Hyperprolactinemia: An Unusual Manifestation of Suprasellar Cystic Lesions

Two patients with suprasellar cysts and hyperprolactinemia are described. These lesions were diagnosed by CT metrizamide cisternography. Suprasellar cysts are a rare cause of pathologic hyperprolactinemia, which most commonly results from pituitary adenomas. Tissue diagnosis revealed suprasellar arachnoid cysts in the first patient and Rathke's cleft cyst in the second. The differential diagnosis of suprasellar cysts is presented, and distinguishing radiographic characteristics are discussed.

Pathologic hyperprolactinemia with resultant amenorrhea and galactorrhea is most commonly the result of a prolactin-secreting pituitary adenoma. We have recently seen two patients with elevated serum prolactin levels who did not have pituitary adenomas but who did have CT evidence of suprasellar cysts.

Materials and Methods

Two women, ages 20 and 36 years old, both with hyperprolactinemia, were evaluated by CT. The patients were imaged on either a GE 8800 or a Siemens Somatom 2 scanner. Both were scanned twice, with initial scans obtained after intravenous contrast administration (50 cc bolus 60% Renografin and rapid drip 200 cc 43% Conray). At a later date, CT metrizamide cisternography (CTMC) was performed on both patients. Five ml of 170 mg% metrizamide was instilled into the subarachnoid space. The patients were placed in a head-down position for 2-4 min to allow cephalad flow of metrizamide into the head before scanning was conducted. Axial and coronal images of 1.5 mm through the sella and suprasellar cistern were obtained in both patients after metrizamide administration.

Results

Case 1. This woman presented in 1979 at age 20 with a 6-month history of amenorrhea, galactorrhea, and headaches. Eighteen months earlier she had an uneventful labor and delivery, and she began taking oral contraceptives for a period of 1 year. The patient remained amenorrheic with a serum prolactin level elevated to 147.6 ng/ml (normal 25 ng/ml). The thyroid-stimulating hormone level was 4.7 U/ml (normal 0–10 U/ml) and the follicle-stimulating hormone level was 10.8 mU/ml (normal approximately 10–25 mU/ml contingent upon the phase of the cycle). Plain radiographs revealed enlargement of the sella turcica, which measured 17 × 11 mm. CT from an outside hospital at that time reportedly demonstrated hypodensity within the sella, thought to represent an empty sella.

The patient presented 3 years later with a chief complaint of increasing frontal headaches. CTMC was performed and demonstrated a non-CSF-communicating suprasellar cyst (Fig. 1). The findings were thought to be most compatible with suprasellar arachnoid cyst. The patient subsequently underwent right subfrontal craniotomy and cyst decompression. The diagnosis of arachnoid cyst was established. The most recent serum prolactin level (18 months after surgery) was 21.5
ng/ml. The patient is now having normal menses, without galactorrhea.

Case 2. This woman presented in 1981 at age 36 with an 8-month history of amenorrhea, galactorrhea, and headache. The serum prolactin level on first evaluation was 64.4 ng/ml. Additional serum hormone levels from the adenohypophysis were not obtained. CT performed at an outside hospital 6 months later reportedly demonstrated a large, mixed-density lesion within the sella and suprasellar cistern. No additional diagnostic tests were performed at that time.

The patient was treated conservatively and followed for 3 years, when visual acuity in the temporal field of her left eye began to deteriorate. The serum prolactin level was now 87.5 ng/ml. CTMC was performed and showed a non-CSF-communicating suprasellar cyst (Fig. 2).

The patient subsequently underwent a right frontal craniotomy and excision of a suprasellar cyst. A diagnosis of Rathke’s cleft cyst was established on histopathology. A postoperative serum prolactin level was not obtained; however, normal menses began 3 months after surgery.

Discussion

Prolactin is a hormone produced and released by the anterior lobe of the pituitary gland under hypothalamic control. The hypothalamus has a stimulatory effect on all the hormones released by the adenohypophysis with the exception of prolactin [1]. It has an inhibitory effect on prolactin production and secretion. It is theorized that this inhibitory effect is mediated by a yet-to-be-isolated prolactin-inhibitory factor. The relationship between the hypothalamus and the production of prolactin is complicated by the fact that under certain physiologic conditions, such as during lactation, a signal is sent to the hypothalamus from the stimulated mammary nipple to increase the production of prolactin. This presumably is mediated by prolactin-releasing hormone. The physiologic effect of prolactin is to increase the secretion of milk by the mammary glandular tissue.

Pituitary adenomas are the most common cause of pathologically elevated serum prolactin levels. The cases presented are most unusual in that no primary pituitary glandular abnor-
mality was present in either patient. However, pituitary glandular dysfunction was caused by a suprasellar cystic lesion in each case. At our institution, the laboratory normal serum prolactin level is 25 ng/ml. When serum prolactin levels approach 50 ng/ml our endocrinologists become concerned about structural lesions adjacent to the infundibulum interfering with transport of prolactin-inhibitory factor to the adenohypophysis. Serum prolactin levels greater than 100 ng/ml are most commonly related to prolactin-secreting pituitary adenomas.

In a report by Korsgaard et al. [2], patients with nonpituitary origin suprasellar tumors were evaluated for endocrinologic dysfunction. Two separate patient populations were identified: group A, with tumors intrinsic to the hypothalamus-pituitary axis—i.e., hypothalamic gliomas and craniopharyngiomas, and group B, with neoplasms extrinsic to the hypothalamic-pituitary axis—i.e., meningiomas, optic nerve gliomas, arachnoid cysts, and epidermoids. Endocrinologic abnormalities were present more commonly in patients with intrinsic neoplasms. Also, size being equal, intrinsic neoplasms more frequently lead to pituitary dysfunction than do extrinsic lesions. Though not included in Korsgaard’s series, a suprasellar aneurysm also has been reported to have caused reversible panhypopituitarism and hyperprolactinemia [3].

One of our reported cases was an arachnoid cyst. Though considered an extrinsic lesion under Korsgaard’s classification, there was associated pituitary axis dysfunction. This association was corroborated by a dramatic fall in serum prolactin levels from a preoperative level of 147.6 ng/ml to a postoperative value of 21.5 ng/ml.

Suprasellar arachnoid cysts are either congenital [4] or acquired [5]. The former are commonly thought to be a result of maldevelopment of the membrane of Liliequist, thus permitting the development of an arachnoid-lined diverticulum, extending anteriorly from the interpeduncular cistern. It is theorized that this diverticulum may become isolated from the CSF once it acquires sufficient size to occlude its neck [6]. Acquired suprasellar arachnoid cysts are the result of adhesive arachnoiditis usually secondary to basilar meningitis or subarachnoid hemorrhage.

Suprasellar arachnoid cysts are not generally associated with hyperprolactinemia resulting in amenorrhea and galactorrhea. However, the patient in case 1 displayed both amenorrhea and galactorrhea. Gentry et al. [7] recently reviewed the literature and presented in detail eight patients with arachnoid cysts. One of these (case 2) did present with galactorrhea, although the prolactin level was not stated. Sansregret et al. [4] reported a case of arachnoid cyst in a patient with amenorrhea and retarded skeletal growth. However, shortly after diagnosis was established by iodoventriculography, the patient died unexpectedly. On histologic examination, sarcoid was present and involved the infundibulum, neurohypophysis, and third ventricle. Involvement of the hypothalamic-pituitary axis by this noncaseating granulomatous process most probably accounted for the glandular dysfunction.

Patients with arachnoid cysts may present with signs and symptoms of hydrocephalus. This is especially likely if the cyst is located in the suprasellar or quadrigeminal plate cisterns. When suprasellar in location, the expanding cysts may cause a partial or complete obstruction of the anterior third ventricle or the foramina of Monro [7].

The diagnosis of Rathke’s cleft cyst was established by histopathology in the second patient. Rathke’s cleft cyst is a nonneoplastic remnant of the Rathke’s pouch. Rathke’s pouch arises from the foregut and ultimately extends cranially to become the craniopharyngeal duct [8]. The anterior portion of the pouch forms the adenohypophysis and the pars tu-
TABLE 1: Common Sellar/Suprasellar Cystic Lesions

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Location</th>
<th>Attenuation Relative to CSF</th>
<th>Calcification</th>
<th>Appearance of Iodinated Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arachnoid cyst</td>
<td>Suprasellar</td>
<td>Equal to</td>
<td>Absent</td>
<td>IV Enhancement</td>
</tr>
<tr>
<td>Ependymal cyst</td>
<td>Suprasellar</td>
<td>Equal to</td>
<td>Absent</td>
<td>Smooth contour</td>
</tr>
<tr>
<td>Empty sella</td>
<td>Sella</td>
<td>Equal to</td>
<td>Absent</td>
<td>Smooth contour</td>
</tr>
<tr>
<td>Epidermoid</td>
<td>Suprasellar</td>
<td>Less than or equal to</td>
<td>Absent*</td>
<td>Intrathecal</td>
</tr>
<tr>
<td>Rathke’s cleft cyst</td>
<td>Suprasellar</td>
<td>Greater than or equal to</td>
<td>Absent</td>
<td>Smooth contour</td>
</tr>
<tr>
<td>Craniopharyngioma</td>
<td>Suprasellar</td>
<td>Greater than or equal to</td>
<td>May or may not be present</td>
<td>Smooth contour</td>
</tr>
</tbody>
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