

LETTER TO THE EDITOR

Case Report. Maxillary sinus infection due to *Emericella nidulans*Fallbericht. Kieferhöhleninfektion durch *Emericella nidulans*

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Schlüsselwörter. *Aspergillus nidulans*, *Emericella nidulans*, Aspergillose, Kieferhöhle, Zink.

Summary. Fungal infections of the maxillary sinus are frequently caused by *Aspergillus* species, particularly *A. fumigatus*. In otherwise healthy persons there is an association with overfilling of dental root canals, when zinc-containing filling materials were used. Below, a maxillary sinus aspergilloma is reported in a young immunocompetent female patient caused by *Aspergillus (Emericella) nidulans*.

Zusammenfassung. Pilzinfektionen der Kieferhöhle werden vorwiegend durch *Aspergillus*-Arten, insbesondere durch *A. fumigatus* verursacht. Bei immunkompetenten Patienten ist eine Assoziation zu überfüllten Zahnkanälen mit zinkhaltigem Füllmaterial beschrieben worden. Wir berichten über eine Kieferhöhleninfektion bei einer immunkompetenten Patientin durch *Aspergillus (Emericella) nidulans*.

Introduction

Maxillary sinus infections occur in immunocompromised but also in otherwise healthy persons. Bacteria as well as viruses and fungi have been identified as causative agents. Clinical symptoms

may be mild and stable over some years or rapidly progressive with invasion of the brain. In this case *Aspergillus (Emericella) nidulans* could be recognized as the infectious agent. This fungus is known to cause diverse infections in human and animals such as pulmonary infection, endophthalmitis, osteomyelitis, sinusitis, and superficial infections.

Case report

A 28-year-old, otherwise healthy German woman visited the Department of Oral Surgery of the University of Bonn having had pain in her right maxillary sinus for nearly 10 years with a considerable increase during recent years. Ten years before, the first right molar tooth (tooth no. 16) had been filled with zinc-containing material, followed by an apical root resection. Now, a revision of the resection was undertaken. When this tooth was examined, pain after percussion was noted. The neighbouring teeth showed normal reactions to cold provocation test. With the exception of hypotonia, all other clinical examinations gave normal results and no signs of immunosuppression were noticed. A panoramic X-ray picture revealed an overfilling of the palatal dental root of the first right molar (tooth no. 16) neighbored by a foreign body of about 5 mm in diameter (Fig. 1). A radiogram of the maxillary sinuses showed a diffuse shadow on the right side (Fig. 2). The left sinus had a normal translucence. An overfilling of the root was diagnosed together with a localized mycetoma-like maxillary sinus infection. During an antroscopy of the maxillary

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Figure 1. Panoramic X-ray picture. Overfilling of the palatal dental root of the first right molar (tooth no. 16) neighbored by a foreign body.



Figure 2. Radiogram of the maxillary sinus. Normal signals at the left side of the maxillary sinus; diffuse shadow on the right side.

sinus the fungal material was removed and parts were sent for pathological and microbiological examination. A post-operative radiogram confirmed a complete removal of the mycetoma-like mass, but some opacities at the peripheral sinus walls had remained. Therefore, antifungal therapy with itraconazole (400 mg day^{-1} , p.o.) was started and continued for 6 months, until the woman was

free of complaints and the X-ray remained negative.

Pathology

The resected specimen measured $0.5 \text{ cm} \times 1.0 \text{ cm}$ and was brittle, with greyish coloration. Histopathology showed a polypous mucosa with giant cell hyperplasia of the ciliated epithelium. Multiple areas of ulceration were seen. In addition, lymphoplasmocytic and particularly granulocytic infiltrates were observed, containing fungal hyphae and giant cells. In addition birefringent crystalline and partially black material was seen (Fig. 3).

Microbiology

The specimen was homogenized mechanically with a sterile pestle and inoculated directly on Sabouraud glucose and blood agar. After 3 days of incubation at 30 and 37 °C, fungal colonies appeared on Sabouraud glucose agar. The colonies initially were light-green, gradually becoming reddish. The red pigment did not diffuse into the agar. Microscopically, a hyaline, septate mycelium was observed with short (about $100 \mu\text{m}$ in length) conidiophores bearing biserial sterigmata on which chains of globose to ovoid conidia were formed. In 2-week-old cultures, Hüllecells were observed.

Serology

During the patient's antimycotic treatment, four sera were taken to confirm aspergillosis and to supervise the therapeutic method (day 1, 27, 56 and 86 after surgery). As *Aspergillus* antigen tests, a latex test and an ELISA (Sanofi Pasteur Diagnostics, Marnes-La-Coquette, France) were used. Both gave negative results each time. For detection of

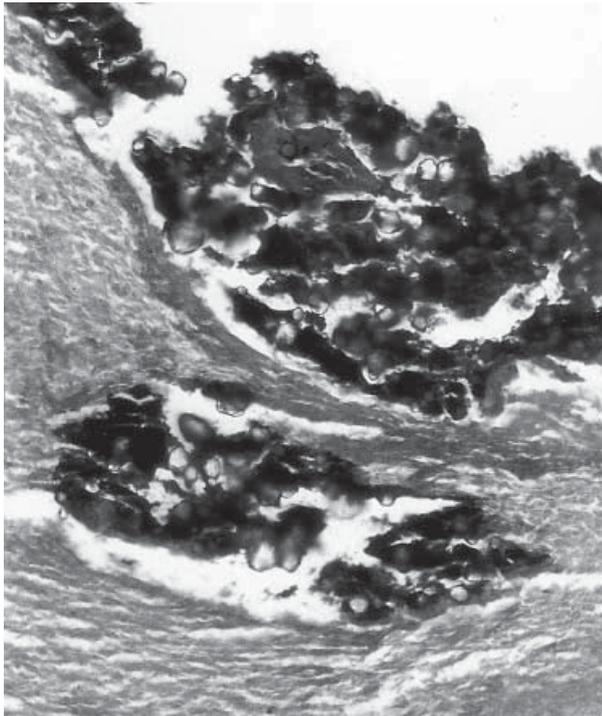


Figure 3. Histopathological examinations. Birefringent crystalline and partially black filling material in the maxillary sinus.

Aspergillus antibodies, the LD Aspergillus Kit IHA (LD Labor Diagnostika Heiden, Germany) was applied. Nearly 1 month after surgery, one normal result was obtained (titre 1 : 20), insignificantly elevated titres found on all other occasions (day 1, 56, 86: titer 1 : 160).

Discussion

Maxillary aspergillosis has been known since 1791 [1]. It usually occurs in immunocompetent patients. There is a striking association with overfillings of upper molar roots, mostly with zinc-containing endodontic material [2–5]. Predominantly, mycetoma-like processes are observed when overfillings of the first molars are concerned, because the roots of these teeth reach furthest into the maxillary sinus. Hence, the disease is characteristically one-sided, whereas allergic sinusitis is mostly bilateral [6]. Women seem to be predisposed (female : male ratio = 1.5–2.2 : 1.0) [2, 7]. The main clinical symptoms of fungal maxillary sinusitis are mild, often including increasing frontal headache, orbicular pain, sneezing, nose-bleeding, and disability of nasal breathing [8]. Radiologic examination shows one-sided opacity of the maxillary sinuses. If this is combined with an overfilling of one of the adjacent teeth, a fungal infection is highly probable. The use of magnetic

resonance imaging or computerized tomography can be helpful in special cases [9–11].

Surgical treatment is the therapy of choice and it is imperative to send material for pathological and microbiological examinations in order to definitively confirm the diagnosis. Microbiological examinations are necessary for the identification of the fungus, whereas histopathology is needed to confirm that hyphae are invading the tissue, to exclude contamination, and to decide whether it is a superficial or a deep tissue infection.

In the present case, the fungal nature of the infection could be confirmed histopathologically, but histopathology did not allow the identification of the causal fungal species as in other cases of maxillary sinus infection caused by *A. nidulans*, in which the species-specific Hüllecells could be recognized in the tissue [12,13]. In this case, serological examinations for detection of galactomannan (*Aspergillus*-antigen-test) gave no hints of an infection caused by *Aspergillus* nor were they useful for supervision of the antifungal therapy. This is not surprising, because localized fungal infections, as in the present case, do not allow close contact of the fungi with the blood vessels and therefore galactomannan will not penetrate into the bloodstream in higher concentrations. In patients with localized one-side maxillary sinus aspergillosis Loidolt [14] described the occurrence of higher amounts of T- and T-suppressor cells in combination with mild suppression of the B-cells. This was not the case in our patient. Surgery with complete removal of the fungi and the overfilled material can be a sufficient therapy [3]. In the present case radiological opacities of the maxillary sinus remained in the control radiogram for a longer time after surgical treatment, so that an additional therapy with an oral antimycotic drug seemed to be necessary to cure the patient completely.

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