Shock States and Multi System Failure
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SHOCK STATES (SHOCK AND MULTISYSTEM FAILURE)
Terms related to shock states
- Shock: physiologic state in which there is inadequate blood flow to tissues and cells of the body
- Anaphylactic shock: shock state resulting from severe allergic reaction producing an overwhelming systemic vasodilation and relative hypovolemia
- Cardiogenic shock: heart has impaired pumping ability- coronary or non coronary origins

TERMS RELATED TO SHOCK STATES
- Distributive shock OR Vasogenic shock– maldistribution or mismatch of blood flow to the cells. Includes neurogenic, anaphylactic and septic shock
- Septic shock: distributive shock state resulting from overwhelming infection resulting in relative hypovolemia
  - Systemic inflammatory response syndrome (SIRS): overwhelming inflammatory response in the absence of infection causing relative hypovolemia and decreases tissue perfusion
  - Obstructive Shock- cardiac function decreased by non cardiac factors, pulmonary hypertension, thoracic tumor

TERMS RELATED TO SHOCK STATES
- Multiple Organ Dysfunction Syndrome- failure of more than one organ in an acutely ill patient such that homeostasis cannot be maintained without interventions
  - Primary MODS- occurs early from well defined illness or injury
  - Secondary MODS- results from uncontrolled systemic inflammation with resultant organ dysfunction. Develops latently after several insults. (MODS)

THREE GENERAL CATEGORIES OF SHOCK
- Hypovolemic shock- decrease in the intravascular volume
- Cardiogenic – heart has impaired pumping ability- coronary or non coronary origins
- Distributive or vasogenic – maldistribution or mismatch of blood flow to the cells. Includes neurogenic, anaphylactic and septic shock
- Adrenal insufficiency as a cause of shock should be considered in any patient with hypotension who lacks signs of infection, cardiovascular disease, or hypovolemia.

CATEGORIES and CAUSES OF SHOCK
- Hypovolemic
  - Absolute Hypovolemia -
  - Loss of whole blood-hemorrhage
  - Loss of plasma- burns
  - Loss of other body fluids- dehydration- diarrhea etc
  - Relative Hypovolemia
  - Pooling of blood- ascites
  - Internal bleeding- fx of long bone, hemothorax
  - Massive vasodilatation- same conditions that can cause distributive shock
- Cardiogenic
  - Direct Pump Failure (MI)

CATEGORIES OF SHOCK
DISTRIBUTIVE
- Neurogenic- alteration in vascular sympathetic tone
- Injury and disease to the spinal cord
- Spinal anesthesia
- Vasomotor center depression-severe pain, drugs, hypoglycemia

8️⃣ CATEGORIES OF SHOCK
- DISTRIBUTIVE
  - Septic Shock- caused by infection-produced toxins- gram negative bacteria, staph, strep, fungal and protozoan infections
  - Infection- urinary tract, respiratory, invasive procedures especially urologic and indwelling lines and catheters
  - At risk patients: At risk patients: older pts, chronic diseases, immunosuppressed, malnourished and debilitated. Typical signs of infection may be absent in elderly with significant infection- decreased cerebral perfusion may be the first sign of compensatory response to septic shock state

9️⃣

10️⃣ CATEGORIES OF SHOCK
- DISTRIBUTIVE
  - Sepsis is defined as the systemic host response to infection with SIRS plus a documented infection
  - SIRS- Systemic inflammatory response syndrome (from a variety of insults- Manifested by two or more of the following
    - Temperature > 100.40 °F (38.0 °C) or < 96.80 °F (36.0 °C)
    - Heart rate > 90 Beats/Min
    - Respiratory rate >20 breaths/min or PaCO2 <32 mm Hg
    - White cell count > 12000cells/ul or < 4000 cells/ul or >10% immature (band)neutrophils

11️⃣ CATEGORIES OF SHOCK
- DISTRIBUTIVE
  - Anaphylactic Shock –immunologic reactions
    - Contrast media
    - Drugs especially antimicrobials
    - Insect bites- stings
    - Anesthetic agents
    - Food and food additives
    - Vaccines
    - Environmental agents –pet dander, mold, pollens

12️⃣ COMPENSATORY MECHANISMS IN SHOCK
- Loss of blood volume
- ↓ CO= ↓ MAP
  - Compensatory Mechanisms
    - ↑ SV x ↑ HR= ↑ CO
    - Peripheral vasoconstriction = ↑ SVR
  - Continued loss of blood volume
  - ↓ CO= ↓ MAP
  - ↓ tissue perfusion and oxygenation
  - cellular anaerobic metabolism
  - cellular hypoxia and death
  - IRREVERSIBLE SHOCK
  - Multisystem organ failure
  - Death
MANAGEMENT

General Collaborative Care Goals
- Identify the patient at high risk for shock
- Diagnose shock swiftly and accurately
- Eliminate or treat the primary cause
- Initiate therapy to correct pathologic changes, modify the systemic response and enhance tissue perfusion
- Protect target organs from dysfunction
- Provide supportive care

MANAGEMENT
- Fluid replacement- IV fluids- NS, LR, Albumin, plasma protein fraction, Hetastarch (Hespan), Dextran, blood- WB or PC
- Maintain airway and oxygenation
- Positioning- head at level of the chest and the knees straight- legs elevated at 45° r/o spinal injury first.

Shock Position

MANAGEMENT
- Drug Therapy
  - a. Sympathomimetic and vaspressor drugs(Vasoconstrictors)- Dopamine, epinephrine (Adrenalin), norepinephrine (Levophed), Neo-Synephrine, (Phenylephrine)
  - Enhance Contractility- Amrinone (Incor), Atropine Sulfate, Dobutamine (Dobutrex)
  - Increase cardiac perfusion- Sodium Nitroprusside (Nitropress, Nipride)-given in low doses to dilate the coronary vessels with minimal peripheral dilatation

SEPTIC SHOCK

Septic Shock is a leading cause of death in hospitals
- ARDS has been observed in about 18% of cases; DIC, in about 38%; and renal failure, in about 50%.

2 Phases
- Early- can last for hours or days- good recovery if treated at this stage
- Late – sudden onset and rapid decline

SEPTIC SHOCK
- Septic shock causes venous dilatation and relative hypovolemia- distributive shock
- First line of treatment is Fluid Resuscitation
- Hemodynamic monitoring- CVP- arterial pressures increased risk of multisystem failure
- Tissue perfusion- if inadequate- inotropic and vasopressor drugs- Dopamine or norepinephrine
- Identify the source of infection if possible- C&S
- Broad spectrum antibiotics are often used until specific organism is identified
- New Treatment Xigris- activated C protein- for severe sepsis and high risk of death

NEUROGENIC
- LOSS OF SYMPATHETIC TONE-
- BP- hypotension
Pulse- slow and bounding  
Respiration's- vary  
Skin- vary  
Mental Status- anxious, restless, lethargic progressing to comatose  
Urine Output- oliguria to anuria  
Other-lowered body temperature

20  NEUROGENIC SHOCK

- Fluid replacement and maintenance of BP  
- Sympathomimetic and vasopressor drugs- Dobutamine, Dopamine, epi, norepi, Neo-Synephrine

21  Multi-System Organ Failure (MSOF)

- Failure of one or more body systems after a major insult to the body such as infection, trauma or severe illness

22  Etiology (MSOF) and Pathology

- Etiology- Inflammatory response, infection, persistent hypotension, hypoxia  
- Pathophysiology- As the body responds to the uncontrolled inflammatory response damage to organs occurs, hypoxia, necrosis  
- Pulmonary, renal, cardiovascular and coagulation systems are effected  
- IRREVERSIBLE SHOCK  
- Multisystem organ failure  
- Death

23  Nursing Diagnoses

- Impaired gas exchange  
- Impaired tissue perfusion  
- Deficient or excess fluid volume  
- Decreased cardiac output  
- Anxiety