Hypertrophic cranial pachymeningitis due to *Aspergillus flavus*

H. Murai, J. Kira, T. Kobayashi, I. Goto, H. Inoue and K. Hasuo

Department of Neurology, Neurological Institute, Department of Otolaryngology, and Department of Radiology, Faculty of Medicine, Kyushu University, Fukuoka, Japan

(Received 27 January, 1992)
(Revised, received 17 February, 1992)
(Accepted 17 February, 1992)

Key words: Hypertrophic cranial pachymeningitis; *Aspergillus flavus*; MRI; Gadolinium-MRI; Pachymeningitis

Summary

A 59-year-old woman suffered from occipital headache and bilateral cranial nerve VII, VIII, IX, X, XI and right XII deficit after developing otitis media. Magnetic resonance imaging (MRI) showed a thickening of the dura mater which was enhanced by gadolinium-DTPA (Gd). *Aspergillus flavus* was identified from the culture of otorrhea. She was treated with miconazole, flucytosin and fluconazole, which resulted in an improvement of the clinical symptoms and a thinning of the Gd-enhanced lesions on MRI. This is the first case of hypertrophic cranial pachymeningitis caused by *Asp. flavus* infection.

Introduction

Hypertrophic cranial pachymeningitis is a rare disease that often causes multiple cranial neuropathy. By now, few cases have been reported in the literature, and the greater part of them are still etiologically unclarified. We report a case of hypertrophic cranial pachymeningitis following otitis media, presenting occipital headache and multiple cranial neuropathy. *Aspergillus flavus* was proven to be the etiological agent. To our knowledge, this is the first case of hypertrophic cranial pachymeningitis due to *Asp. flavus* infection.

Case report

A 59-year-old woman was born deaf in her left ear due to Mondini's anomaly (hypoplasia of the auris interna). She had suffered from diabetes mellitus since 1968, and has been receiving insulin therapy for the past 2 years. In addition, she developed liver cirrhosis with esophageal varices in 1986. In October 1987, she developed otitis media on the left side. She noticed left occipitalgia a few months later, and developed left facial palsy in April 1988. In October 1988, she noted hoarseness and difficulty in swallowing. In January 1989, she suffered from otitis media on the right side, followed by headache and hearing impairment on the right side. In March 1989, a tracheal fenestration was performed as she developed dyspnea because of palsy of the bilateral vocal cords. On April 3, 1989, the date of the admission to our department, physical examination revealed: anemic palpebral conjunctivae and hepatomegaly (4 cm palpable below costal margin). Mental state was normal, and cranial...
nerves I–VI were all normal. Moderate facial palsy on the left side, becoming bilateral one month later. Severe sensorineural hearing impairment on the right side, and moderate to marked dysphagia and dysarthria. Taste loss and unsteady gait appeared one month later. The soft palate movement was poor and the right vocal cord was immobile. Bilateral sternocleidomastoid muscles were weak. The tongue deviated to the right on protrusion. Severe pain occurred on passive neck movements. Muscle power, tonus and coordination of the extremities were normal. Gait was slightly unsteady; tandem gait was poor. Mild impairment of vibratory sensation and hyporeflexia, symptoms of diabetic neuropathy, were observed in the lower extremities.

The blood count showed mild anemia (Hb 10.2 g/dl). The ESR was 55 mm/h. Serum protein was 8.0 mg/dl and albumin 3.3 mg/dl. Liver function tests were: GOT 52 IU/l, γ-GTP 204 IU/l, cholinesterase 68 IU/l, and ICG 43.8% (15 min). The fasting glucose level was 163 mg/dl and HbA1c level was as high as 7.0%. C-reactive protein level was 1.5 mg/dl (normal, < 0.4 mg/dl). The cerebrospinal fluid was clear, showing mild pleocytosis (7/mm³) and 66 mg/dl protein.

X-ray examinations of skull, chest, and abdomen were unremarkable. Ultrasonography and computed tomography (CT) of the upper abdomen indicated liver cirrhosis. A head CT showed right maxillary sinusitis and a contrast enhancement of the dura mater in the posterior fossa. MRI revealed a thickened dura mater in the posterior fossa and above the clivus, strongly enhanced by Gd infusion (Fig. 1a), as well as right maxillary sinusitis. Gallium scintigraphy was negative. Angiography was not performed.

Fungal hyphae were microscopically observed in the smear of the surgically evacuated content in the right maxillary sinus. A culture of the otorrhea revealed the formation of yellowish green colonies, which were identified as Aspergillus flavus (Fig. 2).

From May 16, miconazole therapy was started with an initial dose of 200 mg/day up to 1000 mg/day intravenously. One month later, occipital headache, bilateral facial palsy and dysphagia improved markedly. Furthermore, an MRI taken on June 28 revealed that the Gd enhancement of the dura mater in the posterior fossa was markedly reduced (Fig. 1b). Miconazole was discontinued 1 month later because of the worsening anemia. Fluconazole (4–6 g/day) and then, fluconazole (100 mg/day) was administered orally instead. At the end of August, the facial weakness and dysphagia were hardly noticeable. Soft palate movement and tongue protrusion...
had returned to almost normal. Hearing difficulty, neck pain, ataxia and right vocal cord paresis, however, remained. No surgical exploration was performed.

Discussion

In the present case, a marked thickening of the dura mater in the posterior fossa as seen on MRI, indicated hypertrophic cranial pachymeningitis to be the cause of multiple cranial neuropathy. We assumed *Aspergillus* to be the etiological agent because of the following reasons, although we have not performed any surgical exploration of the dura mater: (1) fungal hyphae were observed in the content of the maxillary sinus, and *Asp. flavus* was identified from the culture of otorrhea. (2) After using antifungal agents, clinical symptoms improved markedly, and Gd enhancement of the dura mater thinned remarkably.

Since the first case of hypertrophic pachymeningitis was reported by Charcot in 1869 [1], several cases have been reported. Among them, syphilis [2], fungus [3,4], tuberculosis [5], Wegener's granulomatosis [6], periarteritis nodosa [7], rheumatoid arthritis [8,9] and intraspinal injection of methylprednisolone acetate [10] have been reported to cause the disease, but most of the cases are etiologically unclarified. Fungal pachymeningitis included *Candida tropicalis* [3] and *Petriellidium boydii* [4]. To our knowledge, the present case is the first case due to *Asp. flavus*. Inflammation of otitis media caused by *Aspergillus* infection easily extends to the dura mater of the skull base, in the presence of Mondini's anomaly. The diabetes mellitus may have contributed to the persistence of the fungal infection.

Reports on the MRI findings of hypertrophic cranial pachymeningitis are still rare. Martin et al. [11] previously reported CT and MRI findings of hypertrophic cranial pachymeningitis, but Gd enhancement was not performed in their cases. Yuh [9] and Callebaut [5] reported the contrast-enhanced MRI findings of rheumatoid and tuberculous pachymeningitis, respectively. Ishii et al. [12] recently reported a case of pachymeningitis which presented Garcin's syndrome. In their case, after the therapy with antibiotics and prednisolone, decrease in thickness of dura mater had been observed on the Gd-MRI. The etiological agent, however, remained unclear.

In our case, brain MRI revealed a thickening of the dura mater and the existence of a chronic inflammation in the thickened dura, as determined by Gd enhancement. A reduction of Gd enhancement of the dura after the therapy suggested the inflammation in the dura had subsided and thus the effectiveness of the antifungal drugs.

Therefore, MRI appears most useful for monitoring the effectiveness of treatment as well as in making an accurate diagnosis of hypertrophic pachymeningitis, especially when Gd enhancement is done.

References

4 Schiess, R.J., Coscia, M.F. and McClellan, G.A. (1984) Pet-
250


