SUBDURAL EPITHELIAL CYST IN THE INTERHEMISPHERAL FISSURE

REPORT OF A CASE, WITH SOME REMARKS CONCERNING THE CLASSIFICATION OF INTRACRANIAL EPITHELIAL CYSTS

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Intracranial epithelial cysts† are dysembryonic lesions which develop from inclusion or displacement of ectodermal elements in early fetal life. There is considerable variation both as to site and histologic structure of these congenital anomalies, yet sometimes insight into their obscure genesis may be gained from an individual case which happens to be “a missing piece in the jigsaw puzzle.” The following unusual observation proved to be instructive in this respect and, therefore, will be reported here in full.

REPORT OF CASE

J. van E., a 40-year-old married woman, was referred on June 13, 1947 by Doctor A. Fath, Kalamazoo, Michigan, with the following history.

In the Spring of 1946, the patient noticed episodic weakness and numbness of her left arm. In July, 1946, she had a left-sided convulsive seizure, with a postictal left hemispareis of 2 hours’ duration. Further attacks occurred once a month; they consisted of initial numbness and clonic contractions of the left upper extremity, prescient and ataxic. Deep reflexes were increased, and a positive Babinski’s sign was present on the left. Stereognosis of the left hand was impaired, and so were graphesthesia, tactile and vibratory sensations over the entire left side. The electroencephalogram showed focal spikes and slow waves in the lower right parietal area. Arteriography demonstrated a similar but larger mass lesion than before.

Subsequent Course. The patient made rapid postoperative improvement; her only neurologic residual was increase of reflexes on the left side. Convulsive seizures recurred in the Fall of 1956, following which she noticed increasing numbness and clumsiness of her left extremities.

On readmission to Blodgett Memorial Hospital on Feb. 19, 1957, she exhibited moderately severe left hemiparesis with increased reflexes, astereognosis of the left hand and diminished pain, vibratory and graphesthetic sensations over the entire left side. The electroencephalogram showed focal spikes and slow waves in the lower right parietal area. Arteriography demonstrated a similar but larger mass lesion than before.

2nd Operation. Cranietomy on Feb. 18, 1957 revealed a large right subdural frontoparietal cyst in the interhemispheric fissure. The lesion, which was partially covered by normal brain, contained 80 cc. of greenish-grey turbid mucinous fluid. The extremely fine wall of the cyst could not be dissected away without damaging the cerebral cortex, hence only incomplete removal was accomplished.

Histologic Examination. The wall of the cyst consisted of a ciliated columnar epithelium which was attached to a layer of fibroblastic tissue, infiltrated by lymphocytes and plasma cells. The cystic fluid gave a positive mucin-test reaction.

Course. Following her second operation, the patient made again an almost complete recovery until her symptoms recurred in the Summer of 1959.

On readmission to Blodgett Memorial Hospital on Nov. 10, 1959, she again showed mild spastic left hemiparesis with slight sensory changes in the left leg. The arteriographic findings were similar as before, though less marked.

3rd Operation. On Nov. 13, 1959, the posterior
FIG. 1. Photomicrograph of wall of cyst showing area of pseudostratified columnar ciliated epithelium.

FIG. 2. Photomicrograph of wall of cyst showing area of stratified nonkeratinizing squamous epithelium.
superior burr hole of the previous bone flap was re-exposed, the dura mater was opened and 30 cc. of greenish-brown murky fluid were removed. The cystic cavity was merely irrigated.

Course. Following this procedure, again all signs and symptoms improved to a remarkable degree. This patient died from myelogenous leukemia on Aug. 17, 1960. Autopsy (done elsewhere) revealed among other findings massive right intracerebral hemorrhage, which had destroyed the original pathologic changes.

ANATOMIC CONSIDERATIONS

Intracranial developmental cysts may be classified in the following groups:

1. Cysts formed by cutaneous ectodermal elements, such as epidermoids and dermoids.7
2. Neuroepithelial (neuroectodermal) cysts arising from the ependymal or choroid epithelium or, as some authors assumed, from the remnants of the paraphysis. The so-called colloid cyst of the third ventricle is the prototype of this group.2,5,6,8
3. Cysts formed from elements of the stomodeal (buccal) ectoderm, such as the craniopharyngioma and the intrahypophyseal cyst of Rathke's cleft.1
4. Cysts representing components of bimeral or trigeminal teratomas or hamartomas.3,4

All these dysembryonic lesions have a preferential location in or near the midline: e.g., the roof of the fourth ventricle, the pineal region, the roof of the third ventricle, the hypophyseo-infundibular area and, as in our case, the interhemispheral fissure. The developmental fault consisting of heterotopic inclusion or displacement of cell rests appears to occur wherever a folding-in process or formation of a raphe takes place. Thus, some of these lesions may be legitimately classified among the dysraphic disorders. It is tempting to use the histologic structure of epithelial cysts as a clue for their possible embryonic origin, but unfortunately, morphologic similarities often prevent such conclusions. It is true that the presence of keratinizing stratified squamous epithelium clearly points to a dermal origin, or that the cellular arrangement of a craniopharyngioma simulates a dental Anlage. However, in many epithelial cysts such distinctive microscopic features are missing. The histologic picture in our case is identical with that seen in many of the colloid cysts of the third ventricle, and also in the cysts of Rathke's cleft. In all these observations the lining of the wall of the cyst is formed by a pseudostratified columnar epithelium with or without cilia; occasionally there are areas of non-keratinizing squamous cells or there may be mucus-producing goblet cells. The cystic contents are mucinous, ropy, or "colloid" and, as in our case, may give a positive mucin reaction. From the histologic findings per se, therefore, one cannot be certain whether the lesion is derived from the neural or buccal ectoderm. The similarity of structure suggests either that the Anlage for the cysts is laid down at a very early embryonic stage in which the ectodermal cells have not yet become differentiated or that the ectodermal cells have remained undifferentiated and still retain their primitive pluripotential character. The origin of the lesion is more likely revealed by its site; thus in our observation, we may assume that the cyst developed from the choroidal or ependymal epithelium in the vicinity rather than from the remote epithelium of the stomodeum.

In summary, we feel that despite their different locations, the so-called colloid cysts of the third ventricle, the cysts of Rathke's cleft of the hypophysis, and the here-described interhemispheral subdural cyst are genetically closely related, possibly representing merely local variants of an analogous aberration in the early embryonic period. Epidermoids, dermoids and craniopharyngiomas, on the other hand, exemplify more differentiated and mature types of congenital ectodermal neoplasm.

SURGICAL CONSIDERATIONS

Although in our case the cyst was a benign extracerebral lesion, its surgical management presented some technical difficulties: Its wall was so thin and friable that it could not be removed completely. When the cyst recurred 9 years later, it had become so tightly adherent to the cortex that the secondary removal was even less complete. In this situation, one would have liked to destroy the remaining wall of the cyst by the local application of a fixative such as Zenker's solution, but since the lesion overlay the motor and sensory areas such procedure appeared inadvisable. It took another 2 years until the reforming cyst produced symptoms again. This time, simple aspiration and lavage of the cystic cavity achieved striking symptomatic, albeit temporary, relief.

SUMMARY

The case of a 40-year-old woman with a subdural epithelial cyst in the right frontoparietal region of the interhemispheral fissure is reported. Subtotal removal of the wall of the cyst achieved an excellent clinical remission for 10 years, a second operation accomplished another remission for additional 2 years, and finally, mere evacuation of the cyst was followed by marked improvement for 9 months until her death from leukemia.

Microscopic preparations showed the wall of the cyst to be lined with pseudostratified columnar ciliated epithelium and, in one area, with non-keratinizing squamous epithelium. The contents of the cyst were mucinous.

The lesion, which developed presumably in an
early embryonic stage, was considered a heterotopic congenital cyst of ependymal origin. It appears to be genetically related to the so-called colloid cysts of the third ventricle and cysts of Rathke’s cleft of the hypophysis.

REFERENCES