Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

journal homepage: www.elsevier.com/locate/jomsmp

Case Report

A case of rhinocerebral mucormycosis extending into the skull

Kiyomi Kudo, Hiroshi Hasegawa*, Eiju Sato, Tetsuharu Kaneko, Daichi Ishida, Chihiro Kanno, Manabu Endo

Department of Dentistry and Oral Surgery, Fukushima Medical University School of Medicine, 1 Hikarigaoka, Fukushima 960-1295, Japan

ARTICLE INFO

Article history:
Received 18 December 2015
Received in revised form 30 June 2016
Accepted 21 August 2016
Available online xxx

Keywords:
Rhinocerebral mucormycosis
Palatal necrosis
Horner syndrome
Cavernous sinus syndrome
Amphotericin B

ABSTRACT

Mucormycosis is a rare fungal infection mainly developing in compromised hosts, and the associated mortality rate is high. We encountered a patient with rhinocerebral mucormycosis that had extended into the skull. Amphotericin B (AMPH-B) was markedly effective and saved the patient's life. The patient was a 51-year-old male with a past medical history of type-1 diabetes and he was being treated with dialysis for chronic renal failure. He visited his family doctor for left cheek pain, and received treatment for a diagnosis of left sinusitis and odontogenic maxillary sinusitis, but the swelling of the left cheek aggravated, and dysesthesia and left palatine mucosal necrosis developed. Thus, the patient was transferred to our department. On the first examination, Horner syndrome and cavernous sinus syndrome were observed, and multiple abscess in the left bucca, mucosal hypertrophy of the paranasal sinus, and lesions in the orbit and skull were noted on CT. Treatment for severe ondontogenic infection was performed, but mucormycosis was diagnosed on the second histopathological examination of the necrotized palatal region. The intravenous administration of AMPH-B (2.5 mg/kg/day) was initiated, and size reduction of the lesions was confirmed on CT after administration for 6 weeks. The lesions completely disappeared thereafter, but the patient died of another disease after 8 years. AMPH-B was markedly effective and saved the patient's life. When buccal cellulitis and sinusitis develop in a compromised host, it is necessary to take rhinocerebral mucormycosis into consideration.

1. Introduction

Mucor is an exogenous fungi belonging to Zygomycetes, and it is present in the soil and air. When it enters the body, it hematogenously proliferates due to its vascular affinity, and rapidly induces serious deep mycosis. Mucormycosis is a rare fungal infection which mainly develops in infection-sensitive hosts with leukemia, diabetes, chronic renal failure, and immunodeficiency, but its development in patients with no underlying disease has also been reported [1,2].

This disease is divided into the rhinocrebral type infecting through the nasal cavity and paranasal sinus, and pulmonary, cutaneous, gastrointestinal, and disseminated types [3]. Rhinocerebral mucormycosis causes diverse symptoms depending on the expansion of the lesion. We encountered a patient with rhinocerebral mucormycosis which had extended into the skull, but amphotericin B was markedly effective and saved the patient's life.

2. Case report

The patient was a 51-year-old Japanese male. Regarding his past medical history, he had developed diabetes at 36 years old. He had been diagnosed with type-1 diabetes at 47 years old, and was being treated with the self-injection of insulin. In addition, he had been treated with dialysis 3 times weekly at a general hospital for chronic renal failure since 49 years old.

He firstly felt pain in the left bucca, and visited the dental and otorhinolaryngology departments of the hospital at which he was receiving dialysis treatment, and acute suppurative apical periodontitis at the left upper first and second premolars, left sinusitis, and odontogenic maxillary sinusitis were suspected, for which drainage through the oral cavity, antibiotic administration, and extraction of the left upper first and second premolars were performed. However, aggravation of swelling and dysesthesia of the bucca occurred, and the left palatine mucosa necrotized. Thus, the patient transferred to our department. On microbial culture performed at the previous hospital, *Enterococcus faecalis* and *Candida tropicalis* were detected at a low level.

☆ AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

* Corresponding author. Fax: +81 24 547 1352.
E-mail address: hasehi@fmu.ac.jp (H. Hasegawa).

http://dx.doi.org/10.1016/j.ajoms.2016.08.004
2212-5558/

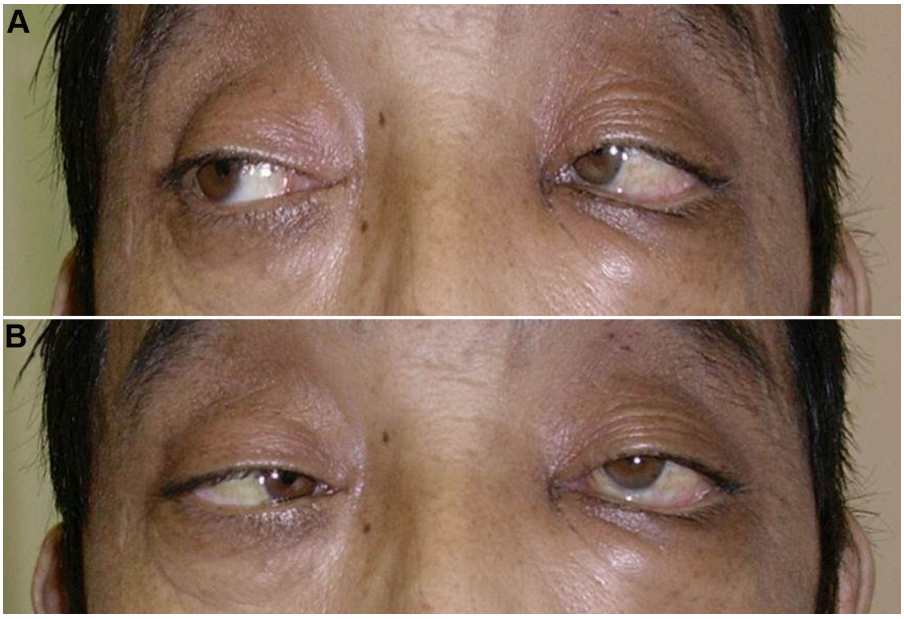

Fig. 1. Left oculomotor paralysis, esotropia, miosis, and ptosis were observed. (A) Right gaze, (B) left gaze. Regarding the left eye, limitation of abduction movement was observed.

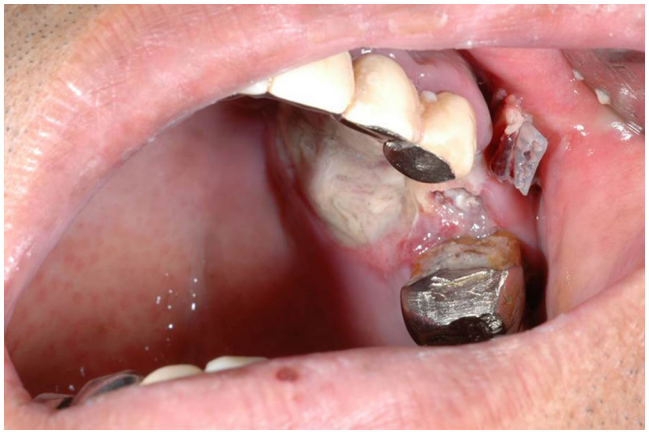

Fig. 2. Necrosis was noted in the left upper gingiva on the palatal side.

On the first examination, the white blood cell count was 12,300/μL; CRP, 10.4 mg/dL; HbA1C, 12.7%; and blood glucose, 139 mg/dL on blood testing, whereas blood glucose was poorly controllable. Regarding the facial appearance, swelling and induration of the left cheek and hypoesthesia of the regions innervated by the first and second branches of the left trigeminal nerve were observed. In addition, facial palsy localized to the buccal branch was noted. Regarding the eyeballs, limitation of abduction (Fig. 1), esotropia, miosis, and ptosis of the left eye were noted. In the oral cavity, gingival necrosis measuring 21 × 17 mm was noted at the left upper first and second premolars on the palatal side. The left upper second premolars extraction socket and maxillary sinus communicated. A drain had been placed in the buccal gingiva in this region by the previous physician, but there was no drainage (Fig. 2). On CT, multiple abscess and mucosal hypertrophy in the left maxillary sinus over the ethmoidal sinus were observed, and the lesion in the maxillary sinus had destroyed the posterior wall and advanced into the pterygopalatine fossa and orbit. On MRI, the advancement of the lesion from the pterygopalatine fossa to the foramen rotundum, cavernous sinus, and Meckel's space was confirmed (Fig. 3). Based on consultation with related departments including the otorhinolaryngology, ophthalmology, neurology, and neurosurgery departments, the patient was diagnosed with Horner syndrome and cavernous sinus syndrome. Since no abnormality was observed in the nasal cavity mucosa, dissemination of a severe ondontogenic infection, paranasal sinus mycosis, or tumorous disease into the orbit and skull was strongly suspected.

Suspecting severe ondontogenic infection, the administration of imipenem/cilastatin (IPM/CS) at 1.0 g/day was initiated, and the necrotized palatine mucosa was biopsied. Microbial culture tests of the drain-placed site, extraction socket of the left upper second premolar, and necrotized palatine mucosa were performed, and drainage from these regions was attempted, but there was no drainage from any region.

At one week after admission, the white blood cell count was 6900/μL and CRP was 0.6 mg/dL, showing improvement of inflammatory findings, but fever higher than 37 °C persisted. On CT, the sizes of the lesions in the orbit and cheek were slightly reduced, but the bone resorption of the maxillary sinus and paranasal lesion aggravated. The histopathological diagnosis of the first biopsied palatine mucosa was acute and chronic inflammation, and no Mucor was detected. To make a definite diagnosis, diagnostic antrostomy of the maxillary sinus was planned, but it was postponed due to poor control of blood glucose, and the palate and extraction socket were biopsied again. At this time-point, *C. tropicalis* was detected twice on microbial culture tests, the β-D glucan level was high (18.35 pg/mL) on a blood test, and Candida antigen was positive, suggesting paranasal mycosis, for which the drugs were switched to oral itraconazole (ITCZ) and faropenem (FRPM). However, bone destruction around the maxillary sinus and infiltration around the cavernous sinus had progressed on CT after one-week administration, showing that the lesion was progressive.

On day 18 after admission, mycelia assumed to be Candida and many cord-like structures with thin septa assumed to be Mucor were observed in the palatine mucosal specimen collected on the second biopsy, and the disease was finally diagnosed as fungal infection by Mucor (Fig. 4). From this day, amphotericin B (AMPH-B) was intravenously administered at 2.5 mg/kg/day. The body temperature decreased to about 36 °C, and size reduction of the lesion was confirmed on CT. AMPH-B administration on dialysis days 3

Please cite this article in press as: Kudo K, et al. A case of rhinocerebral mucormycosis extending into the skull. J Oral Maxillofac Surg Med Pathol (2016), http://dx.doi.org/10.1016/j.ajoms.2016.08.004