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
  - Propylthioruacil (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 hyperparathyroidsim 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

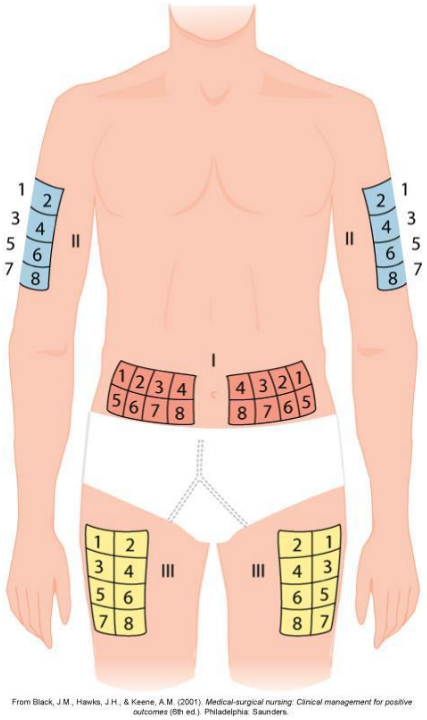
- Commercially prepared insulin
  - Beef, pork, human (available in 10 mL vial)
- Concentration of prepared insulin
  - 100 units/mL = U100
  - 500 units/mL (very rare) = U500
- Storage of Insulin Vials
  - Unopened $\longrightarrow$ refrigerated
  - Opened $\longrightarrow$ 1 month room temperature, 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)