



SNS COLLEGE OF ALLIED HEALTH SCIENCES
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DEPARTMENT : PHYSICIAN ASSISTANT

COURSE NAME : PHARMACOLOGY

UNIT : DRUGS ACTING ON HEART

TOPICS : DRUGS FOR CONGESTIVE HEART FAILURE



CONGESTIVE HEART FAILURE



- Congestive heart failure (CHF) is a condition characterized by the heart's inability to pump blood efficiently, leading to inadequate perfusion of tissues.



Angiotensin-Converting Enzyme Inhibitors (ACE Inhibitors)



Mechanism of Action:

- Inhibit the conversion of angiotensin I to angiotensin II.
- Vasodilation, reduced aldosterone secretion, and decreased sodium and water retention.



Pharmacodynamics:

- Decreased afterload.
- Improved cardiac output.
- Reduced aldosterone-mediated sodium and water retention.

Pharmacokinetics:

- Variable depending on specific drug.



Side Effects:

- Dry cough.
- Hyperkalemia.
- Hypotension.



Indications:

- Chronic heart failure.
- Hypertension.

Contraindications:

- History of angioedema.
- Renal artery stenosis.



Angiotensin II Receptor Blockers (ARBs)



Mechanism of Action:

- Block the effects of angiotensin II at the receptor level.



Pharmacodynamics:

- Similar to ACE inhibitors.

Pharmacokinetics:

- Variable half-lives depending on specific drug.



Side Effects:

- Hyperkalemia.
- Hypotension.



Indications:

- Chronic heart failure.
- Hypertension.

Contraindications:

- Pregnancy.
- Severe renal impairment.



Beta-Blockers



Mechanism of Action:

- Block beta-adrenergic receptors, reducing heart rate and contractility.
- Improve myocardial oxygen supply-demand balance.



Pharmacodynamics:

- Negative chronotropic and inotropic effects.
- Improved cardiac output.

Pharmacokinetics:

- Variable depending on specific drug.



Side Effects:

- Bradycardia.
- Fatigue.
- Hypotension.



Indications:

- Chronic heart failure.
- Post-myocardial infarction.

Contraindications:

- Severe bradycardia.
- Heart block.
- Asthma (non-selective beta-blockers).



Diuretics (e.g., Furosemide)



Mechanism of Action:

- Increase renal excretion of sodium and water.
- Reduce fluid volume and preload.



Pharmacodynamics:

- Diuresis.
- Reduction in edema.

Pharmacokinetics:

- Rapid onset and short duration of action.



Side Effects:

- Electrolyte imbalance (especially hypokalemia).
- Dehydration.
- Hypotension.



Indications:

- Symptomatic relief of fluid overload in heart failure.

Contraindications:

- Anuria.
- Severe electrolyte imbalance.



Aldosterone Antagonists (e.g., Spironolactone)



Mechanism of Action:

- Inhibit aldosterone receptors, reducing sodium and water retention.



Pharmacodynamics:

- Diuresis.
- Reduced aldosterone-mediated effects.

Pharmacokinetics:

- Variable depending on specific drug.



Side Effects:

- Hyperkalemia.
- Gynecomastia.



Indications:

- Severe heart failure.

Contraindications:

- Severe renal impairment.
- Hyperkalemia.



Digoxin



Mechanism of Action:

- Inhibits Na^+/K^+ ATPase, leading to increased intracellular calcium.
- Positive inotropic effect on the heart.



Pharmacodynamics:

- Improved myocardial contractility.
- Reduced heart rate.

Pharmacokinetics:

- Narrow therapeutic window.



Side Effects:

- Arrhythmias (especially in toxicity).
- Nausea.
- Visual disturbances.



Indications:

- Chronic heart failure.

Contraindications:

- Ventricular fibrillation.
- Hypersensitivity.



Physician Assistant Role



- Regular assessment of heart failure symptoms.
- Electrolyte levels (especially potassium).
- Blood pressure.
- Renal function.
- Echocardiogram for assessing cardiac function.



ASSESSMENT



- What all are the Side effects for Diuretics ?
- What is the Mechanism of Action of Digoxin ?