



# **SNS COLLEGE OF ALLIED HEALTH SCIENCES**

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai



**DEPARTMENT : OPERATION THEATRE AND ANAESTHESIA  
TECHNOLOGY**

**COURSE NAME : PHARMACOLOGY**

**UNIT : RENAL SYSTEM**

**TOPICS : DIURETICS, FUROSEMIDE, MANNITOL**



# DIURETICS



- Diuretics are drugs that increase the excretion of water and electrolytes from the body through the urine. They are often used to treat conditions such as hypertension, edema, and heart failure.
- There are different classes of diuretics, including thiazide diuretics, loop diuretics, and potassium-sparing diuretics.



# FUROSEMIDE



**Class:** Furosemide is a loop diuretic.

## **Mechanism of Action:**

- Acts on the thick ascending limb of the loop of Henle in the nephron.
- Inhibits the reabsorption of sodium and chloride ions, leading to increased excretion of these ions in the urine.
- Indirectly causes water loss due to the osmotic effect of increased solute concentration in the tubules.



## **Pharmacodynamics:**

- Rapid onset of action.
- Potent diuretic effect.
- Increases urinary excretion of sodium, chloride, potassium, calcium, and water.



## **Pharmacokinetics:**

Route of administration: Usually oral, but can also be given intravenously for rapid effects.

Absorption: Well-absorbed from the gastrointestinal tract.

Distribution: Widely distributed in the body.

Metabolism: Minimal hepatic metabolism.

Excretion: Primarily excreted unchanged in the urine.



## Indications:

- Edema associated with heart failure, hepatic cirrhosis, or renal disease.
- Hypertension not responsive to other diuretics.
- Pulmonary edema.
- Hypercalcemia.



## **Contraindications:**

- Anuria (lack of urine production).
- Hypersensitivity to sulfonamides (since furosemide has a sulfonamide moiety).
- Severe electrolyte imbalance.



## Side Effects:

- Electrolyte imbalances (hypokalemia, hyponatremia, hypomagnesemia).
- Dehydration.
- Ototoxicity (especially with rapid IV administration).
- Hypotension.
- Hyperglycemia.





## **Technician Role:**

- Blood pressure.
- Electrolyte levels (especially potassium).
- Renal function.
- Hearing (especially in patients at risk for ototoxicity).



# MANNITOL



**Class:** Mannitol is an osmotic diuretic.

## **Mechanism of Action:**

- Creates an osmotic gradient in the nephron.
- Freely filtered by the glomerulus but poorly reabsorbed in the renal tubules.
- Prevents water reabsorption, leading to increased urine production.



## **Pharmacodynamics:**

- Osmotic diuretic effect.
- Expands extracellular fluid volume.



## **Pharmacokinetics:**

Route of administration: Typically administered intravenously.

Poorly absorbed in the gastrointestinal tract.

Does not undergo metabolism in the body.

Excreted unchanged in the urine.



## **Indications:**

- Reduction of intracranial pressure (e.g., in cases of cerebral edema).
- Reduction of intraocular pressure (e.g., in acute glaucoma).
- Oliguric renal failure.



## **Contraindications:**

- Anuria.
- Severe dehydration.
- Heart failure.



## Side Effects:

- Fluid and electrolyte imbalance (dehydration, hyponatremia, hypokalemia).
- Exacerbation of heart failure.
- Edema.



## **Technician Role:**

- Fluid balance.
- Electrolyte levels.
- Renal function.





# ASSESSMENT



- What is the Mechanism of Action of Furosemide ?
- What all are the Contraindications of Mannitol ?