PHARMACOLOGY III

CARDIOVASCULAR MEDICATIONS

PTA1010

Following this lecture the student will:

- State the general principles of cardiovascular medications
- List the various indications for cardiovascular medications
- Recognize and list common side effects for cardiovascular medications
- State general rehabilitation concerns for this class of medications
- Recognize commonly used medications in these classes of drugs

Medications to treat cardiovascular conditions:

- Hypertension: high pressure in vessels
- Angina: chest pain
- Cardiac Arrythmias: irregular rate or rhythm
- Congestive Heart Failure: poor pump
- Antiplatelet: reduce risk of clot formation
- Anticoagulant: reduce risk of clot formation

Anti-hypertensive Drugs

Blood pressure is the relationship between cardiac output and peripheral resistance.

Methods to **reduce pressure** include:

vasodilators (resistance)

diuretics (volume)

↓ HR and ↓ CO (force)

Beta Blockers- end in "lol"

Calcium Channel Blockers

Diuretics for dehydration

Side Effects= decreased HR and BP response to exercise, **orthostatic hypotension**

•Systolic BP (mm Hg) •Diastolic BP (mm Hg)	ACC/AHA Classification
<120 and <80	Normal
120-129 and <80	Elevated
130-139 or 80-89	Stage 1 hypertension
140-159 or 90-99	Stage 2 hypertension
≥160 or ≥100	Stage 2 hypertension

Angina- chest/muscle pain due to ischemic heart disease

- Nitrates
- Beta Blockers
- Calcium Channel Blockers

- *Nitrates and calcium channel blockers both produce peripheral vasodilation and can lead to hypotension.*
- *This decrease in blood pressure may be exaggerated when the patient suddenly sits or stands up (orthostatic hypotension)*
- *Patients will have an increased the risk of falling.*
- *Heat or exercise, may produce an additive effect on the drug-induced hypotension.*

Arrhythmias: a deviation from normal sinus rhythm

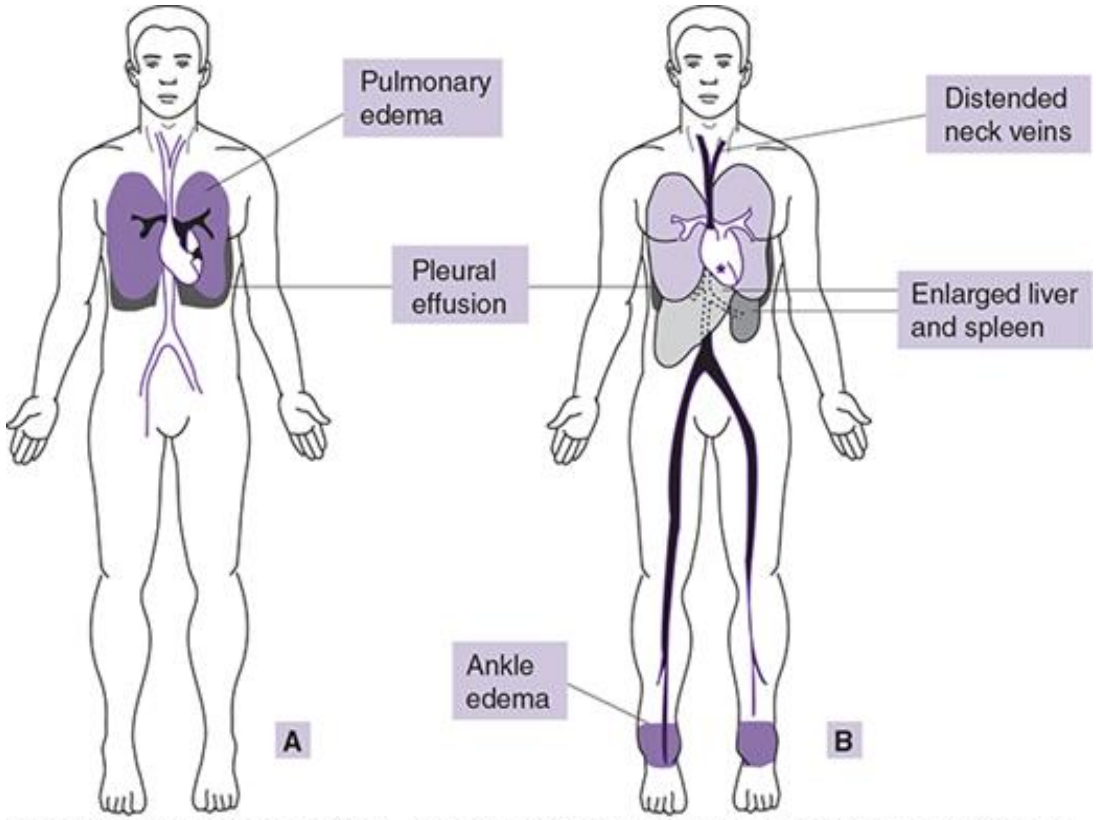
- Bradycardia
- Tachycardia
- PVC
- Atrial Fibrillation/flutter
- Ventricular Fibrillation/flutter

- Sodium Channel Blockers
- Beta Blockers
- Potassium Channel Blockers
- Calcium Channel Blockers

*The primary problems associated with antiarrhythmic drugs in rehabilitation patients are related to **the side effects** of these agents. Therapists should be aware of the potential for **increased arrhythmias** or changes in the nature of arrhythmias. This concern may be especially important in **patients involved in exercise** and cardiac rehabilitation programs.*

Heart Failure

- **Right Sided-** R atrium unable to handle blood return = accumulation in LE, peripheral tissues and organs.
- **Left Sided-** L atrium unable to handle blood returning form lungs= increase in pulmonary pressure in pulmonary veins and Lungs.
- **DIGITALIS to increase heart contractility**
- **General fatigue with exercise**
- **Watch for toxicity=** dizziness, anorexia, headache, vomiting



Coagulation Disorders

- Blood clots or **thrombus** formation can be very serious.
- **Risks for clots**= post surgery, Afib, valve replacement and immobilization

- **Coumadin**= long term prevention of thrombus formation.
- **Heparin**= primary drug for venous thrombosis
- Antiplatelet Drugs= **Aspirin**

- ADVERSE EFFECTS= bleeding, bruising, nausea, vomiting, GI irritation and delayed healing

Case Study 1

- **Brief History.** H.C. is a 55-year-old man who works as an attorney for a large corporation. He is consistently faced with a demanding work schedule, often working 12- to 14-hour days, 6 days each week. In addition, he is 25 to 30 pounds overweight and is a habitual cigarette smoker. He has a long history of high blood pressure, which has been managed fairly successfully over the past 15 years through the use of different drugs. Currently, he is receiving a diuretic (furosemide [Lasix], 160 mg/d), a cardioselective beta blocker (metoprolol [Lopressor], 200 mg/d), and a vasodilator (hydralazine [Apresoline], 200 mg/d). He also takes 81 mg of aspirin each day to prevent myocardial infarction, 20 mg of rosuvastatin (Crestor) to reduce plasma cholesterol, and 10 mg of zolpidem (Ambien) at bedtime when he has trouble falling asleep.
- While rushing to a business luncheon, H.C. was hit by an automobile as he was crossing the street. He was admitted to the hospital, where radiological examination revealed a fracture of the right pelvis. Further examination did not reveal any other significant internal injuries. The pelvic fracture appeared stable at the time of admission, and internal fixation was not required. H.C. remained in the hospital and was placed on bed rest. Two days after admission, a physical therapist was called in to consult on the case. The physical therapist suggested a progressive ambulation program using the facility's therapeutic pool. The buoyancy provided by the pool would allow a gradual increase in weight bearing while protecting the fracture site.
- **Problem/Influence of Medication.** To guard against patient hypothermia, the water temperature in the therapeutic pool was routinely maintained at 95°F. The therapist was concerned that immersing the patient in the pool would cause excessive peripheral vasodilation.
- ***1. How would the combination of the drug regimen and the vasodilation caused by the therapeutic pool affect H.C.'s cardiovascular system?***
- ***2. What precautions should the therapist take to avoid adverse cardiovascular changes during the pool interventions?***

Case Study 2

- **Brief History.** T.M. is a 73-year-old man who is retired from his job as an accountant. He has a long history of type 2 diabetes mellitus, which has progressively worsened over the past decade despite oral antidiabetic medication and insulin treatment. He also has a history of stable (classic) angina that has been managed by nitroglycerin. The patient self-administers a nitroglycerin tablet (0.4 mg) sublingually at the onset of an anginal attack. Recently, the patient was admitted to the hospital for treatment of a gangrenous lesion on his left foot. When this lesion failed to respond to conservative treatment, a left below-knee amputation was performed. Following the amputation, the patient was referred to physical therapy for strengthening and a preprosthetic evaluation.
- **Problem/Influence of Medication.** The therapist initiated a program of general conditioning and strengthening at the patient's bedside the day following surgery. On the third day, the therapist decided to bring the patient to the physical therapy department for a more intensive program, including standing activities with the parallel bars. The patient arrived in the department via wheelchair and began complaining immediately of chest pains. The patient had not brought his nitroglycerin tablets with him to the therapy session.
- ***1. What immediate action should the therapist take to help this patient during an angina attack?***
- ***2. Why did T.M. experience angina before even beginning any exercises or other rehabilitation regimens?***
- ***3. What can be done to prevent similar situations in the future?***

Case Study 3

- **Brief History.** M.R. is a 48-year-old man with a history of coronary artery disease and cardiac rhythm disturbances. Specifically, he has experienced episodes of paroxysmal supraventricular tachycardia, with his heart rate often exceeding 180 beats per minute. He has been treated for several years with the beta blocker propranolol (Inderal). Taking this drug orally at a dose of 60 mg/d has successfully diminished his episodes of tachycardia. M.R. had also been a cigarette smoker but quit recently to improve his health and reduce the risk of cigarette-related diseases. To improve his myocardial function and overall cardiovascular fitness, M.R. underwent a graded exercise test and was subsequently enrolled as an outpatient in a cardiac rehabilitation program. Under the supervision of a physical therapist, he attended cardiac training sessions three times each week. A typical session consisted of warm-up calisthenics, bicycle ergometry, and cool-down stretching activities. Each session lasted approximately 45 minutes.
- **Problem/Influence of Medication.** During the initial rehabilitation sessions, the therapist noticed that M.R. seemed to be having some trouble breathing during the bicycle exercises. The therapist placed a stethoscope over M.R.'s chest and heard distinct wheezing sounds indicative of broncho-constrictive disease. M.R. apparently had some residual effects of cigarette smoking, most likely in the form of mild to moderate emphysema.

1. Could M.R.'s current drug regimen be contributing to the broncho-constrictive symptoms?

2. What potential change in drug therapy may reduce the risk of bronchoconstriction?