The Pituitary gland is located at the base of the brain. It is housed in the sella turcica within the sphenoid bone. The pituitary gland is composed of an anterior and posterior lobe. It plays a key role in regulating most hormonal functions in the body.
Causes of Sellar masses:

- Benign tumors:
  - Pituitary adenoma
  - Cranialpharyngioma
  - Meningioma
  - Dermoid tumor

- Malignant tumors:
  - Primary:
    - Germ Cell tumors
    - Sarcoma
    - Chordoma
    - Pituitary Carcinoma
  - Metastatic:
    - Lung
    - Breast

- Cysts:
  - Rathke’s cleft Cyst
  - Arachnoid cyst

- Lymphocytic hypophysitis

- Pituitary hyperplasia during pregnancy

- Pituitary abscess

Pituitary Adenomas:

- Pituitary Adenomas comprise 10-15% of all intracranial tumors
- 10% of all surgically resected tumors
- Affects up to 20% population (1 in 5
- Majority arise from anterior pituitary gland
- Classified based on size and function

- Size Classification:
  - Microadenomas: <10mm
  - Macroadenomas: >10mm
  - Giant adenomas

Pituitary Adenomas:

- Functional Classification:
  - FSH/LH-Gonadotroph adenomas
  - Nonfunctioning, rarely functions
  - Prolactin-Prolactinomas
  - Most common
  - TSH-TSHomas
  - Rare cause of hyperthyroidism
  - <1% pituitary adenomas
  - GH-Acromegaly
  - ACTH-Cushing’s Disease
  - 2/3 of causes of Cushing’s Syndrome

Workup:

- Lab Work:
  - ACTH, 8am cortisol
  - TSH, free T4, free T3
  - Prolactin (1:100 dilution if macroadenoma)
  - GH, IGF-1
  - FSH, LH, total testosterone/estradiol

- Imaging:
  - CT scan
  - MRI w/wo contrast

- Ophthalmologic exam with visual field testing
Non Secretting Pituitary Adenomas:
- 30% of all pituitary tumors
- Large at presentation
- Mass effects

Non Secretting Pituitary Adenomas:
- Hypopituitarism
- Elevated prolactin from stalk effect
- Compression of optic chiasm
  - Bitemporal hemianopsia

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Prolactinomas:
- Most common hormonally active tumor (48%)
- F >> M
- Microadenomas
  - Benign, some regress spontaneously, can have no growth.
- Macroadenomas
  - Present w/ pressure symptoms, increase in size.

Prolactinomas:
- Clinical features dependent on prolactin level, mass effects, hypopituitarism
- Prolactin stimulates milk in Estrogen-primed breast
- High prolactin inhibits GnRH which decreases FSH/LH which decreases testosterone/estrogen

Prolactinomas:
- Treatment:
  - Medications
    - Dopamine agonists are 1st line treatment regardless of size
  - Surgery
    - In resistant prolactinomas
    - Intolerance to dopamine agonists
  - Radiation
    - For residual/recurrent tumor
Prolactinomas:

- **Cabergoline**
  - Better tolerated
  - Fewer side effects
  - More likely to normalize level
  - No increased risks in pregnancy
  - ½ life 2-3 days
  - Effective dose 1-1.5mg twice a week
  - May go up to 7-12mg/week for resistant prolactinomas

- **Bromocriptine**
  - Cheaper
  - ½ life 8hrs
  - Should be 2-3 times daily
  - Common dose up to 10mg every night or 5mg twice a day
  - Preferred agent in pregnancy

- **Side effects of Dopamine agonists:**
  - Nausea
  - Lightheadedness
  - Mental fog
  - Worsening of depression
  - Psychotic reaction
  - Minimize if take at night, start low, go slow, take w/ snack

Prolactinomas:

- **Clinical presentation:**
  - Obesity
  - Moon facies
  - Dorsal cervical fat pad
  - Exophthalmos
  - Periorbital edema
  - Conjunctival injection
  - Chest/facial plethora
  - Growth retardation
  - Skin atrophy
  - Easy bruising
  - Striae
  - Hyperpigmentation
  - Hirsutism
  - Amenorrhea
Cushing's disease:

- Complications of Cushing's disease
  - Fungal infections
  - Cardiovascular complications
    - Stroke, heart attack
  - Proximal myopathy
  - Psychiatric disturbances
  - Menstrual abnormalities
  - Osteopenosis
  - PCOS (Polycystic Ovarian Syndrome)
  - Diabetes/impaired glucose tolerance

Cushing's disease:

- Surgery is the treatment of choice.
  - Immediate post-op cortisol <2-3pg/dl within 24-72 hours

- If not cured, consider
  - Repeat surgery
  - Radiation treatment
  - PSs

- Medical therapy may be considered for patients who fail surgical therapy or if they are not good surgical candidates.

Acromegaly:

- Secondary to a GH secreting tumor
- M=F
- Mean age 42-44
- Premature mortality from cardiovascular disease.

Acromegaly:

- Change in facial features
  - Enlargement in forehead, mandible, tongue, gap in teeth
- Enlargement of hands/feet
- Excessive sweating
- Dental malocclusions
- Sleep apnea

Acromegaly:

- Comorbidities of Acromegaly:
  - Cardiomyopathy/Congestive Heart Failure
  - Diabetes/Insulin resistance
  - Hypertension
  - Obstructive sleep apnea
  - Precancers colon polyps
  - Thyroid nodules

Acromegaly:

- Management:
  - Surgery
    - 1st line treatment
  - Medications
    - Has been used as adjunctive vs primary medical therapy
      - Somatostatin analogs (octreotide, sandostatin)
      - Dopamine agonists (cabergoline, bromocriptine)
      - GH receptor-antagonist (Pegvisomant)
  - Radiation
Management of Pituitary tumors:

- Multidisciplinary approach:
  - Surgeon
  - Radiation-oncologist,
  - Endocrinologist,
  - Ophthalmologist.

- Goals:
  - Remove tumor mass
  - Control hypersecretion
  - Correct endocrine deficiencies

Surgery for Pituitary tumors:

- The gold standard for treatment of sellar lesions.

- Advantages:
  - Pathological confirmation
  - Immediate decompression of the optic apparatus
  - Rapid reduction of hormone over-secretion.

  - Overall, microsurgery alone provides long-term tumor control rates of 50 to 80%.

Surgery for Pituitary tumors:

- Transcranial approaches:
  - Requires craniotomy and retraction of the frontal lobes of the brain.
  - Sub-optimal exposure of inferior and posterior aspects of tumor.
  - Difficult to distinguish normal gland from tumor from distal perspective.
  - Forces surgeon to operate between CN II or III, risking injury to vision or sense of smell.
  - Used for large invasive tumors or tumors with significant suprasellar extension.
  - Often used as a combined second stage approach following a trans-sphenoidal resection.

Surgery for Pituitary tumors:

- Transsphenoidal Surgery:
  - Sublabial
  - Trans-septal transnasal
  - Endoscopic endonasal

  - Provides easy and direct access
  - Avoids craniotomy
  - Decreased risk to optic nerve
  - “Minimally invasive”
  - Usually done with the help of ENT for exposure.

Endoscopic Endonasal Approach:

- Improved visualization of surrounding optic bulbs, brainstem, and carotids.
- Improved ability to differentiate tumor from normal pituitary tissue.
XRT is not the first line of therapy. It is usually used as adjuvant therapy to treat known residual tumor following incomplete or sub-total resection (STR). It is also used to treat recurrent tumors if small and asymptomatic.

Tumor growth control results achieved with GKRS is similar to those for fractionated RT. GKRS may produce better results than conventional RT in treatment of endocrinopathies secondary to pituitary adenomas. GKRS seems to be safer than fractionated RT in terms of complications.

Case 1

- 75 year old female who has found to have a large pituitary adenoma during workup of confusion and suspected stroke.
- Neurologic exam was non focal.
Case 1
- 48 year old female who presented with decreased vision in her left eye for about 2 months duration.

Case 2
- 48 year old female who presented with decreased vision in her left eye for about 2 months duration.

Case 2
- The patient is a 63 year old male with Pan hypopituitarism.
THANK YOU

Pituitary Tumors And Their Management

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