

Drugs Affecting The Cardiovascular System outline

Introduction

https://www.youtube.com/watch?v=_lgd03h3te8

1. Heart Failure Medication

Heart Failure: (Congestive heart failure)

Abnormal condition that reflects altered structure and/or function of the ventricle and most often results in reduced cardiac output.

Pharmacologic Effects of Cardiac Drugs on the Myocardial Tissue

1. **Inotropic effect** – myocardial contractility

Positive – digoxin, dopamine, and epinephrine

Negative – lidocaine, quinidine, and propranolol

2. **Chronotropic effect** – action affects heart rate

- Positive – norepinephrine
- Negative – acetylcholine

3. **Dromotropic effect** – affects conduction of the heart (affects the conduction speed in the AV node, and subsequently the rate of electrical impulses in the heart)

- Positive – epinephrine
- Negative - verapamil

Digoxin (Lanoxin)

Main function is positive inotropic action, which can cause the myocardium to beat more forcefully increasing cardiac output and decreasing oxygen use

- Used to treat heart failure and to slow ventricular rates in atrial fibrillation and atrial flutter
- Has negative chronotropic (decreases HR) & dromotropic (slows conduction velocity) effects

Other Drugs- Heart Failure

1. Potassium-sparing diuretic (spironolactone)
2. ACE inhibitor (captopril)
3. Angiotensin-receptor blocker (losartan)
4. Beta adrenergic blocker (Carvedilol)
5. Calcium channel blocker (Nifedipine)
6. Catecholamine (Dopamine)
7. Loop diuretic (Furosemide)
8. Thiazide diuretic (Hydrochlorothiazide)
9. Vasodilator (Nitroglycerine)
10. B-type natriuretic peptide – (Nesiritide)

Nursing Implication (Digoxin):

1. **Assess for underlying conditions like:**

Dysrhythmias, clients with electronic pace makers, electrolyte imbalances, renal dysfunction, and older adults

2. **Review drug interactions including:** antacids (reduce absorption 25-30%), antidiarrheal drugs (decrease therapeutic response), indomethacin (reduces renal excretion), Amiodarone (increase serum levels of digoxin)
3. **Measure apical pulse** of the patient for 1 full minute before administering the drug
4. Know the therapeutic **digoxin serum levels** and normal potassium, calcium, and magnesium ion serum levels
5. **Observe ECG monitoring** strip for digoxin-induced dysrhythmias
6. **Monitor intake-and-output** including patient's food intake
7. When giving **IV as undiluted** (0.25 mg/mL), administer slowly at 0.25 mg/min to prevent pulmonary edema
8. **Restrict sodium** at 2g or less daily, **report weight gain** of 2lbs/day

2. Antidysrhythmics

Dysrhythmia

- Any deviation from the normal rhythm of the heartbeat
- Usually develops in individuals approximately from 4-72 hrs post MI or heart attack

Anti-dysrhythmia agents

Drugs used for the treatment and prevention of disturbances in cardiac rhythm that result from some abnormality in the electrophysiological properties of the cardiac conduction system cells or cardiac muscle cells

Vaughan Williams Classification

- Class I (Class Ia, Class Ib, Class Ic)
- Class II
- Class III
- Class IV

Vaughan Williams Classification

Class I

- Membrane-stabilizing agents
- Fast sodium channel blockers
- Divided into Ia, Ib, and Ic agents, according to effects
- Class I example (moricizine)

Used for symptomatic ventricular and life-threatening dysrhythmias

Class II

Beta blockers: (Atenolol, Propranolol)

- Reduce or block sympathetic nervous system stimulation, thus reducing transmission of impulses in the heart's conduction system
- General myocardial depressants for both supraventricular and ventricular dysrhythmias

Class III (Amiodarone, bretylium)

- Used for dysrhythmias that are difficult to treat
- Life-threatening ventricular tachycardia or fibrillation, atrial fibrillation or flutter—resistant to other drugs

Class IV (verapamil, diltiazem)

- Calcium channel blockers
- Used for paroxysmal supraventricular tachycardia; rate control for atrial fibrillation and flutter

Digoxin

- Cardiac glycoside
- Inhibits the sodium-potassium ATPase pump
- Positive inotrope—improves the strength of cardiac contraction
- Allows more calcium to be available for contraction
- Used for CHF and atrial dysrhythmias
- Monitor potassium levels, drug levels, and for toxicity

Example of Antidysrhythmics

1. Adenosine (Adenocard)

- Slows conduction through the AV node

- Very short half-life
- Only administered as fast IV push
- May cause a systole for a few seconds

Side Effects of Antidysrhythmics

NOTE: All antidysrhythmics can cause dysrhythmias

Hypersensitivity reactions

Nausea

Vomiting

Diarrhea

Dizziness

Blurred vision

Headache

Nursing Implications

- Measure baseline BP, P, I & O, and cardiac rhythm.
- Measure serum potassium levels before initiating therapy & monitor for toxic effects.
- Assess for conditions that may be contraindications for use of specific agents.
- Assess for potential drug interactions.
- Instruct patients to take medications as scheduled and not to skip doses or double up for missed doses.
- Patients who miss a dose should contact their physician for instructions.
- For class I agents, monitor ECG for QT intervals prolonged more than 50%.
- IV infusions should be administered with an IV pump.
- Patients taking propranolol, digoxin, and other agents should be taught how to take their own radial pulse for 1 full minute, and to notify their physician if the pulse is less than 60 beats/minute before taking the next dose of medication.
- Monitor for therapeutic response:

Decreased BP in hypertensive patients

Decreased edema

Regular pulse rate or

Improved regularity of rhythm

3. Antihypertensive drugs

Hypertension

Sustained, elevated systolic blood pressure, diastolic blood pressure, or both

A chronic circulatory disease that affects millions around the world

- Untreated hypertension or sub-therapeutic treatment of hypertension increases the risk of stroke, cerebral hemorrhage, heart failure, coronary heart disease (CHD), and renal failure

Classification of Blood Pressure:

Normal <120 and <80

PreHTN 120-139 80-89

Hypertension:

Stage 1 140-159 90-99

Stage 2 160-169 100-109

Stage 3 180-209 110-119

Stage 4 ≥ 210 ≥ 120

Classification of Blood Pressure

Primary Hypertension

- Specific cause unknown
- 90% of the cases

Secondary Hypertension

- Cause is known (such as eclampsia of pregnancy, renal artery disease)
- 10% of the cases

Antihypertensive Agents: Categories

1. Diuretics
2. Beta-blockers,
3. ACE inhibitors
4. Angiotensin II receptor blockers
5. Combined alpha & beta blockers
6. Calcium-channel blockers
7. Alpha 1 blockers
8. Dihydropyridines

Treatment of Hypertension: Lifestyle Modifications

1. Weight reduction

2. Adopt DASH eating plan by consuming fruits, vegetables and low-fat dairy products
3. Dietary sodium reduction
4. Physical activity at least 30 minutes per day in most days of the week
5. Stress reduction

Nursing Implications

1. Assess for contraindications to specific antihypertensive agents.
2. Assess for conditions that require cautious use of these agents.
3. Educate patients about the importance of not missing a dose and taking the medications exactly as prescribed.
4. Patients should check with physician for instructions on what to do if a dose is missed.
5. Monitor BP during therapy and instruct patients to keep a journal of regular BP checks.
6. Monitor for side/adverse effects (dizziness, orthostatic hypotension, fatigue) and for toxic effects.
7. Monitor for therapeutic effects and blood pressure should be maintained at less than 140/90 mm Hg

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