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 : VASODILATORS

TOPICS : NITROGLYCERIN, SODIUM NITROPRUSSIDE

VASODILATORS

- Vasodilators are a class of drugs that function to widen or dilate blood vessels.

- This widening of blood vessels occurs by relaxing the smooth muscles in the walls of arteries and veins, leading to an increase in the diameter of the vessels. As a result, blood flow through the vessels becomes less restricted.

- Vasodilators can act on different types of blood vessels, including arteries and veins, and their effects may be localized or systemic.

- The primary goal of vasodilator therapy is to reduce resistance to blood flow (peripheral vascular resistance) and decrease the workload on the heart.

- This can have several therapeutic applications, including the treatment of hypertension (high blood pressure), angina (chest pain), heart failure, and certain vascular conditions.

NITROGLYCERIN

Class: Nitrate vasodilator.

Mechanism of Action:

Nitroglycerin is a prodrug that is metabolized to release nitric oxide (NO) in smooth muscle cells. Nitric oxide activates guanylate cyclase, leading to increased cyclic guanosine monophosphate (cGMP). This results in vasodilation, primarily in venous vessels. The dilation reduces preload on the heart, decreasing myocardial oxygen demand.

Pharmacodynamics:

Venous dilation, reduced preload, and decreased myocardial oxygen demand. It may also cause some arterial dilation.

Pharmacokinetics:

Nitroglycerin is often administered sublingually, topically, or via intravenous infusion. It undergoes rapid metabolism in the liver.

Indications:

Treatment and prevention of angina pectoris, especially in acute episodes.

Contraindications:

Hypersensitivity, severe anemia, and concurrent use of phosphodiesterase inhibitors (e.g., sildenafil).

Side Effects:

Headache (common), hypotension, and reflex tachycardia.

Technician Role:

Blood pressure monitoring is essential, especially during intravenous administration.

SODIUM NITROPRUSSIDE

Class:

Nitrovasodilator.

Mechanism of Action:

Sodium nitroprusside is a direct donor of nitric oxide (NO). NO activates guanylate cyclase, leading to increased cGMP, resulting in smooth muscle relaxation and vasodilation. It acts on both arterial and venous vessels.

Pharmacodynamics:

Balanced arterial and venous dilation, reducing both preload and afterload. This leads to decreased myocardial oxygen demand and increased coronary perfusion.

Pharmacokinetics:

Administered intravenously due to its short half-life. Metabolized to release cyanide and thiocyanate, which are detoxified and excreted by the liver and kidneys.

Indications:

Acute hypertensive emergencies, congestive heart failure, and induction of controlled hypotension in surgery.

Contraindications:

Hypersensitivity, inadequate cerebral perfusion, and patients with coexisting vitamin B12 deficiency.

Side Effects:

Excessive hypotension, reflex tachycardia, and, rarely, cyanide toxicity.

Technician Role:

Blood pressure, heart rate, and continuous monitoring for signs of excessive hypotension. Monitoring cyanide levels and considering the administration of sodium thiosulfate to counteract cyanide toxicity in prolonged use.

ASSESSMENT

- What is the Pharmacodynamics of Nitroglycerin ?
- What all are the Side effects of Sodium Nitroprusside ?