

Invasive Aspergillosis in Paranasal Sinus

— CASE REPORT —

Hideyuki KAWAUCHI, Kaoru TAKAMURA, Kanako SHIMIZU,
Ryotaro ISHIMITSU, Keiko OGASAWARA, Shingo KATAOKA

Department of Otolaryngology, Shimane Medical university

89-1, Enya-cho, Izumo City, 693-8501

Correspondence address: Hideyuki Kawauchi, MD. DMSc.

Department of ORL.,

Shimane Medical University

E-mail address:

Kawauchi@shimane-med.ac.jp

key words : Invasive aspergillosis, paranasal sinus,
immunocompromised host, beta-D-glucan, intracranial extension

Summary

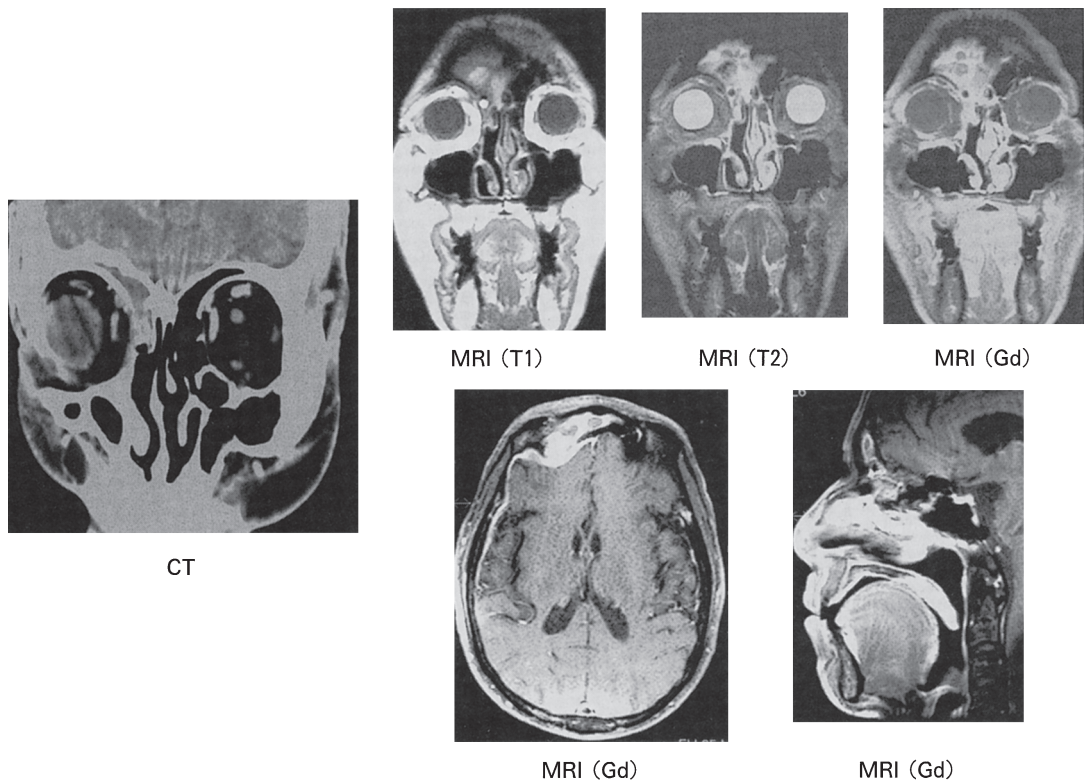
Invasive aspergillosis¹⁾ in paranasal sinuses is not a common disease, in comparison with non-invasive type aspergillosis in paranasal sinuses. This disease entity usually coincides with the immunocompromised hosts such as immunodeficiency patients, the aged patient, and patients with diabetes mellitus. Clinical outcome of these patients is not satisfactory. The prognosis varies in each case, depending on the effects of multidisciplinary treatments such as medication of anti-fungal agents and/or surgical intervention. We have recently experienced five different cases of paranasal sinus aspergillosis invading to the orbit and skull base²⁾. Therefore, clinicopathological feature of this disease entity and clinical course are introduced herein.

Case presentation

Each case is introduced as for age, complication, treatment, and prognosis (Table 1). A patient with leukemia is 41 year-old female, but others are male, and above 70 years old in their age. All of them underwent treatments involving surgical intervention combined with antifungal agents. Although two of them are still alive, other three patients died of disease in spite of such treatments. A 70 year-old man complaining of the pain in his frontal region was firstly seen by us in November 1998. He had a history of hypertension but did not have the immunocompromising disease such as diabetes mellitus. The radiological finding of this patient is shown in Fig. 1. Coronal CT scan of paranasal sinuses showed a soft tissue mass

Table 1 Patient's characteristics

| case | Age | Sex | Location | Complication | Treatment | Prognosis |
|------|-----|-----|----------------|-------------------|------------------------|------------------------|
| 1 | 70M | | R Fr. R Eth | Hypertension | operation & medication | alive |
| 2 | 81M | | R Eth. L Sphe | Dehydration | operation & medication | dead 22 days post-ope |
| 3 | 84M | | R Max. | Diabetes Mellitus | operation & medication | dead 93 days post-ope |
| 4 | 75M | | L Sphe. | Arrhythmia | operation & medication | dead 120 days post-ope |
| 5 | 41F | | L Eth. L Sphe. | AML | operation & medication | alive |

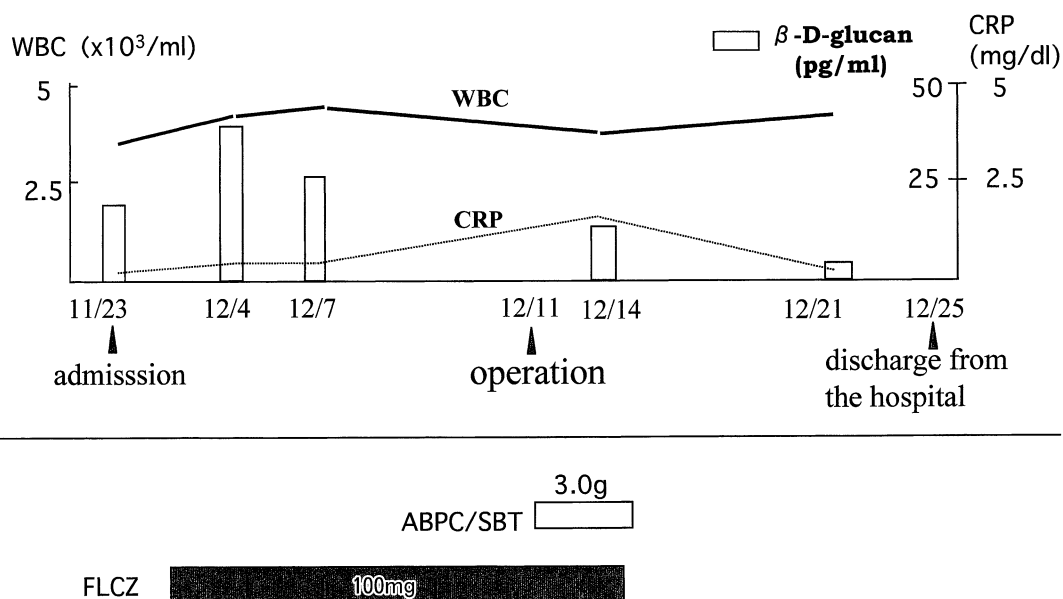


Coronal CT scan of paranasal sinuses showed a soft tissue mass with bony destruction of the superior wall of the right frontal sinus and the medial wall of the right ethmoid sinus. MRI showed a hyperintense lesion in T1-weighted image and a hypotensive lesion in T2-weighted image involving the right frontal and ethmoid sinuses with extension into the right orbit.

Fig. 1 The radiological finding of 70-year-old patient.

with bony destruction of the superior wall of the right frontal sinus and the medial wall of the right ethmoid sinus. MRI showed a hyperintense lesion in T1-weighted image and a hypotensive lesion in T2-weighted image involving the right frontal and ethmoid sinuses with extension into the

right orbit. Because the serum level of beta-D-glucan in this patient was significantly elevated (20.9pg/ml), he was treated with a systemic antifungal agent named fluconazole before the operation. Then, he underwent the extranasal right ethmoidectomy and frontal sinusotomy. Aspergillosis was confirmed by



The serum level of beta-D-glucan gradually decreased after the operation and he was discharged from our hospital.

Fig. 2 Clinical course of 70-year-old patient.

the histopathological examination. The serum level of beta-D-glucan gradually decreased after the operation and he was discharged from our hospital (Fig. 2). 81-year-old man visited our outpatient clinic with pain in the right eye, ptosis, exophthalmos, and visual disturbance. CT scan and MRI on admission showed the lesion in right ethmoid and sphenoid sinuses with right intraorbital extension. Bony destruction was found at the medial wall of left orbit. The serum level of beta-D-glucan in this patient was remarkably high (80 pg/ml). He underwent the extranasal right ethmoidectomy and sphenoid sinusotomy in emergency. The histopathological diagnosis was aspergillus infection. Despite a systemic administration of antifungal agent (fluconazole), the serum level of beta-D-glucan increased gradually and he died of the intracranial extension of

aspergillosis one month later. Most recently we have experienced an interesting case of 41-year-old female leukemia patient, who had complained ptosis, visual disturbance, and headache (Fig. 3). But she was very fortunate to overcome the aspergillus infection in ethmoid sinus with intracranial invasion, after she received the pharmaceutical treatment with antifungal agents and endoscopic sinus surgery in left ethmoid and sphenoid sinuses. She is still alive after bone marrow transplantation from her daughter, combined with whole body irradiation at hematology department. The preoperative and postoperative CT scan and MRI showed findings of left ethmoid sinus and brain abscess (Fig. 4). The fungal infection subsided postoperatively. A granulomatous lesion with purulent discharge was found in ethmoid sinus and sphenoid sinus at the

Case 5: 41 years-old, female

Chief complaint: left ptosis, double vision

Present Illness: under chemotherapy because of AML at Hematology Department

Dec. 26. 00. sensory disturbance of left buccal region

Dec. 29. 00. restraint of eye movement, double vision

Jan. 6. 01. left ptosis, my driasis

Jan. 12. 01. brain abscess derived from paranasal sinus fungal infection was diagnosed by emergent CT scan and MRI



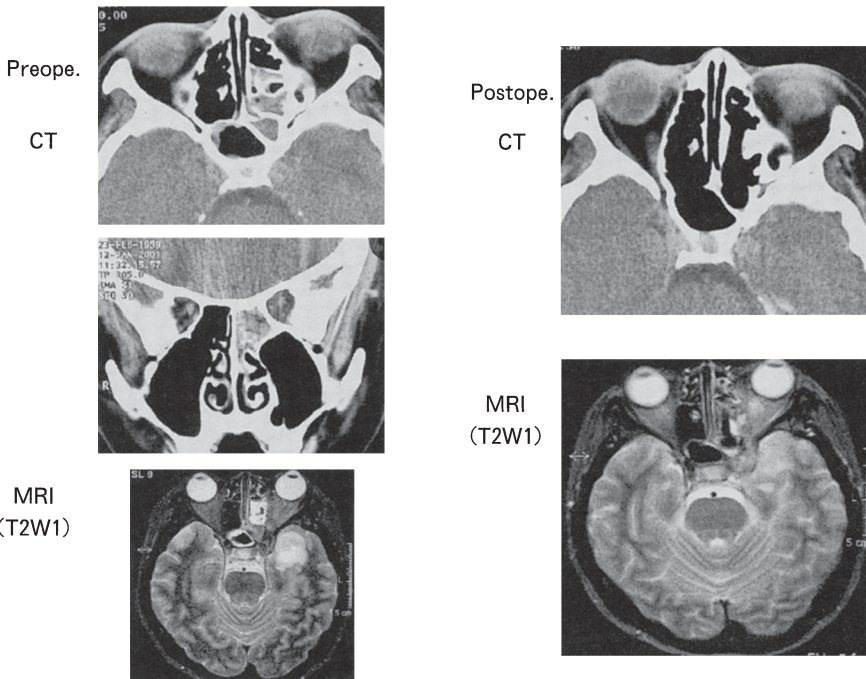
endoscopic ethmoidectomy and sphenoidectomy

preoperative findings



She had complained ptosis, visual disturbance, and headache.

Fig. 3 Clinical findings of 41-year-old female leukemia patient.



It showed findings of left ethmoid sinus and brain abscess preoperatively. But the fungal infection subsided after she received the pharmaceutical treatment with antifungal agents and endoscopic sinus surgery in left ethmoid and sphenoid sinuses.

Fig. 4 The preoperative and postoperative CT scan and MRI.

operation. This lesion was carefully removed as much as possible but very conservatively to have a complete drainage from these paranasal sinuses. To summarize case presentation, we have experienced 5 cases of invasive aspergillosis in paranasal sinuses, extending to the orbit and skull base. It was shown that CT scan and MRI were useful to assess the bony destruction and intracranial or intraorbital extension, respectively. The serum level of beta-D-glucan and CRP were helpful for the diagnosis and monitoring of disease activity before and after treatments. However, in three patients out of 5 cases, various treatments including surgical intervention were not enough to rescue the patients and they passed away for a short period of time, because of intracranial complication.

Comment

Invasive aspergillosis in paranasal sinuses can be often a fatal disease³⁾, so that an earliest diagnosis is warranted for aiming a better prognosis. Therefore, clinical course in each patient should be exactly considered, by employing CT scan and MRI with monitoring beta-D-glucan⁴⁾ or CRP in sera. In immunocompromised hosts, such as an aged person, diabetes mellitus, or leukemia/lymphoma patients^{5,6)}, a desirable radical surgical intervention is not always permitted, because of poor general condition. Taking these into consideration, very much careful attention should be paid for patient's prognosis, even though the minimally invasive surgical removal of fungal lesion under ESS can be considered to be advantageous as well as a pharmaceutical treatment with antifungal

agents.

Conclusion

- 1) Clinical outcome of invasive type paranasal sinus aspergillosis is not satisfactory, especially in immunocompromised patients. In order to improve its prognosis, an earliest diagnosis should be confirmed by CT scan and MRI, and a multidisciplinary treatment should be planned and performed with a surgical intervention combined with a systemic administration of antifungal agents.
- 2) Serum level of beta-D-glucan seemed to be very useful indicator for a diagnosis of fungal infection and monitoring the disease activity in clinical courses.

Reference

- 1) Hora JF: Primary aspergillosis of the paranasal sinuses and associated areas. *Laryngoscope* 75: 768-773, 1965.
- 2) Smith HW, Kirchner JA and Conn NH: Cerebral mucormycosis. *Arch Otolaryngol* 68: 715-726, 1958.
- 3) Weidenbacher M and Brandt G: Lethal aspergillosis of the paranasal sinuses. *Laryngol Rhinol Otol* 54: 722-727, 1975.
- 4) Dupont B, Hurbor M, Kim SJ, et al: Galactomannan antigenemia and antigenuria in aspergillosis; studies on patients and experimentally infected rabbits. *J Infect Dis* 155: 1, 1987.
- 5) Hunt SM, Miyamoto RC, Cornelius RS, et al: Invasive fungal sinusitis in the acquired immunodeficiency syndrome. *Otolaryngol Clin North Am* 33 (2): 335-347, 2000.
- 6) Malani PN, Kauffman CA: Prevention

and prophylaxis of invasive fungal sinusitis in the immunocompromised patient. *Otolaryngol Clin North Am* 33 (2): 301-312, 2000.