Learn Objectives

- Explain concept of polypharmacy in treatment of congestive heart failure
- Explain function of diuretics

Learning Objectives

- Discuss drugs used for initial management of congestive heart failure:
  - Furosemide (Lasix)
  - Morphine sulfate
  - Nitroglycerin (Nitrolingual, NitroQuick, Nitro-Dur)
Learning Objectives

- Discuss digoxin (Lanoxin) and its use in long-term management of congestive heart failure
- Discuss role of angiotensin-converting enzyme inhibitors, beta blockers, and calcium channel blockers in treating patients with congestive heart failure

Introduction

- Congestive heart failure (CHF) is increasing in prevalence
  - 5 million in the United States have heart failure
  - 500,000 new cases are diagnosed each year

- Paramedics are called to assist patients who are often taking multiple medications
  - Must be familiar with medications used for:
    - Long-term therapy of CHF
    - Short-term therapy for exacerbations of CHF
    - Pulmonary edema
Overview of CHF

- May be the result of:
  - Ischemic heart disease
  - Diabetes mellitus
  - Hypertension
  - Disease of the heart valves

Overview of CHF

- Heart failure symptoms:
  - Accumulation of excess fluid
  - Poor peripheral perfusion
  - Inadequate O₂ delivery to the tissues
Overview of CHF

- Fluid overload signs:
  - Shortness of breath from pulmonary edema
  - Extremity edema, especially lower legs

- Pulmonary edema
  - Poor output of the heart caused by heart failure results in accumulation or "backing up" of fluid in lungs

Management

- Long-term control of systolic and diastolic hypertension

- Patients with CHF often take medications for treatment of lipid disorders

Management

- Angiotensin-converting enzyme (ACE) inhibitors are used for patients with history of:
  - Atherosclerotic vascular disease
  - Diabetes
  - Hypertension

- Many receive medications to control heart rate and treat thyroid disorders
Management

- Must know effects of polypharmacy—the administration of many drugs at the same time
- Medications used for treatment of CHF may be potentially harmful in patients with CHF from valvular heart disease or with diastolic dysfunction

Management

- Drugs used for immediate management
  - O₂
  - Furosemide
    - Used to reduce pulmonary edema
    - Loop diuretic
    - 40-mg IV push
    - Effects take 20 minutes to appear

Management

- Drugs used for immediate management
  - Nitroglycerin
    - Produces vasodilation
    - Dilates veins to greater magnitude than it dilates arteries
    - Produces some relief while waiting for furosemide to take effect
    - Reduces cardiac workload of patients with acute symptoms of congestive heart disease
    - Improves blood flow to ischemic myocardium
    - Decreases myocardial O₂ demand
Management

- Drugs used for immediate management
  - Morphine sulfate
    - Relieves pulmonary congestion by venuodilation
    - Lowers myocardial O₂ demand and reduces anxiety

Management

- Drugs used for long-term management
  - Digoxin
    - Increases cardiac contractility
    - Often slows heart rate
    - Used in patients with chronic atrial fibrillation
    - Helps heart beat stronger and slower

Management

- Drugs used for long-term management
  - Digoxin
    - Benefits of a drug-induced reduction of heart rate include:
      - Decreased myocardial O₂ consumption
      - Improved stroke volume, increasing cardiac output
      - Prolonged diastolic coronary blood flow
    - Rapid rate results in:
      - Reduction of filling of the heart
      - Decreases cardiac output and BP
Management

- Drugs used for long-term management
  - Lisinopril
    - ACE inhibitor
    - When angiotensin is inhibited, most powerful vasoconstrictor in the body halts
    - Reduces cardiac ischemic events, mortality rate, and hospital admissions

- Metoprolol
  - Cardioselective beta blocker
  - Binds to beta adrenergic receptors
  - Decreases BP and heart rate
  - Controls hypertension
  - Decreases cardiac workload

- Adding beta blocker to ACE inhibitor decreases mortality rate and hospital admissions
- Beta blockers should be avoided in unstable patients or those who have decompensated CHF
- With chronic heart failure, dose is slowly and progressively increased over prolonged period
Management

- Drugs used for long-term management
  - Calcium channel blockers
    - Should be avoided with CHF
    - Have been shown to increase morbidity and mortality rates in patients with left ventricular systolic dysfunction from heart failure

Questions?