Diuresics

**Mechanism**: Diuretics produce an increase in urinary sodium and water excretion, leading to a reduction in blood and plasma volume.

- **Loop diuretics** increase the excretion of sodium and water.
- **Potassium-sparing diuretics** increase potassium excretion.

**Indications**:
- **Acute heart failure**: Loop diuretics are used to reduce congestion and restore lung function.
- **Chronic heart failure**: Loop diuretics are used to maintain hemodynamic stability and improve symptoms.

**Regimens**: Loop diuretics can be used alone or in combination with other diuretics, and the dose should be titrated based on clinical response.

**Side effects**: Hypokalemia, hypernatremia, and metabolic disturbances should be monitored.

**Notes**: Loop diuretics should be used cautiously in patients with CKD or those on diuretic therapy.

Antiangiotensin-converting enzyme (ACE) inhibitors

**Mechanism**: ACE inhibitors block the production of angiotensin II, a potent vasoconstrictor and aldosterone secretagogue.

**Indications**: ACE inhibitors are used to reduce mortality and morbidity in patients with heart failure.

**Regimens**: ACE inhibitors should be started at low doses and titrated based on clinical response and laboratory measurements.

**Side effects**: Hypotension, hyperkalemia, and cough should be monitored and managed.

Angiotensin-receptor blockers (ARBs)

**Mechanism**: ARBs block the AT1 receptor, similar to ACE inhibitors, but with different side effect profiles.

**Indications**: ARBs are used in patients with renal insufficiency who cannot tolerate ACE inhibitors.

**Regimens**: ARBs should be started at low doses and titrated based on clinical response and laboratory measurements.

**Side effects**: Hypotension, hyperkalemia, and cough should be monitored and managed.

Beta-blockers

**Mechanism**: Beta-blockers decrease cardiac output, heart rate, and myocardial oxygen consumption.

**Indications**: Beta-blockers are used to reduce mortality and morbidity in patients with heart failure.

**Regimens**: Beta-blockers should be started at low doses and titrated based on clinical response and laboratory measurements.

**Side effects**: Bradycardia, hypotension, and worsening heart failure should be monitored.

Other medications

**Amiodarone**: May be used in patients with atrial fibrillation or atrial flutter.

**Ivabradine**: Used in patients with chronic heart failure who are not responding to ACE inhibitors.

**Anticoagulants**: Used in patients with atrial fibrillation to prevent stroke.

Coronary revascularisation

**Coronary artery bypass surgery**: May be considered in patients with severe coronary artery disease.

**Percutaneous coronary intervention**: May be used in patients with unstable angina or acute coronary syndrome.

Heart transplantation

**Indications**: Patients with end-stage heart failure who are not eligible for or respond poorly to medical therapy.

**Source**: Davidson & Kumar.
The goals of treatment in a patient with AHF include:
1. Immediate relief of symptoms
2. Reduction in length of hospital stay & hospital readmissions.

A) Patients with haemodynamic compromise, may require:
- Arterial lines (invasive blood pressure monitoring and arterial gases),
- Central venous cannulation (intravenous medication, inotropic support, monitoring of central venous pressure),
- Pulmonary artery cannulation (calculation of cardiac output/index, peripheral vasoconstriction and pulmonary wedge pressure).

B) Initial therapy:
1. Sit the patient up to reduce pulmonary congestion.
2. Give:
   - Oxygen / Non-invasive positive pressure ventilation (continuous positive airways pressure (CPAP) of 5–10 mmHg),
   - Loop diuretic: furosemide (50–100 mg IV),
   - Vaso-dilator "Nitrates": IV glyceryl trinitrate (10–200 μg/min) until:
     - 1- Clinical improvement occurs or
     - 2- systolic BP falls to < 110 mmHg,
   - All patients require prophylactic anticoagulation with low molecular weight heparin, e.g. enoxaparin 1 mg/kg s.c. ×2 daily.

C) In patients who don't respond to the initial therapy:
   - Inotropic support: Dobutamine / Phosphodiesterase inhibitors / levosimendan can be added.
   - If blood pressure is low, use: noradrenaline (norepinephrine).

D) With acute cardiogenic pulmonary oedema & shock:
   - Intra-aortic balloon pump may be beneficial.

E) Monitoring: regular measurements of temperature, heart rate, blood pressure and cardiac monitoring.