Dumbbell-Shaped Intradiploic Epidermoid Cyst Involving the Dura Mater and Cerebellum

—Case Report—

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Abstract

A 55-year-old woman presented with an epidermoid cyst extending to the cerebellum manifesting as headaches and pain in the left eye. Magnetic resonance imaging showed an intradiploic part with ring enhancement and an intracerebellar part. Intraoperative inspection revealed erosion of the occipital bone and defective dura mater. The tumor was located both epidurally and subdurally and the cyst consisted of pearly white keratin. The tumor was totally removed and the patient was discharged with no neurological deficit. The intradiploic part of the tumor formed the body and the intracerebellar part was caused by inflammatory reaction, which resulted in the atypical enhancement of the intradiploic part.

Key words: intradiploic epidermoid cyst, dura mater, cerebellum, inflammatory reaction

Introduction

Intracranial epidermoid cysts are an uncommon tumor of the skull and account for only 1% of intracranial tumors.^{2,6,12,15} Intracranial epidermoid cysts are usually located in the cerebellopontine angle and parasellar region, as well as the petrous apex, chiasmal region, brain stem, or intraventricular cavity.^{5,7} About 25% of central nervous system epidermoid cysts are intradiploic,^{1-5,9,10,12,13} and about 3% of intradiploic epidermoid cysts extend to the subdural space.⁶ Intracranial epidermoid cysts have a benign clinical and biological nature originating from the inner epithelial lining of the tumor capsule.^{2,5} We report a case of intradiploic epidermoid cyst located both epidurally and subdurally with unusual ring enhancement on neuroimaging.

Case Report

A 55-year-old woman complaining of headaches and pain in the left eye visited a nearby hospital on November 2005. She was referred to our hospital for surgical treatment under a diagnosis of left cerebellar tumor. Physical and neurological examinations revealed no abnormalities.

Radiography of the skull showed a lytic lesion in the occipital bone (Fig. 1). Computed tomography (CT) demonstrated a low density mass with calcification in the inner table of the left posterior fossa (Fig. 2A). Bone window CT showed erosion in the inner table of the skull (Fig. 2B). T₁-weighted magnetic resonance (MR) imaging with gadolinium showed the hypointense intradiploic part with ring enhance-

Fig. 1 Lateral skull radiograph showing an osteolytic lesion in the suboccipital area.

Fig. 2 A: Computed tomography (CT) scan showing a hypodense area with calcification in the inner table of the left posterior fossa. B: Bone window CT scan showing erosion in the inner table of the skull.

Fig. 3 A: T₁-weighted magnetic resonance (MR) image with gadolinium showing a dumbbell tumor consisting of an epidural part with rim enhancement and a subdural encapsulated part. B: T₂-weighted MR image showing the intradiploic part with heterogeneous intensity and the intracerebellar part with high intensity.

ment and the intracerebellar part as hypointense (Fig. 3A). T₂-weighted MR imaging showed the epidural part as hyperintense and the subdural part as hyperintense with extension to the cerebellum (Fig. 3B). Fluid-attenuated inversion recovery (FLAIR) and diffusion-weighted MR imaging were not done because epidermoid cyst was not suspected based on the configuration. The diagnosis was low-grade glioma or parasite.

The patient underwent surgical removal of the tumor in February 2006. Intraoperative inspection revealed erosion of the occipital bone and defective

Fig. 4 Intraoperative photograph showing the tumor located both epidurally and subdurally, erosion of the occipital bone, defective dura mater, and calcification on the surface of the tumor.

Fig. 5 Photomicrographs showing (A) the subdural part lined with flattened squamous epithelia and the cystic space filled with a large amount of keratinized debris, and (B) foreign body reaction and lymphocytic invasion in the epidural cyst wall. Hematoxylin and eosin stain, A: $\times 200$, B: $\times 20$.

dura mater, and calcification on the surface of the tumor (Fig. 4). The tumor originated from the diploe and extended to the cerebellum. The cystic wall was hypertrophic. The cyst consisted of pearly white keratin which was consistent with epidermoid cyst. The tumor was totally removed.

Histological examination revealed that the cyst was well-demarcated from the cerebellar parenchyma and no invasive growth was observed. The cystic wall was lined with flattened squamous epithelia without remarkable atypia, and the fibrous tissue beneath the epithelia was heavily hyalinized. The cystic space was filled with a large amount of keratinized material. No other component including immature nervous tissue was identified (Fig. 5A). Part of the cyst included foreign body reaction and lymphocytic invasion (Fig. 5B).

The postoperative course was uneventful and the patient was discharged without neurological deficit.

Discussion

CT shows intracranial epidermoid cysts as sharply delineated low density lesions without enhancement after contrast injection.¹⁶⁾ Therefore, the CT diagnosis of intracranial epidermoid tumors is often difficult because of indistinct margins, close proximity to the skull base, and density similar to that of cerebrospinal fluid.¹⁴⁾ MR imaging shows epidermoid cyst as hypointense on T₁-weighted imaging without contrast enhancement, and hyperintense on T₂-weighted imaging.⁵⁾ The chief advantages of MR imaging over CT are the three-dimensional definition of the cyst and the absence of skull base artifacts.¹¹⁾

In the present case, the intradiploic part of the tumor formed the body containing keratin degradation which had the atypical appearance of low density on CT and heterogeneous intensity on MR imaging. We speculate that the intracerebellar part was caused by inflammatory reaction of the intradiploic part, because epidermoid cyst causes strong inflammatory reaction and histological examination detected foreign body reaction and lymphocytic invasion in part of the cystic wall.¹⁷⁾ This inflammatory reaction caused hypertrophy of the capsule and peripheral hyperostosis, observed as ring enhancement of the intradiploic part. The MR imaging intensities reflect the differences in the chemical composition of components such as cholesterol and keratin in the epidermoid tissue in addition to differences in the solid and liquid states of the tissue.⁸⁾ FLAIR and diffusion-weighted MR imaging may help to differentiate intracranial epidermoid cysts from other cystic intracerebral tumors, because epidermoid cysts appear as moderately hyperintense and hyperintense, respectively, on these sequences.

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