Heart Failure (HF)

- Inability of ventricles to pump enough blood for body’s needs
- Weakening of heart muscle due to aging or disease

Diseases Associated with Heart Failure

- Mitral stenosis
- Myocardial infarction (MI)
- Chronic hypertension (HTN)
- Coronary artery disease (CAD)
- Diabetes mellitus
- No cure, only prevention and slowing progression

Left-Sided Heart Failure

- Blood accumulates in left ventricle
- Left ventricle thickens and enlarges: hypertrophy
- Blood backs up into lungs
- Cough and shortness of breath result

Right-Sided Heart Failure

- Blood backs up into veins
- Causes peripheral edema and organ engorgement
- Less common than left-sided HF
### Preload
- Affects cardiac output
- Myocardial fibers stretched prior to contraction

### Afterload
- Affects cardiac output
- Pressure in aorta that must be overcome before blood is ejected from left ventricle

### Role of the Nurse
- Obtain health history
- Assess vital signs, urinary and cardiac output before and throughout therapy

### Drugs for Heart Failure
- Treat symptoms
  - Slow heart rate
  - Increase contractility
  - Reduce heart workload

### Nurse’s Role—ACE Inhibitors
- Monitor CBC
- Assess for hypotension
- Monitor for impaired kidney function, hyperkalemia, autoimmune disease

### Client Teaching
- Therapeutic response time: weeks or months
- Sodium and potassium restrictions
- Don’t use with other medications, OTCs, herbals, vitamins
**Nurse’s Role—Diuretics**

- Assess renal function
- Monitor electrolyte levels
- Monitor vital signs, intake/output
- Monitor blood glucose and blood-urea nitrogen (BUN)

**Client Teaching**

- Monitor sodium intake
- Report weight loss
- Report fatigue and muscle cramps
- Change position slowly

**Beta-Adrenergic Blockers (Antagonists)**

- Monitor for worsening symptoms
- Monitor liver function/hepatic toxicity
- Be aware of contraindications

**Client Teaching**

- Monitor blood pressure/pulse
- Report pulse below 50
- Report signs/symptoms of worsening heart failure
- Do not stop taking abruptly

**Cardiac Glycosides**

- Evaluate for ventricular dysrhythmias
- Assess renal function
- Monitor for drug interactions
- Know restriction on use with antidiarrheals/antacids

**Client Teaching**

- Monitor therapeutic levels with laboratory tests
- Know signs/symptoms of toxicity
- Monitor pulse rate
- Report weight gain
- Eat foods high in potassium
**Phosphodiesterase Inhibitors**

- Assess potassium levels
- Monitor for hypotension
- Assess for renal impairment
- Assess for dysrhythmias

**IV Phosphodiesterase Inhibitors**

- Monitor for ventricular dysrhythmias

**Client Teaching**

- Report irregular or rapid heart rate
- Report fever of 101 degrees or higher or increase in chest pain
- If given IV, report fever of 101 degrees or higher or pain/swelling at infusion site

**ACE Inhibitors**

- **Prototype drug:** lisinopril (Prinivil, Zestril)
- **Mechanism of action:** to enhance excretion of sodium and water
- **Primary use:** to lower blood pressure and peripheral resistance
- **Adverse effects:** first-dose hypotension, cough, hyperkalemia, renal failure

**Diuretics**

- **Prototype drug:** furosemide (Lasix)
- **Mechanism of action:** to increase urine flow, reducing blood volume and cardiac workload
- **Primary use:** to reduce edema and pulmonary congestion
- **Adverse effects:** dehydration, electrolyte imbalance, hypotension, ototoxicity
Furosemide Animation

Click here to view an animation on the topic of furosemide.

Beta-Adrenergic Blockers

- **Prototype drug**: carvedilol (Coreg)
- **Mechanism of action**: to slow heart rate and B/P, reducing workload of heart
- **Primary use**: to reduce symptoms of heart failure and slow progression of disease
- **Adverse effects**: fluid retention, worsening of heart failure, fatigue, hypotension, bradycardia, heart block

Beta-Adrenergic Blockers

- **Prototype drug**: carvedilol (Coreg)
- **Mechanism of action**: to slow heart rate and B/P, reducing workload of heart
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Vasodilators

- **Prototype drug**: isosorbide dinitrate (Isordil)
- **Mechanism of action**: to relax blood vessels
- **Primary use**: to lower blood pressure
- **Use**: for clients who cannot take ACE inhibitors
- **Adverse reactions**: reflex tachycardia, orthostatic hypotension

Cardiac Glycosides

- **Prototype drug**: digoxin (Lanoxin)
- **Mechanism of action**: to cause more forceful heartbeat, slower heart rate
- **Primary use**: to increase contractility or strength of myocardial contraction
- **Adverse effects**: neutropenia, dysrhythmias, digitalis toxicity

Phosphodiesterase Inhibitors

- **Prototype drug**: milrinone (Primacor)
- **Mechanism of action**: to block enzyme phosphodiesterase in cardiac and smooth muscle
- **Primary use**: as short-term therapy for heart failure
- **Adverse effects**: hypokalemia, hypotension, ventricular dysrhythmias
ACE Inhibitors

- Reduce afterload
- Drug of choice for heart failure
- Enhance excretion of sodium and water
  - Lowers peripheral resistance and reduces blood volume
- Increases cardiac output

Examples

- Lisinopril (Prinivil, Zestril)
- Captopril (Capoten)
- Enalapril (Vasotec)

Diuretics

- Increase urine flow
- Reduce blood volume and cardiac workload
- Reduce edema and pulmonary congestion
- Prescribed in combination with other drugs

Examples

- Bumetanide (Bumex) and furosemide (Lasix)—loop diuretics
- Chlorothiazide (Diuril) and hydrochlorothiazide (HCTZ)—thiazide diuretics
- Spironolactone (Aldactone)—potassium-sparing diuretic

Beta-Adrenergic Blockers

- Slow heart rate and reduce blood pressure
- Inotropic effect
- Reduce workload of heart

Examples

- Carvedilol (Coreg)
- Metoprolol extended release (Toprol-XL)
Vasodilators

- Minor role in heart-failure treatment
- Lower blood pressure
- Relax blood vessels

Examples

- Hydralazine (Apresoline)
- Isosorbide dinitrate (Isordil)

Cardiac glycosides

- Increase force of heartbeat, slow heart rate
- Improve cardiac output
- Second-line treatment for HF

Examples

- Digitoxin (Crystodigin)
- Digoxin (Lanoxin)

Phosphodiesterase Inhibitors

- Block enzyme phosphodiesterase
- Increase calcium for myocardial contraction
- Cause positive inotropic response and vasodilation
- Increase contractility and decrease afterload
- Short-term therapy only

Drug Therapy for Heart Failure

- Assessment
  - Complete health history, vital signs, urinary output
  - Cardiac output
  - Reason for medication
  - Client’s knowledge
Drug Therapy for Heart Failure (continued)

• Nursing Diagnoses
  – Ineffective tissue perfusion
  – Decreased cardiac output
  – Excess fluid volume
  – Deficient knowledge

• Planning: Client Goals and Expected Outcomes
  – Decreased symptoms
  – Improved organ function
  – Understanding of drug therapy
  – Reporting drug side effects

• Implementation
  – Monitor ECG
  – Observe for side effects
  – Obtain daily weight
  – Monitor serum-drug levels
  – Observe for signs of toxicity
  – Monitor electrolyte levels

• Evaluation of effectiveness of drug therapy
  – Goals met
  – Expected outcomes met

Drugs for Heart Failure

Table 24.1 Drugs for Heart Failure

Table 24.1b Drugs for Heart Failure
## Drugs for Heart Failure

### Table 24.1c Drugs for Heart Failure

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Dose</th>
<th>Dosage Regimen</th>
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<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>100 mg</td>
<td>PO qid</td>
</tr>
<tr>
<td>Metoprolol</td>
<td>50 mg</td>
<td>PO bid</td>
</tr>
<tr>
<td>Isosorbide mononitrate</td>
<td>10 mg</td>
<td>PO tid</td>
</tr>
<tr>
<td>Enalapril</td>
<td>5 mg</td>
<td>PO qd</td>
</tr>
<tr>
<td>Digoxin</td>
<td>0.25 mg</td>
<td>PO qd</td>
</tr>
</tbody>
</table>

*Note: This table is illustrative and not exhaustive.*