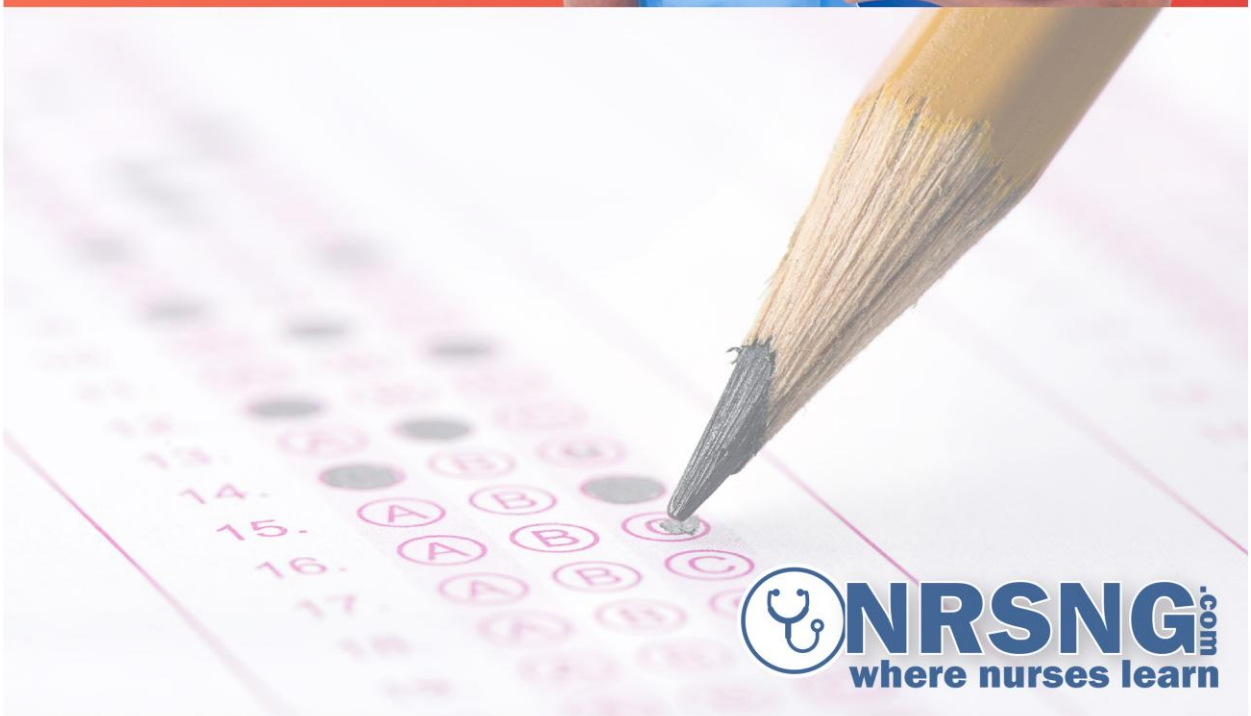
NCLEX® Essentials

MED SURG



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Metabolic and Endocrine Disorders

Syndrome of Inappropriate Antidiuretic Hormone (SIADH)

1. Overview
    a. Excess secretion of ADH from posterior pituitary leading to hyponatremia and water intoxication
    b. caused by trauma, tumors, infection, medications
2. NCLEX® Points
    a. Assessment
        i. fluid volume excess
            1. ↑BP
            2. crackles
            3. JVD
        ii. altered LOC
        iii. seizures
        iv. coma
        v. urine specific gravity >1.032
        vi. ↓BUN, hematocrit, Na+
    b. Therapeutic Management
        i. cardiac monitoring
        ii. frequent neurological examination
        iii. monitor I&O
        iv. fluid restriction
        v. Na supplement
        vi. daily weight (loss of 2.2 lbs or 1kg = about 1L)
        vii. Medication
            1. hypertonic saline
            2. diuretics
            3. electrolyte replacement

Diabetes Insipidus

1. Overview
    a. hyposecretion or failure to respond to ADH from posterior pituitary leading to excess water loss
    b. urine output ranging from 4L to 30L in a 24 hour period leads to dehydration
    c. Causes
        i. neurogenic, stroke, tumor, infection, pituitary surgery
2. NCLEX® Points
    a. Assessment
        i. excessive urine output
            1. dilute urine (USG <1.006)
        ii. hypotension leading to cardiovascular collapse

iii. tachycardia
iv. polydipsia (extreme thirst)
v. hypernatremia
vi. neurological changes

b. Therapeutic Management
   i. water replacement
      1. D5W if IV replacement required
   ii. hormone replacement
      1. DDVAP (Desmopressin)
      2. Vasopressin
   iii. monitor urine output hourly and urine specific gravity
      1. report UO >200mL/hour
   iv. daily weight monitoring

Hyperthyroidism (Throtoxicosis)

1. Overview
   a. Excess secretion of thyroid hormone (TH) from thyroid gland resulting in **increased metabolic rate**
   b. Causes
      i. **Graves disease** (autoimmune reaction)
      ii. excess secretion of TSH, tumor, medication reaction
   c. Thyroid Storm (Thyroid Crisis)
      i. extreme hyperthyroidism (life threatening) due to infection, stress, trauma
         1. febrile state, tachycardia, HTN, tremors, seizures
2. NCLEX® Points
   a. Assessment
      i. ↑T3, T4, free T4, ↓TSH, positive radioactive uptake scan
      ii. goiter
      iii. bulging eyes
      iv. Cardiac
         1. tachycardia, HTN, palpitations
      v. Neurological
         1. hyperactive reflexes, emotional instability, agitation, hand tremor
      vi. Sensory
         1. **exophthalmos** (Graves disease), blurred vision, heat intolerance
      vii. Integumentary
         1. fine thin hair
      viii. Reproductive
         1. amenorrhea, decreased libido
      ix. Metabolic
         1. increased metabolic rate, weight loss

3. Therapeutic Management
    a. provide rest in a cool quiet environment
    b. antithyroid medications (PTU, propylthiouracil)
    c. cardiac monitoring
    d. maintain patent airway
    e. provide eye protection
        i. regular eye exams
        ii. moisturize eyes
    f. Radioactive Iodine 131
        i. taken up by thyroid gland and destroys some thyroid cells over 6-8 weeks
            1. avoid with pregnancy
            2. monitor lab values for hypothyroidism
    g. Surgical removal
        i. monitor airway
            1. assess for obstruction, stridor, dysphagia
            2. have tracheotomy equipment available
        ii. maintain in semi-Fowlers position
        iii. assess surgical site for bleeding
        iv. monitor for hypocalcemia
            1. have calcium gluconate available
        v. minimal talking during immediate post operative period

Hypothyroidism

1. Overview
    a. hyposecretion of TH resulting in decreased metabolic rate
    b. Myxedema coma
        i. lifethreatening state of decreased thyroid production
        ii. coma result of acute illness, rapid cessation of medication, hypothermia
2. NCLEX® Points
    a. Assessment
        i. think HYPOmetabolic state
        ii. Cardiovascular
            1. bradycardia, anemia, hypotension
        iii. Gastrointestinal
            1. constipation
        iv. Neurological
            1. lethargy, fatigue, weakness, muscle aches, parethesias
        v. Integumentary
            1. goiter, dry skin, loss of body hair
        vi. Metabolic
            1. cold intolerance, anorexia, weight gain, edema, **hypoglycemia**

3. Therapeutic Management
    a. cardiac monitoring
    b. maintain open airway
    c. monitor medication therapy (overdose with thyroid medications possible)
    d. medication therapy
        i. levothyroxine (Synthroid)
    e. assess thyroid hormone levels
    f. IV fluids
    g. monitor and administer glucose as needed

Addison's Disease vs Cushing's Disease		
Body System	**Addison's (Hypo)**	**Cushing's (Hyper)**
Cardiovascular	Hypotension, tachycardia	Hypertension, signs of CHF
Metabolic	Weight loss	Moon face, buffalo hump
Integumentary	Hyperpigmentation (bronze)	Fragile, striae abdomen and thighs
Electrolytes	Hyperkalemia, hypercalcemia, hyponatremia, hypoglycemia	Hypokalemia, hypocalcemia, hypernatremia, hyperglycemia

Addison's Disease

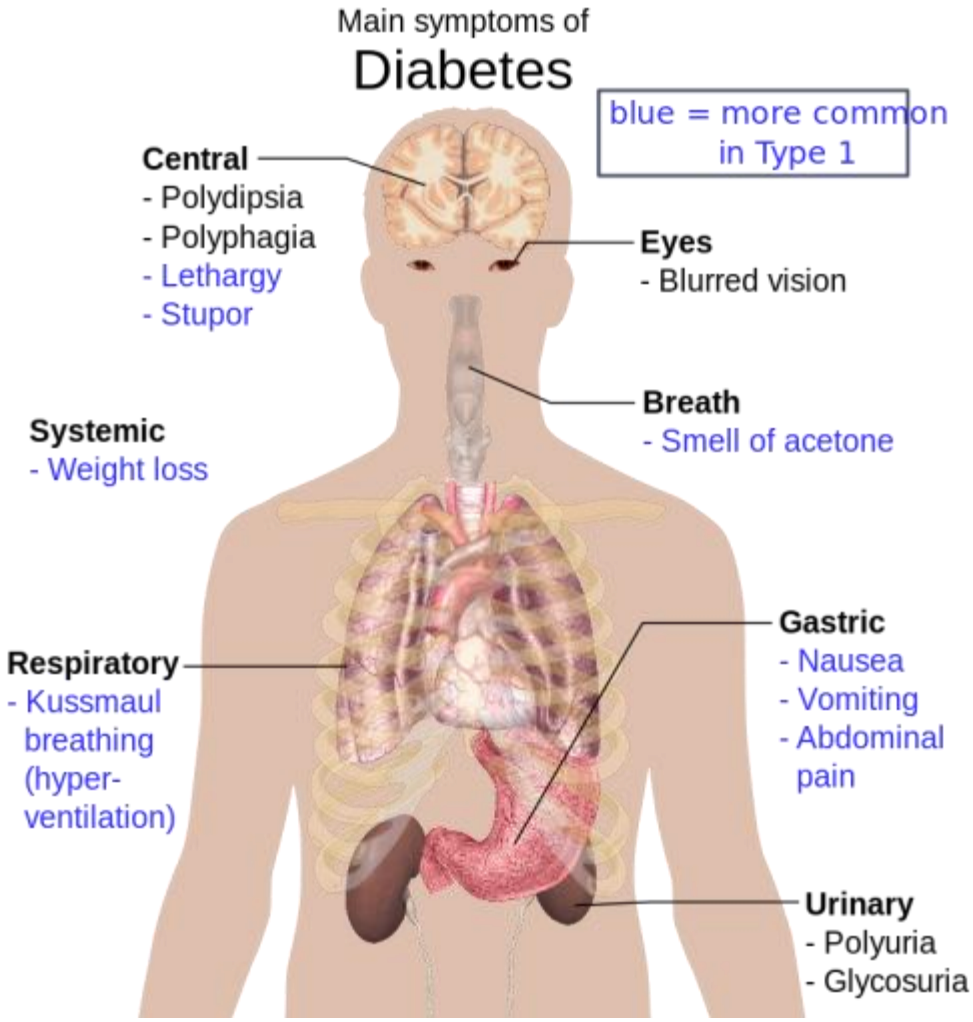
1. Overview
    a. **hyposecretion** of adrenal cortex hormones
    b. decreased levels of glucocorticoids and mineralcorticoids leads to hyponatremia, hyperkalemia, hypoglycemia, decreased vascular volume, fatal if untreated
2. NCLEX® Points
    a. Assessment
        i. review chart above
        ii. think HYPO secretion of adrenal hormones (steroids)
    b. Therapeutic Management
        i. monitor vital signs
        ii. monitor electrolytes (potassium, sodium, calcium)
        iii. monitor glucose
            1. treat low blood sugar
        iv. administer replacement adrenal hormones as needed
        v. lifelong medication therapy needed

   c. Addisonian Crisis
      i. caused by acute exacerbation of Addison's Disease
      ii. causes severe electrolyte disturbances
      iii. monitor electrolytes and cardiovascular status closely
      iv. administer adrenal hormones as ordered

Cushing's Disease

1. Overview
   a. **hypersecretion** of glucocorticoids leading to **elevated cortisol levels**
   b. greater incidence in women
   c. life threatening if untreated
2. NCLEX® Points
   a. see chart above
   b. ↑cortisol, Na+, glucose, ↓K+ and Ca++
3. Therapeutic Management
   a. monitor electrolytes and cardiovascular status
   b. provide skin care and meticulous wound care
   c. provide for client safety
   d. adrenalectomy (surgical removal of adrenal gland)
   e. protect client from infection
   f. often caused by tumor on adrenal gland or pituitary gland

Diabetes Mellitus



1. Overview
    a. pancreatic disorder resulting in insufficient or lack of insulin production leading to elevated blood sugar
        i. **Type I (insulin dependent/juvenile-onset):** immune disorder, body attacks insulin producing beta cells with resulting **Ketosis** (result of ketones in blood due to gluconeogenesis from fat)
        ii. **Type II (insulin resistant/adult-onset):** beta cells do not produce enough insulin or body becomes resistant
2. NCLEX® Points
    a. Assessment
        i. 3 P's
            1. polyuria, polydipsia, polyphagia
        ii. elevate BS
        iii. blurred vision
        iv. elevated HgbA1C

v. non healing wounds
vi. neuropathy
vii. inadequate circulation
viii. End organ damage is a major concern due to damage to vessels
    1. coronary artery disease
        a. HTN, cerebrovascular disease
    2. retinopathy

b. Therapeutic Management
    i. Insulin
        1. required for type I and for type II when diet and exercise do not control BS
        2. assess for and teach the patient regarding peak action time for various insulins
            a. only administer short acting insulins IV
        3. study onset times and peak times for insulins
        4. do not use expired insulin
        5. do not use a vial that appears cloudy (NPH exception)
        6. Mixing regular and NPH
            a. clear (regular) before cloudy (NPH)
            b. inject air needed into NPH, remove needle, inject air needed into regular, remove regular, remove NPH
    ii. patient should monitor BS before, during, and after exercise
    iii. patient should use protective footwear to prevent injury
    iv. infections and wounds should receive meticulous care
    v. foot care
        1. feet should be kept dry
        2. footwear should always be worn
        3. should not wear tight fitting socks
    vi. sick day
        1. continue to check blood sugars and **do not** withhold insulin
        2. monitor for ketones in urine
    vii. 15 rule
        1. if BS are low administer 15 gram CHO (5 lifesavers, 6 oz juice) recheck BS in 15 min
    viii. Complications
        1. lipoatrophy
            a. loss of subq fat at injection site (alternate injection sites)
        2. lipohypertrophy
            a. fatty mass at injection site
        3. Dawn phenomenon
            a. reduced insulin sensitivity between 5-8am
            b. evening administration may help

4. Somogyi phenomenon
    a. night time hypoglycemia results in rebound hyperglycemia in the morning hours

Hyperglycemic Hyperosmolar Nonketotic Syndrome (HHNS)

1. Overview
    a. severe hyperglycemia without ketosis or acidosis
    b. most often with type II
    c. HHNS does not require the breakdown of fats for energy preventing ketosis. With HHNS enough insulin is available to breakdown carbs for energy.
2. NCLEX® Points
    a. Assessment
        i. gradual onset
            1. infection, stress, dehydration
        ii. altered LOC, dry mucous membranes
        iii. BS >600 mg/dL
        iv. negative ketones
        v. ↑ BUN and creatinine
    b. Therapeutic Management
        i. determine cause
        ii. replace fluids - may resolve hyperglycemia
        iii. insulin therapy
        iv. monitor neurological status
        v. treat electrolyte imbalances

Diabetic Ketoacidosis (DKA)

1. Overview
    a. severe insulin deficiency associated with type I diabetes
    b. leads to the breakdown of fats into glucose resulting in ketones
2. NCLEX® Points
    a. Assessment
        i. sudden onset
            1. infection, stress
        ii. fruity breath
        iii. ketones in urine
        iv. hyperglycemia
        v. dehydration
        vi. acidosis (pH <7.35)
            1. fats are broken down into glucose, ketones are by product of fat breakdown , ketones are acidic, potassium leaves the cell in attempt to compensate for acidemia
            2. http://www.eric.vcu.edu/home/resources/consults/Hyperkalemia.pdf

vii. Kussmaul's respirations
viii. hyperkalemia
ix. ↑BUN and creatinine
x. monitor for altered LOC - cerebral edema can occur with fluid shift

b. Therapeutic Management
i. treat dehydration - with hyperglycemia water moves out of cells
ii. intensive insulin therapy
iii. monitor potassium
iv. assess for and treat acidosis
1. helpful to assess anion gap vs pH alone as pH takes into account respiratory effects view more here: http://www.merckmanuals.com/professional/endocrine-and-metabolic-disorders/diabetes-mellitus-and-disorders-of-carbohydrate-metabolism/diabetic-ketoacidosis-dka

NCLEX® Cram - Metabolic and Endocrine Disorders

1. Endocrine system
a. hypothalamus
b. pituitary gland (anterior/posterior)
c. pineal gland
d. thyroid gland
e. parathyroid gland
f. adrenal glands
g. pancreas
h. gonads
2. Endocrine system cheat sheet

Hormone	Gland	Under Production Syndrome	Over Production Syndrome
GH	anterior pituitary		acromegaly
ADH	posterior pituitary	diabetes insipidus	SIADH
T3,T4	thyroid	myxedema coma	graves
PTH	parathyroid	hyperparathyroid	hypoparathyroid
Glucocorticoids: cortisol	adrenal	addisons	cushings
Insulin	pancreas	diabetes mellitus	

3. Pituitary Gland Hormones
a. ACTH
b. FSH
c. GH
d. LH
e. Prolactin
f. TSH
g. Oxytocin

    h. ADH
4. Radioactive Iodine Test
    a. measures thyroid function by measuring how much iodine is absorbed
        i. ↑iodine = hyperthyroidism
5. Glucocorticoids
    a. Cortisol
    b. blunt effect of insulin, suppress inflammation and immune response
6. Thyroid scan should not be completed on pregnant clients
7. Glucose Tolerance Test
    a. high level of glucose ingested
    b. glucose checked 2 hours after
    c. level >200 mg/dL suggests DM
8. HgbA1c
    a. indicates average plasma glucose concentration over time
    b. goal for diabetic clients is <7%
9. Transspehnoidal Hypophysectomy
    a. removal of pituitary tumor
    b. primary post operative concern is monitoring for nasal drainage
    c. assess for CSF in drainage using Halo Test
        i. blood in center with clear ring surrounding blood
    d. client **should not use a straw**
10. Pheochromocytoma
    a. tumor of the adrenal medulla
    b. causes excessive secretion of adrenal medulla hormones (epinephrine and norepinephrine)
    c. HTN, palpitations, hyperglycemia, weight loss
    d. avoid stimulation and provide constant cardiac monitoring
    e. may need adrenalectomy
11. Parathyroid Disorders
    a. think calcium
    b. Hypoparathyroid = hypocalcemia
        i. Trousseau's and Chvostek's signs

ii. provide calcium supplementation
iii. provide vitamin D which aids in calcium absorption

c. Hyperparathyroid = hypercalcemia
   i. monitor for bone deformities
   ii. renal calculi