Endocrine Study Guide

Diabetes Mellitus

Types of Diabetes

- **Type 1 Diabetes Mellitus**
  - Autoimmune destruction of pancreatic beta cells
  - Results in absolute insulin deficiency
  - Requires lifelong insulin therapy
  - Usually diagnosed in childhood or young adulthood
- **Type 2 Diabetes Mellitus**
  - Insulin resistance combined with relative insulin deficiency
  - Most common form of diabetes
  - Often associated with obesity and lifestyle factors
  - May be managed with oral medications, insulin, or both

And 1.5

Oral first, then Insulin if not enough.

Normal Values and Diagnosis

- **Normal fasting blood glucose**: 70-100 mg/dL
- **Diabetes diagnosis criteria**:
  - Fasting plasma glucose ≥ 126 mg/dL
  - Hemoglobin A1c (HbA1c) ≥ 6.5%
  - HbA1c reflects average blood glucose over 2-3 months

Mnemonic -> Ages where people

Now

Long period, like the past.

Glucose at random time => Around 140, After eating =//////////. Like 180 could be normal

Insulin Therapy

Types of Insulin

Rapid-Acting Insulin

Meal Ready

- **Examples**: Lispro (Humalog), Aspart (NovoLog), Glulisine (Apidra)
- **Onset**: 10-15 minutes
- **Peak**: 1-2 hours
- **Duration**: 3-5 hours
- **Uses**: Mealtime (bolus) insulin
- Must be given WITH meals
- When administering sliding-scale lispro insulin, give it **when the breakfast tray is served and ready to eat**
- After giving lispro (Humalog), the first nursing action is to **ensure that the patient has a meal**
- **Administration timing**: Within 15 minutes of obtaining blood glucose measurement

Short-Acting Insulin (Regular)

- **Examples**: Humulin R, Novolin R
- **Onset**: 30-60 minutes
- **Peak**: 2-4 hours
- **Duration**: 5-8 hours
- **Uses**: Given 30 minutes before meals
- **KEY POINT**: This is the ONLY insulin that can be given intravenously (IV)
- Can also be given SubQ (standard and preferred method) and IM (not recommended for routine use; used in specific situations, e.g. DKA, severe dehydration)

Regular is before meals. Unless the pt has hyperglicemia.

Intermediate-Acting Insulin (NPH)

- **Examples**: Humulin N, Novolin N
- **Onset**: 1-2 hours
- **Peak**: 4-12 hours
- **Duration**: 18-24 hours
- **Uses**: Basal insulin coverage
- **Appearance**: Cloudy (must be gently rolled before administration)
- Can be mixed with rapid-acting or short-acting insulins

Long-Acting Insulin

Bed Time

- **Examples**: Glargine (Lantus), Detemir (Levemir), Degludec (Tresiba)
- **Onset**: 1-2 hours
- **Peak**: Minimal to no peak
- **Duration**: 20-24+ hours
- **Uses**: Once-daily basal insulin coverage
- **Insulin glargine (Lantus)** is the answer when a patient with Type 1 DM is ordered insulin therapy once daily to be administered at bedtime
- Provides steady, 24-hour coverage
- Cannot be mixed with other insulins
- Appears clear

Insulin Type	Brand Names	Onset	Peak	Duration	Appearance	Route	When to Give
Rapid-Acting	Lispro (Humalog) Aspart (NovoLog) Glulisine (Apidra)	10-15 min	1-2 hr	3-5 hr	Clear	SubQ	With meals or immediately before
Short-Acting	Regular (Humulin R) Regular (Novolin R)	30-60 min	2-4 hr	5-8 hr	Clear	SubQ, IM, **IV**	30 min before meals
Intermediate-Acting	NPH (Humulin N) NPH (Novolin N)	1-2 hr	4-12 hr	18-24 hr	Cloudy	SubQ	Twice daily or bedtime
Long-Acting	Glargine (Lantus) Detemir (Levemir) Degludec (Tresiba)	1-2 hr	Minimal/None	20-24+ hr	Clear	SubQ	Once daily (usually bedtime)

Insulin Administration

Routes of Administration

- **Subcutaneous (SubQ)**: Most common route
- **Intramuscular (IM)**: Less common
- **Intravenous (IV)**: ONLY regular insulin can be given IV

Insulin Storage

- **Do NOT place insulin in sunlight or a warm environment**
- [redacted]
- **Unopened vials**: Store in refrigerator
- **Opened vials**: Can be kept at room temperature for up to 28 days
- **Never freeze insulin** 1 montl
- **Never warm insulin in the microwave**
- Keep away from direct heat and light

Complications of Insulin Therapy

To much Hypoglicemia, to little isnuline -> hyperglicemia

Hypoglycemia (Most Common Complication)

Hypoglycemia vs. Hyperglycemia

	Hypoglycemia	Hyperglycemia
Blood Glucose	< 70 mg/dL	> 180 mg/dL
Onset	Sudden (minutes)	Gradual (hours to days)
Symptoms	Shakiness, Sweating, Confusion, Hunger Headache, Irritability, Rapid heartbeat Anxiety	Increased thirst (polydipsia), Increased urination (polyuria), Blurred vision, Fatigue, Dry mouth Fruity breath odor
Skin	Cool, clammy, pale	Warm, dry, flushed
Treatment	15g fast-acting carbs, Recheck in 15 min, Glucagon if unconscious	Insulin, Fluids, Identify cause
Causes	Too much insulin Skipped meal Increased exercise	Too little insulin Illness/infection Stress → Cortisol Overeating
Cold and clammy, need some candy **Hot and dry, sugar high**		

Alert!!!

Cold Fish

Red dry lizzard

4 ounces of Juice

Gold Standard

Clammy means sweaty

- **Blood glucose**: < 70 mg/dL
- **Symptoms**:
  - Shakiness
  - Sweating (diaphoresis)
  - Confusion
  - Hunger
  - Headache
  - Irritability
  - Dizziness
  - Rapid heartbeat
- **Treatment for Conscious Patients**:
  - **15-15 Rule**: Give 15 grams of fast-acting carbohydrates, recheck glucose in 15 minutes
  - **4 ounces of orange juice** (equals 15g carbs)
  - Other options: glucose tablets, 4 oz regular soda, 1 tablespoon honey
- **Treatment for Severe/Unconscious Patients**:
  - **Glucagon injection** (SubQ, IM, or IV)
  - Never give oral fluids to unconscious patients

- When a patient shows signs of hypoglycemia (e.g., received regular insulin at 7:30 AM, at 9:30 AM feels hungry with dull headache), the FIRST nursing action is to **test the patient's blood glucose level**

Somogyi Effect

Effect of Insuline

- Rebound hyperglycemia in the morning following nighttime hypoglycemia
- **It is a response to excessive insulin**
- **Cause**: Too much insulin causes nighttime hypoglycemia → body releases counter-regulatory hormones (glucagon, epinephrine, cortisol, growth hormone) → morning hyperglycemia
- **Management**: Decrease the bedtime insulin dose
- **How to identify**: Check blood glucose at 2-3 AM (will be low)

In both, the thing is that glucose goes Up in the early day hours.

Dawn Phenomenon

In Somogy Goes down and then Up, In Dawn only goes Up.

- Morning hyperglycemia due to normal hormone release
- **Cause**: Natural early morning release of growth hormone and cortisol
- **Management**: Increase bedtime insulin dose OR change timing of insulin administration
- **Difference from Somogyi**: No nighttime hypoglycemia occurs

Somogyi Effect vs. Dawn Phenomenon Comparison Table

Feature	Somogyi Effect	Dawn Phenomenon
Definition	Rebound morning hyperglycemia	Morning hyperglycemia
Cause	**Response to excessive insulin** Nighttime hypoglycemia	Normal hormone release (growth hormone, cortisol)
Nighttime Glucose (2-3 AM)	LOW	Normal or slightly elevated
Morning Glucose	HIGH	HIGH
Management	**DECREASE** bedtime insulin	**INCREASE** bedtime insulin or change timing
Key Difference	Preceded by hypoglycemia	NO hypoglycemia

Other Complications

- **Lipodystrophy**: Fatty lumps or indentations at injection sites from repeated injections in the same area
- **Weight gain**: Common with insulin therapy
- **Allergic reactions**: Rare, but can occur

More glucose goes to the ce

Oral Antidiabetic Agents (Type 2 DM)

Drug Class	Example(s)	Mechanism	Side Effects	Nursing Considerations
Biguanides METformin - METallic	Metformin (Glucophage)	↓ Hepatic glucose production ↑ Insulin sensitivity	**Bitter/metallic taste** GI upset Lactic acidosis (rare)	First-line therapy Take with meals Hold before contrast dye
Sulfonylureas	Glipizide (Glucotrol) Glyburide (DiaBeta)	Stimulates insulin release from pancreas	Hypoglycemia Weight gain	**ORAL medication** Take 30 min before meals
Meglitinides	Repaglinide (Prandin)	Rapid insulin release	Hypoglycemia	Take with meals
TZDs (Glitazones)	Pioglitazone (Actos)	↑ Insulin sensitivity	Weight gain Fluid retention Heart failure risk	Monitor for edema Contraindicated in HF
DPP-4 Inhibitors	Sitagliptin (Januvia)	↑ Incretin levels	URI Headache	Low hypoglycemia risk
SGLT2 Inhibitors	Canagliflozin (Invokana) Empagliflozin (Jardiance)	↑ Glucose excretion in urine	Genital yeast infections UTIs Dehydration	CV and renal benefits Weight loss
GLP-1 Agonists	Liraglutide (Victoza) Semaglutide (Ozempic)	↑ Insulin ↓ Glucagon Slows gastric emptying	Nausea Vomiting Pancreatitis risk	**Injectable** Weight loss CV benefits
Alpha-Glucosidase Inhibitors	Acarbose (Precose)	Slows carb digestion	Gas Bloating Diarrhea	Take with first bite of meal

Biguanides

Metformin (Glucophage) Not insuline release, it's more glucose management.

- **First-line medication for Type 2 DM**
- **Mechanism of Action**:
  - Decreases hepatic (liver) glucose production
  - Increases insulin sensitivity in peripheral tissues
  - Does NOT stimulate insulin release (so low risk of hypoglycemia)
- **A common side effect is bitter or metallic taste**
- **Other Side Effects**:
  - GI upset: nausea, diarrhea, abdominal discomfort
  - Lactic acidosis (rare but serious)
  - Vitamin B12 deficiency with long-term use

Muscle makes lactate → liver usually recycles it → Metformin blocks this → lactate accumulates → lactic acidosis risk.

Metformin & MRI Contrast Dye

- **MRI/CT contrast dye** (iodinated contrast) can sometimes cause **acute kidney injury
- If the **kidneys suddenly don't work well**, metformin can build up in the body.
- At the same time, the kidneys also can't clear **lactic acid** effectively.
- Together → this raises the risk of **metformin-associated lactic acidosis (MALA)**.

- **Contraindications**:
  - Renal impairment (kidney disease)
  - Liver disease
  - Heart failure
  - Alcoholism
  - Must be held before and after procedures with contrast dye
- **Administration: Take with meals to reduce GI upset**

Sulfonylureas

Examples: Glipizide (Glucotrol), Glyburide (DiaBeta), Glimepiride (Amaryl)

- **Mechanism of Action**: Stimulate insulin release from pancreatic beta cells
- **Side Effects**:
  - **High risk of hypoglycemia**
  - Weight gain
- **Administration**: Take 30 minutes before meals
- **Nursing Considerations**: Monitor for signs of hypoglycemia

Metformine does not do that

Metformin doesn't have that risk

Both with meals, This one 30 min before like insuline, , Metformin u take it with the food

Meglitinides (Glinides)

Examples: Repaglinide (Prandin), Nateglinide (Starlix)

- **Mechanism of Action**: Stimulate rapid, short-lived insulin release from pancreas
- **Onset**: Very rapid
- **Duration**: Shorter than sulfonylureas
- **Administration**: Take with meals
- **Side Effects**: Risk of hypoglycemia (but lower than sulfonylureas)

Thiazolidinediones (TZDs/Glitazones)

Examples: Pioglitazone (Actos), Rosiglitazone (Avandia)

- **Mechanism of Action**: Increase insulin sensitivity in muscle and adipose tissue
- **Side Effects**:
  - Weight gain
  - Fluid retention
  - Increased risk of heart failure
  - Bone fractures (especially in women)
  - Edema
- **Contraindications**:
  - Heart failure
  - Liver disease
- **Nursing Considerations**: Monitor for signs of fluid retention and heart failure

DPP-4 Inhibitors (Gliptins)

Examples: Sitagliptin (Januvia), Linagliptin (Tradjenta), Saxagliptin (Onglyza)

- **Mechanism of Action**:
  - Increase incretin hormone levels
  - Stimulate insulin release
  - Decrease glucagon secretion
- **Side Effects**:
  - Upper respiratory infections
  - Headache
  - Generally well-tolerated
- **Advantages**: Low risk of hypoglycemia

SGLT2 Inhibitors (Gliflozins)

Examples: Canagliflozin (Invokana), Dapagliflozin (Farxiga), Empagliflozin (Jardiance)

- **Mechanism of Action**: Block glucose reabsorption in the kidneys → glucose excreted in urine
- **Side Effects**:
  - Genital yeast infections (due to glucose in urine)
  - Urinary tract infections (UTIs)
  - Dehydration
  - Increased risk of diabetic ketoacidosis (DKA)
- **Benefits**:
  - Weight loss
  - Cardiovascular protection
  - Renal protection
- **Nursing Considerations**: Teach patients about proper perineal hygiene

GLP-1 Receptor Agonists (Injectable, Non-Insulin)

Examples: Exenatide (Byetta), Liraglutide (Victoza), Semaglutide (Ozempic), Dulaglutide (Trulicity)

- **Mechanism of Action**:
  - Increase insulin secretion
  - Decrease glucagon secretion
  - Slow gastric emptying
  - Promote satiety (feeling full)
- **Route**: Subcutaneous injection

- **Side Effects**:
  - Nausea, vomiting, diarrhea (especially at initiation)
  - Risk of pancreatitis
  - Risk of thyroid tumors (in animal studies)
- **Benefits**:
  - Weight loss
  - Cardiovascular protection

Alpha-Glucosidase Inhibitors

Examples: Acarbose (Precose), Miglitol (Glyset)

- **Mechanism of Action**: Slow down carbohydrate digestion and absorption in the small intestine
- **Side Effects**:
  - Flatulence (gas)
  - Diarrhea
  - Abdominal discomfort/bloating
- **Administration**: Take with the first bite of each meal
- If hypoglycemia occurs, must treat with GLUCOSE (not sucrose) since the drug blocks breakdown of complex sugars

Hyperglycemic Drugs

Glucagon

- **Glucagon is a hyperglycemic hormone secreted by the alpha cells of the islets of Langerhans** Pancreas
- **Mechanism of Action**: Increases blood sugar by stimulating glycogenolysis (breakdown of glycogen to glucose in the liver)
- **Use**: Emergency treatment for severe hypoglycemia when patient is unconscious or unable to swallow
- **Route of Administration**: Parenteral (SubQ, IM, or IV)
- **Nursing Considerations**:
  - Once patient regains consciousness, give oral carbohydrates
  - Position patient on side to prevent aspiration if vomiting occurs
  - Notify healthcare provider

Diazoxide (Proglycem)

- **Mechanism of Action**:
  - Increases blood sugar by inhibiting insulin release from beta cells
  - Stimulates release of epinephrine (adrenaline) from the adrenal medulla
- **NOT indicated for medication-induced hypoglycemic reaction**
- **Use**: Treat chronic hypoglycemia caused by hyperinsulinism due to:
  - Islet cell cancer
  - Islet cell hyperplasia

THYROID DISORDERS and MEDICATIONS

Hypothyroidism vs. Hyperthyroidism

ectomy =>means removal, or extracting

	Hypothyroidism	Hyperthyroidism
Definition	Deficiency of thyroid hormones	Excess thyroid hormones
Common Causes	Hashimoto's thyroiditis Iodine deficiency Thyroidectomy	Graves' disease Toxic nodular goiter Thyroiditis
Metabolism	Slowed	Increased
Weight	Weight gain	Weight loss (despite increased appetite)
Temperature	Cold intolerance	Heat intolerance
Heart Rate	Bradycardia (slow)	Tachycardia (fast)
Energy Level	Fatigue, lethargy	Nervousness, anxiety, restlessness
GI Function	Constipation	Diarrhea
Skin/Hair	Dry skin, brittle hair	Warm, moist skin
Mental Status	Depression, memory issues	Anxiety, irritability, insomnia
Other Signs	Myxedema (severe)	Exophthalmos (bulging eyes - Graves')
Lab Values	↓ T3, T4 ↑ TSH	↑ T3, T4 ↓ TSH
Treatment	Thyroid replacement (Levothyroxine)	Antithyroid drugs (Methimazole, PTU) Radioactive iodine Surgery

Hypothyroidism

- Deficiency of thyroid hormones (T3 and T4)
- **Causes**:
  - Hashimoto's thyroiditis (autoimmune)
  - Iodine deficiency
  - Thyroidectomy (surgical removal)
  - Radiation therapy
  - Certain medications

Symptoms

- Fatigue and weakness
- Weight gain
- Cold intolerance
- Bradycardia (slow heart rate)
- Constipation
- Depression
- Dry skin and hair
- Myxedema (severe hypothyroidism)

Lab Values

- **Low T3 and T4**
- **High TSH** (thyroid-stimulating hormone)

Thyroid Replacement Therapy

Thyroid Medications

Medication	Type	Use	Administration	Key Points
Levothyroxine (Synthroid)	Synthetic T4	Hypothyroidism	Empty stomach 30-60 min before breakfast	Drug of choice Lifelong therapy Monitor TSH
Liothyronine (Cytomel)	Synthetic T3	Hypothyroidism	Empty stomach	Faster onset Shorter duration
Desiccated Thyroid (Armour Thyroid)	Natural T3 + T4	Hypothyroidism	With or without food	From animal sources Less predictable
Methimazole (Tapazole)	Antithyroid	Hyperthyroidism	Once daily	Preferred antithyroid drug Monitor for agranulocytosis
Propylthiouracil (PTU)	Antithyroid	Hyperthyroidism Pregnancy (1st trimester)	Multiple times daily	Blocks synthesis and conversion Hepatotoxicity risk
Radioactive Iodine (I-131)	Thyroid ablation	Hyperthyroidism	One-time oral dose	Permanent treatment Radiation precautions

Takes weeks or months to noticed chang

Radiation to kill the thyroid, to help pt with hyperthyroidism.

Levothyroxine (Synthroid, Levoxyl) - DRUG OF CHOICE

- **Type**: Synthetic T4 (thyroxine)
- **Administration**:
  - Take on empty stomach
  - 30-60 minutes before breakfast
  - Consistent timing is important
  - Same brand preferred (bioavailability varies)

- **Monitoring**: TSH levels checked regularly
- **Side Effects** (from excessive dose):
  - Symptoms of hyperthyroidism
  - Tachycardia
  - Palpitations
  - Tremors
  - Insomnia
  - Weight loss
  - Angina
  - Arrhythmias
- **Drug Interactions** (decrease absorption):
  - Calcium supplements
  - Iron supplements
  - Antacids
  - Take these 4 hours apart from levothyroxine
- **Nursing Considerations**:
  - Monitor heart rate and rhythm
  - Teach patients this is lifelong therapy
  - Never stop abruptly
  - Report signs of hyperthyroidism

Hyperthyroidism

Liothyronine (Cytomel)

- **Type**: Synthetic T3 (triiodothyronine)
- **Characteristics**:
  - Faster onset than levothyroxine
  - Shorter duration
  - Less commonly used

Desiccated Thyroid (Armour Thyroid)

- **Type**: Natural thyroid hormone from animal sources
- **Contains**: Both T3 and T4
- **Less commonly prescribed** due to inconsistent hormone levels

Hyperthyroidism (Graves' Disease)

- Excess thyroid hormones
- **Causes**:
  - Graves' disease (autoimmune)
  - Toxic nodular goiter
  - Thyroiditis
  - Excessive thyroid hormone intake

Symptoms

- Weight loss despite increased appetite
- Heat intolerance
- Tachycardia
- Tremors
- Anxiety, nervousness
- Insomnia
- Exophthalmos (bulging eyes - in Graves' disease)
- Diarrhea

Lab Values

- **High T3 and T4**
- **Low TSH**

.Agranulocytosis is a risk of Thyroid blockers

Antithyroid Medications

Methimazole (Tapazole) - *Preferred*

- **Mechanism of Action**: Blocks thyroid hormone synthesis
- **Dosing**: Once daily
- **Side Effects**:
  - **Agranulocytosis (rare but serious - decreased white blood cells)**
  - Rash
  - GI upset
  - Hepatotoxicity (less than PTU)

Propylthiouracil (PTU)

- **Mechanism of Action**:
  - Blocks thyroid hormone synthesis
  - Blocks peripheral conversion of T4 to T3
- **When Used**:
  - First trimester of pregnancy
  - Thyroid storm (emergency)
- **Side Effects**:
  - **Hepatotoxicity** (liver damage - more common than with methimazole)
  - **Agranulocytosis**
  - Rash

Nursing Considerations for Antithyroid Drugs

- **Monitor for agranulocytosis**:
  - Teach patient to report sore throat, fever, mouth sores, signs of infection
  - May require discontinuation of medication
- **Monitor liver function tests**
- **Teach medication adherence**
- **Monitor thyroid function tests regularly**

Radioactive Iodine (I-131)

- **Mechanism**: Destroys thyroid tissue
- **Result**: Permanent treatment (often leads to hypothyroidism)
- **Precautions**:
  - Radiation safety measures
  - Avoid pregnancy
  - Avoid close contact with pregnant women and children for several days
  - Flush toilet multiple times
  - Wash hands thoroughly

Beta-Blockers (e.g., Propranolol)

- **Purpose**: Manage symptoms of hyperthyroidism
- **Effects**:
  - Reduces tachycardia
  - Reduces tremors
  - Reduces anxiety
- Does NOT treat the underlying thyroid condition

Adrenal Disorders and Corticosteroids

Corticosteroids

Types

- **Glucocorticoids** (anti-inflammatory effects)
  - Prednisone
  - Methylprednisolone (Solu-Medrol)
  - Dexamethasone (Decadron)
  - Hydrocortisone (Cortef)
- **Mineralocorticoids** (fluid and electrolyte balance)
  - Fludrocortisone (Florinef)

Cortisol lowers immune response

Uses

- Inflammatory conditions (asthma, COPD, arthritis, IBD)
- Autoimmune disorders (lupus, rheumatoid arthritis)
- Severe allergic reactions
- Adrenal insufficiency (Addison's disease)
- Organ transplant (immunosuppression)
- Certain cancers

So we use it on situations in wic
we and to lower immune system
and or inflammation

Side Effects of Corticosteroids (Especially Long-Term Use)

Body System	Side Effects	Clinical Significance
Metabolic	Hyperglycemia Weight gain Increased appetite Fat redistribution	Monitor blood glucose May worsen diabetes
Immune	Immunosuppression Increased infection risk Delayed wound healing	Avoid sick contacts Report fever immediately May mask infection signs
Musculoskeletal	Osteoporosis Muscle weakness Fracture risk	Calcium + Vitamin D supplements Weight-bearing exercise
Gastrointestinal	Peptic ulcers GI bleeding	Take with food Monitor for abdominal pain
Cardiovascular	Hypertension Fluid retention Edema	Monitor BP and weight Low sodium diet
Integumentary	Thin skin Easy bruising Poor wound healing Striae	Protect skin from injury
Endocrine	Cushing's syndrome Adrenal suppression	Moon face, buffalo hump **NEVER stop abruptly**
Psychological	Mood changes Insomnia Euphoria/depression	Take in morning Report severe mood changes
Ophthalmologic	Cataracts Glaucoma	Regular eye exams

Metabolic Effects

Cushing Syndrome = Too much cortisol, that's why the loc
fat

- **Hyperglycemia**
- Weight gain
- Increased appetite
- Fat redistribution (central obesity)

Immune System

- **Immunosuppression** → increased risk of infection
- Delayed wound healing
- Masks signs of infection

Musculoskeletal

- **Osteoporosis**
- Muscle weakness and wasting
- Increased risk of fractures

Braulio was stress in Cuba, and he had a bone fracture

Gastrointestinal

- Peptic ulcers
- GI bleeding
- Increased appetite

Cardiovascular

- Hypertension
- Fluid retention
- Edema

Integumentary (Skin)

- Thin, fragile skin
- Easy bruising
- Poor wound healing
- Striae

Endocrine

- **Cushing's Syndrome** (with prolonged use):
  - Moon face
  - Buffalo hump
  - Central obesity
  - Purple striae
- **Adrenal suppression**

Just think how they look like.

Psychological

- Mood changes
- Insomnia
- Euphoria or depression
- Psychosis (rare)

Ophthalmologic

- Cataracts
- Glaucoma

Nursing Considerations for Corticosteroids

Administration

- **CRITICAL: NEVER stop corticosteroids abruptly**
  - Must taper dose gradually
  - Prevents adrenal crisis (life-threatening)
  - Body's adrenal glands need time to resume normal cortisol production
- **Take with food** to reduce GI upset
- **Take in the morning** to mimic natural cortisol rhythm
- **Short-term use**: Usually safe
- **Long-term use**: Requires careful monitoring

Monitoring

- **Blood glucose** (risk of hyperglycemia/diabetes)
- **Blood pressure** (risk of hypertension)
- **Weight** (fluid retention)
- **Signs of infection** (immunosuppression)
- **Bone density** (risk of osteoporosis)
- **Mood changes**

Not memorize, just think on what stuff the drug affects

Patient Teaching

- **Infection prevention**:
  - Avoid crowds and sick people
  - Report fever, sore throat, or signs of infection immediately
  - May not develop typical signs of infection
- **Take calcium and Vitamin D supplements for bone health**
- **Carry medical alert identification**
- **Do not stop medication suddenly**
- **Report any unusual symptoms**
- **Monitor blood glucose *if diabetic***

Addison's Disease vs. Cushing's Syndrome

	Addison's Disease (Adrenal Insufficiency)	Cushing's Syndrome (Excess Cortisol)
Definition	Insufficient cortisol and aldosterone	Excess cortisol
Common Causes	Autoimmune destruction Sudden steroid withdrawal Infection (TB)	Long-term corticosteroid use Pituitary tumor Adrenal tumor
Blood Pressure	Hypotension (LOW)	Hypertension (HIGH)
Blood Glucose	Hypoglycemia (LOW)	Hyperglycemia (HIGH)
Sodium	Hyponatremia (LOW)	Normal or elevated
Potassium	Hyperkalemia (HIGH)	Hypokalemia (LOW)
Weight	Weight loss	Weight gain (central obesity)
Skin	Hyperpigmentation (bronze)	Thin, fragile, easy bruising
Physical Appearance	Thin, weak	Moon face, buffalo hump, purple striae
Energy	Severe fatigue	Muscle weakness
Treatment	Hormone replacement: Hydrocortisone Fludrocortisone	Taper steroids (if exogenous) Surgery/radiation (if tumor) Medications to block cortisol
Emergency	Adrenal crisis: IV hydrocortisone, fluids, glucose	Rarely life-threatening

Aldosterone

Addison's Disease (Adrenal Insufficiency)

- Insufficient production of cortisol and aldosterone by adrenal glands
- **Causes**:
  - Autoimmune destruction
  - Infection (TB)
  - Hemorrhage
  - Sudden withdrawal of corticosteroids

Symptoms

- Hypotension (low blood pressure)
- Hypoglycemia (low blood sugar)
- Hyperkalemia (high potassium)
- Hyponatremia (low sodium)
- Fatigue and weakness

- Hyperpigmentation (bronze skin color)
- Weight loss
- GI symptoms (nausea, vomiting, diarrhea)

Treatment

- **Lifelong hormone replacement**:
  - Hydrocortisone (glucocorticoid)
  - Fludrocortisone (mineralocorticoid)

Adrenal Crisis (Addisonian Crisis)

- **Medical emergency**
- **Symptoms**: Severe hypotension, shock, confusion, abdominal pain
- **Treatment**:
  - IV hydrocortisone
  - IV fluids
  - IV glucose
  - Treat underlying cause

Cushing's Syndrome (Excess Cortisol)

Causes

- **Exogenous**: Long-term corticosteroid use (most common)
- **Endogenous**: Pituitary tumor, adrenal tumor

Symptoms

- Moon face (rounded face)
- Buffalo hump (fat pad on upper back)
- Central obesity with thin extremities
- Purple striae (stretch marks)
- Hyperglycemia
- Hypertension
- Muscle weakness
- Thin, fragile skin
- Easy bruising
- Osteoporosis

Treatment

- **If caused by medications**: Gradually taper steroids
- **If caused by tumor**: Surgery or radiation
- **Medications**: Ketoconazole, Metyrapone (block cortisol synthesis)

Growth Hormone

Deficiency

GH -> Affects sugar levels, Increases sugar levels, Same as To much cortisol, same as to much thyroid hormone.

Treatment: Somatropin (Genotropin, Humatrope, Norditropin)

- **Type**: Synthetic human growth hormone
- **Route**: Subcutaneous injection
- **Uses**:
  - Growth hormone deficiency in children
  - Growth hormone deficiency in adults
  - Turner syndrome
  - Chronic renal insufficiency
- **Monitoring**:
  - Growth measurements (height, weight)
  - Blood glucose levels
  - Thyroid function
- **Side Effects**:
  - Injection site reactions
  - Headache
  - Hyperglycemia
  - Hypothyroidism

Excess (Acromegaly)

Big with a lot of glucose and high blood pressure. ~~dfdfdfdvfdfdfddddddd~~

- **Cause**: Usually, pituitary tumor producing excess growth hormone
- **Symptoms**:
  - Enlarged hands, feet, and facial features
  - Joint pain
  - Carpal tunnel syndrome
  - Hypertension
  - Diabetes

Treatment Options

- **Surgery**: Remove pituitary tumor
- **Radiation**: Destroy tumor
- **Medications**:
  - **Octreotide (Sandostatin)**: Somatostatin analog - inhibits GH release
  - **Pegvisomant (Somavert)**: GH receptor antagonist

Good luck on your exam! Happy studying!