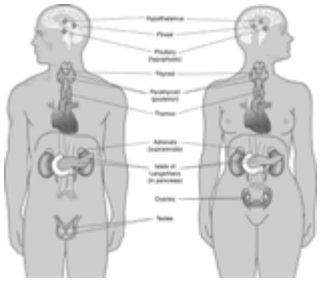
Chapter 42

Assessment and Management of Patients With Endocrine Disorders

Endocrine System

- Affects almost every cell, organ, and function of the body
- The endocrine system is closely linked with the nervous system and the immune system
- Negative feedback mechanism
- Hormones
  - Steroid: act inside the cell
  - Peptide (protein): act on cell surface
  - Amine
  - Fatty acid derivative

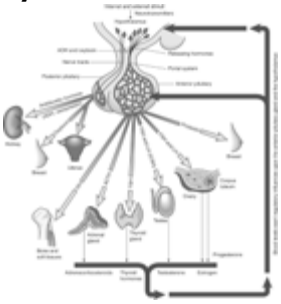
Major Hormone Secreting Glands of the Endocrine System



Hypothalamus

- Hormones
  - CRH
  - TRH
  - GHRH
  - GnRH
  - Somatostatin
- Controls the release pituitary hormones

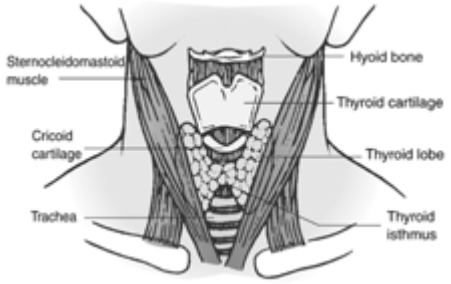
Pituitary Gland and Its Hormones



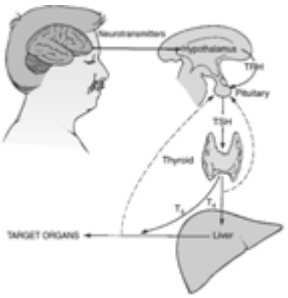
Thyroid Gland

- Thyroid hormones: T_3 and T_4 also produce calcitonin
- Iodine is contained in the thyroid hormone
- TSH from the anterior pituitary controls the release of the thyroid hormone
- TRH from the hypothalamus controls the release of TSH
- Thyroid hormone controls cellular metabolic activity
- T_3 is more potent and more rapid-acting than T_4
- Calcitonin is secreted in response to high plasma calcium level and increases calcium deposition in bone

Thyroid Gland (cont.)



Hypothalamic-Pituitary-Thyroid Axis



Thyroid Diagnostic Tests

- TSH
- Serum-free T_4
- T_3 and T_4
- T_4 resin uptake
- Thyroid antibodies
- Radioactive iodine uptake
- Fine-needle biopsy
- Thyroid scan, radio scan, or scintiscan
- Serum thyroglobulin

Thyroid Disorders

- Cretinism
- Hypothyroidism
- Hyperthyroidism
- Thyroiditis
- Goiter
- Thyroid cancer

Hypothyroidism

- Causes: autoimmune thyroiditis and Hashimoto's disease (most common cause) (see Chart 42-2)
- Affects women 5X more frequently than men
- Manifestations
  - Early symptoms may be nonspecific

Hypothyroidism (cont.)

- Manifestations (cont.)
  - Fatigue; hair, skin and nail changes; numbness and tingling of fingers; menstrual disturbances; subnormal temperature and pulse; weight gain; subdued emotional and mental responses; slow speech; tongue, hands, and feet may enlarge; personality and cognitive changes; and cardiac and respiratory complications
  - Myxedema may progress to stupor, coma, and death

Medical Management of Hypothyroidism

- Synthetic levothyroxine-replacement therapy
- Medication interactions
- Effects of hypnotic and sedative agents; reduce dosage
- Support of cardiac function and respiratory function
- Prevention of complications

Hyperthyroidism

- The second most prevalent endocrine disorder
- Excessive output of thyroid hormone
- Graves disease (most common cause)
- Affects women 8X more frequently than men
- Manifestations of thyrotoxicosis: nervousness; palpitations; rapid pulse; poor heat toleration; tremors; skin is flushed, salmon color, warm, soft, and moist (however, elders' skin may be dry and pruritic); exophthalmos; increased appetite and dietary intake; weight loss; elevated systolic BP; may progress to cardiac dysrhythmias and heart failure

Medical Management of Hyperthyroidism

- Radioactive ^{131}I therapy
- Medications: see Table 42-3
  - Propylthiouracil and methimazole
  - Sodium and potassium iodine solutions
  - Dexamethasone
  - Beta blockers
- Surgery and subtotal thyroidectomy
- Relapse of disorder is common
- Disease or treatment may result in hypothyroidism

Thyroidectomy

- Treatment of choice for thyroid cancer
- Cancer surgery may include modified or radical neck dissection, and may include treatment with radioactive iodine to minimize metastasis
- Preoperative goals include the reduction of stress and anxiety to avoid precipitation of thyroid storm
- Preoperative teaching includes dietary guidance to meet patient metabolic needs and to avoid caffeinated beverages and other stimulants, explanation of tests and procedures, and demonstration of proper postoperative head support

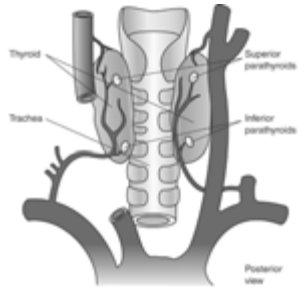
Postoperative Care

- Monitor dressing for potential bleeding and hematoma formation; check posterior dressing
- Monitor respirations and protect airway
- Assess pain and provide pain relief measures
- Use semi-Fowler's position and support head
- Assess voice but discourage talking
- Potential hypocalcemia related to injury or removal of parathyroid glands; monitor for hypocalcemia

Parathyroid Gland

- 4 glands on the posterior thyroid gland
- Parathormone regulates calcium and phosphorus balance
  - Increased parathormone elevates blood calcium by increasing calcium absorption from the kidneys, intestines, and bone
  - Parathormone lowers phosphorus level

Parathyroid Gland (cont.)



Hyperparathyroidism

- Primary hyperparathyroidism is 2X to 4X more frequent in women
- Manifestations include elevated serum calcium, bone decalcification, renal calculi, apathy, fatigue, muscle weakness, nausea, vomiting, constipation, hypertension, cardiac dysrhythmias, and psychological manifestations

Hyperparathyroidism (cont.)

- Treatment
  - Parathyroidectomy
  - Hydration therapy
  - Encourage mobility and reduce calcium excretion
  - Diet: encourage fluid and avoid excess or restricted calcium
- Hypercalcemic crisis

Hypoparathryoidism

- Deficiency of parathormone usually due to surgery such as thyroidectomy, parathyroidectomy, or radical neck dissection
- Results in hypocalcaemia and hyperphosphatemia
- Manifestations include tetany, numbness and tingling in extremities, stiffness of hands and feet, bronchospasm, laryngeal spasm, carpopedal spasm, anxiety, irritability, depression, delirium, and ECG changes
  - Chvostek's sign
  - Trousseau's sign

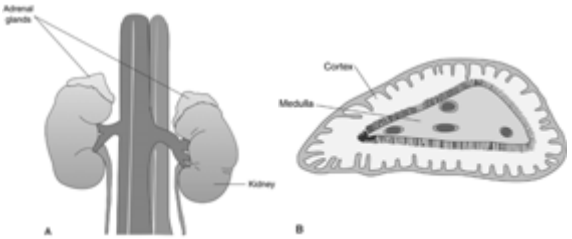
Management of Hypoparathyroidism

- Increase serum calcium level to 9 to 10 mg/dL
- Calcium gluconate IV
- May also use sedatives such as pentobarbital to decrease neuromuscular irritability
- Parathormone may be administered; potential exists for allergic reactions
- Maintain environment free of noise, drafts, bright lights, and sudden movement
- Consume diet high in calcium and low in phosphorus
- Initiate vitamin D supplementation

Adrenal Glands

- Adrenal medulla
  - Functions as part of the autonomic nervous system
  - Catecholamines: epinephrine and norepinephrine
- Adrenal cortex
  - Glucocorticoids
  - Mineralocorticoids
  - Androgens

Adrenal Glands (cont.)



Adrenocortical Insufficiency

- Addison's disease
- May be the result of adrenal suppression by exogenous steroid use
- Manifestations include muscle weakness, anorexia, GI symptoms, fatigue, dark pigmentation of skin and mucosa, hypotension, low blood glucose, low serum sodium, high serum potassium, mental changes, apathy, emotional lability, and confusion
- Addisonian crisis
- Diagnostic tests: adrenocortical hormone levels, ACTH levels, and ACTH stimulation test

Nursing Process—Assessment of the Patient With Adrenocortical Insufficiency

- Assess level of stress and note any illness or stressors that may precipitate problems
- Fluid and electrolyte status
- VS and postural blood pressures
- Note signs and symptoms related to adrenocortical insufficiency such as weight changes, muscle weakness, and fatigue
- Medications
- Monitor for signs and symptoms of Addisonian crisis

Nursing Process—Diagnosis of the Patient With Adrenocortical Insufficiency

- Risk for fluid volume deficit
- Activity intolerance and fatigue
- Knowledge deficit

Interventions

- Monitor for signs and symptoms of possible fluid volume deficit, encourage fluids and foods, select foods high in sodium, and administer hormone replacement as prescribed
- Activity intolerance; avoid stress and activity until stable, perform all activities for patient when in crisis, maintain a quiet non-stressful environment, and implement measures to reduce anxiety
- Teaching: see Chart 42-10

Cushing's Syndrome

- Due to excessive adrenocortical activity or corticosteroid medications
- Manifestations include hyperglycemia that may develop into diabetes, weight gain, central type obesity with "buffalo hump," heavy trunk and thin extremities, fragile thin skin, ecchymosis, striae, weakness, lassitude, sleep disturbances, osteoporosis, muscle wasting, hypertension, "moon-face," acne, increased susceptibility to infection, slow healing, virilization in women, loss of libido, mood changes, increased serum sodium, and decreased serum potassium: see Chart 42-11
- Dexamethasone suppression test

Cushing's Syndrome (cont.)

Nursing Process—Assessment of the Patient With Cushing's Syndrome

- Activity level and ability to carry out self-care
- Skin assessment
- Changes in physical appearance and patient responses to these changes
- Mental function
- Emotional status
- Medications

Nursing Process—Diagnosis of the Patient With Cushing's Syndrome

- Risk for injury
- Risk for infection
- Self-care deficit
- Impaired skin integrity
- Disturbed body image
- Disturbed thought processes

Collaborative Problems/Potential Complications

- Addisonian crisis
- Adverse effects of adrenocortical activity

Nursing Process—Planning the Care of the Patient With Cushing's Syndrome

- Goals include decreased risk of injury, decreased risk of infection, increased ability to carry out self-care activities, improved skin integrity, improved body image, improved mental function, and absence of complications

Interventions

- Decrease risk of injury; establish a protective environment; assist as needed; and encourage a diet high in protein, calcium, and vitamin D
- Decrease risk of infection; avoid exposure to infections; assess patient carefully as corticosteroids mask signs of infection
- Plan and space rest and activity
- Provide meticulous skin care and frequent, careful skin assessment
- Explain the causes of emotional instability to the patient and his family
- Provide patient teaching: see Chart 42-12

Corticosteroid Therapy

- Widely used to treat adrenal insufficiency, suppress inflammation and autoimmune response, control allergic reactions, and reduce transplant rejection
- Common corticosteroids: see Table 42-5
- Patient teaching
  - Timing of doses
  - Need to take as prescribed, tapering as required to discontinue or reduce therapy
  - Potential side effects and measures to reduce side effects; see Table 42-6