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# NCLEX Notes Week 13: Endocrine System

## Functions of the Endocrine System

- Maintenance and regulation of vital functions
- Response to stress and injury
- Growth and development
- Energy Metabolism
- Reproduction
- Fluid, electrolytes, and acid-base balances

## Hypothalamus

- Activates, controls, and integrates the peripheral autonomic nervous system, endocrine processes, and many somatic functions including body temperature, sleep, and appetite

## Pituitary gland

- Master gland
- Promotes growth of body tissues, influences water absorption by the kidney, and controls sexual development and function

## Adrenal gland

- Regulates sodium and electrolyte balances, also sustains the fight or flight response

## Thyroid gland

- Controls the rate of the body's metabolism and the growth and production of thyroxine triiodothyronine and thyrocalcitonin

## Pancreas

- Influences carbohydrate metabolism and the production of insulin and glucagon

## Hemoglobin A1c

- This is a reflection of how well blood sugar levels have been controlled for the past 3 to 4 months
- Should be under 6.5%

## Diabetes Insipidus

- Hyposecretion of ADH by the posterior pituitary gland usually caused by a stroke, trauma, or surgery or it could be idiopathic
    - Assessment

        - Excretion of large amounts of dilute urine
        - Polydipsia
        - Dehydration
        - Low urine specific gravity
        - Fatigue
        - Postural hypotension
        - Tachycardia
    - Interventions
        - Monitor vital signs and neurological and cardiovascular status
        - Monitor electrolyte values and for signs of dehydration
        - Vasopressin may be prescribed
        - Monitor intake and output

**Syndrome of Inappropriate Antidiuretic Hormone (SIADH)**

- Condition of hyperfunctioning of the posterior pituitary gland in which excess ADH is produced
- Results in increased intravascular volume, water intoxication, and dilational hyponatremia
    - Assessment
        - Signs of fluid volume overload
        - Changes in the level of consciousness
        - Weight gain without edema
        - Hypertension
        - Anorexia, nausea, and vomiting
        - Low urinary output
- Interventions
    - Implement seizure precautions
    - use Loop Diuretics to promote diuresis

**Addison's Disease**

- Type of secretion of adrenal cortex hormones
- Requires lifelong glucocorticoids replacement
    - Assessment
        - Lethargy, fatigue, and muscle weakness
        - Hyponatremia
        - Hyperkalemia
        - Hyperpigmentation of the skin (bronzed)
    - Interventions
        - Monitor white blood cell count
        - Administer glucocorticoids

        - Observe for Addisonian crisis caused by stress, infection, trauma, or surgery
    - Client education
        - The client should not use any over-the-counter medications
        - Corticosteroid replacement will need to be increased during times of stress
        - Need to avoid strenuous exercise and stressful situations
        - They should wear a medical alert bracelet

**Addisonian Crisis**

- A life-threatening disorder caused by acute adrenal insufficiency
- Can cause hyponatremia, hyperkalemia, hypoglycemia, and shock
    - Assessment
        - Severe headache
        - Severe abdominal, leg, and lower back pain
        - Generalized weakness
        - Irritability and confusion
        - Severe hypotension
    - Interventions
        - Prepare to administer glucocorticoids IV
        - Monitor vital signs
        - Administer fluids

**Cushing's Syndrome**

- A metabolic disorder resulting from The Chronic and excessive production of cortisol
    - Assessment
        - Moon face, buffalo hump
        - Truncal obesity with thin extremities
        - Hyperglycemia
        - Hypertension
        - Hypokalemia
        - Fragile skin that bruises easily
    - Interventions
        - Monitor intake output
        - Monitor vital signs
        - Prepare client for adrenalectomy if the condition results from an adrenal adenoma
        - Allow patient to discuss feelings related to bodily appearance

**Pheochromocytoma (was on the ATI a lot)**

- Catecholamine producing tumor usually found in the adrenal medulla
- Excessive amounts of epinephrine and norepinephrine are secreted
    - Assessment
        - Proximal or sustained hypertension
        - Severe headaches
        - Palpitations
        - Heat intolerance
        - Hyperglycemia
        - Tremors
    - Interventions
        - Monitor for hypertensive crisis
        - Instruct the client not to smoke, drink caffeine-containing beverages, or change Edition suddenly
        - Promote rest in a non stressful environment
        - Prepare the client for an adrenalectomy

**Hypothyroidism**

- Hypersecretion of thyroid hormones and characterized by a decrease the rate of body metabolism
- The T4 is low and the TSH is elevated
    - Assessment
        - Lethargy and fatigue
        - Intolerance to the cold
        - Dry skin and hair
        - Constipation
        - Edema around the eyes and face (myxedema)
- Interventions
    - Instruct the client to eat a low-calorie diet
    - Discuss our daily exercise program
    - Administer thyroid replacement Levothyroxine sodium is the most common
    - Monitor for signs of Overdose including tachycardia, chest pain, restlessness, nervousness, and insomnia

**Hyperthyroidism**

- Hypersecretion of thyroid hormones
- T3 and T4 are usually elevated in the TSH is low
    - Assessment
        - personality changes

        - Weight loss
        - Nervousness and find the tremors
        - Palpitations
        - Diarrhea
        - Hypertension
    - Interventions
        - Provide adequate rest
        - Obtain daily weights
        - Administer iodine preparations to inhibit the release of thyroid hormones
        - Administer anti-thyroid medication such as methimazole or propylthiouracil to block thyroid synthesis as prescribed

**Thyroid Storm**

- Occurs in a client with uncontrollable hyperthyroidism
- Can result from sickness, stress, or surgery
    - Assessment
        - Elevated temperature
        - Tachycardia
        - Systolic hypertension
        - Nausea and vomiting
        - Delirium and coma
    - Interventions
        - Maintain a patent Airway and adequate ventilation
        - Administer antithyroid medications
        - Monitor vital signs
        - Monitor for cardiac dysrhythmias

**Diabetes Mellitus**

- Chronic disorder of impaired carbohydrate, protein, and lipid metabolism caused by a deficiency in insulin
    - Type 1: deficiency of insulin do the primary beta-cell destruction
    - Type 2: relative lack of insulin or resistance to the action of insulin: usually caused by obesity
        - Assessment
            - Polyuria
            - Polydipsia
            - Polyphagia
            - Hyperglycemia
            - Weight loss (in type 1)

        - Blurred vision
        - Slow wound healing
    - Diet and exercise
        - Most clients will need to participate in carbohydrate counting
        - Patient will need to remain consistent in order to control their blood glucose level
        - Exercise lowers the blood glucose level, encourages weight loss, and reduces cardiovascular risk
        - The client to try to exercise at the same time each day and should exercise when glucose from the meal is peaking

**Somogyi Phenomenon**

- Normal or elevated blood glucose levels are present at bedtime
- Hypoglycemia occurs at about 2 to 3 a.m.

**Hypoglycemia**

- Occurs when the blood sugar levels fall below 70
    - Assessment
        - Hunger
        - Confusion
        - Drowsiness
        - Tremors
        - Sweating
        - Headache
        - could lead to a seizure or loss of consciousness

**Diabetic Ketoacidosis**

- Is a life-threatening complication of type 1 diabetes that develops when I severe insulin deficiency occurs
    - Assessment
        - Occur suddenly
        - Kussmaul's respirations
        - Fruity breath
        - Nausea and abdominal pain
        - Blood glucose is usually greater than 300
    - Interventions
        - Treat hyperglycemia with insulin Administration
        - Administer IV fluids to treat the dehydration
        - Correct electrolyte imbalances

Hyperosmolar Hyperglycemic Syndrome

- Extreme hyperglycemia
- Most often occurs in individuals with type 2 diabetes
    - Assessment
        - Occurs gradually
        - Altered central nervous system function with neurological symptoms
        - Blood glucose is usually greater than 800
    - Treatment
        - Fluid administration
        - Insulin Administration

## Chronic Complications of Diabetes Mellitus

### Diabetic Retinopathy

- Chronic and Progressive impairment of the retinal circulation
- Permanent vision changes and blindness can occur
    - Interventions
        - Early prevention via the control of hypertension and blood glucose levels
        - Photocoagulation may be done to remove hemorrhagic tissue to decrease scarring and prevent progression of disease process
        - Cataract removal with lens implant may improve vision

### Diabetic Neuropathy

- General deterioration of the nervous system throughout the body
    - Complications
        - Ulcers of the feet
        - Gastric paresis
        - Erectile dysfunction
        - Neurogenic bladder
- Assessment
        - Paresthesias
        - Decreased or absent reflexes
        - Poor peripheral pulses
        - Diarrhea or constipation
        - Incontinence
        - Impotence

# Medications

## Antidiuretic Hormones

- Vasopressin
    - Enhance reabsorption of water in the kidneys, promoting an antidiuretic effect and regulating the fluid balance
        - Side Effects
            - Flushing
            - Headache
            - Water intoxication
            - Nasal congestion

## Thyroid hormones

- Levothyroxine sodium
    - Used to replace the thyroid hormone to help control the metabolic rate of tissues and accelerate heat production and oxygen consumption
        - Side Effects
            - Nausea
            - Decrease appetite
            - Weight loss
            - Insomnia

## Anti-thyroid medications

- Methimazole
- Proythiouricil
    - High thyroid medications inhibit the synthesis of the thyroid hormone
        - Side Effects
            - Nausea and vomiting
            - Diarrhea
            - Drowsiness
            - Hypersensitivity with rash

## Insulins

- Rapid – (most end in log – Novolog(Aspart)/Humolog (Lispro)/Apidra (Glulisine)
    - Onset 15 min
    - Peak 1hr
    - Duration 3
- Short – R (Humulin R; Novolin R = regular short)

    - Onset 30 mins
    - Peak 2-4 hrs
    - Duration 4-7
- Intermediate – NPH ; 70/30
    - Onset 1.5 hours
    - Peak 4-12
    - Duration 16 - 24
- Long  - Insulin Glargine (LANTUS) or Levemir never mix!
    - Onset 2 – 4 hrs
    - Duration 24 hours