Primary Osteogenic Sarcoma of the Skull
Case Report

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Osteogenic sarcoma, which most commonly affects the long bones, has been encountered only very rarely as a primary tumor of the skull. Ingraham and Matson\(^1\) state that, in children, primary malignant sarcomas may occasionally occur at this site; they point out that histologically the tumor may be osteogenic or more commonly fibrosarcoma, and they report a case of the latter. Davidoff et al.\(^1\) presented a case of osteogenic sarcoma in a woman who received radiation therapy for a tumor diagnosed as osteoma at another institution 6 months previously. In the discussion of the same paper, H. G. Jacobson recalled other examples. In Rowbotham’s series\(^2\) of 20 cases of tumor involving the skull, there was not a single case of osteogenic sarcoma and the author even expressed doubt as to whether a primary growth of this kind ever occurred. It seems to develop in association with Paget’s disease,\(^3\) as a late complication of radiotherapy\(^4\) or in relation to other tumors of the cranium.\(^5\) A case of primary osteogenic sarcoma is reported here.

Case Report

A 20-year-old youth was admitted complaining of weakness of the right leg and blurring of vision. About a year previously he had begun to suffer from frontal headaches, buzzing in the ears, visual disturbances and periods of weakness of the right leg. Impaired appetite had followed by a loss in weight of some 5 kg.

Examination. The patient was cooperative but not able to answer questions clearly. A firm regular mass about 6 cm. in diameter and sensitive to pressure, projected from the left parietal region, extending over the midline. There was weakness of the right limbs, especially of the leg, with some spasticity, and a Babinski sign on this side; no changes in sensation were noted. There were 2 diopeters of papilledema without retinal hemorrhage.

The E.E.G. showed a slight bilateral disturbance. Skull radiographs revealed separation of sutures and reduced density of the dorum sellae. Intracranial calcification could be made out in the left parietal area, associated with local destruction of the calvaria extending for about 8 cm., with irregular new-bone formation projecting outwards (Fig. 1). Angiography via the left common carotid artery showed the growth to be very vascular, deriving its blood supply mainly from the superficial temporal and middle meningeal arteries.

Blood vessels extended with the tumor out under the scalp, while deep within the brain the pericallosal artery was depressed. The anterior cerebral artery showed a contralateral shift of 9 mm. The superior longitudinal sinus seemed to be displaced by the tumor (Fig. 2 a and b). The clinical diagnosis was parasagittal meningioma.

Operation. Craniotomy under general anesthesia and hypotension was performed on July 27, 1964. The external carotid artery was ligated as a preliminary measure. The tumor was found immediately beneath the skin, invading and destroying the underlying bone. As the bone was elevated, it became clear that the tumor had enveloped the dura mater and sagittal sinus. The lateral wall of the sinus was damaged during removal of the growth but the defect could be closed. In spite of induced hypotension and the previous ligature of the external carotid artery, bleeding was profuse throughout the procedure.

Postoperative Course. The patient’s postoperative condition was satisfactory, but he died suddenly 24 hours later. Permission for autopsy was not obtained.

The pathologist’s report on the specimen is as follows.

The sectioned material was grayish with extensive zones of hemorrhage. Some parts were soft, other zones were gritty and still others were hard and difficult to cut. Histologic examination revealed a tumor very rich in cells of different shapes and sizes; the cytoplasm usually was basophilic and well delineated; nuclei were large and hyperchromatic, with bizarre mitoses (Fig. 3a). Many of the sections showed bone production, chiefly osteoid, and immature (Fig. 3b). There were necrotic changes and cystic spaces. The diagnosis of osteogenic sarcoma was confirmed by Dr. L. V. Acke-
Fig. 2a. Demonstrates blood supply of the tumor via the external carotid artery; also shows downward displacement of the pericallosal artery.

Fig. 2b. Demonstrates large blood vessels in the tumor filling mainly from the external carotid artery.

Fig. 3a. Tumor tissue: Note the pleomorphism and inconstancy in size and shape of nuclei. H. & E. X30.

Fig. 3b. Tumor tissue: Osteoid and new bone formation. H. & E. X10.