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Trauma Patient: Initial Assessment, Catheter Placement, and Stabilization

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The Trauma Patient: Initial Assessment, Catheter Placement And Stabilization

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- ❖ Mantra Of Emergency Medicine – BE PREPARED! – Preparation is critical for the possibility of a positive outcome in an emergency situation
 - It is important to have “All hands on deck” in an emergent situation.
 - Many “activities” need to be occurring at once (i.e. – obtaining vitals, IV catheter placement, recording of vitals, etc)
 - Supplies to have in a central location (crash cart, catheter cart, etc) –
 - Selection of IV catheters, clippers, non-sterile gloves, scrub solution, alcohol, dry gauze, catheter/bandage tape, t-pieces, saline flush
 - Supplemental oxygen source – drop-down lines are preferred over portable anesthetic machines
 - Even after flushing (scavenging) the line, anesthetic “particles” remain in the system
 - Syringes and tubes for blood sample collection
 - If in house blood analysis is possible, collect enough blood for CBC, Chemistry, Electrolytes and Coagulation Panel
 - Doppler or Oscillometric blood pressure
 - Doppler is preferred method for small animals, especially cats
 - Selection of Crystalloid IV fluids
 - Sodium Chloride, Plasma-Lyte or Normasol-R, Lactated Ringers Solution
 - 500 ml bags for animals less than 10 kg. 1 Liter bags for animals greater than 10 kg
 - Endotracheal tubes and appropriately-sized laryngoscope
 - Will also need a tie to secure endotracheal tube in place as well as a syringe to inflate the cuff
 - Emergency drugs and syringes
 - Epinephrine, Atropine, etc
- ❖ Initial Assessment of the Patient
 - Signs that the patient needs to be triaged immediately and assessed by a doctor:
 - Bleeding profusely
 - Having trouble breathing
 - Laterally recumbent and/or minimally responsive
 - Seizing
 - Have any penetrating wounds in to chest or abdomen
 - Showing signs of poor tissue perfusion (Pale mucus membranes, prolonged capillary refill time, poor/weak pulses)

- ❖ IV Catheter Selection and Placement
 - If possible, IV catheter should be placed in thoracic limb
 - Select the largest bore catheter and shortest catheter possible! (16- or 18-gauge in large breed dogs, 20-gauge in smaller dogs and cats). Shorter IV catheters will decrease resistance
 - Selecting a large-bore catheter allows for a larger amount of fluid to be administered quickly during fluid resuscitation.
 - Start as distal (low) as possible. If catheter placement is unsuccessful, placement can be pursued more proximally (higher up)

- ❖ Quick Assessment Tests (QATs)
 - Packed Cell Volume (PCV)/Total Solids (TS)
 - Useful in assessing signs of internal or excessive external hemorrhage as well as hydration status
 - Normal PCV for dogs – 35-55%. Normal for cats – 25-45%
 - Normal Total solids for dogs – 5.5-7.0. Normal for cats – 6.0-8.0
 - **NOTE** – Assessing total solids is necessary to monitor for signs of blood loss. A patient can have a normal PCV with decreased total solids due to splenic contraction!
 - Blood Glucose
 - Useful in assessing patient for signs of sepsis
 - Normal BG for dogs – 70-120. Normal BG for cats – 70-140
 - Blood Lactate
 - Useful in assessing patient for signs of poor tissue perfusion
 - Normal Lactate for dogs - < 2.0
 - Normal lactate for cats - < 1.7

- ❖ Obtain the patient's **initial** vitals – Important to obtain **serial** vitals as well!!
 - Weight
 - Obtaining an accurate weight is important for fluid calculations as well and drug calculations
 - Shock dose of crystalloid fluids – 90 ml/kg.
 - Administer ¼ shock dose of fluids and reassess vitals
 - Overall mentation – BAR, QAR, anxious, dull/obtunded, comatose?
 - Temperature – Important for assessing pain and warming/cooling strategy. If head trauma is present, thermoregulatory mechanism can also be affected (hypothalamus)
 - Normal Dog – 100.0°F-102.5°F
 - Normal Cat – 101.0°F-102.5°F
 - Hypothermia can be corrected with external heat support such as warm water bottles, bear hugger, hot dog, warmed IV fluids, etc
 - Discontinue active warming when temperature reaches 100.0°F
 - Hyperthermia can be corrected with room temperature IV fluids, Running IV fluid line through cold water, wetting the patient, etc
 - Discontinue active cooling when temperature reaches 103.0°F

- Heart rate/Pulse Rate
 - Normal Dog – 70-160. Normal Cat – 120-240
 - Does the heart rate match the pulse rate? If not, an electrocardiogram (ECG) may be beneficial.
 - Tachycardia can be indicative of hypotension, hyperthermia, hypoventilation (panting heavily) or pain
 - Bradycardia can be indicative of end stages of shock, CNS abnormalities (head trauma), electrolyte imbalances, etc
 - Pulse Quality
 - Bounding pulses – Can be indicative of anemia, pain or fever
 - Weak/Poor pulses – Can be indicative of shock
 - Hypovolemic shock – Severe fluid loss
 - Cardiogenic shock – Weakened heart is not able to pump enough blood
 - Cardiac Tamponade – fluid accumulation in the pericardial space
 - Absent pulses
 - Shock or tamponade
 - Blood Pressure Monitoring
 - Normal blood pressure – 120-140/80 MAP - 100
 - Causes of hypotension – hypovolemia, decreased cardiac output, shock (hypovolemic, cardiogenic)
 - Causes of hypertension – Anxiety or pain
 - Oscillometric or Doppler blood pressure
 - Oscillometric used for larger patients. Doppler used for small patients (especially cats)
 - Measuring for proper cuff size
 - Cuff width should be one-half to 2/3 the circumference of the limb
 - Should be obtained on thoracic limb due to closer proximity to the heart
 - Mucus Membrane Color
 - Pale mucus membranes – can be indicative of poor tissue perfusion or anemia
 - Red mucus membranes – Can be indicative of hyperthermia or sepsis
 - Capillary Refill Time (CRT)
 - Prolonged (>2 sec) CRT can indicate poor tissue perfusion (hypothermia, hypovolemia, shock)
 - Fast/Quick (<1 second) CRT – Can indicate hyperthermia or sepsis
- Respiratory Rate and Effort
 - Provide supplemental oxygen to trauma patients
 - Causes of abnormal respiratory signs

- Poor cardiac output due to trauma, pulmonary contusions, pulmonary edema, pneumothorax, hemothorax, penetrating chest wounds, trauma to the respiratory center of the brain (medulla oblongata, Pons)
- Classify respiratory rate and respiratory effort
 - Dyspnea – Difficulty breathing
 - Can be due to obstructed airway, chest/lung trauma, pneumothorax (air in the pleural space)
 - Tachypnea – Rapid breathing
 - Can cause hypoventilation (poor gas exchange)
 - Can be due to pain, anxiety, hyperthermia, lung injury, anemia, hypovolemia
 - Bradypnea – Abnormally slow respiratory rate
 - Can be seen in respiratory decompensation or CNS trauma

❖ Pain Assessment and Management

- Pain assessment and management are imperative for trauma cases
- What works/is appropriate for one patient may not be for another patient
- It is important to consider both short-term and long-term pain management
 - Use of short-acting and longer-acting opioids – Fentanyl (half life of about 10 minutes) vs. Hydromorphone (half-life of >2 hours)
- Pain management is an effective tool in patient assessment as pain can cause hyperthermia, tachycardia, hypertension, tachypnea, red/injected mucus membranes, fast CRT
- Multimodal analgesia – Decreases the dose of the drugs while simultaneously increasing efficacy of the drugs
- Try to avoid alpha-2 agonists (dexmedetomidine) and phenothiazines (acepromazine) due to their adverse cardiovascular effects (Severe bradycardia and vasodilation, respectively)
- Be your patient's advocate!
- Pain management is essential for adequate patient care and will make obtaining further diagnostics less stressful on the patient as well as the staff