Review of cranial nerves:

Visceral motor neurons from the Edinger-Westphal nucleus lead to the ciliary ganglion where the short ciliary nerves end in the ciliary body and iris. These nerves control the constrictor pupillae and the ciliary muscles which determine the size of the pupil and the curvature of the lens, respectively. Damage to unilateral axons or nucleus will be demonstrated with loss of direct light reflex but preservation of consensual reflex. Accommodation reflex is also affected by these pathways.

The medial longitudinal fasciculus coordinates the III and VI nerves on horizontal gaze. Lesions of the MLF (termed internuclear ophthalmoplegia) are characterized by inability to gaze medially on the affected side upon attempted lateral gaze. Will often see nystagmus on unaffected side. Accommodation reflex is still in tact.

Oculocephalic reflex (doll’s eye) is suppressed in conscious patients. In comatose patients the reflex is in tact (positive doll’s eyes) when the patient’s eyes stay fixed on an object upon turning the head from side to side. It is lost (negative doll’s eyes) when the eyes move with the head.
**Sellar Masses**

A. Benign tumors
   1. Pituitary adenomas: Most common sellar mass after age 30. Arise from cells of anterior pituitary (gonadotroph, thyrotroph, lactotroph, somatotroph, corticotroph). Often see hypersecretion of associated hormone except gonadotrophs, but can see hyposecretion due to compression or neighboring cells.
   3. Meningioma

B. Malignant tumors
   1. Primary malignancy
      a. Germ cell tumors: “ectopic pinealomas” usually occur in early adulthood. Sx include hydrocephalus, DI, hormone deficiencies. Find bHCG in serum. Metastasize quickly, but very radiosensitive.
      b. Chordomas: Present with HA, visual changes, hormone deficiencies. Locally aggressive.
      c. CNS lymphomas: Presentation same as with chordomas.

C. Other (cysts, abscesses—rare, AV fistulas of cavernous sinus). Lymphocytic hypophysitis can occur in postpartum women and is characterized by severe HA in relation to size of lesion with hormone deficiencies. Steroids help regress lesion.

D. Clinical presentation
   ---Impaired vision: most common. Often a result of compression of optic chiasm.
   ---HA, diplopia, CSF rhinorrhea, pituitary apoplexy causing excruciating HA and diplopia.
   ---Hormone deficiency: Pts often do not complain of related symptoms. Most common is decreased LH causing decreased energy and libido and amenorrhea.

D. Radiologic evaluation
   1. MRI: Best imaging study. Different findings on unenhanced vs gadolinium-enhanced (ie macroadenomas take up gadolinium more so that surrounding CNS but microadenomas take up less than surrounding pituitary).
   2. CT: Better for craniopharyngioma and meningiomas. Will see calcification.
   3. PET scan: In development

E. Hormonal studies
   1. Hypersecretion: Only caused by pituitary adenomas.
      --Prolactin adenoma: elevated prolactin (>200ng/mL diagnostic)
      --Somatotroph adenoma: high growth hormone after oral glucose load or high IGF-1
      --Corticotroph adenoma: high elevated 24 hour urine cortisol excretion with high-nl or high serum ACTH
      --Gonadotroph: can see changes in LH and FSH or subunits of TRH but only 35% secrete enough to raise levels.
      --Thyrotroph: elevated TSH and free T4 and T3 levels.

References:
- Cranial Nerves: Anatomy and Clinical Comments, Wilson-Pauwels, Akesson, Stewart
- UpToDate 10.1 (several sites, including sellar masses, neurologic exam, pituitary adenomas)
- Neurology, Glick