Cerebral convexity epidermoid tumor subsequent to multiple percutaneous subdural aspirations

Case report

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While occasional spinal epidermoid tumors may arise subsequent to lumbar punctures, the association of cerebral epidermoid tumors with percutaneous subdural taps has not been made. The case is reported of a 30-year-old man with a right frontal convexity epidermoid tumor beneath the coronal suture, through which, as an infant, he had had multiple percutaneous subdural taps.

Key Words - epidermoid tumor - dermoid tumor - percutaneous subdural tap

INTRASPINAL epidermoid tumors can develop years after single or multiple lumbar punctures. It is generally assumed that these tumors arise from epidermis carried into the spinal canal by the lumbar puncture needle. These tumors may occur more commonly in children, in whom needles without stylets were once frequently used. Although many children undergo percutaneous aspirations of intracranial subdural collections, an association between this procedure and cerebral epidermoid tumors has not been made. This report describes the case of a 30-year-old man with a right frontal convexity epidermoid tumor beneath the coronal suture, through which, as an infant, he had had multiple percutaneous aspirations of postmeningitic subdural effusions.

Case Report

History. At the age of 6 months, this patient developed fever and a stiff neck, and was admitted to a hospital in Wisconsin on January 5, 1954, where the diagnosis of Hemophilus influenzae meningitis was made. He was treated with penicillin, sulfa, and hydration, after which his temperature returned to normal.

On January 12, 1954, he presented with a spiking fever and a bulging anterior fontanel that prompted needle taps of the subdural spaces through the coronal sutures. On aspiration, 15 cc of clear, xanthochromic fluid was obtained from the left side; no fluid was aspirated through the tap on the right side. Over the next 8 days, the child had seven taps performed through the left and four taps through the right coronal sutures. As much as 45 cc of fluid was aspirated from the left suture on one occasion, but the volumes of aspirated fluid gradually decreased, and the procedure became nonproductive on January 20, 1954. No fluid was ever obtained from taps through the right coronal suture.

Because the child remained febrile, irritable, and listless, a pneumoencephalogram (PEG) that showed no filling of the left subdural space was performed on February 2, 1954. Six days later, he underwent a left temporal craniotomy with removal of a subdural membrane. His fever resolved, and after dramatic improvement he was discharged on February 16, 1954.

The patient remained entirely well until 1973 when, at the age of 25 years, he developed left-sided adhesive seizures and was hospitalized in Utah for evaluation. An electroencephalogram showed seizure ac-
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tivity emanating from the right frontal region, but a radionuclide brain scan, PEG, and cerebral angiogram were said to be normal. He was treated with diphenylhydantoin, but his seizures were not completely controlled until phenobarbital was added to his drug treatment.

Examination. The patient moved to San Francisco in 1974 and sought neurological follow-up consultation at the San Francisco Veterans Administration Medical Center. Following a seizure in May, 1978, a computerized tomography scan showed a right frontal mass with attenuation ranging from 0 Hounsfield units in the center to 14 at the periphery (cerebrospinal fluid density = 4 units). There were short, linear calcifications at the tumor margins, and the brain was slightly shifted from right to left (Fig. 1) He was admitted to the Neurosurgical Service for further evaluation.

On admission, general physical and neurological examinations were completely normal. A cerebral arteriogram was performed and showed an avascular mass lesion in the right frontal region centered beneath the coronal suture (Fig. 2).

Fig. 1. Computerized tomographic scan showing the right frontal mass of low attenuation with minimal calcification at its margins. There is a slight right-to-left shift of the brain.

Fig. 2. Lateral view of the venous phase of the right internal carotid arteriogram showing posterior bowing of superficial veins (solid arrows) behind an avascular mass centered beneath the coronal suture (open arrows).
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Fig. 3. Operative photograph showing the partially resected, pearly-white flakes of the tumor. The compressed gyri of the right frontal lobe are seen at the tip of the dissector.

Operation. On December 27, 1978, a right frontal craniotomy was performed that exposed a large, superficial tumor to which the overlying dura adhered at several points. The tumor was a homogeneous mass of pearly-white, waxy flakes, typical of an epidermoid tumor (Fig. 3). No capsule was apparent; after the mass was completely resected, it was evident that the brain was compressed but not invaded by the tumor. The dura attached to the tumor was resected.

Microscopic examination of the resected tumor showed predominantly keratin debris, but several sections showed thin bands of keratinized stratified squamous epithelium that were indicative of an epidermoid cyst (Fig. 4).

Discussion

The putative etiology for congenital epidermoid tumors is the inclusion of cutaneous ectoderm by the closing medullary folds near the end of the first month of fetal life. Some intraspinal epidermoids, however, have been associated with previous lumbar punctures, suggesting that skin epidermis carried into the spinal canal by the needle subsequently proliferates into a tumor. This etiological factor was substantiated in an animal model by VanGilder and Schwartz, who showed that skin fragments taken from rats and implanted into their spinal cords would reproducibly grow into epidermoid and dermoid tumors. The same results were found in dogs and cats. VanGilder and Schwartz also showed that skin implants grew as readily in the brains as in the spinal cords of rats.

By analogy, it is likely that subdural punctures in children, particularly those performed with needles that had no stylets, could cause the implantation into the brain of epidermis that could develop into epidermoid tumors. This seems a particularly likely mechanism in the convexity tumors that lie beneath the coronal suture, the site of the majority of percutaneous punctures for subdural aspiration. Despite multiple bilateral subdural taps, our patient developed an epidermoid tumor only on the right side. His brain may have been protected from implantation of epidermis by the buffer zone of subdural fluid on the left side.

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References

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