Concept Review Exam 5

Diabetes Insipidus (DI) – Deficiency of ADH

- (3)Types of DI – Primary, Secondary, & Nephrogenic
- Risk Factors
  - Head injury
  - Tumor/lesion
  - Irritation near/around pituitary gland
  - Surgery to pituitary gland
  - Infection
  - Lithium carbonate/Demeclocycline
- Signs/Symptoms
  - Excessive diluted urination
  - Excessive thirst
  - Electrolyte imbalance
  - Excessive fluid intake
  - Polyuria
  - Polydipsia
  - Nocturia
  - Fatigue
  - Dehydration
- Specific Gravity
  - ↓ Urine specific gravity < 1.005

- Diagnostics
  - Water Deprivation Test (ADH Stimulation Test) - #1 DIAGNOSITC
    - Withhold fluids for 8 to 12 hours or until 3% to 5% of the body weight is lost
    - Patient continues to excrete large volumes of urine
      - Low specific gravity
      - Increasing serum osmolality & elevated serum sodium levels
  - Vasopressin SQ injection produces urine output w/ an ↑ specific gravity & osmolality

    - If urine becomes more concentrated → Neurogenic DI
    - Little or no change → Neurogenic DI or psychogenic polydipsia

- <u>Medications</u>
  - Vasopressin – Desmopressin (DDAVP) [med is effective – decrease in urine output]
    - Used to replace & help with the deficit of ADH
  - Thiazides

- Nursing Management
  - Monitor VS, UO, CVP, I&O, labs & specific gravity
  - Assess skin turgor and mucous membranes
  - Weigh daily

        - Maintain prescribed diet
        - IV therapy
        - Provide skin & mouth care
        - Encourage client to drink when thirsty
        - Monitor for medication side effects
        - Teach the client that it's life-long therapy

Syndrome of Inappropriate antidiuretic Hormone (SIADH) – Excessive release of ADH

- Risk Factors
    - Malignant tumors
    - Increased intrathoracic pressure
    - Meningitis
    - Stroke
    - Head injury
    - TB
    - Medications
    - Infections

- Signs/Symptoms (early & late)
    - EARLY
        - HA
        - Weakness
        - Anorexia
        - Muscle cramps
        - Weight gain (w/o edema because sodium is not retained)
    - LATE (as hyponatremia occurs)
        - Personality changes
        - Hostile
        - Sluggish DTR
        - N/V/D
        - Oliguria- dark yellow & concentrated appearance
        - Seizures, coma, death
    - LATE (fluid volume excess)
        - Tachycardia
        - Bounding pulse
        - Possible HTN
        - Crackles
        - Distended neck veins
        - Taut skin
        - Weight gain w/o edema

- Diagnostics

- URINE TESTING
  - ↑ Urine Na+
  - ↑ Urine osmolarity
  - As urine volume decreases, urine osmolarity increases
- BLOOD TESTING
  - ↓ Blood Na+
  - Dilutional hyponatremia
  - ↓ Blood osmolarity
  - < 270 mEq/L
  - As blood volume increases, blood osmolarity decreases

- Medications
  - Demeclocycline
    - Unlabeled use to correct fluid and electrolyte imbalances by stimulating urine flow
    - Contraindicated- patients w/ impaired kidney function
  - Tolvaptan, Conivaptan
    - Promote water excretion w/o causing sodium losses
    - Utilized in acute setting because of rapid increase of sodium levels
  - Furosemide – Loop Diuretic
    - Used to increase water excretion from kidneys
    - watch for increased urine output, hypokalemia

- Nursing Management
  - First priority: Restrict fluids 500-1,000 mL/day
    - Comfort measures for thirst
  - Flush all enteral and gastric tubes w/ 0.9% sodium chloride, instead of water
  - Monitor I&O, VS, lung sounds, weight, mental status, & labs
  - Provide safe environment & reduce environmental stimuli (quiet environment)

- Complications
  - Water intoxication, cerebral/pulmonary edema, and severe hyponatremia
    - W/o prompt treatment, SIADH leads to these and can result in coma or death
  - Central pontine myelinolysis
    - Can result from treatment of SIADH
    - Characterized by nerve damage that is caused by the destruction of myelin sheath in brainstem

Thyroid Storm/Crisis – Sudden urge of large amounts of thyroid hormones into the bloodstream

- Risk/ Precipitating Factors
  - Uncontrolled hyperthyroidism

    - Infection
    - Trauma
    - Emotional stress
    - DKA
    - Digitalis toxicity – affect thyroid levels
    - Post-thyroidectomy

- Signs/Symptoms
    - Vomiting
    - Abdominal pain
    - Chest pain
    - Dyspnea
    - Hyperthermia
    - Delirium
    - Hypertension
    - Tachydysrhythmias
    - Palpitations

- Diagnostics
    - ↓ TSH
    - ↑ Free T4 and/or T3
    - Degree of thyroid hormone excess typically not more profound than that seen in patients with uncomplicated thyrotoxicosis

- Nursing Management
    - Maintain patent airway with O2 administration
    - Continuous cardiac monitoring
    - Maintain normal temperature
    - Administer thioamides and then sodium iodine 1 hour after
    - Administer Beta blockers
    - Administer glucocorticoids
    - Administer IV fluids

- Medications
    - Iodine
    - Beta Blockers
    - Glucocorticoids
    - IV fluids

Myxedema Coma – Persistently low thyroid production

- Signs/Symptoms
    - Hypoglycemia
    - Respiratory failure
    - Hypothermia

- Hyponatremia
- Coma
- Hypotension
- Dysrhythmias
- Bradycardia

- Nursing Management
  - Maintain patent airway with O2 administration
  - Continuous ECG monitoring
  - Initiate aspiration precautions
  - Administer levothyroxine, IV fluids, glucose intravenously, corticosteroids as prescribed
  - Assess the client's temperature hourly, Keep client warm
  - Monitor blood pressure, ABGs, and electrolytes frequently
  - Monitor changes in in mental status

- Medications
  - Levothyroxine
  - IV Fluids
  - Intravenous Glucose
  - Corticosteroids

Cushing's Disease/Syndrome – Oversecreting of the glucocorticoid hormone cortisol from the adrenal cortex

- Know difference between disease and syndrome
  - Disease
    - ❖ Tumor in pituitary gland causing release of ACTH
  - Syndrome
    - ❖ Caused by long-term use of glucocorticoids

- Signs/Symptoms
  - Weakness, fatigue
  - Sleep disturbances
  - Back and joint pain
  - Altered emotional state
    - ❖ irritability, depression
  - Decreased libido

- Physical findings
  - Classic picture → central-type obesity, with a fatty "buffalo hump" in the neck and supraclavicular areas, a heavy trunk, and relatively thin extremities
  - Evidence of decreased immune function and decreased inflammatory response
  - Thin, fragile skin
  - Bruising and petechiae
  - Hypertension (sodium and water retention)

- Tachycardia
- Gastric ulcers d/t oversecretion of hydrochloric acid
- Weight gain and increased appetite
- Dependent edema: changes in fat distribution, including the characteristic fat distribution of moon face, truncal obesity, and fat collection on the back of the neck (buffalo hump)
- **Striae** (reddened lines on the abdomen, upper arms)

- LABS
  - ↑ Plasma cortisol levels
  - **24- hr. urine**: elevated levels of free cortisol
  - Plasma ACTH levels
    - Anterior pituitary hypersecretion of ACTH = ↑ ACTH levels
    - Disorders of adrenal cortex or medication therapy = ↓ ACTH levels
  - ↑ Glucose level
  - ↑ Sodium level
  - ↓ K+ & Ca+
  - ↓ Lymphocytes
  - Salivary cortisol → elevations confirm the diagnosis of Cushing's disease

- Diagnostics
  - Identify lesions of the pituitary gland, adrenal gland, lung, GI tract, and pancreas:
    - Xray
    - MRI
    - CT scans

  - Radiological imaging determines the source of adrenal insufficiency (tumor, adrenal atrophy)

- Intervention (tapering vs surgery)
  - If caused by tumor → Surgical remove of tumor
    - Transsphenoidal hypophysectomy
  - Patients w/ primary adrenal hypertrophy → Adrenalectomy
  - If caused by corticosteroids → taper dose to minimum dosage needed to treat underlying disease
  - Alternate-day therapy
    - Decreases symptoms of Cushing's syndrome & allows recovery of adrenal gland's responsiveness to ACTH

- Nursing Management
  - Monitor I&O, daily weight, and WBC
  - Assess for indications of hypervolemia
  - Prevent infection by performing frequent hand hygiene
  - Use surgical asepsis when performing dressing changes and any invasive procedures

- Encourage physical activity within client's limitations
- Provide meticulous skin care, Q2H turns
- Maintain a safe environment to minimize risk of pathologic fracture and skin trauma

Addison's Disease/Crisis – Adrenocortical insufficiency

- Know the difference between disease and crisis
  - Disease
    - Caused by damage or dysfunction of the adrenal cortex
    - The production of mineralocorticoids and glucocorticoids is diminished, resulting in decreased aldosterone and cortisol
  - Crisis (acute adrenal insufficiency)
    - Rapid onset, medical emergency
    - If not quickly diagnosed and properly treated, the prognosis is poor

- DISEASE S/S:
  - Weight loss
  - Craving for salt
  - Hyperpigmentation
  - Weakness and fatigue
  - N/V/D or constipation
  - Abdominal pain
  - Dizziness w/ orthostatic hypotension
  - Dehydration,
  - Hyponatremia
  - Hyperkalemia
  - Hypoglycemia
  - Hypercalcemia

- CRISIS S/S:
  - Hypotension
  - Cyanosis
  - Fever
  - N/V/D & abdominal pain
  - Signs of shock
  - Pallor
  - HA, Confusion, & restlessness
  - Shock

- Diagnostics
  - ↑ K+ and Ca+
  - ↓ Na+
  - ↑ BUN & Cr
  - Normal to ↓ glucose

        - ↓ Serum cortisol
        - ECG:
            - Dysrhythmias d/t electrolyte imbalance
            - XR, CT, MRI to determine adrenal insufficiency caused by tumor or adrenal atrophy

- Nursing Management
    - Administer insulin and dextrose
    - Administer calcium and sodium polystyrene sulfonate
    - If acidosis occurs, administer sodium bicarbonate
    - Loop or thiazide diuretics
    - Establish an IV line and initiate a rapid infusion of 0.9% NS
    - Monitor VS and electrolytes
    - Administer hydrocortisone sodium succinate as replacement therapy
    - Administer an H2 antagonist, such as ranitidine, IV for ulcer prevention
    - Monitor I&O, electrolytes, glucose levels
    - Administer saline infusions to restore fluid volume; observe for dehydration; obtain orthostatic VS
    - Administer hydrocortisone IV bolus and a continuous infusion or intermittent IV bolus
    - Provide meticulous skin care, Q2H turns
    - Maintain a safe environment
    - Monitor electrolytes & heart

Pheochromocytoma – RARE CONDITION caused by a tumor in the adrenal medulla causing excess production of catecholamines. – SEVERE EPISODIC HYPERTENSION

- Typical Triad – Palpitation, H/A, Diaphoresis
- 5 H's – Hypertension, H/A, Hyperhidrosis, Hypermetabolism, Hyperglycemia
- Risk Factors (attacks induced by):
    - Trauma
    - Mechanical pressure of tumor
    - Stress
    - Many different types of medications

- Precautions
    - **Avoid palpating the abdomen of a patient with suspected pheochromocytoma since it may cause the sudden release of catecholamines and severe HTN**

- Diagnostic
    - 24-hour urine sample
        - Levels indicate high levels of free catecholamines, metanephrine (MN), and vanillylmandelic adic (VMA)

- Intervention (pre op & primary)

        - Primary treatment → surgical removal of tumor
        - Preop:
            - Alpha and beta blockers
                - 10-14 days prior to surgery: alpha adrenergic blockers
                - After alpha adrenergic blockers maintain adequate BP → beta blockers are prescribed
                    - If beta-adrenergic blockers are started too early, unopposed alpha-adrenergic stimulation can precipitate a hypertensive crisis

Diabetic Ketoacidosis (DKA) – Uncontrolled hyperglycemia, metabolic acidosis, dehydration, electrolyte loss, & accumulation of ketones in the blood & urine. BREAKDOWN FAT.

- Rapid onset
- Morality rate – 10%

- Signs/Symptoms
    - Polyuria
    - Polydipsia
    - Marked fatigue
    - Blurred vision
    - Weakness
    - Headache
    - Hypotension
    - Weak, rapid pulse
    - Kussmaul Respirations
    - Possible change in mental status
- GI Symptoms
    - Anorexia
    - Nausea
    - Vomiting
    - Abdominal pain
    - Acetone breath (fruity odor)

- Diagnostic
    - BS > 300
    - Anion Gap > 12
    - Evidence of ketoacidosis:
        - Bicarb – 0-15
        - pH – 6.8-7.3
    - Ketones in blood & urine
    - Na+ & K+ changes
    - Increased BUN, Cr & Hct

- Rehydration Rule 0.9% vs 0.45%
  - 0.9 NaCl (GOLDEN RULE)
  - Rapid Infusion for first 1-3 hrs.
    - 0.5-1 L/hr.
    - Rehydrate up to 6-10 L of IV fluid

- Electrolyte restoration (know when K+ is given)
  - Typically, hyperkalemic
    - Hydration → Hypokalemia
      - Increased plasma volume & subsequent decrease in serum potassium
      - Increased urinary excretion of potassium
  - Insulin enhances movement of K+ into the cells → hypokalemia
  - Frequent monitoring of electrolyte levels & ECG (to monitor any dysrhythmias)

- Insulin administration (know what type of insulin, route)
  - Reverse Acidosis
    - Reversed w/ insulin
      - Inhibits fat breakdown → ends ketone production & acid buildup
    - **REGULAR INSULIN in units** until it is appropriate to administer SQ insulin (because onset is fast)
      - Cannot stop insulin drip until SQ insulin therapy has been initiated (overlapping occurs w/ insulin drip & SQ insulin)
    - Hourly glucose monitoring
    - Bicarb is typically avoided
    - When hanging the insulin drip, the nurse must flush the insulin solution through the entire IV infusion set and discard the first 50 mL of fluid. Insulin molecules adhere to the inner surface of plastic IV infusion sets; therefore, the initial fluid may contain a decreased concentration of insulin.

Hyperglycemic Hyperosmolar State (HHS) – Profound hyperglycemia, hyperosmolarity that leads to dehydration, & an absence of ketosis [**not acidotic** like DKA]

- Gradual onset
- If left untreated – Coma & Death

- Signs/Symptoms
  - Dry mucous membranes
  - Poor skin turgor
  - Tachycardia
  - Orthostatic hypotension
  - Alteration of consciousness
  - Seizures
  - Hemiparesis
  - Polyuria

    - Polydypsia
    - Polyphagia
    - Headache

- Diagnostic
    - BS > 600
    - Blood osmolality > 320 mOsm/L
    - NO KETONES apparent in blood and urine
    - Na+ (hypernatremia) & K+ changes
    - Increased BUN, Cr, & Hct

- Rehydration Rule 0.9% vs 0.45%
- Electrolyte restoration (know when K+ is given)
- Insulin administration (know what type of insulin, route

Diabetic Ketoacidosis (DKA) vs. Hyperglycemic Hyperosmolar State (HHS)

- DKA - No insulin is present & this promotes the breakdown of stored glucose, protein, and fat, which leads to the production of ketone bodies and ketoacidosis

- HHS - The insulin level is too low to prevent hyperglycemia (and subsequent osmotic diuresis), but it is high enough to prevent fat breakdown

Hypoglycemia – too much insulin; not having anything to eat; age – older; alcohol consumption; activities; BS < 70 mg/dL; Severe = BS < 40 mg/dL

- Signs/Symptoms (adrenergic, CNS & severe)
    - ADREGERNIC
        - Diaphoresis
        - Tremors
        - Tachycardia
        - Palpitations
        - Nervousness
        - Hunger
        - Cold, clammy skin
    - CNS
        - Inability to concentrate
        - Headache
        - Confusion
        - Memory lapses
        - Slurred speech
        - drowsiness
    - SEVERE

        - Disorientation
        - Seizures
        - Loss of consciousness
        - Death

- Nursing Management
    - Know recommended carbs
        - Recommendation for 15 g of fast-acting concentrated source of carbs
        - **Commercially prepared glucose tablets**
        - **6-10 Life Savers or hard candy**
        - **4 tsp of sugar**
        - **4 sugar cubes**
        - **1 tbsp. of honey or syrup**
        - **½ cup of fruit juice or regular (not diet) soft drink**
        - **8 oz. of low-fat milk**
        - **6 saltine crackers**
        - **3 graham crackers**
    - Unconscious Pt.
        - Glucagon IV/IM, SQ
        - 50% Dextrose
    - Monitor blood sugar every 15 min