Ectopic Neural Tissue of Occipital Bone*

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ROENTGENOLOGICAL films of the skull exhibiting multiple lytic lesions of the suboccipital bone called this entity to our attention. The anomaly had no bearing on the condition for which the patient was admitted—a subdural hematoma overlying the left cerebral hemisphere.

Case Report

A 57-year-old laborer was admitted to the Washington University Neuromedical Service on Dec. 20, 1961.† For many years he experienced intermittent frontal headaches which were attributed to sinusitis. Approximately 2 weeks before admission headache of a different quality developed, the pain being more generalized and constant in nature. On the day of admission he became drowsy, slept a great deal, and talked incoherently.

Examination. Significant physical findings were lethargy, confusion, mild left hemiparesis, a dilated left pupil which reacted poorly to light, bilateral extensor toe signs and a pulse rate of 56. The optic fundi were normal.

Laboratory findings, including hemogram, urinalysis, urea nitrogen, blood sodium, potassium, chloride and CO₂ were normal. Films of the skull (Fig. 1) were interpreted by the neuroradiologist as follows: “In general the osseous and soft tissues are normal with evidence of bilateral trigonal choroidal calcification and no calcification of the pineal body. There are multiple fairly discrete lytic defects in the occipital bone beneath the groove of the transverse sinus having a soap-bubble appearance and thought to represent some benign process, not specifically understood. However, it is not possible on the basis of the appearance alone to differentiate the cause of these lesions from such diseases as multiple myeloma and metastatic carcinoma. The remainder of the calvarium is normal.”

The patient was considered to have an expanding intracranial lesion and therefore was referred to the Neurosurgical Service. A left common carotid angiogram exhibited dislocation of vessels characteristic of a left subdural hematoma.

Operation. Angiography was followed immediately by left temporal craniectomy (Dec. 20, 1961) and evacuation of a large subdural hematoma. Examination of the right subdural space showed it to be normal.

Course. The patient made an excellent recovery. Upon reaction from anesthesia he was alert, rational and no longer hemiparetic. There was still pupillary inequality, and he complained of intermittent headache. Within 4 days he was asymptomatic and neurological findings were entirely normal.

To evaluate the nature of the lesions of the suboccipital bone, determinations of blood calcium and phosphorus, serum protein, alkaline and acid phosphatase, and electrophoresis of serum proteins were made and found to be within normal limits. The urine did not show abnormal Bence-Jones proteins.

2nd and 3rd Operations. On Dec. 29, 1961, two of the lesions of the left suboccipital bone were biopsied under local anesthesia. Upon exposing the bone the involved areas could be identified by oval-shaped areas which had a bluish discoloration, each measuring 1 ½ by ¾ cm. The involved bone was very thin, being only a fraction of a mm. in thickness. A No. 20 needle was introduced easily through it and 1 cc. of faint blood-tinted fluid which had the appearance of cerebrospinal fluid was aspirated. Following this the thinned bone was removed exposing grayish tissue of fibro-granular consistency. Upon removal of this tissue a pinpoint perforation was noted in the center of the inner table of bone. Through this tiny opening clear cerebrospinal fluid flowed and continued to well up in the bony cavity. The inner table of bone, which was thinned also, was removed exposing a normal-appearing dura mater. Cerebrospinal fluid continued to flood the dura mater, but the opening through which it gained access to the extradural space could not be identified. On Feb. 1, 1962, another lesion from the right suboccipital bone was biopsied and processed for electron microscopy as well as light microscopy. Grossly and histologically it was identical to the ones found on the left side.

Pathology. Sections for light microscopy were stained with hematoxylin and eosin, phosphotungstic acid hematoxylin, and by the Nissl

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technique. They were composed of brain tissue within a bony cyst. The tissue consisted principally of astrocytic glial cells and their processes, although occasional oligodendrocytes, gitter cells and even scattered neurons were present (Fig. 2). The neurons were reminiscent of Purkinje cells in their shape and single stout dendritic process.

Electron micrographs confirmed the fact that the lining of the cysts was neural tissue. The scattered neurons were large cells with a single robust process (Figs. 3 and 4). The main constituent of the tissue lining the bony cysts was formed of processes of fibrous astrocytes (Fig. 5). Dense bundles of fibrils filled the astrocytic processes. Residua of myelinated axons (Figs. 6 and 7) also were present. A basement membrane outlined the neuroglial tissue and separated it from connective-tissue elements. This membrane (Fig. 8) was equated with the pia-glial basement membrane enclosing the normal cerebellum.

Fig. 1. Lateral (A) and anterior-posterior (B) roentgenograms of skull showing multiple lytic lesions of suboccipital bone.

Fig. 2. Photomicrograph of ectopic neural tissue obtained from one of the lytic lesions of the skull shown in Fig. 1. Hematoxylin and eosin, X 900.