The ABCs of

Shock

UNDERSTANDING THE FACTS BEHIND

1. Definition

Inadequate tissue and organ perfusion to meet metabolic demands leading to eventual global cellular hypoxia

2. Recognition of shock

- Inadequate tissue perfusion

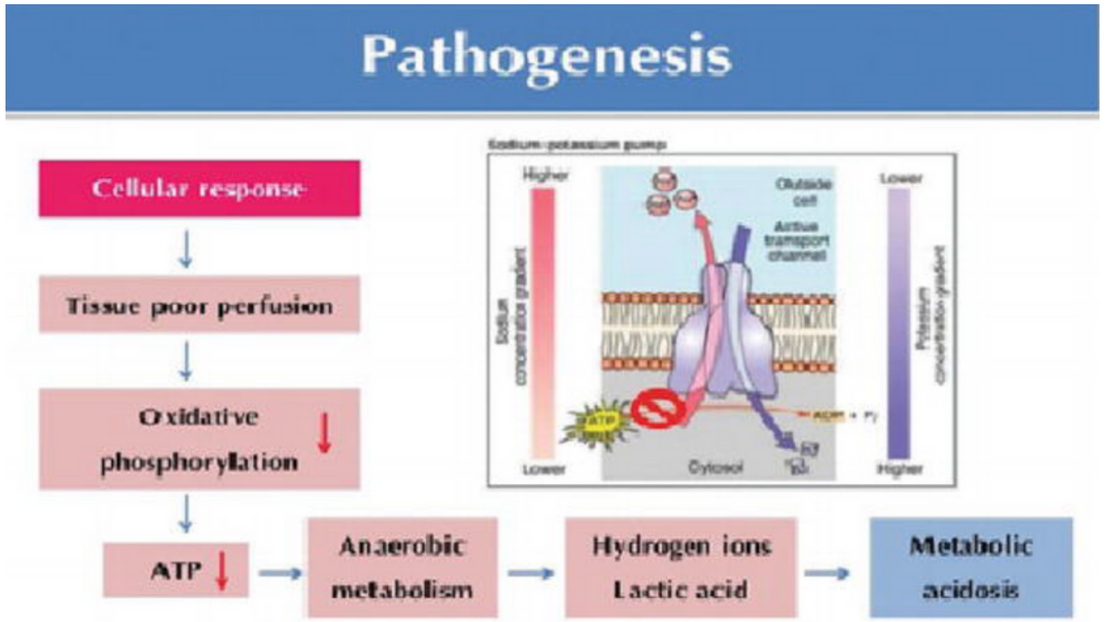
- Skin: cold, pale, decreased capillary refill
- Renal: decreased urine output
- CNS: anxiety, confusion lethargy

- Increased sympathetic tone

- Narrowed pulse pressure
- Tachycardia

3. Pathophysiology of shock

- At cellular level, there is cellular hypoxia → tissues enter anaerobic state & accumulate lactic acid → **metabolic acidosis**



Pathogenesis image from : intechopen.com

4. Stages of shock

- Pre-shock: compensated phase where patient usually has normal blood pressure.
- Shock: the compensatory mechanism of the body is overwhelmed (almost 20–25% of blood volume is lost)
- End organ failure: irreversible organ damage and death

5. Types of shock

Shock classification	Causes	Signs & symptoms	Investigations
Hypovolemic (Loss of circulating blood volume)	Acute hemorrhage (20%) Dehydration from burns Others: Acute pancreatitis, Ruptured AAA, Ruptured ectopic pregnancy	Pallor Cold Clammy Skin ↑ HR ↑ peri vascular resistance ↓ JVP	FBC U/E/Cr Cardiac Enzymes PT/PTT GXM ABG UPT
Cardiogenic (Intrinsic cardiac failure)	Blunt Cardiac Injury AMI Others: Valvular Stenosis, Regurgitation or Rupture, Ischemia, Arrhythmias, Cardiomyopathy, AVSD	Pallor Cold clammy skin ↑ HR ↑ peri vascular resistance ↑ JVP Pulmonary Edema	Cardiac enzymes ECG
Obstructive (impaired venous return)	Tension Pneumothorax Cardiac Tamponade Pulmonary Embolism	↑ JVP	D-dimer
Neurogenic (distributive) [Loss of symp. tone]	Spinal injury Cerebral injury/ haemorrhage	Warm peripheries N/ heart rate Neuro deficit ↓ JVP	-based on history of traum MRI
Septic (distributive)	Infections – sepsis (SIRS)	Fever, Rigor Warm peripheries ↑ HR ↓ peri vascular resistance (hyper-dynamic state) ↑ CO ↓ JVP	FBC Blood culture/ serology CRP
Anaphylactic (distributive)	Bites / Stings Allergens – Drugs / Food	Fever, rigors Warm peripheries a/w angioedema, bronchospasm	Blood test Allergy test

6. Management

General management	1. AIRWAY a. Maintain airway – 100% oxygen with non-rebreather mask b. Intubation if necessary 2. BREATHING a. 100% O2 via non-rebreather mask 3. CIRCULATION a. IV catheter (start fluid resuscitation) b. Inotropic support (eg. IV dopamine, dobutamine, norepinephrine) 4. MONITORING a. Vitals b. ECG c. Urine output
Hypovolemic shock:	1. Fluid rx a. Crystalloid fast infusion b. Colloids or whole blood infusion if major blood loss 2. Treat underlying causes after patient stabilizes
Cardiogenic shock	1. Correct arrhythmias, U&E abnormalities, acid-base disturbances 2. Treat underlying causes a. Thrombolysis for MI/ PE b. Surgery for VSD, valve incompetence
Obstructive shock	1. Treatment based on underlying cause a. Cardiac tamponade: pericardiocentesis b. PE: thrombolysis c. Tension pneumothorax: needle decompression followed by chest tube insertion
Neurogenic shock	1. Fluid rx 2. Vasopressors
Septic shock	1. Fluid rx 2. Vasopressors 3. Treat underlying cause a. Broad-spectrum empirical antibiotic therapy
Anaphylactic shock	1. Fluid rx 2. Epinephrine/ antihistamines/ glucocorticoids

SIGMUM