Benign osteoblastoma of the skull

Case report

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A case of benign osteoblastoma involving the skull is reported and the radiological, pathological, and clinical features of this tumor discussed. Benign osteoblastoma should be considered in the differential diagnosis of skull tumors because of its favorable response to conservative excision.

KEY WORDS • skull tumor • benign osteoblastoma

Benign osteoblastoma is an uncommon tumor, and its occurrence in the skull is particularly rare. Although cranial occurrences have been included in some general series, we have been unable to find a description of benign osteoblastoma of the skull in neurosurgical journals.

Case Report

A 12-year-old girl struck her head on a towel rack in September, 1971; she did not lose consciousness. Shortly after the incident she noted for the first time a swelling about the size of an acorn near the traumatized site in the right frontal area. This swelling increased in size and by December, 1971, was painful.

Examination. There was a firm, moderately tender, nonmovable mass, measuring 5 x 4 cm, in the right frontal region of the skull. The remainder of the physical and neurological examination was within normal limits. Skull films revealed an expansile defect in the right frontal skull, well circumscribed by a calcific shell (Fig. 1). A technetium brain scan revealed a large area of increased radioactivity in the right anterior region which was apparent on all views. Right carotid arteriography (Fig. 2) indicated prominent middle meningeal and superficial temporal arteries leading into the lytic defect. There was an early and continuous capillary blush in the area of the defect. The intracranial arteries were shifted very little by the mass.

Operation. A right frontal scalp flap was turned to expose the tumor. The galea was dissected free from the thickened pericranium and tumor, which were totally removed by means of peripherally placed burr holes. The mass was not adherent to the underlying dura, but several arterial feeders from the dura were noted. The scalp, pericranium, bone, and dura were extremely vascular. An acrylic cranioplasty was then performed.

Postoperative Course. The postoperative course was uneventful, and the patient was discharged on the sixth postoperative day. She is doing well 2 years following the operation, without evidence of recurrence.
Pathological Examination. The specimen was a portion of skull measuring 10 x 8 x 5 cm. In the center of the specimen, there was a round lesion, about 5 cm in diameter, which appeared to push the inner and outer table apart. A section through the lesion revealed the center was composed of a firm, whitish, spongy material. Microscopically, the tumor consisted of a highly vascular osteoblastic connective tissue stroma. Osteoid and primitive bone were deposited within this tissue. The numerous osteoblasts varied in size and shape, but there was no evidence of abnormal mitotic activity (Fig. 3). Multinucleated giant cells were occasionally seen (Fig. 4).

Discussion

Benign osteoblastomas were first recognized as a pathological entity in separate reports by Jaffe and Lichenstein in 1956. This tumor had previously been described as an “osteoblastic osteoid tissue forming...
Benign ossification of the skull

**Fig. 3.** Photomicrographs of tumor demonstrate irregular bone formation and intense osteoblastic activity in the highly vascular stroma. H & E.  
Left: × 150.  
Right: × 400.

**Fig. 4.** Photomicrographs showing multinucleated giant cells in a highly vascular stroma with irregular bone formation. H & E.  
Left: × 150.  
Right: × 400.
tumor" by Jaffe and Mayer in 1932. Dahlin and Johnson in 1954 reported this lesion as "giant osteoid osteoma," distinguishing it from ossifying fibroma and classical osteoid osteomas.

Benign osteoblastoma is an uncommon, benign, solitary vascular tumor most often involving the vertebrae and long bones. Pain is the most prominent presenting symptom, and there appears to be no sex predilection. The majority of patients are young adults, usually over 10 and under 35 years of age. Involvement of the skull is rare. Dahlin reported 28 cases of benign osteoblastoma with one described in the roof of the orbit, and one in the temporal bone. Lichtenstein and Sawyer, in their 20 cases, noted four affecting the skull.

Radiographically, the tumor is characterized by a predominantly osteolytic, expanding lesion with evidence of new bone formation or varying degrees of calcification. The mass is usually well circumscribed by a calcific shell and may be dense because of the presence of calcific stippling. Brain scanning and arteriography have not previously been described with benign osteoblastoma. The importance of utilizing these neuroradiological techniques in addition to plain skull films in the differential diagnosis of cranial tumor has recently been stressed, although benign osteoblastoma was not mentioned. In our case, carotid arteriography demonstrated the marked vascularity of the tumor, as well as its external carotid blood supply. A technetium brain scan indicated increased uptake consistent with a highly vascularized tumor.

Benign osteoblastoma should be treated with limited local resection. In the skull, conservative excision is usually anatomically possible. This tumor should be differentiated from osteogenic sarcoma, chondrosarcoma, and metastatic tumors for which therapy might be more radical.

Acknowledgment

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