

Medical Management of Pituitary Tumors After Surgery

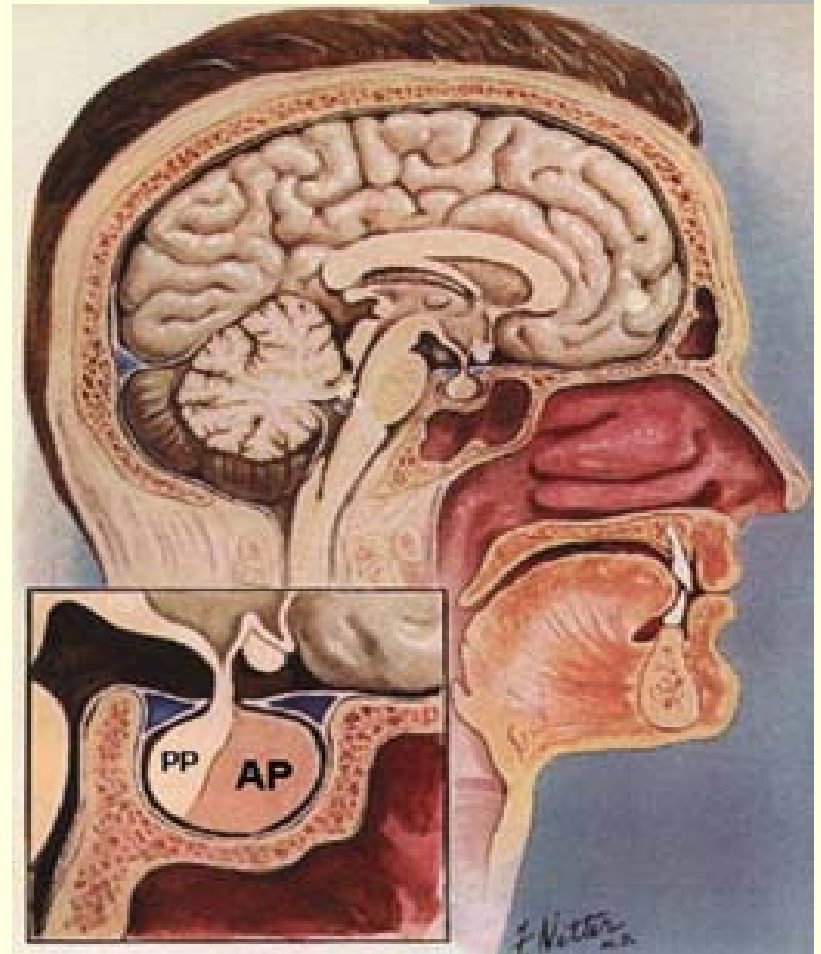
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Overview

- Endocrine Active Tumors
 - Medical Treatment as a secondary treatment
- Endocrine Inactive Tumors
 - Preoperative and postoperative pituitary insufficiency
 - Medical Replacement of Hormonal Deficiencies

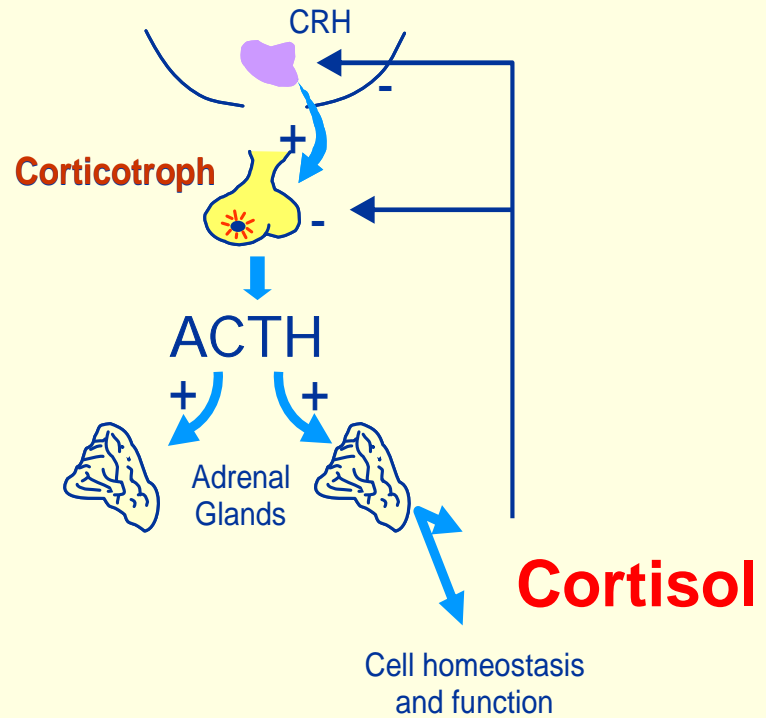
Introduction

- Normal Pituitary Function
 - Anterior Pituitary
 - Growth
 - Reproductive Function
 - Thyroid Function
 - Adrenal Gland Function
 - Lactation
 - Posterior Pituitary
 - Thirst and Fluid Balance



Cushing's Disease

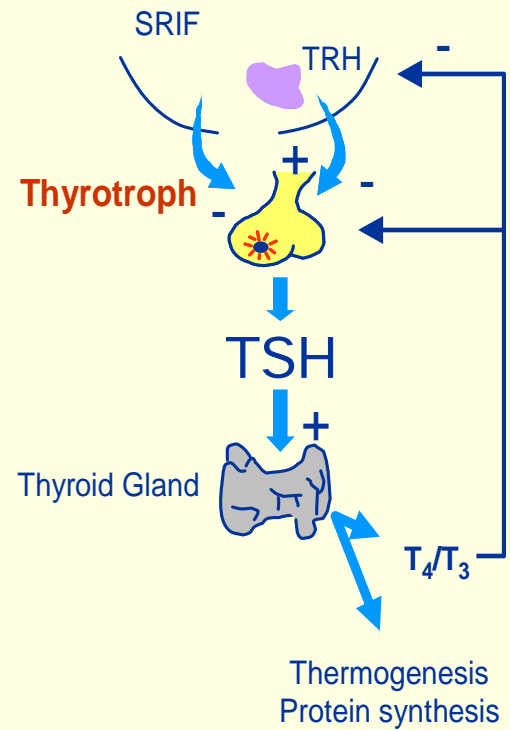
- Hypercortisolism
- Central obesity
- Striae
- Hyperglycemia
- Osteoporosis
- Hirsutism



TSH-cell Adenoma

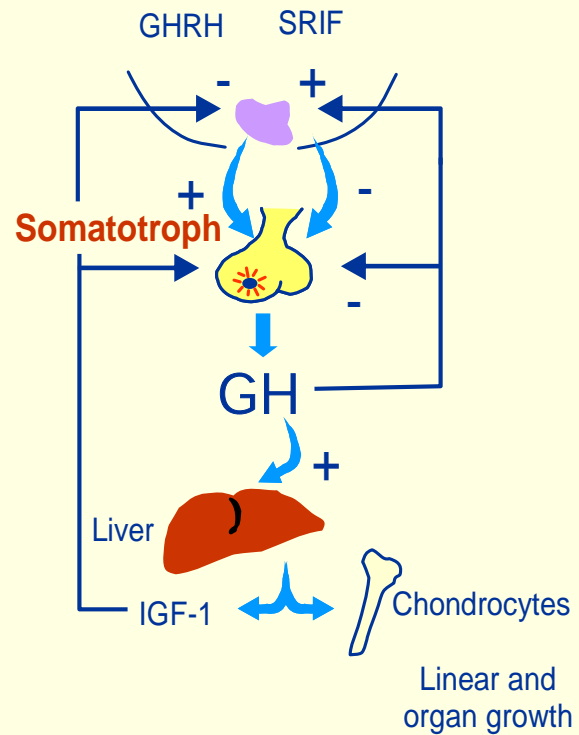
Goiter

Thyroxine (T4)



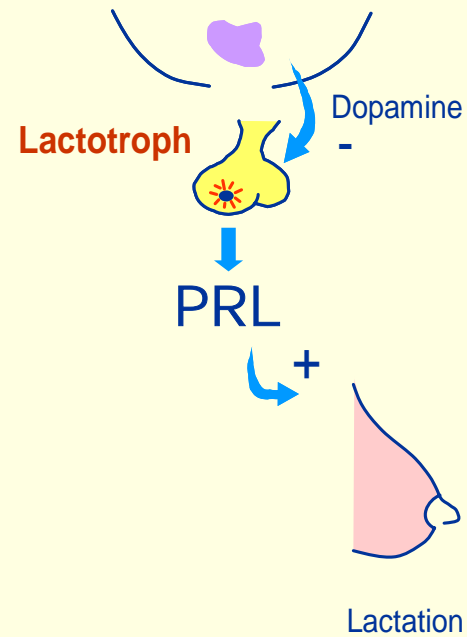
Acromegaly

- Acral enlargement
- Soft tissue swelling
- Cardiac hypertrophy
- Hypertension
- Hyperglycemia
- Sleep apnea



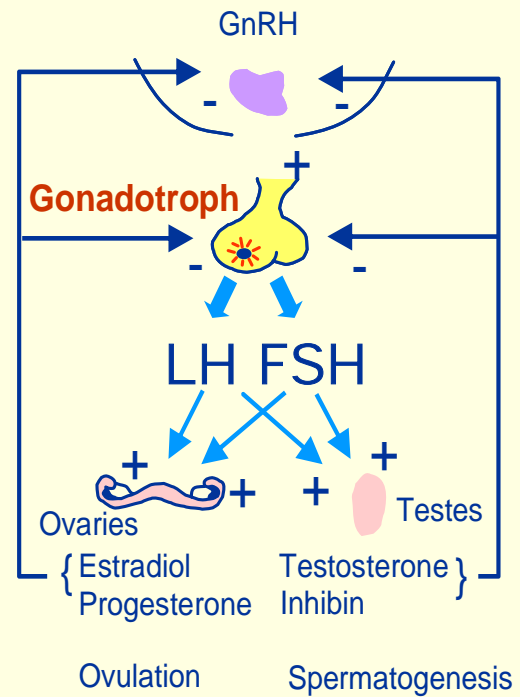
Prolactinoma

- Galactorrhea
- Amenorrhea
- Infertility
- Hypogonadism



Non-functioning Adenoma

- Central effects
- Hypogonadism
- Hypergonadism (rare)
- Incidental



Endocrine Active Tumors

- Growth Hormone (GH)
 - Acromegaly
- Adrenocorticotrophic Hormone (ACTH)
 - Cushing's Disease
- Prolactin (PRL)
 - Prolactinoma
- Thyroid Stimulating Hormone (TSH)
 - Hyperthyroidism (very rare)

Acromegaly

- 60% are Macroadenomas (>10mm)
- 40% are Microadenomas (<10mm)

- Surgical cure rates differ between Macros and Micros
 - Macroadenomas - 50%
 - Microadenomas - 85%

Medical Treatment - Acromegaly

- Assess cure 6-12 weeks after surgery
- Start medical therapy if not cured
- Replace any hormonal deficiencies

Somatostatin Analogues

- Octreotide (Sandostatin)
- Lanreotide (Somatuline)
- Long acting injection medications
- Drug of choice for initial treatment
- Suppress GH secretion from the pituitary
- Shrink or prevent growth of tumor
- Effective in 60%

GH Receptor Antagonists

- Pegvisomant (Somavert)
 - Daily injection
 - Blocks action of GH at the receptor
 - Does not reduce GH or treat tumor size
 - Effective in >90%

Cushing's Disease

- Medical Treatment in Refractory cases
- Long-term success is limited
- Drugs block cortisol synthesis
 - Ketoconazole
 - Metyrapone

Prolactinoma

- Primarily treated with medication
- Recurrence can be treated with low dose medications
 - Bromocriptine (Parlodel)
 - Cabergoline (Dostinex)

TSH-oma

- Treated with somatostatin analogues
- Suppresses TSH secretion from pituitary
 - Octreotide (Sandostatin)
 - Lanreotide (Somatuline)

Endocrine Inactive Tumors

- Non-Functioning Pituitary Adenoma
 - Most Common Pituitary Adenomas (about 40%)
 - Do not cause symptoms of hormone overproduction like other pituitary adenomas
 - Most are derived from Gonadotroph cell line (LH, FSH)

Pre-surgical Hormonal Deficiencies

- Hypogonadism - Most common clinically
 - Males – decreased libido, energy
 - Females – amenorrhea
- Pressure of tumor on normal gland
- Interference with normal secretion of pituitary hormones

Preoperative Hypopituitarism

- Panhypopituitarism (all hormones) <20%
- Adrenal insufficiency 30%
- Thyroid insufficiency 20%
- Hypogonadism 75%
- Mild elevations in prolactin 25%

Post-operative Hypopituitarism

- Improvement in ~ 50%
- No change in ~ 45%
- Worsening in ~5%

Assessing Hormones

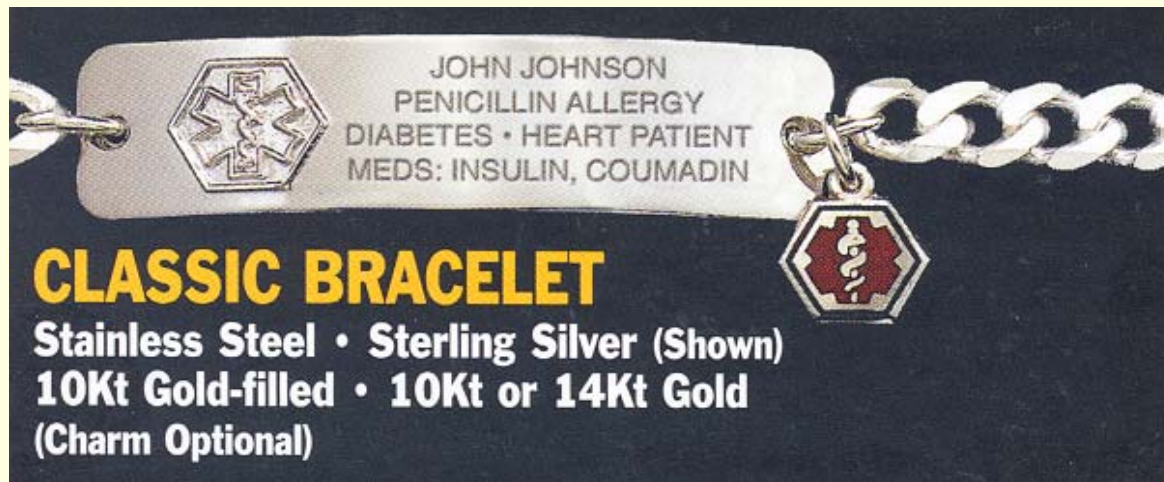
- Initial follow-up should be at 6 weeks after surgery
 - History and Physical exam
 - Assess Thyroid function
 - Gonadal Hormones
 - Prolactin and IGF-I (Growth Hormone)
 - Cortisol Levels if necessary

Cortisol Replacement

- Oral medications
 - Hydrocortisone (15-20 mg per day)
 - Divided Doses
 - Prednisone (2.5-7.5 mg per day)
- During Physiologic Stress
 - Fever
 - Double usual dose

Emergencies

- MedicAlert Bracelet
 - Notify Medical Personnel that you require cortisol to survive if unconscious



Thyroid Replacement

- Oral replacement
 - Levothyroxine (T4)
 - Levothroid
 - Levoxyl
 - Synthroid
 - Unithroid
 - Liothyronine (T3)
 - Cytomel
 - Thyroid Extract (Contains T4 and T3)
 - Armour thyroid

Estrogen Replacement

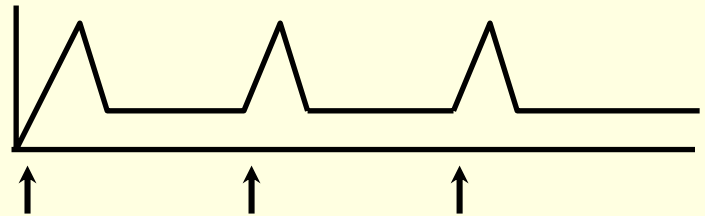
- Premenopausal Women
 - Oral Contraceptive
 - Menopausal hormonal replacement therapy
 - Many Formulations
 - Tablets
 - Patches
 - Vaginal (cream, tablet, ring)
- Treat until “Menopause”

Testosterone Replacement

- Available as Injection, Patch, Gel
 - Each has advantages and disadvantages

Intramuscular Testosterone

- Injection
 - Pros
 - Administered every 1-2 weeks
 - Cons
 - Peaks, valleys



Transdermal Testosterone

- Gel or Patch

- Applied Daily

- Pros

- Even levels

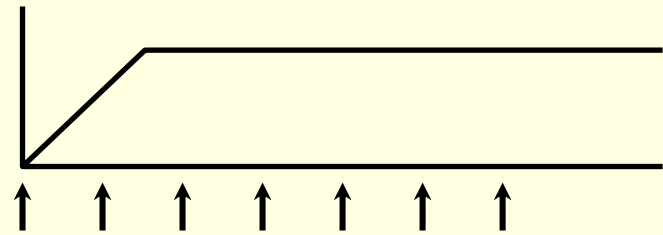
- Cons

- Gel

- Can transfer to other people

- Patch

- Adhesive can irritate Skin



Growth Hormone

- Testing for GH deficiency usually requires GH stimulation testing
- GH replacement is administered by daily injection
- Monitoring is critical
- Dosing is individualized to normalize IGF-I level

Goals of Replacement

- Replacement of hormones that are no longer produced by the Pituitary
 - Raise hormonal levels to within the normal range for age
 - Ameliorate the symptoms associated with hormonal deficiencies
 - Avoid side effects
- Long term monitoring on an annual basis
 - Assess for recurrence

Questions?

- Endocrine Active Treatment
 - Adjunctive therapy
- Hypopituitarism
 - Preoperative and postoperative
- Hormonal Replacement
 - Multiple hormonal therapies