NC VII: Emergency and Critical Care

Types of Shock and Management

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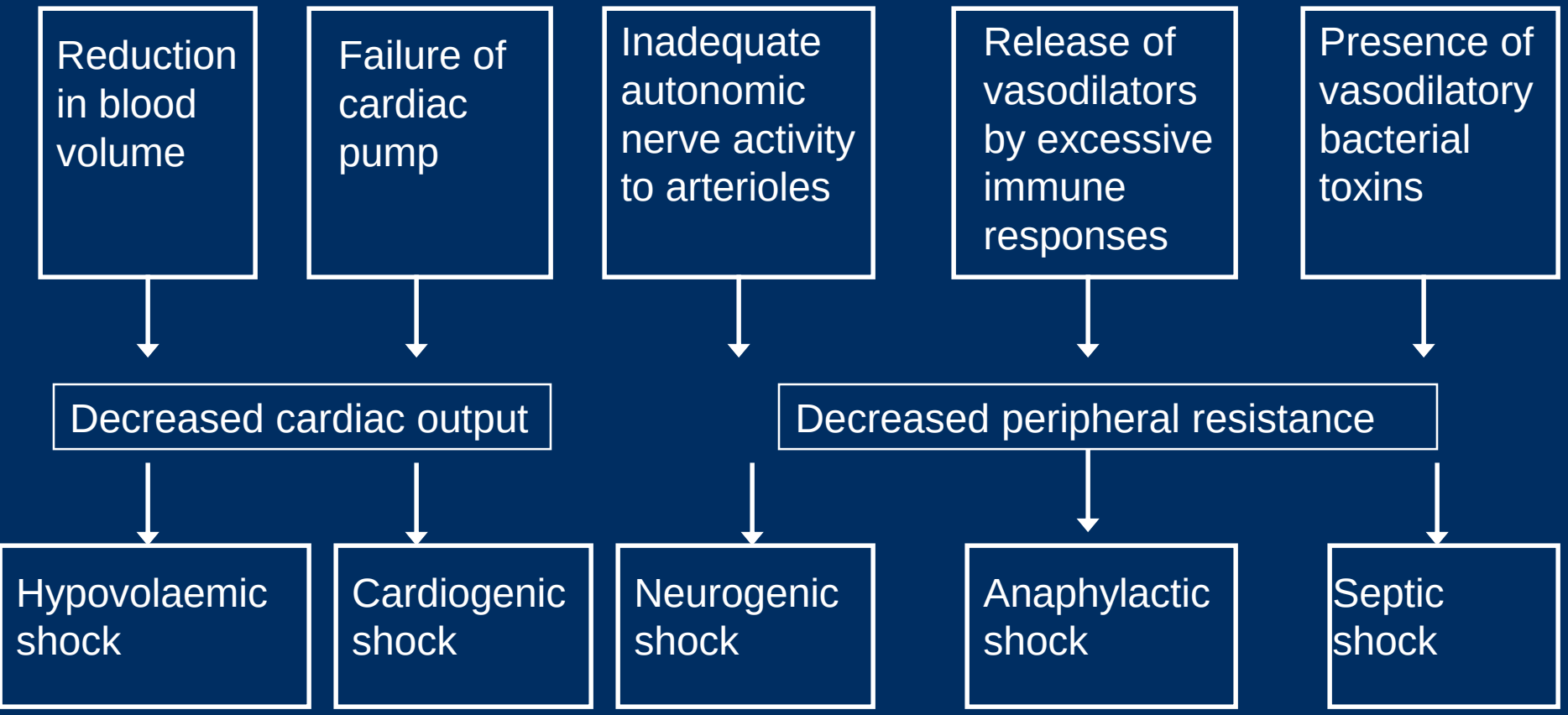
Shock Classifications



Hypovolaemic Shock

Characterized by decreased circulating blood volume which is inadequate to maintain tissue perfusion (O_2 delivery) and nutrients to cells

Causes

External fluid loss (>15%)

- haemmorrhage
- excessive fluid loss
  - GIT - vomiting, diarrhoea
  - burns, exudative lesions
  - insensible loss, excessive sweating,
  - urinary losses, diabetes insipidus/mellitus

Causes

Internal Fluid Loss

(relative hypovolaemia)

- haemmorrhage - haemothorax, AAA
- ascites, peritonitis
- intestinal obstruction
- fractures, trauma

Clinical Presentation

- tachycardia (only 60% of pts)
- decreased pulse pressure
- tachypnoea
- decreased urine output
- altered mental state
- cool, clammy skin

Cardiogenic Shock

Reduced cardiac contractility leads to impaired pumping of the ventricles (primarily left)

Causes

- AMI
- cardiac contusion
- cardiomyopathy, congestive cardiac failure
- cardiotoxic drugs/depressants
- myocarditis
- ruptured ventricular septum
- acute valvular insufficiency
- obstructive causes – tension pneumothorax

Clinical Presentation

- hypotension
- altered mental status
- oliguria
- elevated JVP
- peripheral or pulmonary oedema
- may have arrthymias

Septic Shock

Shock from infection may be caused by any infective agent

- viruses
- bacteria
- fungi
- rickettsiae, parasites

Mortality remains high ~80%

Clinical Presentation

Similar irrespective of infective organism

- severe hypotension <90 mmHg despite adequate fluid resuscitation
- tachypnoea >20
- PO_2 <75 mmHg
- tachycardia
- temperature >38 or < 36^{o}C
- WCC > 12,000

Neurogenic Shock

Massive vasodilation due to loss of vasomotor tone.

May be caused by

- spinal cord injury
- high levels of spinal anesthesia
- ganglionic/adrenergic blocking agents

Clinical Manifestations

- hypotension
- flaccidity/areflexia distal to spinal cord lesion
- bradycardia or normal HR
- dry skin below spinal cord lesion
- no change in colour below spinal cord lesion

Anaphylactic Shock

- Characterized by massive vasodilatation and increased capillary permeability

- A severe form of hypersensitivity resulting from sudden release of chemical mediators derived from mast cells and /or basophils - IgE or IgG_4

Causes

May be caused by

- severe allergic reaction
  e.g drug reactions, bites, stings,
  latex, foods, chemicals

Clinical Manifestations

- Cutaneous
  - tingling, erythema, urticaria, pruritis,
  - angio-oedema
- Respiratory
  - tight throat, hoarsness, cough
  - stridor, wheeze
- GIT
  - cramps, nausea
  - vomitng, diarrhoea

Clinical Manifestations

Cardiovascular

- dizziness, syncope
- tachycardia, hypotension,
- arrthymias, myocardial ischaemia
- confusion, coma

- Miscellaneous
  - conjunctivitis, rhinitis, lacrimation
  - headache, generalised oedema, vaginal discharge, DIC

Principles of Shock Management

- Airway
- Breathing
- Circulation
- Disability
- Identify & treat underlying cause

Circulation

- patient positioning
- IV access X 2
- bloods for pathology
- 12 lead ECG
- ABG’s - guides resuscitation
- Lactate levels
- vital signs, GCS, temperature, $SatO_{2,}$

Circulation

- assess & control external bleeding
  - direct pressure
  - splinting of fractures
- assess & control internal bleeding
  - surgery

Stroke Volume

- ↑Preload - fluid loading and/or resuscitation
  - increases cardiac output (CO) by increasing venous return & preload
  - stroke volume is augmented by fluids
  - Frank-Starling curve is useful in describing effects of fluid loading on CO

Fluid Challenge

- Patient assessment
- To guide fluid therapy use
  - BP, MAP (70-105)
  - CVP (2-6 mmHg)
- 250/500/1000 mls
  - fluid given over 5-10 minutes
  - reassess patient's response
  - wait 15 mins/ continue further challenge
  - reassess patient's response

Fluid Loading

- blood expands intravascular volume more than same volumes of crystalloids
- Hb & haematocrit are decreased after fluid loading with crystalloids

Vasoactive Drugs

- fluid loading should always be the first step
- vasoactive drugs if fluid loading not effective
- goal of therapy is to optimise O_2 transport
- Medications
  - Dopamine
  - Dobutamine
  - Noradrenaline/adrenaline
  - GTN

Minimise Oxygen Consumption

- Work of breathing/shivering
  - ventilation
  - paralysis
  - environmental control
- Anaphylaxis
  - adrenaline
  - hydrocortisone, ventolin
  - airway management
  - fluids

Minimise Oxygen Consumption

- Neural stress response
  - analgesia
  - sedation
- Treatment of sepsis
  - operative treatment
  - antibiotics
  - nutrition

Questions