



# **SNS COLLEGE OF ALLIED HEALTH SCIENCES**

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**DEPARTMENT : OPERATION THEATRE AND ANAESTHESIA  
TECHNOLOGY**

**COURSE NAME : PHARMACOLOGY**

**UNIT : INOTROPES**

**TOPICS : DOPAMINE, DOBUTAMINE, AMIODARONE**



# INOTROPES



- Inotropes are medications that affect the force and strength of the heart's contractions.
- They are used to manage various cardiac conditions by altering the myocardial contractility.



## TYPES OF INOTROPES



- **Positive Inotropes:** Increase the force of heart muscle contractions.  
Examples: Dobutamine, Dopamine, Digoxin.
- **Negative Inotropes:** Decrease the force of heart muscle contractions.  
Examples: Beta-blockers, certain Calcium Channel Blockers.



## MECHANISM OF ACTION



- Positive inotropes usually act by stimulating receptors in the heart, increasing calcium influx, which enhances contraction strength.
- Negative inotropes often work by blocking receptors or channels, reducing the intracellular calcium, thereby weakening contractions.



# PHARMACODYNAMICS



- Influences ion concentrations (especially calcium) in cardiac cells, affecting contractility.
- Alters the function of receptors or channels in the heart muscle.



# PHARMACOKINETICS



- Varies for each medication; typically administered intravenously or orally.
- Absorption, distribution, metabolism, and elimination differ among inotropes.



# DOPAMINE



**Class:** Sympathomimetic amine.

**Mechanism of Action:**

- Low Dose (Renal Dose): Stimulates dopamine receptors, leading to vasodilation in renal blood vessels, increasing renal perfusion.
- Moderate Dose (Beta-1 Effects): Enhances cardiac contractility and increases heart rate.
- High Dose (Alpha Effects): Causes vasoconstriction, increasing systemic blood pressure.



## **Clinical Uses:**

- Used in various clinical settings, including shock (septic, cardiogenic), heart failure, and certain types of renal failure.

## **Dosage:**

- Dosing is titrated based on the desired effect and the patient's response.
- The infusion rate is adjusted according to the specific clinical scenario.





# DOBUTAMINE



## **Class:**

Synthetic sympathomimetic amine.

## **Mechanism of Action:**

- Selective beta-1 adrenergic agonist, primarily increasing cardiac contractility with minimal chronotropic effects.
- It also produces mild vasodilation.



## **Clinical Uses:**

- Utilized in conditions where increased cardiac output is needed, such as heart failure and certain types of shock.

## **Dosage:**

- Administered as an intravenous infusion.
- Dosage is adjusted based on the patient's hemodynamic response.



# AMIODARONE



## **Class:**

Antiarrhythmic agent.

## **Mechanism of Action:**

- Blocks sodium, potassium, and calcium channels, as well as adrenergic receptors.
- Prolongs the action potential and refractory period.
- Exhibits class I, II, III, and IV antiarrhythmic properties.



## Clinical Uses:

- Used in the management of life-threatening ventricular arrhythmias, atrial fibrillation, and atrial flutter.

## Dosage:

- Typically administered intravenously for acute arrhythmias, followed by oral maintenance therapy.
- Dosing is individualized based on the specific arrhythmia and patient characteristics.



# CLINICAL CONSIDERATIONS



## Dopamine and Dobutamine

### **Indications:**

Used in situations requiring positive inotropic support, such as heart failure or shock.

### **Monitoring:**

Close hemodynamic monitoring is essential to titrate the dosage appropriately.



## **Adverse Effects:**

Potential for tachycardia, arrhythmias, and increased myocardial oxygen consumption.



## **Amiodarone**

### **Indications:**

Reserved for serious ventricular arrhythmias, atrial fibrillation, and atrial flutter.

### **Monitoring:**

Regular monitoring of thyroid function, pulmonary function, and liver enzymes is required.



## **Adverse Effects:**

Potential for pulmonary toxicity, thyroid dysfunction, and hepatotoxicity.





## TECHNICIAN ROLE



- **Vital Signs Monitoring:** Regularly check blood pressure, heart rate, and rhythm to detect any changes or adverse effects.
- **Assessment of Symptoms:** Monitor for signs of worsening heart failure, arrhythmias, or other adverse reactions.
- **Fluid Balance:** Evaluate fluid status and signs of fluid overload or dehydration.



# ASSESSMENT



- What all are the Clinical use of Dobutamine ?
- What is the Mechanism of Action of Dopamine ?