NUR 354 PHARMACOLOGY II EXAM 2|NEW 2025-2026|110QUESTIONS&ANSWERS|ALREADY GRADED A+

What drug class do furosemide and bumetanide fall under?
Loop diuretics

What is the pharmacological action of loop diuretics?
- block reabsorption of sodium, chloride, and water in the loop of Henle

Which diuretic class still works well in kidney impairment?
Loop diuretics

What are the therapeutic uses associated with loop diuretics?
- reduce edema from HF, cirrhosis, and renal failure
- can be used to temporarily treat hypertension from FVE

What are the drug interactions associated with loop diuretics?
- hypokalemia risk: may cause dysrhythmias with digoxin and cardiac glycosides (heart failure meds)
- caution with meds that are nephrotoxic or ototoxic like opioids and amino-glycoside antibiotics
- may counteract insulin and cause hyperglycemia due to increased blood concentration

What are the food interactions associated with loop diuretics?
- hawthorn= hypotension
- ginseng and high sodium reduce effectiveness

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What side effects are associated with loop diuretics?
- hypokalemia and other electrolyte imbalances

- dehydration

- hypotension

- hypovolemia

What adverse effects are associated with loop diuretics?
- ototoxicity: tinitus, vertigo, nausea
- hyperglycemia
- hyperuricemia
- increased LDL and decreased HDL

What are some nursing interventions for loop diuretics?
- obtain baseline data: vitals, i's&o's, amount and placement of edema, lung sounds, skin turgor, mucus membrane assessment
- daily weights at same time each day
- monitor electrolyte levels
- monitor BP and HR/pulses before administration

What are some safety considerations for loop diuretics?
tell provider if any of these symptoms develop: dry mouth, increased thirst, muscle cramps, n/v,

symptoms of orthostatic hypotension such as dizziness, lightheadedness, and syncope may occur

What should you educate patients on if they are receiving loop diuretics?
- change positions slowly
- tell provider if signs of dehydration or electrolyte imbalance occur

How should you evaluate for loop diuretic effectiveness?
daily weights, i's&o's, electrolyte levels, kidney function monitoring (serum creatinine and serum BUN)

What drug class is hydrochlorothiazide in?
thiazide diuretic

What is the pharmacological action of thiazide diuretics?
blocks sodium, chloride, and water reabsorption in the kidney tubule which encourages potassium and water excretion

What are the therapeutic uses of thiazide diuretics?
- first choice for treating HTN quickly
- edema from HF, liver and kidney disease
- reduces urine production in diabetes insipidus
- good for osteoporosis because it promotes calcium reabsorption

True or false: thiazide diuretics are equally as effective as loop diuretics
false: thiazide diuretics are less effective than loop diuretics

What are the drug interactions associated with thiazide diuretics?
- use w/ other HTN meds will add to effects on BP

- may reduce efficacy of anticoagulants and insulin

- use with NSAIDs increases risk for nephrotoxicity

- hypokalemia= high risk for digoxin toxicity

- carbamazepine and thiazide diuretics increase each-other's toxicity

What are the food interactions associated with thiazide diuretics?
- ginko biloba may cause paradoxical interaction and cause HTN
- hawthorn may cause hypotension when used with thiazide diuretics

What are the side effects associated with thiazide diuretics?
- hypokalemia and hyponatremia along with other electrolyte imbalances
- increased risk for gout attacks
- dehydration

What are the adverse effects associated with thiazide diuretics?
- pregnancy: decreased placental perfusion
- NOT SAFE FOR USE WITH RENAL IMPAIRMENT

What are some nursing interventions appropriate for thiazide diuretic therapy?
- notify provider of prolonged signs of dehydration and electrolyte imbalance
- alternate day dosing can help with electrolyte imbalance
- give with food or milk to reduce GI upset
- administer early in day
- i's&o's + daily weights

What is some patient education we can provide for thiazide therapy?
- record intermittent therapy on calendar

- take med early in day with a meal or milk
- change positions slowly, no heavy machinery or dangerous activities while dizzy
- report weight change of more than 3 lbs in one day, edema on lower extremities, bleeding/bruising, dizziness, trembling, numbness, fatigue, or myalgia

what drug class is chlorthalidone in?
thiazide LIKE diuretics

what is the mechanism of action of thiazide like diuretics?
blocking sodium reabsorption at the distal convoluted tubule

What is the therapeutic use of thiazide like diuretics?
used alone or in combination with other drugs to control HTN

What are the food interactions associated with thiazide like diuretics?
grapefruit juice may increase effects of the drug and lead to severely low BP

what are some side effects and adverse effects of thiazide like diuretics?
hypotentsion
electrolyte imbalances including hypercalcemia
thrombocytopenia
symptoms of dehydration

What are some safety considerations for thiazide like diuretics?
- gout: may increase risk for gout flare

what is the drug class of spironolactone?
potassium sparing diuretic

what is the mechanism of action of spironolactone?
- aldosterone antagonist; works on distal renal tubules
(aldosterone is responsible for keeping sodium in the body and releasing potassium)

What are the therapeutic uses of spironolactone?
- combo with other drugs to treat HTN and edema
- HF

what are some drug interactions associated with spironolactone?
- aspirin, other salicylates, potassium supplements, ACE inhibitors, and ARB's may increase potassium levels= hyperkalemia and/or toxicity
- use with digoxin may cancel digoxin effects
- use with other antihypertensives= hypotension

what food interaction is know to exist with spironolactone?
hawthorn may cause hypotension

What are the side effects associated with spironolactone?
hyperkalemia
men: deepening of voice, impotence
women: menstrual irregularity
drowsiness
metabolic acidosis

What are some safety considerations for spironolactone?
- cannot be given to patients with kidney impairment or anuria
- not safe for use with other potassium sparing drugs (ACE inhibitors, ARB's, or direct renin inhibitors)

- no salt substitutes!

what drug class does mannitol fall into?
osmotic diuretics

what is the mechanism of action of osmotic diuretics?
- inhibit water reabsorption in the proximal convoluted tubule and thin descending loop of henle and collecting duct
- raise serum osmolality (concentration) and draws fluid into vascular and extravascular space

What are the therapeutic uses for osmotic diuretics?
used to
- prevent renal failure with hypovolemic shock by preserving urine flow
- decreases ICP and IOP
- promoted serum retention and water excretion with hyponatremia

what is CKD?
chronic kidney disease
- excess fluid and waste from the blood remain in the body and cause other issues like heart disease and stroke

what is renal dosing?
To avoid harm when drug clearance is significantly decreased, the dose of renally cleared drugs should usually be reduced in patients with renal disease.

What is the effect of nitrates on the blood vessels?
vasodilation of arteries, veins, and coronary arteries

Why do we use nitrates in coronary artery disease?
reduces heart workload and lowers the myocardial oxygen demand; overall reducing work done by the heart

what is the short term and long term effects of organic nitrates?
- short term: terminate acute angina episode associated with coronary artery disease
- long term: decrease severity and frequency of episodes

what is the drug class of nitroglycerine?
organic nitrates

What are the administration routes and special considerations of nitroglycerine?
- sublingual: peak plasma level in 2-4 mins
- PO, transmucosal, and topical: large first pass effects; wear gloves with topical
- IV: use UV protectant glass bottle and special tubing because plastic absorbs the med and UV rays degrade it
- extended release PO and transdermal: only used for prophylaxis due to slow onset; take patch off at night

what are the adverse effects/safety considerations associated with nitroglycerine?
- headache due to dilation of cerebral vessels
- reflex tachycardia
- orthostatic hypotension
- tolerance
- caution with other HTN meds
- NO VIAGRA/SILDENAFIL!!!

how can we avoid a tolerance to nitroglycerin?

start with the lowest dose, avoid foods containing nitrates, remove transdermal patch at bedtime

what are the other nitrate drugs and the differences between them?
- isosorbide dinitrate: rapid and long acting forms
- isosorbide mononitrate: primarily long acting

what drug class contains meds that end in "-lol"?
beta-adrenergic blockers

what is the mechanism of action of beta-adrenergic blockers?
reduce workload by slowing HR and reducing contractility

what is the therapeutic use of beta blockers?
decrease HR, treat HF, HTN, angina, and MI, and occasionally migraines

what are some side effects associated with beta blockers?
fatigue/activity intollerance, insomnia, drowsiness, impotence, bradycardia, confusion

abrupt cessation can cause rebound HTN, angina, and MI

what are some nursing considerations for beta blockers?
- check BP and HR before administering, during treatment, and after effects have taken effect
- hold if HR is less than 60 bpm or if BP is low

what is the mechanism of action of calcium channel blockers?

inhibit calcium transport into myocardial cells which causes heart vessel vasodilation and decreased work load to the heart

What is the therapeutic use of calcium channel blockers?
lowers blood pressure by reducing force of heart contractions

what are the adverse effects of calcium channel blockers?
hypotension, bradycardia, heart failure, constipation, headache, dizziness, and edema

what drugs are in the calcium channel blocker class?
diltiazem and verapamil

What drugs fall into the thrombolytic drug class?
alteplase and reteplase (end in "-ase")

what is the mechanism of action of thrombolytic drugs?
acts by cleaving plasminogen which forms plasmin and then degrades the fibrin matrix of the thrombi

what are the therapeutic uses of thombolytics?
- dissolve clots obstructing coronary arteries

- restore myocardial circulation in acute MI

What are the safety considerations/adverse effects for thrombolytic drugs?
- high risk of excessive bleeding; caution if patient recently experienced a stroke or TBI
- dysrhythmias may occur during myocardial reperfusion

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- not compatible with heparin

what drug class does ranolazine fall into?
non-nitrate antianginal

what is the mechanism of action of ranolazine?
not known exactly how, but it reduces the cardiac oxygen demand in stable angina

What is the therapeutic use of ranolazine?
- chronic stable angina; improved exercise tolerance
- used in combination with a beta blocker or an organic nitrate

What are some side effects associated with ranolazine?
QT prolongation and elevated BP

what food does ranolazine interact with?
grapefruit juice

What drugs fall into the class known as ACE inhibitors and are used for MI?
captopril and lisinopril

What is the therapeutic use of lisinopril?
reduces cardio morbidity in patients with MI

What is the mechanism of action of captopril?
blocks angiotensin converting enzyme and prevents vasodilating prostaglandins from degrading; results in inhibiting vasoconstriction and promoting systemic vasodilation

What is the difference between stable and unstable angina?
- stable: predictable and alleviated by rest
- unstable: change in episodes occurring for longer, more frequently, and during rest

What is vasospastic angina?
Angina that is stimulated by the random vasoconstriction of the the cardiac vessels

what is silent angina?
Myocardial ischemia that does not cause pain

what is the difference between ischemia and infarction?
- ischemia: lack of O2
- infarction: lack of O2 for so long that it actually causes necrosis/damage to the heart tissue

What are the steps of angina protocol?
stop activity
sit/lie down
immediately use NTG or spray
wait 5 mins
if pain persists, call 911 and take 2nd nitro dose
wait 5 minutes
if pain persists take 3rd nitro dose

What is the protocol for expected MI?
MONA
-M: morphine for pain, anxiety, and reduce preload
-O: oxygen~ GIVE FIRST!!
-N: nitroglycerine is first line treatment

-A: aspirin prevents platelet clots and arterial constriction

which deliveries of nitroglycerine can be used to prevent angina attacks?
sublingual (before exerting activity)
sustained release PO (long term prophylaxis)
transdermal (long term prophylaxis)
topical ointment (long term prophylaxis)

What is renin?
an enzyme secreted by and stored in the kidneys that promotes the production of the protein angiotensin

What is angiotensin?
a protein whose presence in the blood promotes aldosterone secretion and tends to raise blood pressure; angiotensin 1 is inactive but angiotensin 2 is active

What is aldosterone?
Secreted from the adrenal cortex and promotes sodium, chloride, and water reabsorption in the kidneys.

What should we know about angiotensin 2?
angiotensin 2 is one of the most potent know natural vasoconstrictors

What is necessary to convert angiotensin 1 into angiotensin 2?
angiotensin conversing enzyme

How does angiotensin II increase BP?

It causes vasoconstriction and increased release of ALDOSTERONE which results in sodium and water retention

What is the mechanism of action of ACE inhibitors?
Block formation of Angio II and prevent constriction of blood vessels.

Dilated blood vessel results in decreased BP.

What are the adverse effects of ACE inhibitors?
Persistent cough

Postural hypotension

Hyperkalemia

Angioedema (most serious)

what drugs are in the angiotensin receptor blocker class?
losartan, valsartan, olmesartan
memory trick: the sartans are spartants fighting off angiotensin

What is the mechanism of action of angiotensin receptor blockers?
blocks angiotensin 2 receptors in arteries and adrenal gland which results in BP lowering; also increase sodium excretion

what are the side effects of angiotensin receptor blockers?
hypotension
no cough
rarer angioedema

What drug class is aliskiren in?
direct renin inhibitor

What is the mechanism of action of aliskiren?
bind to renin and prevent conversion of angiotensinogen to angiotensin I

What are drug interactions with aliskiren?
not safe for use with ACE inhibitors

What are the adverse effects of direct renin inhibitors?
diarrhea
cough
flulike symptoms
rash

What are the therapeutic uses of calcium channel blockers?
angina pectoris, dysrhythmias, and HTN

What are the calcium channel blockers that affect the heart rate?
diltiazem and verapamil

What are the calcium channel blockers that do not affect heart rate?
nifedipine, nicardipine, amlodipine, clevidipine
memory trick: heart rates fine with -dipine

what is the intended use of clevidipine?

only for IV administration in hypertensive crisis because half-life is 1 minute

What is the mechanism of action of alpha blockers in relation to HTN?
directly lower blood pressure by blocking sympathetic receptors in arteries resulting in vasodilation

What are the adverse effects associated with alpha blockers?
orthostatic hypotension
dizziness
nausea
nervousness
fatigue

What drugs fall into the alpha blocker class?
doxazosin, terazosin, tamsulosin

What is the mechanism of action of alpha 2 agonists?
decrease the outflow of sympathetic nerve impulses from CNS to the heart and arterioles resulting in slowing of the heart rate from decreased conduction rate and vasodilation

What are the side effects of alpha 2 agonists?
dizziness, drowsiness, dry mouth, difficulty breathing, abnormally slow HR, fainting

What are the adverse effect of alpha 2 agonists?
hemolytic anemia
leukopenia
thrombocytopenia
lupus

Which med is given for HTN in pregnancy?
methyldopa; an alpha 2 agonist

What drug class does clonidine fall into?
alpha 2 agonists

What is the mechanism of action of direct vasodilators?
directly relax vascular smooth muscle

What are the side effects of direct vasodilators?
- reflex tachycardia (prevented by concurrent use of BB)
- rebound hypertension (due to reflex tachycardia
- sodium and water retention
- activation of RAAS which may cause HTN (admin diuretic to counteract)
- excessive diuresis resulting in hypotension and circulatory collapse

What drugs are in the direct vasodilator class?
hydralazine, nitroprusside, diazoxide, minoxidil

What three factors affect hypertension?
- cardiac output: volume of blood pumped per minute= stroke volume x HR
- peripheral resistance: friction/resistance in arteries as blood flows though
- blood volume

What are the types of hypertension?
- primary: idiopathic
- secondary: cause identified (examples: cushing's syndrome, hyperthyroidism, chronic renal disease, certain drugs)

How can we control HTN without meds?
limit alcohol
restrict sodium consumption
reduce sat fat and cholesterol
increase fresh fruit and veg
increase aerobic activity
stop tobacco use
reduce stress
maintain optimum weight

What is the DASH diet?
Dietary Approached to Stop Hypertension
- Low sodium intake
- Carbs: 55-60%
- Protein: 15-20%
- Fat: 25-30%

Blood pressure categories
Normal: <120/<80 mmHg
Prehypertension/Elevated: 120-129/<80 mmHg
HTN stage 1: 130-139/80-90 mmHg
HTN stage 2: >140/>90 mmHg

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