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Rhinofacial Aspergillosis in an Infant

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Abstract

Introduction: Invasive fungal sinusitis is a potentially lethal infection in immunocompromised patients, with a reported incidence of around 2%. Neutropenia due to aplastic anemia or secondary to chemotherapy is the main cause of acute invasive fungal sinusitis.
Case Presentation: We present the case of a 6-month-old boy with hemophagocytic syndrome. During the follow-up for fever and pancytopenia at the medical faculty hospital of Hacettepe University, Ankara, Turkey, the patient developed discoloration and black crusting of the nasal columella. Antifungal medical treatment and biopsy were recommended owing to the suspicion of invasive fungal infection. The premaxilla, nasal columella, and nasal cartilages were necrotic. Medical and surgical treatments were performed to prevent the spread of infection. After controlling the underlying immunosuppression, nasal reconstruction was advised.
Conclusions: Invasive fungal sinonasal disease is a rare clinical phenomenon in immunocompromised patients. Although it is associated with high mortality rates, it can be successfully managed with a combination of surgical and medical treatments.

Keywords: Acquired, Aspergillosis, Immunosuppression, Nasal Deformities

1. Introduction

Invasive fungal sinusitis is common in immunocompromised patients. The incidence of this disease has increased due to uncontrolled diabetes mellitus, hemochromatosis, AIDS, organ transplantation, and hematological malignancies. High mortality rates have been reported, especially in children (1). Besides soil and fruits, Aspergillus and other fungal species can be found in the throat, nasal cavity, and feces of immunocompetent individuals. On the other hand, the disease may be lethal in immunosuppressed people.

Acute invasive fungal sinusitis, a rapidly progressive form of sinusitis, is characterized by purple-black crusty lesions on endoscopic findings. The diagnosis of acute invasive fungal sinusitis is based on mycotic infiltration of the mucosa, submucosa, blood vessels, tissues, or bones (2, 3). In this report, we present the case of a 6-month-old patient, who developed rhinofacial Aspergillosis during follow-up for hemophagocytic syndrome.

2. Case Presentation

A 6-month-old boy was referred to the emergency department for further investigation and treatment during the follow-up for hemophagocytic syndrome. According to the patient's medical history, after vaccination, the patient had developed fever and suckling difficulties and was diagnosed with hepatosplenomegaly. Table 1 shows the results of blood analysis.

Table 1. Laboratory Test Results

Test Parameters	Results	Preference Range
Hemoglobin	5 g/dL	9.5-13/dL (for infants)
Thrombocyte	3000 mm^3	150 000-450 000/mm^3
Triglyceride	550 mg/dL	0-200 mg/dL
Fibrinogen	120 mg/dL	200-450 mg/dL
Ferritin	> 1200 ng/mL	7-276 ng/mL

As the patient's fever and pancytopenia did not improve, he was referred to the emergency department of medical faculty hospital of Hacettepe University, Ankara, Turkey, and treatment was continued with meropenem, teicoplanin, and amikacin. However, fever did not subside, and fungal infiltration was detected in the lungs. Accordingly, teicoplanin was replaced with amphotericin B. His clinical condition did not improve, and necrotic areas were observed in the nose.

The patient was referred to the otorhinolaryngology department. Paranasal computed tomography (CT) did not reveal any fungal infections. The lesions progressed, and the patient underwent surgical debridement 1 week after the emergence of lesions. During surgery, the premaxilla had a necrotic appearance secondary to infection and was covered with green-black crusts and hyphae (Figure 1).

The skin of the upper lip and nasal columella was separated, and necrotic tissues were dissected. The quad-

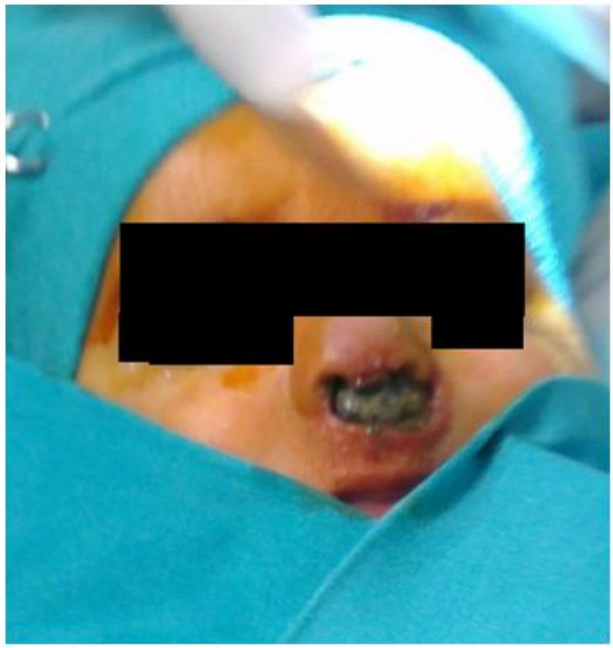

Figure 1. Preoperative Image of the Patient

rangular cartilage, upper lateral cartilage, alar cartilage, vestibule, bilateral anterior part of the inferior turbinate, and bilateral medial part of the maxilla and maxillary crest were necrotic and excised (Figures 2 - 5; Table 2). During curettage, two maxillary central incisors with necrotic roots were also removed.

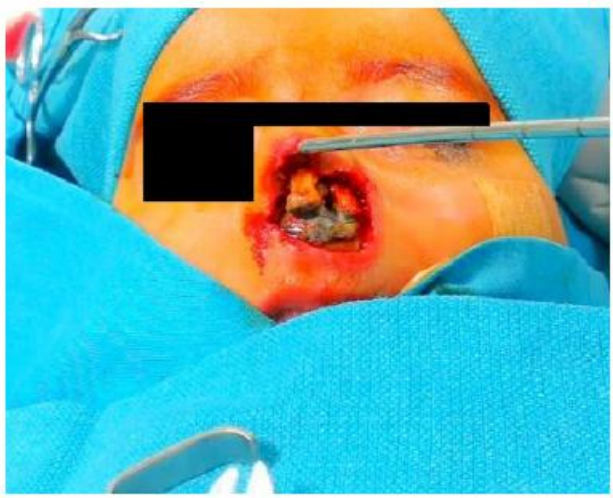

Figure 2. Intraoperative Image of the Patient

Upon encountering bleeding in healthy areas, the

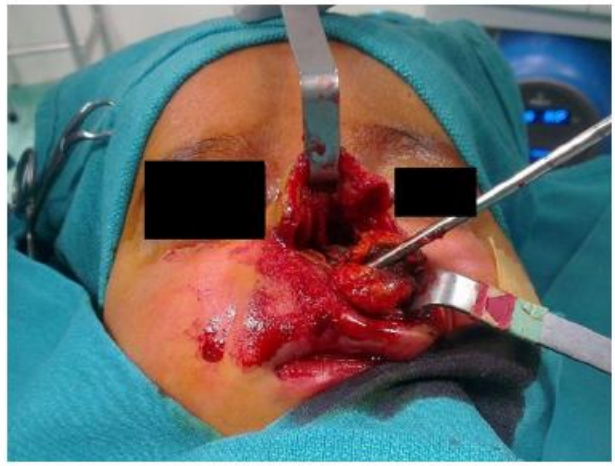

Figure 3. Intraoperative Image of the Patient

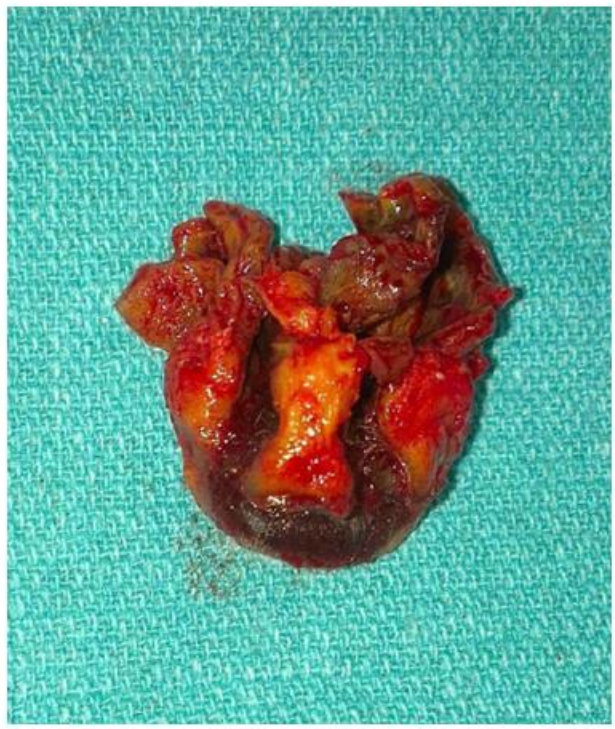

Figure 4. Image of the Necrotic Bilateral Medial Part of the Maxilla and Maxillary Crest

operation was terminated, and the antifungal agent, voriconazole, was administered. The patient was treated with liquid boric acid, and Xeroform gauze was used for dressing (Figures 6 and 7 show the patient's condition 1 week and 1 month postoperative, respectively). In the pathological and microbiological examinations, A. niger

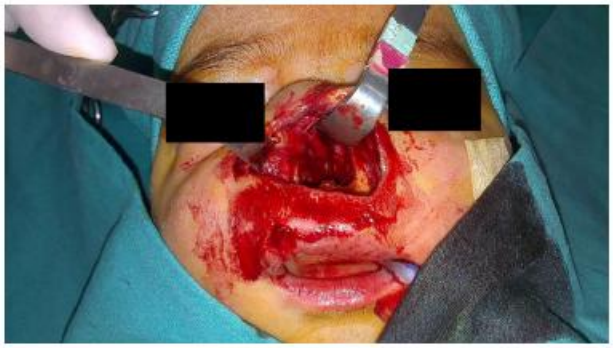

Figure 5. Image of the Patient After Resection

Table 2. The Patient's Demographic Characteristics

Variable	Value
Age	6 months
Gender	Male
Underlying primary disease	Hemophagocytic syndrome
Microbiological diagnosis	*Aspergillus niger* and *Aspergillus flavus*
Surgical therapy	Inferior turbinate, columella, and nasal septum debridement

and *A. flavus* growth was observed. At 2-month follow-up, the infection had not recurred, and nasal reconstruction was recommended after observing improvements in the patient's clinical condition.

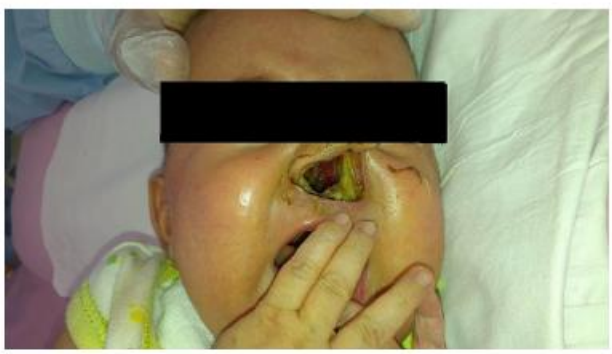

Figure 6. One Week After Surgery

3. Discussion

Gram-positive or negative bacteria are common causative agents of community-acquired or nosocomial infections (4). Fungal infections are most commonly

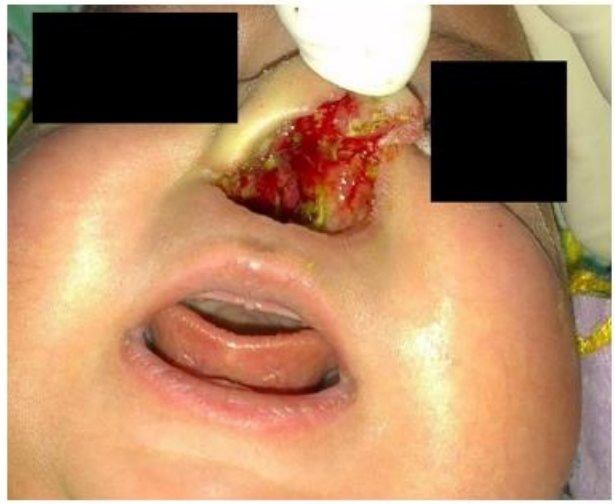

Figure 7. One Month After Surgery

seen in immunocompromised patients. The incidence of invasive fungal sinusitis has been reported at 2%. Patients with hematological diseases are at a higher risk of invasive fungal sinusitis (5). A previous study demonstrated that mucormycosis was more common in patients with uncontrolled diabetes, whereas Aspergillosis was more frequent in hematological and oncological patients (6).

In the present report, the patient had a hematological disorder, in addition to invasive Aspergillosis. Overall, typical findings of hemophagocytic syndrome are fever, hepatosplenomegaly, and cytopenia or bicytopenia (eg, anemia and thrombocytopenia). Other findings include hypertriglyceridemia, hypofibrinogenemia, and hyperferritinemia (ferritin level > 500 ng/mL), as reported in the present case (7). Invasive fungi exert pathological effects, leading to ischemic necrosis of tissues. They can spread rapidly throughout the body and invade the eyes and brain.

To diagnose invasive fungal sinusitis, a high index of suspicion is necessary. This disease should be considered in patients with fever, facial pain, rhinorrhea, and nasal congestion (2). Symptoms may persist for up to 1 month before the condition progresses rapidly, sometimes within days (8). On the nasal cavity examination, purple-black crusts, necrotic vascular areas, discolored mucosal areas, and sometimes hyphae may be seen. All these findings were observed in the present case.

Definitive diagnosis of invasive fungal sinusitis is based on histopathological findings of hyphal formation in tissues or culture of biopsy material (2). Imaging methods such as paranasal CT scan with contrast and magnetic resonance imaging (MRI) should be used for soft tissue in-

vasion if necessary. Although paranasal CT findings are nonspecific, an invasive infection is generally associated with mucosal thickening, hyperdense areas in sinus soft tissues, sinus opacification, and bone destruction at later stages of disease (9). In the present case, when CT scan was performed, the detected lesions did not show bone destruction, as fungal infection had not progressed yet. Therefore, imaging modalities may not be helpful in the diagnosis of invasive fungal sinusitis.

Due to the high mortality rates, invasive fungal sinusitis treatment should be aggressive. The treatment protocol consists of repeated surgical debridement and concomitant systemic antifungal treatment. The aim of surgical debridement is to decrease the fungal burden, decelerate the course of disease, remove necrotic tissues, and collect tissues for biopsy. Debridement should continue until bleeding of healthy tissues (repeated if necessary) (3).

Prior to the introduction of amphotericin B, the mortality of invasive fungal sinusitis was as high as 90%. However, concomitant use of surgery and amphotericin B has decreased this rate considerably. Our patient was receiving amphotericin B when the lesions were first detected. However, this was not sufficient to prevent the progression of infection, and surgery was required. According to a recent study, voriconazole is more effective than amphotericin B in the treatment of Aspergillus (10). In the present case, amphotericin B was replaced with voriconazole, which was administered intravenously for 6 weeks.

Although many factors determine the duration of treatment, it generally takes 6 to 8 weeks to control the infection and improve the associated immunosuppression. In patients with invasive fungal sinusitis, neutropenia should be monitored closely, as it is one of the most important determinants of prognosis and recurrence of infection (11).

The present case is of interest, as it, to the best of our knowledge, describes the youngest case of nasal Aspergillosis diagnosed so far. The videos of the surgical procedure, together with pathology preparation procedure and images of microbiological culture media, could be very useful.

3.1. Conclusion

Invasive fungal sinusitis is an emergency condition, which requires immediate medical and surgical treatment. The treatment involves a range of medical protocols. The outcomes of the disease ultimately depend on the cause of the underlying immunosuppression.

Footnote

Conflict of Interest: The authors declare that they have no conflict of interest.

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