Case Report

A Rare Giant Intracranial Osteochondroma

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Osteochondroma is the most common benign bone tumor. However, intracranial osteochondroma is very rare, which usually arises from the skull base. Origination from the dura and falx occurs only in sporadic cases. To our knowledge, only twelve cases have been reported in English literature. We report a case of giant osteochondroma from the falx cerebri causing external compression on the brain. Radiographic findings, computed tomography and magnetic resonance imaging manifestation with histologic correlation are described.

Case Report

A 15-year-old boy was brought to a local hospital because of an episode of apnea during sleeping. The past history included episodes of headache and generalized seizures for one year. Physical examination revealed bilateral papilledema without focal neurological...
ical deficits. The brain computed tomography (CT) revealed a large calcified mass on the midline of the frontal area. He was soon referred to our institution for further evaluation and management.

Skull radiographs revealed an intracranial mass with dense calcifications on the midline of the frontal region (Fig. 1). Brain CT study showed a huge mass with the size about $14 \times 6 \times 6$ cm at the midline of the frontal lobe and posterior displacement of the corpus callosum. The tumor dem onstrated a wavy peripheral zone with higher attenuation but lower density in the center. Irregular dense calcifications were noted at the peripheral region of the mass. After contrast medium administration, the tumor was moderately ring-enhanced (Fig. 2). The magnetic resonance imaging (MRI) using a 1.5-T superconducting magnet (Siemens Vision Tesla) showed a huge mass on the midline of the frontal region, directly attached to the falx cerebri. Mixed laminated high and low signal intensities of the mass on both T1-weighted image (T1WI) (TR/TE:566/10) and T2-weighted image (T2WI) (TR/TE:2900/102) were depicted. The frontal lobe was displaced by the tumor but the gray matter appeared intact. The T2WI images showed only mild edema around the tumor. After intravenous gadopentetate dimeglumine administration, good peripheral enhancement of the tumor was noted (Fig. 3). According to the MRI appearance, an extra-axial intracranial mass without aggressive behavior and closely related to the falx cerebri was impressed.

Discussion

Osteochondroma is the most common benign bone tumor. How ever, intracranial osteochondroma is very rare and only few cases have been reported. There are four tumor foci within the cranial vault,
namely: (1) the sphenoid, the ethmoid and the occipital bones of the skull bases; (2) the choroids plexus; (3) the dura mater; and (4) the arachnoid. Most of them arise from bones that are embryologically derived from cartilage, which may account for their predilection on the base of the skull. Parafalcine dural attachment of the tumor is noted in only 15% of the intracranial cartilaginous tumors, as shown in this case, with pathogenesis undetermined. Such tumor is supposed to arise from metaplasia of meningeal fibroblasts, perivascular mesenchymal cells, or from multipotential mesenchymal cells.

As a benign bone lesion with slow growing character, intracranial osteochondroma behaves in the same way as other solitary osteochondroma. It usually

Fig. 3. MR features of the intracranial osteochondroma. (A) Axial precontrast T1WI (TR/TE:566/10). A giant mass is on the midline of frontal region. (B) Axial T2WI (TR/TE:2900/102) shows high signal in the central area of the tumor. (C) Axial post-contrast T1WI (TR/TE:566/10). The tumor presents laminated peripheral ring-enhancement. (D) Coronal post contrast T1WI (TR/TE:566/10). The tumor directly attached to falx cerebri (arrow heads) is well-depicted. (E) Sagittal post contrast T1WI (TR/TE:566/10). The tumor causes mass effect on the frontal lobe. However, the displaced gray matter can still be seen (arrow heads).

Fig. 4. Histopathologic features of the intracranial osteochondroma. Osteochondroma shows cartilage cap (upper) and mature bone trabeculae (lower). (H&E stain, original magnification).
does not result in clinical symptoms until it becomes large enough to cause mass effect. However, mortality has been reported in some cases owing to tumor erosion into vasculature with resultant hemorrage.  

The initial brain CT scan revealed a giant tumor mass with calcification occupying on the midline of the frontal region. However, it was difficult to define whether this tumor was an intra- or extra-axial lesion solely on the CT images. As a result, brain MRI study was performed to reveal a giant intracranial mass in peripheral laminated appearance that was moderately ring-enhanced. Brain tissue was externally compressed by the tumor. Nevertheless, overlying gray matter was still discernible. Furthermore, the relationship between tumor and the falx cerebri was well demonstrated on the MRI, to provide a clue of tumor origin. According to both CT and MRI findings, the image studies strongly suggested an extra-axial mass lesion with dense peripheral calcifications (osteoid matrix) in nature. Correlating MR findings, the histopathologic results of this brain tumor, we found that the peripheral laminated layers of mixed hyper- and hypointensities on both T1WI and T2WI MR images represented the cartilage cap of the tumor. The hyperintense central area of the tumor on T2WI represented the myxoid degeneration. The well-demarcated border of the tumor with minimal perifocal edema suggested the benign nature of this rare intracranial tumor.

References