

# Shock

## Definitions of shock

1- It is a state characterized by systemic hypotension , it can occur due to diminished cardiac out put or due to reduce effective circulating blood volume. It results in impaired perfusion of tissue and cellular hypoxia

2-Acute medical condition associated with a fall in blood pressure, caused by such events as loss of blood, severe burns, allergic reaction, or sudden emotional stress, and marked by cold, pallid skin, irregular breathing, rapid pulse, and dilated pupils.

## Types of shock

- 1- Cardiogenic shock
- 2- Hypovolemic shock
- 3- Shock associated with systemic inflammation

## Less common

- 1- Neurogenic shock
- 2- Anaphylactic shock

# **Cardiogenic – low cardiac out put**

## **Intrinsic causes**

1-Myocardial infarction

2-Cardiac arrhythmias

3-Cardiac myopathy

4-Rupture of the heart

## **b-Extrinsic compression**

1-Cardiac tamponed from haemopericardium

2-Obstruction to the outflow

3- pulmonary embolism

## **c-Obstruction to the outflow**

1- pulmonary embolism

2- Ball valve thrombus

3-Tension pneumothorax

# **Hypovolemic - loss of blood or plasma volume**

## **Causes :**

1- Acute hemorrhage 2- Dehydration 3-Burns 4-Acute pancreatitis

5- Excessive use of diuretics

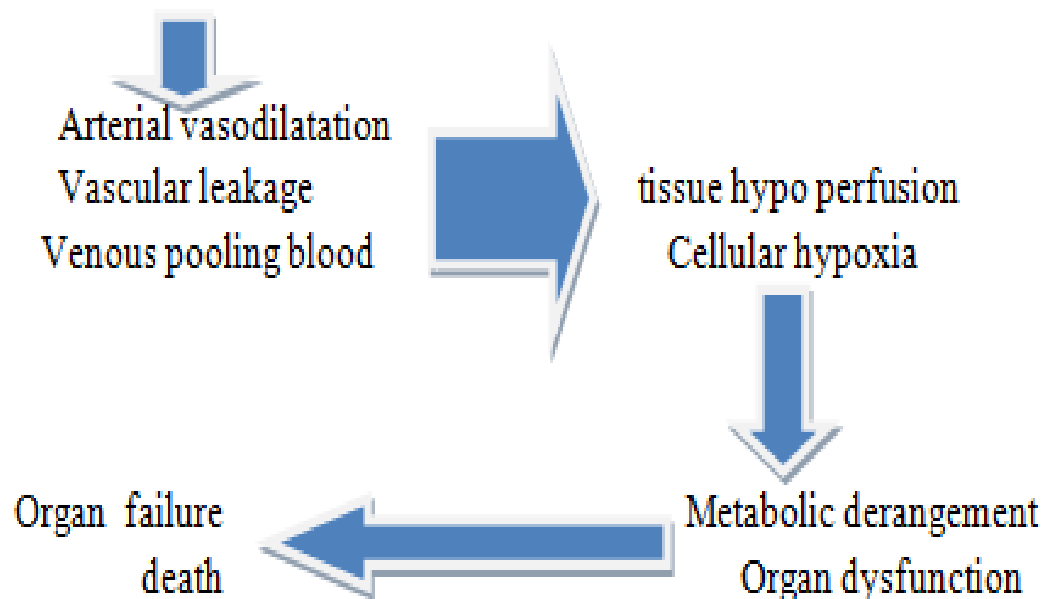
## **Hypovolemia**

Is a direct loss of effective circulating blood volume leading to:

- 1-A rapid, weak, thread pulse due to decreased blood flow combined with tachycardia
- 2-Cool, clammy skin due to vasoconstriction and stimulation of vasoconstriction
- 3-Rapid and shallow breathing due to sympathetic nervous system stimulation and acidosis
- 4-Hypothermia due to decreased perfusion and evaporation of sweat
- 5-Thirst and dry mouth, due to fluid depletion
- 6-Cold and mottled skin especially extremities, due to insufficient perfusion of the skin

## **Shock associated with systemic inflammation**

Release of inflammatory mediators



# Septic shock

Caused by microbes also called endotoxic shock

Metabolic alteration in septic shock

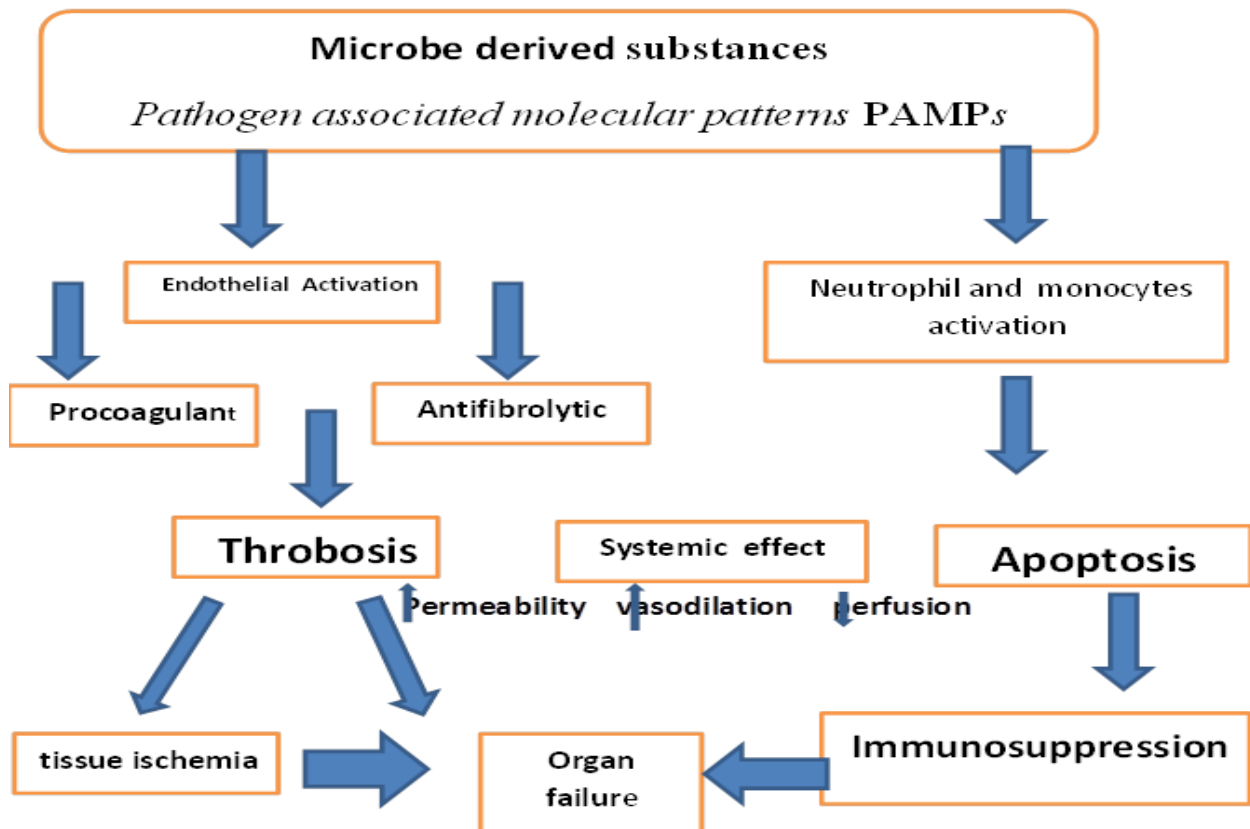
Insulin resistance

Hyperglycemia

Gluconeogenesis

Lactic acidosis

## Pathogenesis of microbial shock



# Stages of shock

Initial stage Tissues are low perfused, decreased cardiac output CO , Hypoxia lead to increased anaerobic metabolism, lactic acid formation.

Compensatory: Reversible. SNS activated by low CO, attempting to compensate for the decrease tissue perfusion( Activation mechanism of (ADH, Renin angiotensin aldosterone system , conservation of fluids)

Progressive - Failing compensatory mechanisms: profound vasoconstriction from the SNS lead to ISCHEMIA Lactic acid production is high lead to metabolic acidosis.

Irreversible - Cellular necrosis and Multiple Organ Dysfunction Syndrome may occur and death

## Systemic Shock outcome

- 1- Systemic lactic acidosis
- 2- Decreased myocardial contractility
- 3- Decreased vascular tone
- 4- Decrease blood pressure, preload, and cardiac output