Shock and Multiple Organ Dysfunction

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Shock

- Life-threatening condition in which tissue perfusion is inadequate to deliver oxygen and nutrients to support cellular function
- Affects all body systems
- May develop rapidly or slowly
- Any patient with any disease state may be at risk for developing shock
- Regardless of the initial cause of shock, certain physiologic responses are common to all types of shock: hypoperfusion of tissues, hypermetabolism, and activation of the inflammatory response

Classifications of Shock

- Hypovolemic
- Cardiogenic
- Septic
- Neurogenic
- Anaphylactic
- Obstructive
- Distributive (neurogenic, anaphylactic, septic)

Cellular Effects of Shock

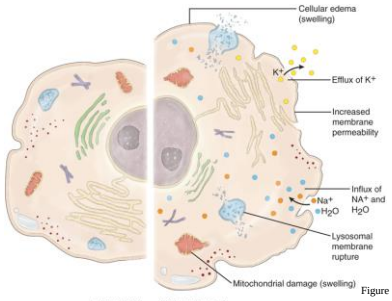
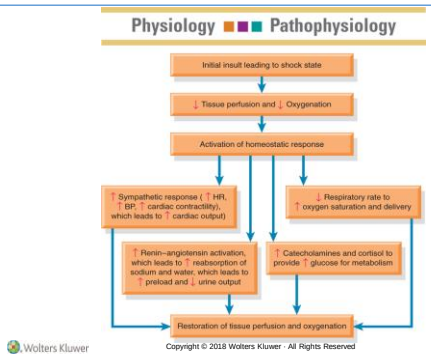


Figure 14-1

Compensatory Mechanisms in Shock



Stages of Shock

- Compensatory
- Progressive
- Irreversible

Compensatory Stage of Shock

- SNS causes vasoconstriction, increased HR, increased heart contractility
  - This maintains BP, CO
- Body shunts blood from skin, kidneys, GI tract, resulting in cool, clammy skin, hypoactive bowel sounds, decreased urine output
- Perfusion of tissues is inadequate
- Acidosis occurs from anaerobic metabolism
- Respiratory rate increases due to acidosis, may cause compensatory respiratory alkalosis
- Confusion may occur

Progressive Stage

- Can no longer compensate
- Hypoperfusion
- Vasoconstriction continues
- Deterioration of mental status
- Pulmonary changes
- Dysrhythmias, ischemia
- Acute renal failure
- Liver, GI, hematological changes
- Risk for DIC

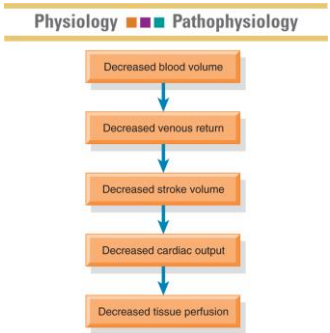
Irreversible Stage of Shock

- At this point, organ damage is so severe that the patient does not respond to treatment and cannot survive
- BP remains low
- Renal, liver function fail
- Anaerobic metabolism worsens acidosis
- Multiple organ dysfunction progresses to complete organ failure
- Judgment that shock is irreversible only made in retrospect

Treatment of Shock

- Identify the etiology, timely treatment
- Fluid replacement
  - Crystalloid, colloid solutions
  - Complications of fluid administration
- Vasoactive medications
- Nutritional support

Pathophysiology of Hypovolemic Shock



Hypovolemic Shock

- Medical management
  - Treatment of underlying cause
  - Fluid, blood replacement
  - Redistribution of fluid
  - Pharmacologic therapy
- Nursing management
  - Administering blood, fluids safely
  - Implementing other measures

Modified Trendelenburg

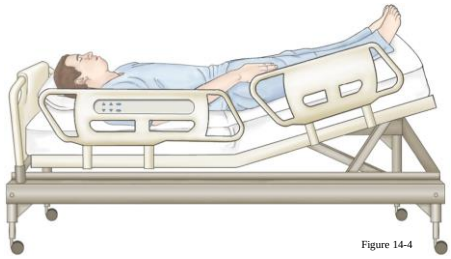
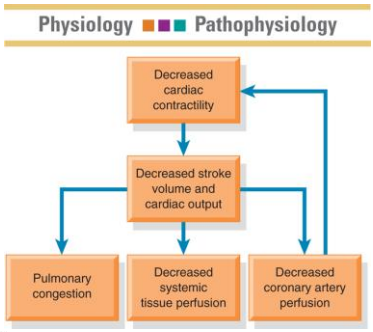


Figure 14-4

Pathophysiology of Cardiogenic Shock



Cardiogenic Shock

- Medical management
  - Correction of underlying causes
  - Initiation of first-line treatment
    - Oxygenation
    - Pain control
    - Hemodynamic monitoring
    - Laboratory marker monitoring
    - Fluid therapy
    - Mechanical assistive devices

Cardiogenic Shock: Pharmacologic Therapy

- Dobutamine
- Nitroglycerin
- Dopamine
- Other vasoactive medications
- Antiarrhythmic medications

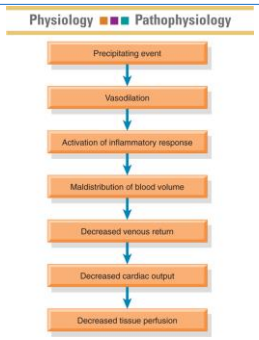
Cardiogenic Shock: Nursing Management

- Preventing cardiogenic shock
- Monitoring hemodynamic status
- Administering medications, IV fluids
- Maintaining intra-aortic balloon counter pulsation
- Ensuring safety, comfort

Circulatory Shock

- Septic shock
- Neurogenic shock
- Anaphylactic shock

Pathophysiology of Circulatory Shock



Management of All Types of Shock

- Fluid replacement to restore intravascular volume
- Vasoactive medications to restore vasomotor tone, improve cardiac function
- Nutritional support to address metabolic requirements

Fluid Replacement

- Crystalloids: 0.9% normal saline, lactated Ringer's solution, hypertonic solutions (3% hypertonic saline)
- Colloids: albumin, dextran (dextran may interfere with platelet aggregation)
- Blood components for hypovolemic shock
- Complications of fluid replacement include fluid overload, pulmonary edema

Vasoactive Medications

- Used when fluid therapy alone does not maintain MAP
- Support hemodynamic status; stimulate SNS
- Check vital signs frequently; continuous monitoring of vital signs every 15 minutes or more often
- Give through central line if possible
  - Extravasation may cause extensive tissue damage
- Dosages usually titrated to patient response

Nutritional Therapy

- Nutritional support needed to meet increased metabolic and energy requirements to prevent further catabolism due to depletion of glycogen
- Support with parenteral or enteral nutrition
- GI system should be used to support its integrity
- Administration of glutamine
- Administration of H_2 blockers or proton pump inhibitors

Multiple Organ Dysfunction Syndrome

- Presence of altered function of two or more organs in an acutely ill patient such that interventions are necessary to support continued organ function
- Primary or secondary
- High mortality rate; 75%
- Treatment
  - Controlling initiating event
  - Promoting adequate organ perfusion
  - Providing nutritional support
- Promoting communication