retrospective studies.[7,11] We believe that the most important risk factors in our patient were electrical burns (which means more than 50% burns on the body surface), the presence of a central venous catheter, and using broad-spectrum antibiotics. Suspicion of fungal infections and initiation of rapid empirical antifungal therapy is very critical in terms of patient prognosis, especially in the case of intensive care hospitalization, long-term use of broad-spectrum antibiotics, the presence of a central catheter, unexplained fever, and clinical worsening.

The mortality rate of invasive *Fusarium spp.* infections in immunocompromised patients is very high despite antifungal therapy. For treatment of invasive fusariosis, liposomal amphotericin B (3-5 mg/kg) is usually preferred. Catheter removal and antifungal therapy are very important for catheter-related infections.[12] In recent years, voriconazole has been recommended in combinations or single treatment regimens.[6] In our patient, we removed the catheter as early as possible and we preferred to use only 3 mg/kg liposomal amphotericin B for 3 weeks because of patient's immunosuppression is not severe as hematological malignancies. He had a good response to this treatment.

In a conclusion; *Fusarium* fungemia is a condition that should be considered in severe burn patients who receive broad-spectrum antibiotics and microbiological identification is important in terms of treatment management.

Informed Consent: Verbal and written consent was obtained from the patient who participated in this study

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – Y.E.; Design – A.D., Y.D.; Supervision – A.D., C.F.; Resources – Y.E., Y.D.; Materials – A.D., C.F.; Data Collection and/or Processing – A.D., Y.D., C.F.; Analysis and/or Interpretation – Y.E., Y.D.; Literature Search – Y.D.; Writing Manuscript – Y.E.; Critical Review – Y.E., A.D., Y.D., C.F.

Declaration of Interests: The authors declare that they have no conflicts of interest

Funding: The authors declared that this study has received no financial support.

Hasta Onamı: Sözlü ve yazılı hasta onamı bu çalışmaya katılan hastadan alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir – Y.E.; Tasarım – A.D., Y.D.; Denetleme – A.D., C.F.; Kaynaklar – Y.E., Y.D.; Malzemeler – A.D., C.F.; Veri Toplanması ve/veya İşlemesi – A.D., Y.D., C.F.; Analiz ve/veya Yorum – Y.E., Y.D.; Literatür Taraması – Y.D.; Yazıyı Yazan – Y.E.; Eleştirel İnceleme – Y.E., A.D., Y.D., C.F.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Herhangi bir finansal destek alınmamıştır.

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