Consequences of a Deficient Sellar Diaphragm*

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REPORTS concerning the "empty sella turcica syndrome" have produced confusing as well as conflicting hypotheses as to the etiology of this entity. Busch's\(^3\)\(^4\) anatomical description of the incomplete sellar diaphragm and Kaufman's\(^3\)\(^4\)\(^5\) explanation of the physiological mechanisms producing the "empty" sella have done much to clarify this condition. The purpose of this paper is to further elaborate this entity and to discuss the consequences that many occur as a result of an incomplete or absent diaphragma sellae.

**Case Reports**

**Case 1.** This 44-year-old chronic hypertensive woman was seen for a grand mal seizure. Skull radiographs showed an enlarged sella turcica. Visual field examination revealed tubular vision. Pituitary function tests were normal. Carotid angiography showed no abnormality; a pneumoencephalogram was not performed. An absence of the sellar diaphragm was found at the time of subfrontal exploration. A normal-appearing pituitary gland was present in the anteroinferior portion of the enlarged sella. Follow-up examinations of the patient have shown no evidence of hypopituitarism or visual abnormalities.

**Case 2.** A 58-year-old man was admitted with the chief complaint of loss of appetite and generalized weakness and fatigue. Tangent visual field testing revealed an incomplete bitemporal hemianopsia. Skull radiographs showed marked enlargement of the sella turcica. An iron deficiency anemia was present with no demonstrable cause. Pituitary function studies revealed panhypopituitarism. Bilateral carotid angiography demonstrated a downward displacement of the A-1 segment of the anterior cerebral arteries and pneumoencephalography showed symmetrical ventricular dilatation with downward displacement of the third ventricle to the level of the diaphragm. Air from the subarachnoid space also entered the sella. The optic chiasm was explored; there was no sellar diaphragm, and the optic nerves and chiasm appeared to dip into the sella. The enlarged sella contained a small pituitary gland in its base. It was noted that the anterior cerebral arteries were indenting the dorsal aspect of the optic chiasm. Because of our experience with Case 3 below, the lamina terminalis was opened. There has been no improvement in the patient's visual fields.

**Case 3.** Visual failure brought this 35-year-old woman to us. She had experienced the onset of headaches 12 years earlier and a reduction in the peripheral field of vision 8 years earlier. A diagnosis of pituitary adenoma was made, based upon the clinical features of Cushing's disease, failing vision, radiographic enlargement of the sella turcica, angiography, and pneumoencephalography. Following radiation therapy, she was discharged on thyroid extract and cortisone; her visual fields had improved remarkably. Our first examination revealed a minimal reduction in the left temporal visual field. Visual acuity was 20/50 in the left eye with 20/20 in the right eye. Skull radiographs showed an enlargement of the sella turcica. Laboratory data on this admission revealed panhypopituitarism. The patient was discharged on hormonal replacement.

The patient was readmitted to the hospital at age 38, with a complaint of further visual failure, having experienced a gradual decrease in the temporal visual field in the left eye over 18 months. Visual field examination on this admission showed a complete temporal hemianopsia in the left eye with a
visual acuity of 20/100 (Fig. 1 left). The visual fields in the right eye were full, and the acuity was 20/20. Carotid angiography revealed a low-lying A-1 segment of the anterior cerebral artery that appeared to dip down to the sella turcica (Fig. 2). Pneumoencephalography revealed that the third ventricle had herniated into the upper portion of the sella turcica (Fig. 3). A small amount of air was seen in the sella outside the third ventricle.

Exploration of the optic chiasm revealed

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**Fig. 1.** Case 3. Visual fields, left eye. *Left:* Preoperative chart demonstrates an absolute scotoma in temporal field (stippled) with relative central scotoma (fine cross hatching). *Right:* Postoperative chart shows that the central scotoma and absolute scotoma in the temporal field have disappeared. Graying occurred within the area of fine cross-hatching in the temporal visual field when tested with a 1/1000 inch test object.

**Fig. 2.** Case 3. *Left:* Lateral arterial phase of the carotid angiogram demonstrates a downward displacement of the segment of the anterior cerebral artery. *Right:* Towne projection also demonstrates the downward sweep of the proximal anterior cerebral artery.