

DRUGS USED IN THERAPY OF SHOCK

Defination

- Shock is a rapidly deteriorating syndrome caused by an inadequate capillary perfusion of vital tissue. If the condition is not treated properly it leads to death.
- In shock the cardiac output and blood pressure are generally but not necessarily low.

Types of shock

- Hypovolemic shock
- Cardiogenic shock
- Distributive shock
 - o Septic shock
 - o Neurogenic shock
 - o Anaphylactic shock

Mechanism of action of shock

1.Hypovolemic shock

It occurs due to sudden reduction in the circulating blood volume. The excessive sympathoadrenal discharge causes a redistribution of cardiac output with reduction in the blood flow to the skin, intestine, kidneys.

2.Cardiogenic shock

This is due to failure of the heart as a pump as in acute myocardial infarction. Rarely in some cases there is complete failure of the compensatory sympathoadrenal discharge.

3.Obstructive shock

Extracardiac obstructive disease impairs cardiac filling.

4.Distributive shock

In shock due to sepsis and burns the peripheral resistance is initially low. In the later stages the cardiac output falls and the peripheral resistance rises markedly.

5.Septic shock

It is initiated by the toxins released by the microorganism exotoxins and endotoxin. May patient with septic shock have partial adrenocortical insufficiency.

Treatment of shock

1. Treatment of Septic Shock

- Fluid replacement.
- Supplemental oxygen.
- Antibiotics: Survival correlates with how quickly the correct drug given cover gram positive and gram negative bacteria:
 - o Ceftriaxone 1 gram IV BD or
 - o Imipenem 1 gram IV TDS.

2. Treatment of Cardiogenic Shock

- Aspirin, beta blocker, morphine, heparin
- If no pulmonary edema, IV fluid
- If pulmonary edema
- Dopamine – will ↑ HR and thus cardiac work
- Dobutamine – May drop blood pressure
- Combination therapy may be more effective

3. Treatment of Anaphylactic shock

Epinephrine is 1st line drug:

- Standard Dose: Inj. 0.5 ml (1:1000) IM.
- Repeat every 5-10 min if not improve.
- Inj. 0.5 ml (1: 10000),(1:100000) IV.

4. Treatment of neurogenic shock

- Airway support.
- Fluid replacement.
- Dopamine (>10 mcg/kg/min).
- Ephedrine (12.5 - 25 mg IV every 3-4 hr).
- Atropine for bradycardia. (0.5 mg IV every 3 to 5 mins – 3 mg).
- Treatment of the underlying cause.

5. Treatment of Hypovolemic shock

- (a) Increase Cardiac Output
 - (b) Increase Tissue Perfusion
- The plan of action should be based on:
- (a) Primary problem
 - (b) Adequate fluid replacement
 - (c) Improving myocardial contractility

Drugs used in treatment of shock

1. Norepinephrine

- Most widely used vasopressor.
- Potent α_1 agonist causing vasoconstriction in tissue beds.
- Resultant increase in SVR causes rise in blood pressure.
- Standard dose: 4 mg in 50 ml (0.08 mg/ml).

2. Epinephrine

- Nature's vasopressor.
- Most commonly used during resuscitation cardiac arrest and anaphylaxis.
- α_1 : Increases SVR.
- β_1 : Increases HR and myocardial contractility.
- β_2 : Bronchial smooth muscle relaxation.
- Standard dose: 10 mg in 50 ml (0.2mg/ml).

3. Dopamine

- Vasopressor agent.
- Use in cardiogenic and septic shock.
- Receptor stimulation depend on dose given.
- It is indicated for reversing hypotension following MI, trauma, sepsis, kidney failure, chronic CHF

4. Dobutamine

- A synthetic catecholamine.
- An inodilator.
- β_1 stimulation: Increase HR and increase cardiac contractility.
- β_2 mediated vasodilatation.
- Reduction in MAP is common with dobutamine.
- NE usually needed to offset vasodilatation.

5. Vassopressin

- Peptide hormone released from posterior pituitary.
- Causes increase permeability of DCT and CT, increases water retention. (V_2 receptor).
- V_1 receptor present in the smooth muscle of a arteriolar wall and stimulation causes smooth muscle contraction and vasoconstriction.

6. Adrenaline

- Administration of this drug increases the cardiac output,
- decreases the renal blood flow, and increases the Total Peripheral Resistance (TPR). Adrenaline is employed in the management of
- anaphylactic shock.

7. Isoprenaline

- It exerts its action by a β -adrenergic activity. It acts on heart and the periphery.
- It does not cause vasoconstriction in the kidneys (unlike adrenaline).
- It is helpful in patients with shock who have a high peripheral vascular resistance

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8. Metaraminol

- Its haemodynamic actions are similar to those of nor - adrenaline.
- its duration of action is longer than that of nor - adrenaline.