

NURS3101: Foundations of Professional Practice 3A NOTES

Index:

- Trauma assessment.....
- Triage.....
- Airway, breathing & ventilations.....
- Circulation.....
- Paediatric Nursing.....
- Trauma & Emergency Conditions.....
 - Shock.....
 - Sepsis.....
 - Spinal injury.....
 - Traumatic brain injury and intracranial pressure.....
 - Toxicology.....
 - Burns.....
 - Pneumothorax/Haemothorax.....
 - Inhalation injury.....
 - Blast injury.....
 - Drowning.....
 - Acute kidney injury.....
 - Fractures.....
- Urinary Catheters.....
- Organ donation.....
- Stress & PTSD.....
- End of life care.....

Glossary

| | |
|-------------------------------------|---|
| | severe hypoxia or oxygen reaching the tissues; severe hypoxia. |
| Computerised tomography (CT) | X-ray images taken from different angles and uses computer processing to create cross-sectional images, or slices, of the bones, blood vessels and soft tissues inside your body. |
| | discoloration of the skin due to poor circulation or inadequate perfusion of the blood. |
| Dyspnoea | breathing difficulty, breathlessness, laboured breathing, shortness of breath |
| Ecchymosis | discoloration of the skin resulting from bleeding underneath, typically caused by bruising. |
| Hypoxia | reduction of oxygen supply to a tissue below physiological levels despite adequate perfusion of the tissue by blood |
| Laryngeal oedema | a frequent complication of intubation. It often presents shortly after extubation as post-extubation stridor and results from damage to the mucosa of the larynx. Mucosal damage is caused by pressure and ischemia resulting in an inflammatory response |

Trauma Assessment

➤ Primary & secondary survey and DETECT:

- The primary survey includes checking the priorities (i.e. **ABCD**) and as the secondary survey follows this with the non-immediate assessments (i.e. **EFGHI**)
 - AIRWAY, BREATHING, CIRCULATION, DISABILITY**
 - FLUIDS, GLUCOSE, HISTORY, INSPECTION.**

| | Assessments | Interventions |
|----------|---|--|
| A | <ul style="list-style-type: none"> Introduce yourself and ask "How are you?" and say pts. name. Their response or absence of response will identify if conscious. Look for signs of airway obstruction, use of accessory muscles, tracheal tug, intercostal recession, paradoxical chest and abdominal wall movement. Listen for speech (words, phrases or sentences), abnormal breath sounds | <ul style="list-style-type: none"> If no response, try touch or pain as stimuli while saying pts. name. Head tilt, chin lift and jaw thrust manoeuvres may be needed to identify obstruction Suctioning of airway may be needed to clear debris. If obstruction cannot be suctioned, call for help and a Guedel's airway or nasopharyngeal airway may need to be inserted. Change position- semi-high fowlers position or lateral |
| B | <ul style="list-style-type: none"> Look at chest wall movement, depth and count rate (1 min), look for cyanosis (peripheral or central) Pulse oximetry (aim for $\geq 97\%$) Listen for breath sounds left and right with stethoscope. Ask pt to cough and observe strength Feel (percuss) both sides of lungs, top and bottom, normal to hear hollow sound. | <ul style="list-style-type: none"> Apply oxygen, reassess Re-position Insert appropriate airway and consider assistance with ventilation. Get a doctor to review and/or suggest a chest x-ray if abnormal sounds heard on auscultation or percussion |
| C | <ul style="list-style-type: none"> Look for pallor and peripheral cyanosis, skin mottling Listen for confusion in the pattern of speech. Notice any complain of chest pain Feel for warm hands and feet, count the heart (30 secs) and note the rhythm and strength peripheral pulses. Measure BP, CRT (should be < 3 secs) | <ul style="list-style-type: none"> Apply oxygen Raise legs of bed to facilitate BP increase and assist circulation to peripheries Establish IV or IO access Fluid challenge- bolus (250mL or more), reassess. Call for help if simple intervention not working. |
| D | <ul style="list-style-type: none"> Look for facial asymmetry and abnormal movements (including seizure activity), pupil reaction (non-responsive, fixed?) and size Listen for slurred speech or unusual speech/thought form. | <ul style="list-style-type: none"> Placing pt in lateral position if unconscious with adequate breathing/circulation and no spinal injury. |

| Numeric code | ATS category | Time until requiring treatment | Description |
|--------------|---------------|--|--|
| 1 | Resuscitation | <ul style="list-style-type: none"> Immediately or within 2 minutes. | <ul style="list-style-type: none"> People in this group are critically ill and require immediate attention. Most would have arrived in ED via Ambulance. They would probably be suffering from a critical injury or cardiac arrest. |
| 2 | Emergency | <ul style="list-style-type: none"> Within 10 minutes | <ul style="list-style-type: none"> People in this group suffer from a critical illness or severe pain. E.g. serious chest pains, difficulty in breathing, severe fractures |
| 3 | Urgent | <ul style="list-style-type: none"> Within 30 minutes | <ul style="list-style-type: none"> People in this group suffer from severe illness, bleed heavily from cuts, have major fractures, or be dehydrated. |
| 4 | Semi-urgent | <ul style="list-style-type: none"> Within 1 hour | <ul style="list-style-type: none"> People in this group have less severe symptoms or injuries, such as a foreign body in the eye, sprained ankle, migraine or earache. |
| 5 | Non-urgent | <ul style="list-style-type: none"> Within 2 hours | <ul style="list-style-type: none"> People in this group have minor illnesses or symptoms that may have been present for more than a week, such as rashes or minor aches and pains |

- Special components with triaging:

- Frequent users
- Strongly of age

- DNW (did not wait).

- Busy department
- Bed block

Airway, Breathing & Ventilations

➤ Airway management, Guedel's, bag and mask

- Assessment of airway includes:
 - Determining airway patency
 - Is the patient unresponsive and unable to maintain the airway- manual opening of the airway through jaw-thrust manoeuvre is necessary.
 - Identifying any obstructions or potential obstructions- loose teeth, foreign bodies, bleeding, secretions, vomitus and oedema.
 - Is suction needed, has it worked?

→ ALL trauma clients should receive HIGH-FLOW OXYGEN and be stabilised.

- Assessment of breathing includes checking:
 - For spontaneous breathing
 - Good rise and fall of the chest
 - Skin colour
 - General respiratory rate and rhythm
 - Use of abdominal accessory muscles
 - Position of the trachea
 - Observation of chest wall integrity
 - Presence of jugular venous distension
 - Bilateral breath sounds
 - Presence of tracheal wheezes

➤ Airway devices.

- Fig 1.1: Oropharyngeal airway (Guedel's - the name)
 - Used to maintain a patient's airway by preventing the tongue from coming forward and blocking the airway.
 - Particularly important when a patient becomes unconscious and the tongue relaxes allowing the tongue to obstruct the airway.
- Fig 1.2: Endotracheal tube (ETT)
 - Used to insert an ET tube to intubate a patient
 - A paramedic or nurse will need to locate and hand this device to the doctor in an emergency.
- Fig 1.3: Nasopharyngeal tubes (NPA):
 - Can be positioned down the nasal passageway to secure a patient's airway.
 - Used in emergencies when tracheal intubation is impossible, but not advisable or outside the practitioner's scope of practice.
- Fig 1.4: Laryngeal mask (LMA)
 - An airway tube that connects to a ellipital mask with a cuff which is inserted through the patient's mouth and once inflated forms an airtight seal on top of the glottis.
 - Mental status- Agitation,
 - Facial expressions- grimacing, wincing,

Circulation

➤ Management of central lines - dressing, line change, maintaining patency

• Central venous catheters (CVC):

- Why us CVP monitoring?
 - Provides measurement of pressure in the right atrium
 - Allows accurate decisions to be made about fluid resuscitation
 - Allows for rapid infusion of fluids
- Insertion sites:
 - Subclavian vein
 - Axillary vein
 - Internal jugular vein
 - Basilic vein
- Management:
 - Routine observation and dressing changes
 - Maintain aseptic technique
 - Administration of fluids and medications
- Complications related to CVC:
 - Pneumothorax (if subclavian)
 - Excessive bleeding
 - Arteriovenous fistula
 - Catheter occlusion
 - Catheter fracture
 - Catheter dislodgement
 - DVT
 - Air embolism
 - Catheter entry site infection

• Arterial lines

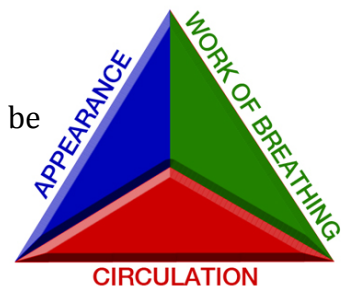
- Why us arterial monitoring?
 - Provides continuous measurement of CVP (central BP)
 - Provides early detection of hypotension in patients who are haemodynamically unstable
 - Provides a route for regular and easy ABGs
- Insertion sites:
 - Femoral artery
 - Brachial artery
 - Radial artery
- Management:
 - Positioning
 - Zeroing
 - Documentation
 - Dressing maintenance
- Complications with arterial monitoring:
 - Haemorrhage
 - Thrombosis
 - Infection

Paediatric Nursing

- Ages of paediatrics:
 - < 37 weeks = Preterm or Premature Infant
 - Up to 1 month = neonate
 - 1-14 months = infant
 - 14 months to puberty (12-13yrs) = child
- Differences in anatomy:
 - Respiratory:
 - Airways more prone to collapse
 - Accessory muscles not developed = abdominal (diaphragmatic) breathing
 - Narrower airway = greater work of breathing, more prone to obstruction.
 - Higher oxygen requirements = higher rate
 - Greater oxygen consumption
 - Adaptation of chemoreceptors not as immediate = and hypoxia more likely = compensation in neonates
 - Cardiovascular:
 - Ventricles more compliant
 - Lower levels of haemoglobin, higher bilirubin
 - Nervous system:
 - Autonomic innervation of organs not fully developed = sympathetic

- Common conditions:
 - Respiratory (asthma, bronchitis, pneumonia)
 - Neurological (cerebral palsy, meningitis, seizures)
 - Cardiac (congenital heart disease, acquired procedures)

- Assessment of the child:
 - Immediate assessment (PAT): observations that can be made in the first few minutes of contact with the child.

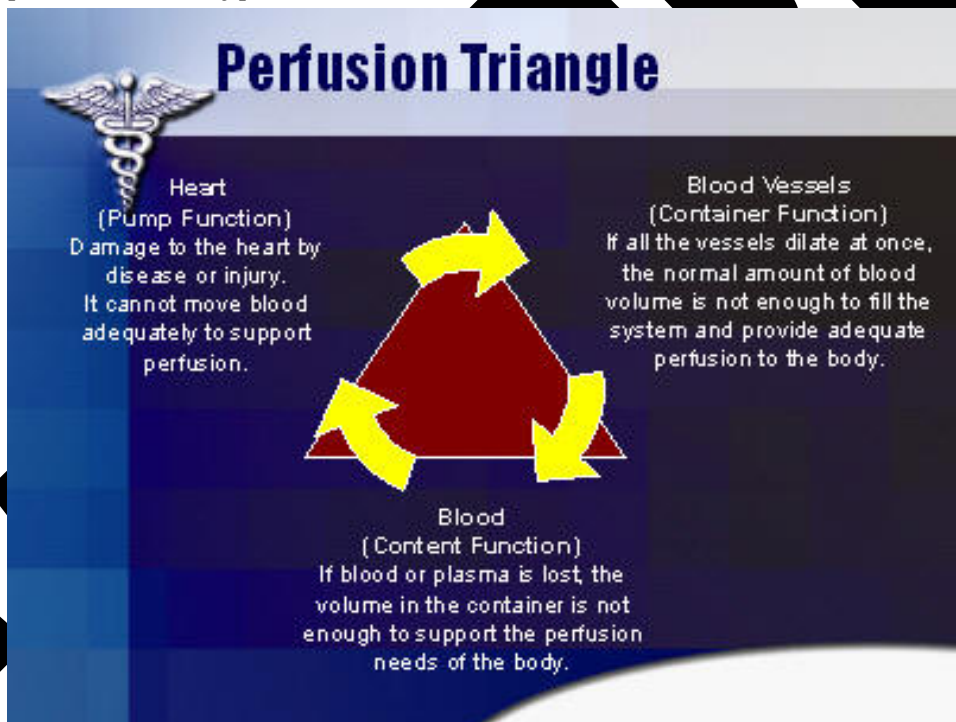


| | |
|---|--|
| | <ul style="list-style-type: none"> • Noises, secretions, cough, artificial airway • Is child breathing? Observe work of breathing • Nasal breathing? • Neutral head position • Head bobbing, sniffing position, tripod position, nasal flaring, |
| B | <ul style="list-style-type: none"> • Look for work of breathing: <ul style="list-style-type: none"> ◦ Tracheal tug, intercostal recession, accessory muscle use, ◦ Resp rate (SAGO limits vary depending on child age), rhythm and depth ◦ spontaneous/ supported/ ventilator dependent, oxygen requirement and delivery mode • Listen for lung sounds <ul style="list-style-type: none"> ◦ Bilateral air entry and movement |

Trauma & Emergency conditions

SHOCK

- **Shock:** an altered physiological state that can affect the function of every cell and organ system in the body; it is a complex syndrome resulting from decreased blood flow to tissues with resulting cellular dysfunction and eventual organ failure.
- $MAP = \text{systolic BP} + 2 \times (\text{diastolic BP})$
 - E.g. $BP = 120/80 = 120 + 2 \times (80)$. $MAP = 280$
 - $MAP < 50 \text{ mmHg}$ is inadequate to force blood through coronary arteries and myocardium = ischaemia, brain ischaemia, etc.
- Hypotension is the common symptom of shock. Shock also causes low perfusion and hypoxia



- Causes of shock:
- 1. Hypovolaemic:
 - a. Fluid loss (e.g. dehydration, severe vomiting/diarrhoea),
 - b. Fluid shifts (e.g. burns),
 - c. Haemorrhage (internal or external).
 - 2. Cardiogenic/obstructive:
 - a. Pump failure (e.g. MI, angina, valvular heart disease, CCF, severe arrhythmia).
 - b. Obstruction to flow (e.g. clot, tumour, cardiac tamponade, tension pneumothorax, pulmonary embolism).
 - c. Inability to fill properly (e.g. compression trauma)
 - 3. Distributive/vasogenic

SEPSIS

- Sepsis or septicaemia: the presence of infection that induces a systemic response where the patient will exhibit signs/symptoms.
- SIRS: Systemic Inflammatory Response Syndrome – can be triggered by infectious and non infectious conditions
 - SIRS criteria: 2 of the following + suspected or confirmed infection:
 - **Temp** $<36^{\circ}\text{C}$ or $>38^{\circ}\text{C}$ (some sources say $36-38^{\circ}\text{C}$).
 - **WCC** $>12 \times 10^9/\text{L}$ or $<4 \times 10^9/\text{L}$ (could indicate infection already accumulated in tissues).
 - **RR** >24 breaths/min
 - Hyperventilation with arterial blood gas partial pressure of carbon dioxide $<32\text{mmHg}$
 - **HR** >90 beats/min
- Pathophysiology:
 - Bacteria enter bloodstream and cause a systemic inflammatory response or release cytokines
 - Toxins interact with macrophages, activating non-specific defences
 - **Release of cytokines** e.g. tumour necrosis factor and Interleukin-1
 - **Inflammation**
 - **Coagulation**
 - **Capillary leakage**
- Signs/symptoms
 - Tachypnoea
 - Tachycardia
 - Temp $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$ (hypothermia $<36^{\circ}\text{C}$ is more common)
 - Oliguria
 - Acidosis
 - Thrombocytopenia
 - Altered mental status.
 - **SEVERE SEPSIS**
 - Hypotension: hypotension and tachypnoea are good indicators.
 - MAP $<90\text{mmHg}$
 - Lactate $>4\text{mmol/L}$ (36mg/dL)

Treatments

- Monitor vital signs frequently.

SEPSIS 6

1. Administer high flow oxygen
2. Take blood cultures
3. Give broad spectrum antibiotics
4. Give IV fluid challenges
5. Measure serum lactate and haemoglobin
6. Measure accurate urine output

TRAUMATIC BRAIN INJURIES (TBI) AND INTRACRANIAL PRESSURE (ICP)

➤ Skull anatomy:

- Composed of three main structures:
 - Brain tissue $\approx 80\%$
 - Blood components $\approx 10\%$
 - Cerebrospinal fluid (CSF) $\approx 10\%$
- There are 12 cranial nerves.
- CSF: The serum-like fluid that circulates through the ventricles of the brain, the cavity of the spinal cord, and the subarachnoid space, functioning in shock absorption.

➤ Cerebral blood flow:

- Changes in oxygen, carbon dioxide, and pH all affect the maintenance of cerebral blood flow, cerebral blood volume, and CSF.

$\downarrow O_2 + \uparrow CO_2 + \uparrow \text{acidosis} = \text{vasodilatation} \rightarrow \uparrow \text{Cerebral flow} + \text{ICP}$

- Blood flow to tissues is controlled by vasoconstriction and vasodilation of blood vessels.

➤ What impacts blood vessel size?

- Hormones
- Cytokines- e.g. histamine
- Oxygen demand- e.g. hypoxia stimulates vasodilation
- Neural mechanisms- e.g. baroreceptor, chemoreceptor, etc.

- Mean arterial pressure (MAP) is the average pressure in a patient's arteries during one cardiac cycle. It is a better indicator of perfusion to vital organs than systolic blood pressure (SBP).

MAP is obtained by invasive or non-invasive monitors or calculated.

$$\text{MAP} = \frac{(2 \times \text{DBP}) + \text{SBP}}{3}$$

Intracranial pressure (ICP) is the pressure within the skull.

- Obtained by the closed ICP monitoring system

NORMAL

- Normal (supine) = 7 – 15 mmHg
- Normal (supine) = 3 – 7 mmHg
- Normal (supine) = 1.5 – 6 mmHg
- Severe = $>20\text{mmHg}$

➤ What increases intracerebral volume?

- Increase in cranial tissue volume
 - E.g. tumour, abnormal growth, inflammation/infection.
- Increase in CSF
 - E.g. doesn't change much in volume but abnormalities can include, blood, increase WBCs, tumour cells or protein in CSF.

23 yr. old gunshot wound, found lying on side outside bar in pool of

- GCS13
- HR128
- RR32
- BP 95/60
- O289%
- IV N/S and oxygen commenced and 200mL of 10% dextrose
- Ambulance is on route to the hospital
- Trauma team:
 - Trauma surgeon, orthopaedic doctor, neurosurgeon, doctor
 - Airway, breathing and circulation factors
 - Medical imaging team
 - Social work
 - Wards
 - Senior registrar
 - New registrar
- 1000mL of warmed normal saline bolus given over 10 minutes, 500mL on route, total = 1050mL
- 1000mL of warmed normal saline bolus given over 10 minutes, 500mL on route, total = 1050mL
- 1000mL of warmed normal saline bolus given over 10 minutes, 500mL on route, total = 1050mL

• Primary interventions (ABCDE)

- 10