Endocrine Disorders

Pituitary Gland

Anterior pituitary gland
- Growth hormone (GH)
  - Stimulates growth in tissue and bone
- Thyroid-stimulating hormone (TSH)
  - Acts on thyroid gland
- Adrenocorticotropic hormone (ACTH)
  - Stimulates adrenal gland
- Gonadotropins (FSH), (LH)
  - Affects ovaries

Medications
- Growth hormone deficiency
  - Somatrem (Protropin), somatropin (Humatrope)
- Growth hormone excess
  - bromocriptine (Parlodel), octreotide (Sandostatin)
- Thyroid-stimulating hormone
  - Thyrotropin (Thytropar)
- Adrenocorticotropic hormone
  - Corticotropin (Acthar) = ACTH
- Action
  - Stimulates adrenal cortex to secrete cortisol (glucocorticoid)
- Use
  - Antiinflammatory, immunosuppressant, diagnose adrenocortical disorders, treat acute multiple sclerosis

Nursing Interventions with ACTH
- Monitor weight, edema, electrolytes
- Do not stop drug abruptly; taper doses
- Warn client to decrease salt intake
- Warn client not to take live vaccines during use
- Instruct clients to report decreased wound healing
- Monitor for new infection

Posterior Pituitary Gland
- Antidiuretic hormone (ADH)
  - Vasopressin (Pitressin)
  - Desmopressin acetate (DDAVP)
- Action
Promotes water reabsorption into the renal tubules to maintain water balance

Use
  - Diabetes Insipidus (DI)

**Nursing Interventions with ADH**
- Monitor vital signs
- Accurate I & O
- Monitor electrolytes, urine specific gravity, serum / urine osmolality
- Monitor for lethargy, confusion, & headache which indicates water intoxication
- Emergency equipment & drugs readily available
- Readily report abnormal findings to physician

**Thyroid Gland**
- Thyroid gland hormones
  - Thyroxine (T4)
  - Triiodothyronine (T3)
- Functions
  - Control metabolic rate and all cellular activity

**Hypothyroidism**
- Decrease in thyroid hormone secretion
- Associated labs
  - TSH, T4 and T3
- Symptoms
  - Weight gain, myalgias, intolerance to cold, fatigue, bradycardia

**Medication Management**
- Levothyroxine (T4, Synthroid)
  - Action
    - Increase metabolism rate and cellular metabolic processes
  - Side effects/adverse reactions
    - Nervousness, tremors, insomnia, weight loss
    - Tachycardia, palpitations, dysrhythmias
    - Thyroid crisis

**Nursing Interventions with Levothyroxine (T4, Synthroid)**
- Monitor vital signs
- Monitor weight
- Administer same time each day (empty stomach)
- Teach patient:
  - Check labels of all OTC medications for thyroid disease warnings
- Signs/symptoms of “hypo/hyper” thyroidism, and to report abnormalities to the physician/nurse
- Monitor own pulse

**Hyperthyroidism**
- Increase in thyroid hormone secretion
- Associated Labs
  - TSH, T4 and T3
- Symptoms
  - Nervousness, tremors, insomnia, weight loss
  - Tachycardia, palpitations, dysrhythmias
  - Heat intolerance
  - Exophthalmos

**Medication Management**
- Hyperthyroidism
  - Propylthiouracil (PTU)
  - Methimazole (Tapazole)
- Action
  - Reduce excess secretion of T4, T3 by inhibiting thyroid secretion
- Use
  - Treat thyrotoxic crisis
  - Preparation for subtotal thyroidectomy

**Nursing Interventions with Anti-Thyroid Drugs**
- Discontinue 3-4 days prior to RAI Treatment
- Teach patient:
  - Do not stop abruptly
  - Signs/symptoms of “hypo/hyper” thyroidism, and to report abnormalities to the physician/nurse
  - Avoid using iodized salt, eating seafood, using OTC cough medications
  - Monitor own pulse

**Parathyroid Glands**
- Parathyroid hormone (PTH)
  - PTH released with decreased blood calcium
  - Calcitonin
    - Treats hyperparathyroidism by promoting renal excretion
    - Treats calcium overdose
  - Calcitriol (Vitamin D analog)
    - Treat hypoparathyroidism by promoting calcium GI absorption and release of calcium from bone into bloodstream
Hypocalcemia caused by deficiency in PTH

**Signs and Symptoms**

**Hypocalcemia**
- Tingling, burning, twitching in lips, fingertips, toes
- Muscle aches or cramps in face, legs, feet
- Muscle twitching or spasms particularly around mouth, but also in hands, arms and throat (tetany)
  - Carpopedal spasm
  - Laryngeal spasms
  - + Chvostek
  - + Trousseau

**Hypercalcemia**
- N / V, anorexia
- Excessive thirst
- Frequent urination
- Abdominal pain / constipation
- Muscle / joint weakness and aching
- Decreased tendon reflexes
- Fatigue, lethargy, confusion

**Nursing Interventions and Calcium Disorders**
- Monitor calcium levels
- Warn client to check OTC drugs for calcium content
- Instruct client to report symptoms of hypo / hypercalcemia
- For calcitriol do not use other sources of vitamin D

**Adrenal Glands**
- Adrenal medulla & adrenal cortex (norepinephrine and epinephrine – fight/flight)
- Adrenal cortex produces:
  - Glucocorticoids (cortisol)
    - Released in stress
    - Affects macronutrient metabolism
    - Tx Adrenal hyposecretion (Addison’s disease)
  - Mineralocorticoids (aldosterone)
    - Secretes aldosterone
      - Promotes blood pressure increase
    - *Both have mineralcorticoid effects - promoting sodium and water retention, K+ excretion, B/P*

**Glucocorticoids**
- Prednisone (Deltasone)
Action
- Suppresses inflammatory response and immune systems

Use
- Decrease inflammation, immunosuppressant, allergic reactions

Side effects/adverse reactions
- Increased appetite, sweating, headache, flushing
- Mood changes, depression, psychosis
- Tachycardia, hypertension
- Hyperglycemia
- Weight gain and edema

Nursing Interventions with Glucocorticoids
- Obtain baseline vital signs, weight, electrolytes, glucose for future comparison when dosing is to be long term
- Instruct patient to report weight gain > 5 #’s over several days
- Increase blood glucose monitoring
- Never stop drugs abruptly; taper dose
- Instruct patient to avoid close contact with others suspected of having an infectious process

Antidiabetic Drugs

Diabetes Mellitus
- Serum glucose levels
  - Adult Fasting = 70-110 mg/dl
- Insulin
  - Function
    - Major role in transporting circulating glucose into body cells and converting carbohydrates, proteins, fats into storable forms necessary for energy use

Insulin Preparation and Administration
- Commercially prepared insulin
  - Beef, pork, human (available in 10 mL vial)
- Concentration of prepared insulin
  - 100 units/mL = U100
  - 500 units/mL (very rare) = U500
- Storage of Insulin Vials
  - Unopened → refrigerated
  - Opening → 1 month room temperature, 3 months refrigerated

Insulin Delivery
- Never oral
- SubQ
- IV (only regular insulin)
• Syringes are 100 units/mL for U100
• During illness/stress

**SubQ Administration**

- Teach client to recognize s/s of hypoglycemia and how to tx low levels
- Teach client injection techniques
- Teach client how to monitor blood sugar
- Explain sliding scale insulin may be necessary during illness and/or stress
- Teach importance of dietary and medication compliance
- Advise client to wear medical Alert tag/bracelet

**Oral Antidiabetic (Hypoglycemic) Drugs**

• First-generation sulfonylureas
  - Stimulate insulin release from pancreas
  - First used 1940
    - Short-acting = tolbutamide (Orinase)
    - Intermediate-acting = Acetohexamide (Dymelor)
    - Long-acting = chlorpropamide (Diabinese)

• Second-generation sulfonylureas
  - glipizide (Glucotrol)
  - Stimulate insulin release from pancreas
  - Increased tissue response and decreases glucose production
  - Dosing < first generation
  - Longer duration & fewer side effects
- Except => hypoglycemic reaction possible

- **Biguanides**
  - **Metformin (Glucophage)**
    - Lowers hepatic production of glucose
    - Lowers postprandial blood sugar levels
    - Raises insulin receptor sensitivity
    - No hyper/hypoglycemic effects
    - GI side effects common
    - Bitter/metallic taste
    - Contraindicated in hepatic or renal failure

- **Thiazolidinediones**
  - Decrease insulin resistance
  - Used alone or in combination
  - Do not induce hypoglycemia
    - Pioglitazone (Actos)
    - Rosiglitazone (Avandia)
    - Raises risk for coronary event

**Nursing Interventions with Oral Antidiabetics**
- Teach client to recognize s/s of hypoglycemia and how to tx low levels
- Explain insulin may be necessary during illness and/or stress
- Teach importance of dietary and medication compliance
- Teach client how to monitor blood sugar
- Warn client that alcohol increases half-life increasing risk for hypoglycemia

**Treating Diabetic Emergencies**
- Wear medical alert bracelet
- Insulin induced hypoglycemia
  - Administer glucagon
    - PO, IM, IV
- Ketoacidosis or Hyperosmolar hyperglycemia non-ketotic syndrome
  - Administer IV insulin infusion (regular only)