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Practical Wound Management for Nurses Mini Series

Session 1: Triage, Assessment and Initial Treatment of Wounds

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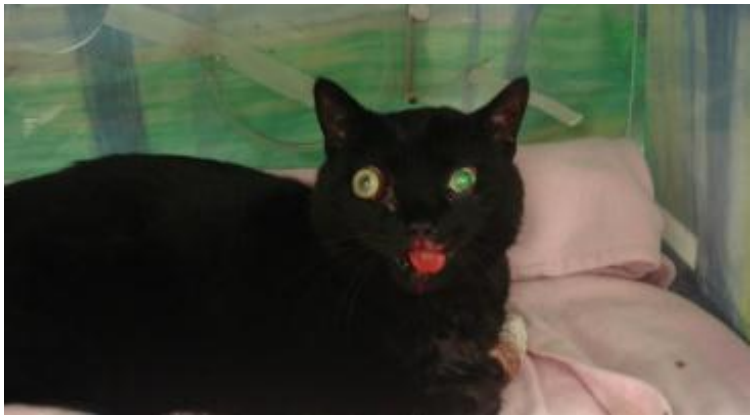

Trauma: Initial assessment and stabilisation

Trauma is a common cause of emergency presentations in small animal practice. Due to our patients small size the potential for multi-system damage is high and their injuries need to be approached in a systematic manner to ensure than no life threatening abnormalities are missed. Appropriate management in the first few hours is vital for success. Many patients benefit from a multi-modal approach in the successive days, concentrating on careful nursing, nutrition and pain relief.

Primary assessment

A major body system assessment approach should be used to rapidly identify the life threatening problems and initiate life-saving treatment. The major body systems are:

- Cardiovascular
- Respiratory
- Neurological

Cardiovascular

Cardiovascular assessment is aimed at identification of hypoperfusion as a result of hypovolaemia. Significant blood loss can occur into body cavities and fracture sites without visible haemorrhage. This is especially true in cats. The response to hypovolaemia is initially tachycardia, vasoconstriction and increased myocardial contractility as a result of adrenergic stimulation. With continued blood loss these compensatory measures fail to maintain tissue perfusion and signs of decompensated hypovolaemic shock ensue.

The response of dogs to blood loss is predictable and the degree of hypoperfusion can be estimated from the severity of their clinical signs (see table below). Cats are less predictable and more difficult to assess. Their higher resting heart rate also means there is less room for an increase in heart rate. We are therefore more reliant on palpation of pulse quality for assessment in these patients. Assessment of the severity of hypovolaemia is used to guide fluid therapy.

Respiratory

Respiratory assessment is aimed at identification of dyspnoea and identification of the underlying cause. All patients presenting with dyspnoea should be provided with immediate oxygen therapy in the least stressful manner possible.

Common causes of dyspnoea following trauma include:

- Pneumothorax
- Pulmonary contusions

Less common causes include diaphragmatic hernia and chest wall trauma.

Significant haemothorax is an extremely rare cause of dyspnoea as in these patients the signs of hypovolaemia predominate.

Traumatised animals should therefore be assessed carefully for lung sounds; all areas of the thorax should be carefully auscultated. Some of these patients can be extremely challenging, especially those that have both pneumothorax and pulmonary contusion. Pleural space disease (dull lung sounds) should prompt needle thoracocentesis.

Neurological

In the primary assessment of these patients, neurological assessment is limited to mentation, posture and assessment for limb movement and deep pain. Patients with severe cardiovascular compromise should not be assessed for neurological function until they are more stable.

Mentation: Patients with coma or stupor (response only to pain) are likely to have intra-cranial injury. Reduced mentation in the absence of cardiovascular abnormalities should prompt evaluation for head injury.

Posture: Decerebrate rigidity (extensor rigidity in all four limbs with associated abnormal mentation, opisthotonus may or may not be present) is associated with caudal midbrain or cerebellum injury. This posture has a grave prognosis for recovery.

Decerebellate rigidity: (extensor rigidity of forelimbs, flexion of hind limbs with opisthotonus and normal mentation) is associated with caudal cerebellar lesions. This carries a better prognosis.

Schiff-Sherrington posture: (extensor rigidity of forelimbs, flaccid, atonic, areflexic, analgesic pelvic limbs, normal mentation) is associated with an acute, severe, T3-L3 lesion. Prognosis has typically been thought to be poor for full recovery of motor function, however with time some of these positions can recover.

Once life threatening problems are dealt with or identified, emergency management of wounds and fractures should be addressed. Emergency management should prevent any additional injury, minimise contamination and control systemic implication. Open wounds may be covered with a sterile dressing until the patient is stabilised. Many patients may be in pain from their injuries, so appropriate analgesia is important. Fractious patients may require sedation or general anaesthesia for wound evaluation to be performed.

Wounds

Emergency treatment of wounds can be carried out prior to definitive treatment later. Analgesia and effective restraint may be necessary, until the animal is stable enough for sedation or GA. Wounds can be classified by their cause and the type of tissue damage caused: incisional, abrasion, avulsion (or degloving), shearing, puncture or perforated, and burns. Regardless of the aetiology of the wound, the factor which has the single biggest impact of future healing is the presence of contamination and necrotic tissue.

Haemostasis

Bleeding should be controlled first. Apply direct pressure with sterile gauze swabs, or by bandaging. Pressure can be applied to brachial or femoral arteries if profuse arterial haemorrhage is present.

A form of tourniquet can be applied above the wound if it is on a limb. Narrow elastic tourniquets such as Penrose drains put significant pressure on neurovascular structures and should only be used for up to 5 minutes. Bands 5-10cm wide can be used for up to 30 minutes. Blood pressure cuffs can be placed proximal to the wound and inflated to 20-30cm H20 higher than arterial pressure- these can be left in place for up to 6 hours. Ultimately ligation may be needed for larger vessels, and the limb then relies on collateral circulation.

Control of Contamination

After adequate haemostasis the wound should be covered with a sterile dressing while preparing for lavage. Wearing sterile gloves and gown, the wound is packed with sterile gel or soaked swabs and hair clipped from the wound outwards. The wound can then be lavaged with copious saline of Hartmanns. If gross contamination is present, use tap water followed by Hartmanns. Then cover the wound again with a sterile dressing.

Once the patient is stable a more thorough evaluation may be carried out. Appropriate chemical restraint may be required for examination. Diagnostic imaging may be used to check for foreign

material, penetrating injuries, associated fractures, dislocations and tendon or ligament damage. A management plan should take into account the wound's location, size, damage to local structures and the amount of tissue loss.

Lavage reduces the number of bacteria present, and helps to loosen necrotic tissue and débris. Lavage solutions containing antibacterials or detergents should be avoided; they can cause cell damage, slow wound healing and may result in bacterial resistance.

The pressure for lavage solution needs to exceed the adhesive and cohesive forces of the contaminant, yet avoid pushing débris into the tissues and causing damage to vital tissues. The suggested force is 5–10 psi. In practice this can be achieved by using a bag of fluid with an 18–20 gauge needle fitted to the end of an attached giving set. The volume of lavage solution is equally important. For small, superficial wounds, 0.5–1 l is generally used; for larger wounds several litres of sterile lavage solution may be needed.

Any traumatic wound will require the débridement of devitalised tissues and foreign material, in order to prevent infection and necrosis and to promote optimal wound healing. Débridement may be performed using a number of different methods.

Sharp débridement involves the use of a scalpel blade or scissors and may be carried out carefully in stages in order to preserve as much healthy tissue as possible. Subcutaneous tissue, fat, skin, fascia and muscle can generally be freely débrided. Tendons, vessels, nerves and bone should be débrided much more conservatively.

Mechanical débridement involves the use of dressings, irrigation or hydrosurgery. Wet to dry dressings are commonly used in veterinary practice but their use requires sedation or anaesthesia as removal is painful.

Autolytic débridement involves the use of wound dressings and solutions, e.g. hydrogels, and is not recommended in infected wounds.

Following débridement, a decision needs to be made about wound closure. Options include primary closure, delayed primary closure, secondary closure or secondary intention. If doubts exist over remaining contamination and necrotic tissue, a period of open wound management is indicated.

Antibiotics; Wounds correctly managed with lavage and debridement followed by closure do not routinely require antibiotics. However, deep wounds involving muscle, severe tissue damage, systemic infection or an immune-compromised patient are indications for broad spectrum intravenous antibiotics. A first generation cephalosporin or clavulanic acid potentiated amoxicillin are good first line choices.