Cerebrospinal Fluid Rhinorrhea and the Empty Sella

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Cerebrospinal fluid rhinorrhea is associated infrequently with abnormalities of the pituitary fossa or sphenoid sinus. It has almost always been described in reference to tumor, cyst, infection, head injury, nasal or cranial operation, yttrium or x-ray therapy. The occurrence of cerebrospinal fluid rhinorrhea in the absence of the above and in the presence of an "empty sella" had not been reported in the English literature prior to June, 1968. At that time Ommaya, et al., reviewed 18 cases of nontraumatic rhinorrhea including two patients with "empty sellas." One was a 57-year-old man with seizures and mild hypopituitarism, in whom pneumoencephalography and surgery showed that the anterior portion of the sella was empty. A second patient, mentioned only briefly, had an arachnoidal hernia through a hole in the floor of the sella. Both patients were operated on successfully for arrest of the rhinorrhea.

The "empty sella" syndrome usually refers to a rare late complication of radiotherapy for pituitary adenomas. Years after receiving radiation, these patients characteristically develop vision impairment, probably due either to involvement of the optic nerve and chiasm by dense scar tissue or radiation degeneration, without evidence of tumor recurrence.

In our four new patients cerebrospinal fluid rhinorrhea was associated with leakage through an "empty sella" as verified at operation. None had received radiotherapy and in none was there any evidence of tumor.

Case Reports

Case 1. A 53-year-old woman had had intermittent cerebrospinal fluid rhinorrhea since May, 1965, and one episode of meningitis in January, 1966. In August, 1966, she was admitted to the Neurological Institute because of recurrent cerebrospinal fluid rhinorrhea. There was no history of head trauma or previous surgery. The patient had had six pregnancies, and a normal menopause had begun 2 years prior to admission.

Examination. Physical examination was normal except for moderate obesity and right-sided cerebrospinal fluid rhinorrhea. Neurological examination was normal. There was no visual defect. Endocrine evaluation revealed no abnormality. Skull x-ray films showed a fluid level in the right sphenoid sinus. Coronal and sagittal tomograms of the sella turcica revealed erosion of the floor of the sella, slightly more on the right side. Bilateral carotid arteriography was normal.

Operation. Operation performed through a right frontal craniotomy showed the sella to be markedly enlarged. There was space on each side of the pituitary gland. The diaphragma sellae was widely patent, and no tumor or opening into the sphenoid sinus was seen. The sella turcica was then packed with muscle.

Postoperative course. The postoperative course was uneventful, and the patient has had no more rhinorrhea.

Case 2. A 52-year-old woman had had cerebrospinal fluid rhinorrhea since September, 1966, and an episode of meningitis in December, 1966. Because of persistent cerebrospinal fluid rhinorrhea she was admitted to the Neurological Institute in January, 1966. There was no past history of trauma or head surgery. A hysterectomy had been performed in 1955 for fibroids, but the ovaries had not been removed.

Examination. Physical examination was normal except for moderate obesity and right-sided cerebrospinal fluid rhinorrhea. Neurological examination was normal. There

Received for publication January 6, 1969.
was no visual field defect. Endocrine evaluation was normal. X-ray films revealed a sella turcica which was larger than normal.

Operation. A right frontal craniotomy showed that the sella turcica was enlarged and filled with arachnoid trabeculae. There was no sign of tumor. The stalk of the pituitary was resting on the dorsum of the sella. Neither pituitary tissue nor diaphragma sellae could be found. The empty sella was then packed with muscle.

Postoperative course. Postoperatively the patient did well and had no subsequent rhinorrhea.

Case 3. A 57-year-old woman had had persistent cerebrospinal fluid rhinorrhea since February, 1962. She was admitted to the Neurological Institute in November, 1964, for evaluation and treatment. There was no history of trauma or head surgery. The patient’s sister had been successfully operated on at another hospital for cerebrospinal fluid rhinorrhea. In 1942, the patient had undergone hysterectomy for fibroids. She had been on thyroid replacement therapy for several years.

Examination. Physical examination was normal except for obesity and left sided rhinorrhea on bending forward. Neurological examination was normal. There was no visual field defect. Endocrine evaluation was normal. X-ray films of multiple skull positions revealed a fluid level in the left sphenoid sinus with enlargement of the right side of the floor of the sella turcica.

Operation. Through a left frontal craniotomy it was revealed that the left side of the sella turcica was empty. The pituitary gland occupied only the right side of the sella, and the chiasm was prefixed. Although no opening into the sphenoid sinus could be seen, muscle was packed into the left side of the sella, the presumed location of the leak.

Postoperative course. Postoperatively the patient did well with no recurrent cerebrospinal fluid rhinorrhea.

Case 4. A 45-year-old woman had had intermittent left-sided cerebrospinal fluid rhinorrhea since February, 1967, following an upper respiratory infection. She was admitted to the Neurological Institute in August, 1967, for evaluation and treatment of persistent rhinorrhea. There was no history of trauma or previous surgery. The patient was pre-menopausal. Six years prior to admission she had a severe bifrontal headache lasting 8 days.

Examination. Physical examination was normal except for moderate obesity. Neurological examination was normal. There was no visual field defect. Endocrine evaluation revealed no abnormality. Laminograms (5 mm cuts) showed an area which was at first interpreted as being a large defect in the sella floor; polytomograms (2 mm cuts) revealed this area to be the intrasphenoid septum. The polytomograms further showed an opacified left sphenoid sinus (Fig. 1 left) with a defect in the antero-lateral aspect of the sella in proximity with the anteriorly placed sphenoid sinus (Fig. 1 right). Radio-iodinated human serum albumin (RISA, 2 cc) was injected into the lumbar subarachnoid space. Serial brain scans and radioactive counts from cotton pledges in both nostrils revealed a definite left-sided cerebrospinal fluid leak and increased uptake of radioactive material in the area of the sella (Fig. 2).

Operation. A left-fronto-temporal crani-