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Saksenaea erythrospora infection after medical tourism for esthetic breast augmentation surgery☆

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SUMMARY

Background: Mucormycosis caused by *Saksenaea erythrospora* is rarely reported in humans. Three previous cases have been reported in the literature, two associated with trauma (a sailing accident in Argentina and a combat trauma in Iraq) and one as a cause of invasive rhinosinusitis (India), all in immunocompetent patients . The first case of mucormycosis following esthetic surgery, associated with medical tourism, is reported herein.

Case report: A case study of an *S. erythrospora* infection in an immunocompetent woman after the completion of esthetic surgery (dermolipectomy and breast augmentation) is reported. The infection presented as a rapidly progressive necrotizing infection of the skin and soft tissue, which required a bilateral mastectomy and extensive surgical debridement associated with prolonged antifungal therapy. The organism was identified phenotypically and confirmed biologically after rDNA amplification and sequencing. Two months later, the patient remains hospitalized awaiting the start of reconstructive surgeries. The present case is, to the best of the authors' knowledge, the first report from Colombia.

Conclusions: Mucormycosis should be considered in the differential diagnosis of necrotizing infections of the skin and soft tissue that evolve rapidly after cosmetic surgery performed in tropical or subtropical countries.

1. Introduction

Mucormycosis is a rare infection caused by fungi of the order Mucorales.[1,2] Mucormycosis typically occurs in patients with comorbidities such as neutropenia, hematological malignancy, diabetes, or steroid use. There are several different clinical manifestations of the infection, including rhinocerebral, pulmonary, gastrointestinal, cutaneous, or disseminated onset, which typically correlate with the predisposing condition.[3]

Rhizopus spp are the most common causes of invasive mucormycosis (50%), followed by *Mucor spp*, *Apophysomyces spp*, and *Lichtheimia spp*. *Saksenaea vasiformis* is responsible for less than 2% of these infections, most of which occur in tropical or subtropical climates.[4]

S. vasiformis was previously considered to be the only species of the genus, until the discovery of *Saksenaea oblongispora* and *Saksenaea erythrospora* in 2010.[5] Although these fungi will grow on routine mycological media, they do not sporulate easily, which makes them difficult to identify. Therefore, the use of molecular methods based on PCR amplification and internal transcribed spacer (ITS) sequencing is necessary. Being a soil saprophyte, infections by these microorganisms are typically associated with a history of trauma, burns, bites, or animal bites. Additionally, these organisms have been associated with nosocomial infections, such as intramuscular injections, catheter-related bloodstream infections, and

☆ The sequence obtained in this study was submitted to GenBank under accession number **KU951560**.

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surgical site infections.[6,7] More than 80% of *S. vasiformis* infections have been reported in previously healthy or nonimmunocompromised patients; these infections are clinically characterized by necrotizing fasciitis or cellulitis that rapidly spreads to the surrounding tissues.

2. Case report

A previously healthy 29-year-old Colombian woman with a history of dermolipectomy and breast augmentation performed in the city of Maracaibo, Venezuela presented fever and chills associated with pain and erythema in the surgical wound of the right breast on the fifth postoperative day. The patient underwent an operation for the removal of the breast implants, and broad-spectrum antibiotic therapy was initiated. The patient was admitted to the local hospital in Valledupar, Colombia on the ninth postoperative day due to the persistence of inflammatory signs in the right breast, leukocytosis (19×10^9 cells/l), and neutrophilia (80%). Blood and surgical wound cultures were taken, and antimicrobial therapy with meropenem and vancomycin was initiated. On the 11th postoperative day, a clinical deterioration was evident, and the patient reported increased pain at the surgical site; the presence of skin necrosis, with the production of pus in the right breast, was noted (Figure 1A). A radical right breast mastectomy, surgical debridement of the necrotic tissue, and drainage were performed. In addition, a sample was taken for histopathology studies and microbiological cultures. Following the surgical procedure, the patient was admitted to the intensive care unit for invasive mechanical ventilation and was given antibiotic management with tigecycline and cefepime.

Forty-eight hours later, the patient had an increased white blood cell count (64×10^9 cells/l), and a persistent clinical deterioration was evident. The left periareolar area was erythematous and there was soft tissue necrosis extending from the right axillary line to the left breast and upper-third of the abdomen (Figure 1B). A radical left mastectomy and debridement of the necrotic tissue were then performed (Figure 1C).

Three sets of blood cultures were persistently negative for bacteria, and direct microbiological examination of the samples did not show the presence of fungi, bacteria, or mycobacteria (Gram and Ziehl–Neelsen stains were negative). In addition, cultures of the necrotic tissue for bacteria and mycobacteria did not show signs of microbial growth. However, the primary fungal culture of this clinical specimen showed the presence of mycelial fungi with no septate hyphae, suggestive of mucormycosis. Amphotericin B and caspofungin were thus added to the treatment regime. The patient was then transferred to a hospital with greater capabilities 72 h later for hyperbaric oxygen therapy. Two months later, the patient remains hospitalized awaiting the start of reconstructive surgeries.

The fungal isolate was incubated at 37 °C for 10 days in potato dextrose agar (PDA; Scharlab S.L, Barcelona, Spain), malt extract agar (MEA; Scharlab S.L), and Sabouraud–glucose agar (SDA; Scharlab S.L). Rapidly growing colonies with white aerial mycelia were found in all of the samples. Microscopic examination showed sterile broad non-septate hyphae with sporadic hemispherical columella (Figure 1D). Despite multiple cultures in various mycological media, it was not possible to obtain fungal sporulation. The strains were then subcultured in Czapek Dox agar (CZA; Oxoid, UK) and showed the presence of dichotomously branching rhizoids at the base of the hyaline sporangiophores and the typical flask-shaped sporangia (Figure 1E).

Histopathological analyses showed abundant granulated tissue with the foreign body reaction and multiple aseptate hyphae in the intravascular space with branching at right angles, suggestive of mucormycosis (Figure 1F). The fungal culture was sent to the Laboratorio Corpogen Corporation for molecular identification. This was performed by amplification and sequencing of the ITS and 5.8S RNA of the nuclear rDNA by PCR using the primers ITS1 (5′-TCC GTA

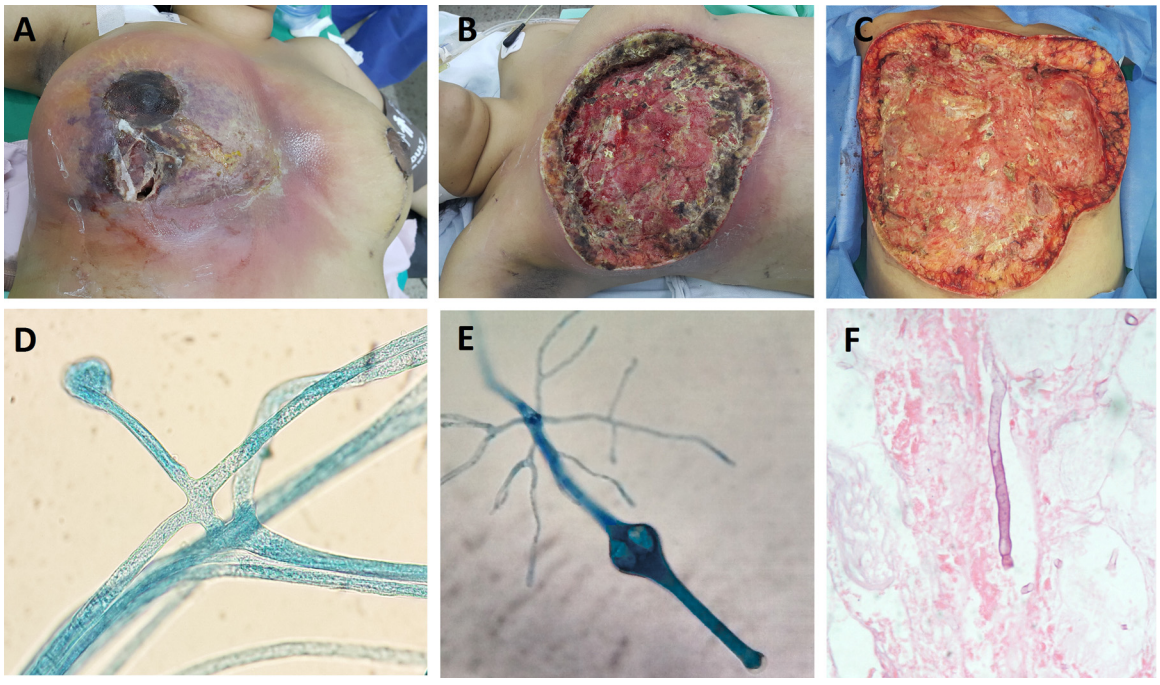

Figure 1. (A) Image showing the mammoplasty and dermolipectomy on the 11th postsurgical day; skin necrosis with the production of pus in the right breast is shown. (B) Postoperative image following mastectomy of the right breast. (C) Intraoperative image after mastectomy of the left breast and debridement of the surrounding skin and soft tissue. (D) Microscopic image of the fungal columella on PDA agar (40×). (E) Classical structures (sporangium, sporangiophore, rhizoids) of *Saksenaea spp* on CZA agar (40×). (F) A section of the patient's skin and soft tissue infected with mucormycosis stained with hematoxylin and eosin, showing broad aseptate hyphae in the intravascular space with branching at right angles (40×).