NURS3101
Final exam Revision Notes

Contents

Tutorial 1 – Shock and blood transfusion

Learning objectives:

- Explain shock, stages and types of shock
- Recognise the most common type of shock
- Understand primary and secondary survey in emergency care
- Identify the different mechanisms of injury and potential patient injuries
- Outline and prioritise the management of a patient in hypovolaemic shock
- Understand permissive hypotension, triad of death, and acute traumatic coagulopathy
- Explain best practice for blood transfusion and massive transfusion
- Revise the pathophysiology of shock, including classification and stages of shock
- Understand trauma call and the role of the trauma team
- Practice how to conduct patient history
- Practice how to conduct Primary (A-E assessment) & Secondary assessment
- Prioritise the care and interventions for a patient experiencing shock
- Discuss the rationale and outcome of the interventions
- Use the massive transfusion protocol

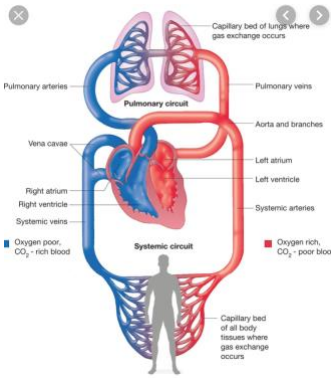
Reading – 'Nursing care of people experiencing trauma or shock'

- Trauma → Injury to human tissues and organs resulting from the transfer of energy from the environment
- Traumatic injury is the leading cause of death in people under 45y/o, a leading cause of morbidity, mortality and permanent disability
- Components of trauma
  - Mechanism → The environmental factor that caused the trauma
  - Intention → whether intentional or unintentional injury
  - Environment → things in the environment that may have contributed to the injury, risk of injury, etc
- Types of trauma
  - Minor trauma → injury to a single part or system e.g. fracture, small second-degree bur, laceration requiring sutures
  - Major or Multiple trauma → serious single system injury e.g. traumatic leg amputation. Multiple trauma is usually a result of MVA
  - Blunt trauma → trauma in which the inside and the outside of the body make no communication (internal)
  - Penetrating trauma → foreign object enters the body to cause injury to internal structures e.g. gunshot or stab wounds
  - Other types of trauma include → inhalation (from gas, smoke or steam), burn or freezing injuries, blast injuries
- Airway obstruction
  - Airway must be assessed for patency stat
  - All interventions performed must be reassessed for effectiveness
  - All trauma victims should receive high flow oxygen until stabilised
  - Breathing assessment is paramount and should include:
    - Whether the person has spontaneous breathing
    - Good rise and fall of the chest
    - Determination of skin colour
    - General rate and depth
    - Use of abdominal or accessory muscles
    - Position of trachea
    - Observation of chest wall integrity and jugular vein distention
    - Bilat breath sounds
    - Any surface trauma

- Integumentary effects
  - Not as serious as other injuries with exception to burns
  - May be caused by blunt or penetrative sources
  - 5 specific injuries of the integumentary system
    1. Contusion → superficial tissue injury result from blunt trauma and cause breakage of small blood vessels and bleeding into surrounding tissue
    2. Abrasion → partial thickness denudations of an area of integument generally resulting from falls or scrapes
    3. Puncture wound → occurs when a sharp or blunt object penetrates the integument
    4. Laceration → open wounds that result from sharp cutting or tearing
    5. Full thickness avulsion injury → injuries that result in loss of all the layers of the skin causing fat and muscle to be exposed
- Abdominal effects
  - Direct trauma can lacerate or compress the solid organs and cause burst injuries to the hollow organs
  - Blood vessels may be torn, and organs displaced from their blood supply causing life-threatening haemorrhage
- Musculoskeletal effects
  - Are not considered high priority in a person with multiple injuries except in cases where it is life or limb threatening
- Neurological effects
  - Head injuries are a common type of injury
  - Most result from blunt trauma
- Multiple organ dysfunction syndrome
  - Common complication of severe injury
  - Progressive impairment of 2 or more organ systems
  - Results from an uncontrolled inflammatory response to severe injury or illness
  - Primary organs systems involved include: resp, renal, hepatic, haematological, cardio, gastro and neurological
- Primary trauma assessment
  - A → Airway
  - B → Breathing; rib fractures and collapsed lung
  - C → Circulation assessment; identifying any sources of external bleeding
  - D → Disability; neurological status
  - E → Exposure/Environment
- Secondary trauma assessment
  - F → Full set of VS
  - G → Give comfort measures; physical and emotional
  - H → Head to toe assessment and medical hx
  - I → Inspection of posterior surfaces for injuries

Video – 'what is shock'

- O2 delivery < O2 required → inadequate delivery of oxygen to the tissues (tissue perfusion)
- Tissue perfusions → volume of blood that can be distributed over a certain amount of time over/to a certain amount of tissue (e.g. 20mL/min/100g tissue) → perfusion = how much blood can reach a certain amount of tissue in a given time period
- Certain things can increase the amount of oxygen required but shock focuses on the oxygen that is actually delivered or the 'oxygen delivery'



Types of shock

1. Hypovolaemic shock → Vomiting, diarrhoea, bleeding = volume loss
2. Cardiogenic shock → Decrease flow through the entire cardiovascular system (hypocontractile)
3. Obstructive shock → Obstruction preventing blood flow
   - e.g. pulmonary embolism
4. Distributive shock → Collection of fluid between the cells of organs that require oxygen and the blood vessels that are delivering the oxygen. This makes it a lot harder for blood to get to the tissues because it has to get through all the fluid first
   - E.g. septic, anaphylactic, neurogenic shock

Review questions

1. How is BP calculated, what factors determine BP and which body system are involved in BP homeostasis?
   - BP is calculated using a sphygmomanometer
   - Factors that determine BP include: Cardiac output, stroke volume, peripheral vascular resistance, volume of circulating blood
   - The body systems involved include the cardiovascular system, renal and respiratory systems.
2. What receptors detect a change in BP? Where are they located?
   - Baroreceptors located in the aortic arch and the carotid sinus are responsible for detecting changes in BP
3. What is mean arterial pressure (MAP)? In practice, how could you calculate MAP?
   - MAP is the average arterial blood pressure in an individual during a single cardiac cycle.
   - MAP = CO (cardiac output) x SVR (systemic vascular resistance)
4. Define shock and explain the stages of shock, especially how you would recognise the early stage of shock?
   - Shock is when the oxygen supply to the tissues does not meet the demand required.
   - Shock has 3 different stages:
     → 1. Early, reversible and compensatory shock: begins when there is a MAP drop of less than 10mmHg from normal. The circulating blood volume may drop less than 500mL but is not enough to cause serious effects
     → 2. Intermediate or progressive shock: occurs after a sustained MAP drop of 20mmHg or more and a fluid loss of 35-50% (1800-2500mL)
     → 3. Refractory or irreversible shock: tissue anoxia is generalised, and cell death is so widespread that a temporary return in MAP will have no effect as too much cell death has occurred to sustain life. Cell death → tissue death → organ death → body death
5. How may shock be classified?
   - Shock can be classified in 4 ways:
     1. Hypovolaemic → decrease in IV volume by 15% or more
     2. Cardiogenic → the heart's pumping ability is compromised to the point that it cannot maintain cardiac output and tissue perfusion
     3. Obstructive → caused by an obstruction in the heart or great vessels that impede venous return or prevents effective cardiac pumping action
     4. Distributive → results from widespread vasodilation and decreased peripheral resistance
6. What is the by-product of anaerobic metabolism and explain the effects of hypoxia might have in the body (brain, heart, kidneys).
   - Lactic acid
7. What are some of the signs and symptoms that indicate that a patient is in shock?
   - Cool, clammy skin

- Pale of ashen skin
- Bluish tinge to the lips of fingernails
- Rapid pulse
- Rapid breathing
- N&V
- Decreased BP

8. What form of shock are you most likely to encounter in the Emergency Department? What are some of possible causes?
   - Hypovolaemic shock that may be caused by:
     - Loss of blood volume from haemorrhage
     - Loss of IV volume from skin due to things like burns
     - Loss of IV volume from severe dehydration
     - Loss of body fluid from GIT
     - Renal losses of fluid due to use of diuretics or endocrine disorders such as diabetes insipidus

BloodSafe eLearning

a. What are the components of blood and which circumstances they are indicated?
   - **Red cells**: transfused to alleviate S&S of anaemia due to blood loss, disease or tx
   - **Platelets**: used to treat or prevent bleeding in px who have thrombocytopenia or abnormal platelet function (e.g. due to tx with antiplatelet drugs)
   - **Plasma**: (and **fresh frozen plasma**) contains coagulation factors and plasma proteins and is used to treat bleeding or to reduce the likelihood of bleeding
   - **Cryoprecipitate**: contains a number of clotting proteins and is most commonly used to treat bleeding or to reduce the likelihood of bleeding where fibrinogen is low
   - **Other**: albumin, clotting factor concentrates, immunoglobulins
b. Which level of haemoglobin (Hb) is a probable benefit for transfusion? When can you get a false Hb reading in practice?
   - A Hb reading of <70g/L
   - A false reading can occur when a patient is over/dehydrated, or a specimen is taken from an IV line or from the wrong px
c. What should the duration of blood transfusion for urgent and non-urgent situation?
   - Urgent → as rapidly as the px body can tolerate
   - Non-urgent → can be transfused over 1-3 hours but must be finished before 4 hours
d. Pre–transfusion test such as crossmatch is very important, what are the three crucial points nurses should be focus when collecting a pre-transfusion sample?
   - Positive identification of the px
   - Correct blood test tube
   - Correct labelling
e. What are the tests the laboratory performs to ensure the donor blood is compatible with the patient?
   - ABO and RhD blood grouping of the px
   - An antibody screen of the px plasma to detect red cell antibodies
   - A crossmatch with the donor blood and the px blood
f. What are the 3 Ps prior to commence transfusion?
   - Patient
   - Prescription
   - Pack
g. How do you as a nurse prepare for non-urgent transfusion and monitor your patient during transfusion?
   → Preparation for administration
   - Prescription is complete