Intraosseous Meningioma with a Dural Defect

—Case Report—

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Abstract

A 56-year-old female presented with a rare intraosseous meningioma associated with an unusual dural defect caused by invasion of the tumor. The underlying dura mater is normal or thickened in most cases of intraosseous meningiomas. Most intraosseous meningiomas are benign histologically, but they should be extirpated before invasion into the subdural space occurs.

Key words: intraosseous meningioma, dural defect, meningioma

Introduction

Meningiomas originating in an extradural region may be called ectopic, extracalvarial, extracranial, epidural, diploic, or intraosseous meningioma.^{2,5,11,12,16,18)} Ectopic meningioma is derived from presumed ectopic arachnoid cap cells in an extradural location and occurs in only 0.8–0.9% of all meningiomas.^{14,17)} An intraosseous ectopic meningioma is rare. Most intraosseous meningiomas are associated with normal or thickened underlying dura mater.^{1–4,6–12,14–16,18–22)} We describe a case of intraosseous meningioma with a small dural defect.

Case Report

This 56-year-old female was admitted to another hospital because of severe vertigo on March 23, 1993. Radiography demonstrated an osteolytic lesion, so she was transferred to our hospital. There was no scalp mass.

No neurological deficits were found on admission. Radiography showed an osteolytic lesion, 2.5×2.5 cm in size, in the right parietooccipital area. Computed tomography and magnetic resonance imaging revealed an osteolytic lesion in the lambdoid suture, which was markedly enhanced by contrast medium (Figs. 1 and 2). The tumor seemed to originate from the diploic space and had expanded mainly inside but also outside. Right external carotid angiography

showed a faint tumor stain at the right parietal area.

After reflecting the scalp, a slight erosion was noticed in the outer tables of the right parietal bone. A right parietal craniectomy was performed. The tumor had invaded the inner and outer tables of the skull. A small defect was found in the underlying dura mater (Fig. 3). A small part of the tumor with a diameter of about 2 mm had invaded the underlying arachnoid membrane and the wall of a large cortical vein. This was coagulated with a bipolar coagulator to avoid obliteration of the vein. After the dura was removed, the dural defect was patched with periosteum. The bone defect was repaired by cranioplasty with methylmethacrylate.

The postoperative course was uneventful. Histological examination revealed meningotheliomatous meningioma with whorl formations (Fig. 4 upper). A small dural defect was caused by tumor invasion (Fig. 4 lower).

Discussion

Extracranial meningiomas can be subdivided into the following four main types: Primary intracranial meningioma with direct extension outside the skull, meningioma originating from arachnoid cells and accompanying nerve sheath, meningioma without demonstrable connection with a cranial nerve, and metastasis from an intracranial meningioma.⁵⁾ Extracalvarial meningiomas can be divided into three types as follows: Meningiomas occurring within the maxillary and frontal sinuses, meningiomas adher-

Fig. 1 Computed tomography scan with a bone window showing an intraosseous lesion.

Fig. 2 Sagittal T₁-weighted magnetic resonance images demonstrating an intraosseous lesion (arrowhead) as low signal intensity (left), enhanced by gadolinium-diethylenetriaminepenta-acetic acid (right).

Fig. 3 Intraoperative photograph showing a small defect of the underlying dura mater (arrow).

Fig. 4 upper: Photomicrograph of the tumor showing a meningioma with whorl formations. HE stain, $\times 200$. lower: Photomicrograph of the underlying dura mater showing a small defect (arrow) caused by the tumor invasion. HE stain, $\times 100$.

ent to the outer surface of the frontal or temporal calvaria, and meningiomas in the scalp without attachment to the bone.¹⁸⁾ Our case correspond to the third extracranial type or the second extracalvarial type and should be called an intraosseous meningioma.

True primary intraosseous meningioma is defined as a lesion that does not involve the underlying dura.⁴⁾ However, intraosseous meningiomas can be classified as primary and secondary, and the dura may become involved later in the course of the tumor growth even in primary intraosseous meningioma.²⁾ Secondary intraosseous meningioma is due to extension of an intracranial meningioma into the calvarium.²⁾ The underlying dura may be affected by primary or secondary intraosseous meningiomas. In

our case, the tumor mainly occupied the intradiploic space. Although the possibility of the meningioma originating from the dura mater cannot be denied, the present case may be diagnosed as an intraosseous meningioma, but whether primary or secondary cannot be recognized.

Radiological findings of the skull bone in 63 cases of supratentorial meningiomas suggested that tumors with lysis (pure or mixed) recurred more frequently and became more aggressive than the blastic type.¹³⁾ The meningioma in our case had invaded the underlying arachnoid membrane and the wall of a large cortical vein despite the absence of malignancy. Although most intraosseous meningiomas are benign histologically, malignant cases do occur.^{9,20)} Osteolytic lesion of the skull may have several causes such as metastatic malignant tumor, histiocytosis X, epidermoid, hemangioma, myeloma, osteogenic sarcoma, etc. The osteolytic lesion should be extirpated as soon as possible, before the tumor infiltrates into the subdural space.

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