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### Trauma Patient: Post-Stabilization and Recovery

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# Caring for the Recovering Critical Care Patient

Mandy Bush, LVMT

## Monitoring

- Monitoring a critically ill patient after stabilization is crucial
  - \* It is important to monitor Patient as a whole, not just individual values
  - \* It is often more helpful to monitor trends of monitored parameters, rather than individual values
  - \* Looking at “The BIG Picture” can help a technician spot changes in the patient more quickly, and helps them to understand what is happening on a physiologic level
- Monitoring Frequency
  - \* Frequency varies based on level of critical care, but may also depend on available staff and equipment.
- Key Points of Monitoring
  - \* With increased frequency of monitoring, it is useful to have a chart or flow-sheet means of recording values
  - \* Detail is important- making notes on the chart and communicating them with other care-takers could save the animal's life in a critical situation
  - \* Continuation of care is important to consider
  - \* Daily rounds, as a group, will often help with communication and understanding how the case is progressing in time.

## What to monitor

- The Rule of 20
  1. Fluid Balance
  2. Oncotic Pull/Albumin
  3. Glucose
  4. Electrolytes and Acid-Base Balance
  5. Oxygenation and Ventilation
  6. Level of Consciousness/Mentation/Neurologic Status
  7. Blood Pressure
  8. Heart Rate, Rhythm, Contractility, and Myocardial Injury
  9. Temperature
  10. Coagulation
  11. Red Blood Cell and Hemoglobin Concentration
  12. Renal Function
  13. Infection Identification/Prevention and Treatment and Immune Status
  14. GI Motility and Mucosal Integrity
  15. Drug Dosages and Metabolism
  16. Nutrition
  17. Pain Control
  18. Nursing Care
  19. Wound Care and Bandage Changes
  20. Tender, Loving Care
- Temperature- strive to maintain temperatures between 98.5 to 102.5 degrees F
  - \* It can be helpful to compare rectal and toe-web temps
  - \* An increased in body temperature = An increase in metabolism
    - ~ A 1.8 degree increase in body temperature = 13.8% increase in metabolism
    - ~ May need to consider this when calculating maintenance IV fluid rates (+10%)
- Heart Rate:
  - \* Auscultation: We can hear arrhythmias and murmurs. Decreased heart sounds can indicate other complications
    - ~ Pulse Deficits: We can palpate arrhythmias and get an idea of weak/poor/thread pulses
    - ~ ECG: Makes it easy to see heart rate, rhythm, and any arrhythmias present.
      - > It is very important to remember ECG clips can cause irritation over time.
  - \* Pulse Abnormalities
    - ~ Tachycardia (>160bpm): Caused by hypovolemia, drugs, hypoxemia, fever, excitement, exercise and pain.
    - ~ Bradycardia (<60bpm): Caused by high vagal tone, severe electrolyte disturbances and atrioventricular conduction blocks.
    - ~ Arrhythmias can be caused by hypoxia, myocardial contusions and metabolic or acid base imbalances

- Respiratory Rate/Effort
  - \* Important to monitor effort as well as rate
  - \* Auscultation-
    - ~ Crackles during late expiratory or the early inspiratory phase are indicative of bronchopulmonary disease (pulmonary edema).
    - ~ Expiratory wheezes: asthma. Pleural effusion: muffled lung sounds.
    - ~ Localized areas of dullness: atelectasis or lobar consolidation
    - ~ Generalized dullness may be caused by pneumothorax.
- Mucus Membrane Color
- Capillary Refill Time – indication of peripheral perfusion, not blood pressure
  - \* Prolonged CRT can be caused by hypovolemia/Excitement/Fear/Pain
- Mentation- Four Levels: Normal/Obtunded/Stuporous/Comatose
  - \* Obtunded: mild to moderate reduction in alertness and often appears drowsy, but is easily aroused.
  - \* Stupor: deep sleep that is only responsive to vigorous or painful stimuli, once the stimulus is removed the patient returns to its sleep-like state.
  - \* Comatose: totally unresponsive even to painful stimuli.
- Blood Pressure- Oscillometric
  - \* Normal            Systolic: 100-160            Diastolic: 50-100            Mean: 70-120
    - ~ We should become concerned for adequate perfusion when systolic <90 or Mean <60
  - \* Hypotension is due to vasodilation/hypovolemia/arrhythmias/anesthetics
  - \* Hypertension- can cause retinal detachment or neurologic derangements from intracranial hemorrhage
- Body Weight- This is the best means of assessing fluid volume loss and the response to IV fluid therapy
  - \* Recommended to be checked at least once a day
    - ~ A gain of 1 lb in body weight is equivalent to a gain of about 500 ml in body water
- Blood work
  - \* PCV – should be monitored at least daily
    - ~ Normal canine PCV is 39%-55% (lower in puppies, higher in sight hounds) TP 6.0-7.8
    - ~ Normal feline PCV is 24%-45% (also lower in kittens) TP 6.2-8.0
    - ~ Splenic contraction and splenic expansion can cause changes in PCV with no change in TP
      - > Splenic Contraction can be due to exercise or blood loss
      - > Splenic expansion can be due to sedation or anesthesia

PCV	TP	INDICATIONS
High PCV	Normal TP	Splenic Contraction
		Breed-related high normal
	Low TP	Protein-loss or decreased production (HGE)
Low PCV	Normal TP	Anemia
	Low TP	Blood loss
		Dilution from IV fluids
	High TP	Protein overproduction with anemia (Bone marrow disease/FIP)
Normal PCV	Low TP	Decreased protein production
		Increased loss from GI or intestinal tract
	High TP	Dehydration with anemia
		Increased globulin production

## What to look for

- Shock- Three types
  - \* Hypovolemic: develops when there is a blood volume deficit  $\geq 15\%$
  - \* Cardiogenic: when the heart fails as a pump
  - \* Distributive: maldistribution of blood away from central circulation as a result of peripheral vasodilation
  - \* Treat all three types with IVF therapy – directed at expanding intravascular volume
- DIC- caused by sepsis/neoplasia/massive trauma
  - \* Manifests as diffuse hemorrhage resulting from ultimate consumption of coag factors and plts.
  - \* Important to monitor for spontaneous bruising and petechiations
  - \* Treat underlying cause, replacement of blood components, heparin therapy
- SIRS: Systemic Inflammatory Response Syndrome
- Sepsis
- MODS: Multiple Organ Dysfunction Syndrome

## Fluid Therapy

### Useful in:

- ~ Supportive Care
- ~ Correcting Hypovolemia
- ~ Diuresis – 1.5-3x maintenance fluids
- ~ Administering some IV medications
- ~ Cooling/rewarming patients

## Oxygen Therapy

- Administration techniques
  - \* Flow-by- a tube or mask held about 6 inches from the patient's face and rate put to 6 L/min
    - ~ Do not position directly into nares as it can irritate nasal passages and cause anxiety.
  - \* Bag – This is a temporary solution! Cannot be used more than 30 minutes due to improper ventilation and carbon dioxide buildup
  - \* Nasal Catheters- 3-8 french red rubber catheters placed directly into the nares.
    - ~ Sutured or Stapled in place.
    - ~ Humidification highly recommended.
    - ~ 50-100 ml/kg/min O<sub>2</sub> flow rate
  - \* O<sub>2</sub> Collars- E-collar with cellophane tape on bottom 2/3
    - ~ Allows ventilation and O<sub>2</sub> is heavier than room air so it stays in the bottom 2/3 as a reservoir

## Pain Control

- Critically ill patients often most likely in need of pain control- but most often less able to express need
- What does pain look like?
  - \* Increased: Heart rate, respiratory rate, blood pressure, and/or temperature, vocalization or trembling, insomnia, or inappetence.
- Pain control checklist
  - \* Establish pain alleviation as a standard of care
  - \* Recognize the signs of pain
  - \* Respect the Owners observations and assessment of pain in their pets
  - \* Be aware of known painful procedures and surgeries, encourage preemptive and immediate post-procedure treatments
  - \* Reduce incidences of painful procedures by combining treatments
  - \* Use techniques to minimize pain
  - \* Differentiate pain from other distresses
  - \* Understand treatment options and encourage appropriate types of therapy
  - \* Monitor effects of various drugs to evaluate efficiency
  - \* Educate other animal caregivers about pain management issues

## Nursing Care/Comforts

- Maintenance of IV Catheters
  - \* Should be visualized and palpated above and below many times a day
    - ~ Recommended to be visualized every 2 hours if IV fluids are being administered
    - ~ Flush the catheter every 6-8 hours if continuous IVF not being administered
  - \* Bandages/tape changed every 24 hours, or if dirty
    - ~ Check for leakage or signs of infection at the catheter insertion site.
  - \* If a new IV catheter is being placed, leave the old one in until the new one is in place.
- Urinary Bladder Care
  - \* Exercise when possible, bladder expression, urinary catheterization
- Lube eyes every 4-6 hours in patients that are not blinking often
  - \* Especially in patients receiving oxygen therapy
  - \* Monitor eyes for ulcers and ocular discharge
- Switch the patient's sides or change body positions every 2-4 hours.
  - \* Will help to prevent pressure sores – especially important in large breed/overweight animals
  - \* Passive Range Of Motion – (physiotherapy) Done for patient comfort and increased circulation
- Provide an appropriate environment for patient comfort
- Timing of treatments and increased proficiency of technicians can minimize stress/pain level of patient.
- Owner visits
  - \* Of high importance for Owners to be able to see patient, as long as visitation protocols are understood
  - \* Main priority is to patient health
    - ~ While owner visits are often helpful and enjoyed by the patient, they can sometimes be detrimental