Lipoma involving the skull

Case report

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The case of an intracranial lipoma involving the left frontal bone is reported. Lipomas of the bone are rare; only three cases of lipomas involving the skull have previously been reported. The differential diagnosis includes a healing bone infarction or fracture, meningioma, hemangioma, and fibrous dysplasia. Diagnosis prior to surgery is difficult.

KEY WORDS: skull neoplasm, lipoma

Although there is abundant adipose tissue in normal bone marrow, lipomas of the bone are rather unusual. Such tumors arise most often in peripheral bones and rarely in the skull.

Case Report

This 36-year-old man presented to a neighborhood physician with a complaint of intermittent headache in the left frontal region. Cranial computerized tomography (CT) was abnormal, and the patient was referred to our department for further evaluation. Pertinent medical history included radical neck dissection followed by radiation therapy for malignant lymphoma of the right cervical area in February, 1983.

Examination. Physical examination was essentially normal except for a surgical cicatrix and a unilateral hypoglossal nerve palsy related to the previous neck dissection. Plain skull x-ray films showed a shadow resembling ground glass bulging into the left frontal region, with no periosteal reaction around the lesion (Fig. 1). Computerized tomography revealed a thickened left frontal bone pressing against the left anterior horn (Fig. 2 left). Examination at the bone window level showed that the external lamina of the bone was normal but that the internal lamina projected into the intracranial space (Fig. 2 right). The mass appeared to enlarge the interlaminar space, which contained trabecular-like structures. Cerebral angiography demonstrated only a mass lesion with no staining, and bone scans were not particularly helpful.

Operation. At surgery to excise the lesion, the external lamina was found to be normal, and the internal lamina bulged prominently into the intracranial space. The tumor was yellow and quite waxy in composition, filling the space between the external and internal laminae. The periosteum and dura were normal. The internal lamina was removed along with the tumor, and the external lamina was used for cranioplasty. Histological examination of the surgical specimen revealed a lipoma consisting of adipose tissue and a trabecular structure. The specimen was free of hemorrhage, necrosis, and calcification (Fig. 3). A diagnosis of intracranial lipoma was made.

Postoperative Course. The patient made an uneventful recovery from surgery. A CT scan obtained 6 months postoperatively was normal.

Discussion

Types of Lipoma

Bone marrow is characterized by an abundance of adipose tissue; however, lipoma of the bone is rare. Generally speaking, there are four types of lipoma related to bone: 1) soft-tissue lipoma, defined as a lipoma originating in soft tissue and pressing against the bone; 2) periosteal lipoma, a lipoma originating from the subperiosteal tissue and causing hyperostotic reactions or erosion of the adjacent bone; 3) intraosseous lipoma, a lipoma originating from the medullary cavity and causing dilatation of the bone; and 4) liposarcoma.
Lipoma involving the skull

An intraosseous lipoma as described here is rare. Dahlin\(^7\) reported that the incidence of this tumor was less than one in 1000 patients with bone tumors observed at the Mayo Clinic. Twenty-eight patients with intraosseous lipoma were reviewed by Hart\(^7\) and 66 by Milgram.\(^9\) The most common sites of involvement are the metaphyses of the long bones, particularly the femur, tibia, and fibula.\(^5\) Frequent symptoms are pain and swelling that persist for several weeks to years.\(^5\) Only three cases of intraosseous lipoma of the skull have been reported thus far.\(^2,13\)

**Radiographic Diagnosis**

On plain x-ray films, these tumors are characterized by a well-circumscribed radiolucent lesion and occasional dilatation of the bone marrow cavity. Although the cortex thins, it maintains a normal appearance and no periosteal reaction is visible.\(^1,12\) Trabeculae are often seen, and frequently assume a lobular or bubbly appearance.\(^7\) However, these findings are nonspecific. When the lesion involves the skull, such as described by Small, *et al.\(^13\)* and by us, or develops at the coccyx, as reported by Hanelin, *et al.\(^4\)* osteosclerotic features may be observed. The presurgical diagnosis was fibrous dysplasia for the former location and chordoma for the latter. As described above, intraosseous lipomas lack specific radiographic features and may develop at various sites. Therefore, accurate presurgical diagnosis of this tumor is considered difficult.

**Differential Diagnoses**

There are several theories as to whether intraosseous lipoma should be considered a true tumor. Most authors state that it is a true neoplasm of the adipose tissue.\(^1,5\) The conditions to be differentiated from an intraosseous lipoma include the recovery process following a bone infarction or fracture.\(^5,14\) One decisive feature that differentiates these conditions from intraosseous lipoma is their lack of invasive characteristics.

The x-ray film of the patient reported here exhibited an expansive lesion with the appearance of ground glass in the marrow of the frontal bone. Lack of radiolucency is explained by a relative abundance of trabecular structure. The angiogram showed only local displacement due to the tumor, without tumor stain or vessel abnormalities. The differential diagnosis includes meningioma, hemangioma, and fibrous dysplasia. The radiographic appearance of intraosseous meningioma varies, ranging from the osteolytic to the osteoblastic form.\(^10\) In a meningioma, however, angiographic studies ordinarily demonstrate a „feeding artery” from the external carotid arteries, with an intense blush in the venous phase.\(^11\) The hemangioma of the skull is likely to be presented as a circumscribed, round or oval honeycombed area; a „spoke-wheel” pattern is typical.\(^11\) Angiography commonly demonstrates the external carotid artery supplying the lesion, with a patchy distribution of contrast medium in coarse dots or col-
Therefore, the present case could be differentiated from a meningioma or a hemangioma by the angiographic findings.

The radiological findings of fibrous dysplasia are extremely variable, with predominantly fibrous lesions appearing radiolucent or like ground glass in contrast to the sclerotic appearance of osseous lesions. Increased bone density is characteristic of changes involving the skull. Angiographic abnormalities are very unusual in cases of fibrous dysplasia involving the cranial vault, except for local displacement of the brain due to the thickened bone. Consequently, the presurgical diagnosis of our patient was fibrous dysplasia. The final diagnosis could be made only after microscopic examination of the surgical specimen.

Accurate presurgical diagnosis of this rare tumor is considered difficult. Magnetic resonance (MR) imaging may be useful in identifying the nature of this lesion; unfortunately, our case predated the MR imaging era.

References


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