Radiologic Evaluation of Sellar Masses

Steven Brauer, Harvard Medical School Year III
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Patient Presentation

• 38-year-old G2 P3 female
• Menstrual irregularity
• Milky nipple discharge
• Prolactin 107 ng/mL (normal 15-30)
• hCG <5 mIU/mL
• FSH, TSH, T4, IGF-1 within normal limits
• Meds: none
Prolactin - secretion

• Polypeptide hormone secreted by lactotrophs of anterior pituitary
• Inhibited by dopamine
Prolactin - actions

• Induces proliferation of ducts and lobules in breast
• Permits lactation
• Inhibits reproductive function and sexual drive
Hyperprolactinemia – Causes

- Physiologic – pregnancy, breast-feeding, REM sleep, exercise, sexual intercourse, acute stress
- Prolactinoma
- Pituitary stalk compression/damage (tumor, surgery, radiation, inflammation)
- Drugs (antipsychotics, antidepressants, opiates, H2 blockers, estrogens, antiandrogens, verapamil)
- Primary hypothyroidism
- Chronic renal failure
- Cirrhosis
- Seizures
- Pseudopregnancy
Imaging of Sellar Region

• MR
  – Imaging method of choice, good soft tissue contrast, multiplanar imaging, does not require neck hyperextension, no ionizing radiation

• CT
  – Superior imaging of bony structures, may reveal calcification in meningioma or craniopharyngioma
Anatomy - Sagittal

Adenohypophysis (anterior lobe of pituitary gland)
- Pars tuberalis
- Fibrous trabecula
- Pars intermedia
- Pars distalis
- Cleft

Hypothalamus
- Lamina terminalis
- Paraventricular hypothalamic nucleus
- Supraoptic hypothalamic nucleus
- Supraopticohypophyseal tract
- Tuberohypophyseal tract
- Hypothalamohypophyseal tract
- Infundibulum (pituitary stalk)

Mammillary body
- Arcuate (infundibular) nucleus

Neurohypophysis (posterior lobe of pituitary gland)
- Median eminence of tuber cinereum
- Infundibular stem
- Infundibular process

Netter, 2003
Anatomy - Coronal

Cavernous sinus
Oculomotor nerve (III)
Trochlear nerve (IV)
Abducent nerve (VI)
Ophthalmic nerve (V₁)
Maxillary nerve (V₂)

Optic chiasm
Posterior communicating artery
Internal carotid artery
Hypophysis (pituitary gland)
Sphenoidal sinus
Nasopharynx

Coronal section through cavernous sinus

Netter, 2003
# Sellar Mass - Symptoms

<table>
<thead>
<tr>
<th>Impacted Structure</th>
<th>Clinical Impact</th>
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<tbody>
<tr>
<td>Pituitary</td>
<td>Hypogonadism</td>
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<tr>
<td></td>
<td>Hypothyroidism</td>
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<td></td>
<td>Growth failure and adult hyposomatropism</td>
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<td></td>
<td>Hypoadrenalism</td>
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<td>Optic chiasm</td>
<td>Loss of red perception</td>
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<td>Bitemporal hemianopia</td>
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<td>Superior or bitemporal field defect</td>
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<td>Scotoma</td>
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<td>Blindness</td>
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<td>Hypothalamus</td>
<td>Temperature dysregulation</td>
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<td>Appetite and thirst disorders</td>
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<td>Obesity</td>
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<td>Diabetes insipidus</td>
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<td>Sleep disorders</td>
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<td>Behavioral dysfunction</td>
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<td>Autonomic dysfunction</td>
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<tr>
<td>Cavernous sinus</td>
<td>Ophthalmoplegia ± ptosis or diplopia</td>
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<td>Facial numbness</td>
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<tr>
<td>Frontal lobe</td>
<td>Personality disorder</td>
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<td>Anosmia</td>
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<td>Brain</td>
<td>Headache</td>
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<td>Hydrocephalus</td>
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<td>Psychosis</td>
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<td>Dementia</td>
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<td>Laughing seizures</td>
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Melmed, 2005

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**Table 318–6. Features of Sellar Mass Lesions**

- Impacted Structure
- Clinical Impact

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Steven Brauer, 2006
Gillian Lieberman, MD
Normal MR - Coronal

T1, unenhanced

Chan and Carmony, 2000
Normal MR - Sagital

T1, contrast-enhanced

Chan and Carmony, 2000
Index Patient Head MRI

T1, unenhanced

T1, with contrast enhancement

Courtesy of Dr. Yakub Reczek
Follow-up MRI, one year later

T1, with contrast enhancement

Courtesy of Dr. Yakub Reczek
Differential diagnosis – Sellar Mass

Hyperplasia
Neoplasm
  - Pituitary adenoma
  - Craniopharyngioma
  - Meningioma
  - Chordoma
  - Choristoma
  - Glioma
  - Schwanoma
  - Germ cell tumor
  - Dermoid/Epidermoid
  - Lymphoma
  - Metastasis (breast, lung, GI)
Tuber cinereum hamartoma
Cysts
  - Arachnoid cyst
  - Rathke’s cleft cyst
Abscess

Inflammatory/Infiltrative
  - Lymphocytic hypophysitis
  - Sarcoidosis
  - Langerhans cell histiocytosis

Vascular
  - Aneurism
  - Carotid-cavernous fistula
  - Apoplexy
  - Infarction
Companion Patient #1: Pituitary Apoplexy on MRI

T1, 2 years later
T1, with contrast, 2 years later

Chan and Carmony, 2000
Companion Patient #2: Craniopharyngioma on CT and MRI

CT

MRI T1

MRI T2

MRI T1, contrast

Chan and Carmony, 2000
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References


• Snyder, P. J. Causes, presentation, and evaluation of sellar masses. *UpToDate*, 2006.