Brain & Chiasmal Herniations into Sella after Medical Treatment of Prolactinoma

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ABSTRACT: Background: Dopamine agonists are widely used in the treatment of pituitary prolactinomas. We report a case of inferior mesial frontal lobe (gyrus rectus) and chiasmal herniations into an enlarged sella following successful medical treatment of a pituitary macroadenoma. Method: A 71-year-old healthy man presented to medical attention with visual complaints. On examination, he was found to have bitemporal hemianopsia. Endocrine evaluation revealed an elevated prolactin level. He was treated medically with a dopamine agonist (bromocriptine). Results: Evaluation after one year of medical treatment revealed stabilization of the patient’s vision, with a significant bitemporal field loss. Serum prolactin levels normalized (5.16 ng/ml). The MRI of the sella showed almost complete disappearance of the tumor, resulting in right mesial frontal lobe herniation inferiorly into an enlarged sella with associated chiasmal deformation. Conclusions: We report a case where successful medical treatment of a large pituitary prolactinoma has resulted in inferior frontal lobe and chiasmal herniations into an enlarged sella.


Prolactinomas, the most common hormonally active pituitary adenomas, are usually detected as microadenomas (<10mm in diameter) and generally have a benign natural history. In contrast, macroprolactinomas (>10mm diameter) may pose a greater clinical challenge since patients often present with symptoms related to mass effect. We report a case of inferior mesial frontal lobe and chiasmal herniations into an enlarged sella, as a consequence of successful medical treatment of a pituitary macroprolactinoma.

CASE HISTORY

A 71-year-old man presented to medical attention complaining of visual disturbance. His neurological examination was remarkable for a bitemporal hemianopsia. Endocrine evaluation revealed a high prolactin level (200ng/ml, normal <25 ng/ml) and imaging studies at that time showed a pituitary macroadenoma (the initial CT scan was destroyed and was therefore not available for review). He was treated medically with a dopamine agonist (bromocriptine, increased to 5mg tid). He responded well with slight improvement, then stabilization of
his bitemporal visual field defect within the first few months of treatment.

After one year of treatment, routine visual field testing revealed no further deterioration of his visual field defect. Neuroimaging was performed by CT scan which showed a mass in the pituitary fossa different in character from the original pituitary tumor (more hypodense). Subsequent MRI of the sella demonstrated that the original tumor had all but disappeared. The intrasellar mass seen on the follow-up CT scan was, in fact, the infero-medial portion of the right frontal lobe that had herniated inferioy into the sella, enlarged and vacated by the treated tumor. There was associated chiasmal deformation into the sella as well.

The patient has continued to be treated medically. His vision has remained stable and his serum prolactin levels have normalized. He is not able to arrange transportation for regular imaging studies and, therefore, is followed clinically and by a combination of visual field testing and serum prolactin levels.

**DISCUSSION**

The pituitary gland is a bilobed structure weighing approximately 0.6 g and is found within the confines of the sella turcica (pituitary fossa). The anatomy of the sella and sellar region has been recently detailed by Rhoton et al. The normal dimensions of the sella are approximately 13 mm in depth, 14 mm in width and 17 mm in length. The sella is bounded anteriorly by the tubeculum sellae, posteriorly by the dorsum sellae and laterally by the carotid prominences and cavernous sinuses. The floor of the sella is formed by a thin piece of sphenoid bone which separates the sella from the underlying sphenoid sinus. The roof of the sella turcica is formed by a thin layer of dura, the diaphragma sellae, which covers the pituitary gland except for a small opening in its center that transmits the pituitary stalk.

Tumors of the anterior pituitary account for 10% to 15% of all primary brain tumors. Most patients with prolactinomas present having microadenomas, where high serum prolactin levels account for the clinical presentation of amenorrhea and/or galactorrhea in women, or decreased libido and impotence in men. Macroprolactinomas are less common and can cause symptoms related to extension superiorly involving the optic nerves and chiasm in the suprasellar region, and to extension laterally encroaching upon contents of the cavernous sinus. The sella itself is often expanded by macroadenomas and tumor may erode the floor of the sella to involve the sphenoid sinus.

Magnetic resonance imaging has become the imaging modality of choice for examination of the sella and the parasellar structures (reviewed by Tarr and Lewin). Short echo time/short relaxation time (T1-weighted) sequences are routinely used. The coronal plane is optimal for imaging the sella because it minimizes image-distorting partial volume effects from the
carotid artery, sphenoid sinus and suprasellar cistern. The MRI examination in the sagittal plane is useful to assess midline structures. The ability to distinguish normal pituitary from pituitary lesions is enhanced by the intravenous administration of paramagnetic contrast material. An MRI can also be useful in detecting hemorrhage within the pituitary gland. Subacute hemorrhage is seen as increased intensity on uncontrasted T1 images due to the presence of methemoglobin. Acute hemorrhage, as seen in cases of pituitary apoplexy, is appreciated as hypointensity on T2-weighted spin-echo or gradient echo sequences due to the presence of deoxyhemoglobin.

Dopamine agonists are widely used in the treatment of pituitary prolactinomas (reviewed by Nomikos, Buchfelder and Fahlbusch) and act directly on D2 dopamine receptors of normal and tumorous prolactin secreting cells (recently reviewed by Ivan et al.)