Acute pain is a protective mechanism to prevent or minimize injury. There are varying opinions regarding the duration of acute pain but it is typically the immediate pain associated with traumatic or induced (surgical incision) injury. Prolonged painful stimulus results in chronic or neuropathic pain. Basically, the nerve becomes the source of the pain. Chronic or neuropathic pain is often misdiagnosed or inappropriately treated in veterinary patients. The flight response in equids or the stoic nature of cattle results in fewer easily recognizable physical manifestations of pain than that of small animal patients. Small animal patients will manifest acute pain by vocalization, inappetence or lethargy. Recumbency or vocalizations are often late responses to pain in large animal patients allowing acute pain to go undetected, developing into chronic neuropathic pain. The development of several pain scales have helped clinicians evaluate and treat pain once it has been detected but often, due to the difficulty in recognizing pain, treatment begins late in the course of disease. There are several common chronic/neuropathic pain syndromes in small animals, horses and cattle but it is also worth discussing some of the uncommon pain syndromes that are not completely understood but likely associated with a neuropathic component.

The most common chronic pain syndromes in small animal patients are associated with osteoarthritis, chronic otitis, pain associated with cancer and cancer treatments, ophthalmic pain and thoracolumbar instability. The most common neuropathic pain syndromes in horses are laminitis, navicular syndrome or caudal heel pain, osteoarthritis, neuroma from a neurectomy or a site of injury, pelvic fracture and back pain associated with kissing spine lesions. Situations in which neuropathic pain is suspected are head shakers, stringhalt, castration and occasionally enucleation. The most common conditions in cattle include laminitis or foot pain, osteoarthritis and neuroma from a wound site. Uncommon causes in cattle include lumpy jaw, cancer eye and mastitis. Any chronic pain that alters the behavior, personality and physical appearance of these animals should be considered neuropathic pain.

Neuropathic pain in people is notoriously difficult to treat due to the emotional aspect of pain. Anxiety and depression amplify the pain response. Tricyclic anti-depressants have been a traditional first-line therapy for neuropathic pain in people. Small animal patients manifest
anxiety through separation anxiety, self and furniture mutilation. Equine head shaking and stall weaving are suspected of having an emotional aspect as a response to pain. Behavior is beyond the scope of this discussion but it is valid to consider anxiety or depression when developing a management protocol. Typically, veterinarians treat visible signs of pain with non-steroidal anti-inflammatory agents as first-line treatment. Behavior modification is only introduced when a patient is at risk of harming itself due to excitement. When initial treatment is ineffective, finances are often the primary factor when determining if another analgesic protocol is applied or the animal is euthanized. Fortunately, many veterinary patients have moved to the realm of family members and owners are willing to invest more time and money to dealing with chronic pain. Unfortunately, cattle and horses used solely for economic purposes are rarely allowed second changes.

Recognition of pain begins with an owner or manager observing poor performance, lack of activity or poor appetite. The first steps towards developing a treatment plan are observing behavior, including interaction with herd members or companions, review of the history and a lameness or thorough physical exam. Serial photographs of the patient are a useful method for following progress of disease and success of treatment.

Chronic pain typically requires aggressive multi-modal treatment to override or control hyperexcitability of the nervous system. Treatment options for pain include the non-steroidal anti-inflammatory drugs, opioids, dissociative agents, local anesthetics (injectable and in transdermal patch form), gabapentin, anti-anxiety or antidepressant medications (trazodone, acepromazine, fluphenazine, amitriptyline), and techniques like botox administration, epidural drug administration, perineural catheter placement and regional limb perfusion. Treatment choices should include financial considerations, residue concern in meat and milk of cattle and drug detection in horses used for competition. When dealing with food producing animals, the veterinarian must understand the required withdrawal period for milk or meat after the administration of analgesic drugs. Withdrawal periods are printed on product labels for drugs approved for food animals. Unfortunately, many analgesic drugs for neuropathic pain are administered off-label and require research regarding withdrawal times prior to administration in these patients. Questions regarding withdrawal can be referred to the American Veterinary Medical Association or the American Medicinal Drug Use Clarification Act (AMDUCA).

Gabapentin is recommended in the initial treatment of neuropathic conditions. Although the mechanism of action is not completely understood, activity at voltage activated calcium channels appears to result in less hyperexcitable nerves, less burning and shooting pain and less allodynia. From personal experience, inclusion of this drug initially in a treatment protocol for neuropathic or chronic pain allows other drugs to be more effective. In humans, gabapentin is effective as an analgesic in only 30% of the population. The success rate in large animals is unknown; therefore gabapentin should be used as part of a multi-modal analgesic plan.
A non-steroidal anti-inflammatory drug should be included in treatment unless a known sensitivity to this class of drug exists. Carprofen, deracoxib, firoxicib, phenylbutazone and flunixin meglumine are the most common in practice but meloxicam and firoxicib are gaining popularity. Flunixin meglumine is used with frequency in beef cattle and non-lactating dairy cattle with a withdrawal period of 4 days for slaughter. The combination of meloxicam and gabapentin have been researched in cattle and found to have a low drug residue concentration soon after plasma concentrations fall below effective levels.

Opioids are an effective part of a multi-modal initial treatment plan. Butorphanol, morphine, fentanyl patches and methadone are relatively economical. Methods of delivery include intravenous constant rate infusion, transdermal, sub-lingual, intramuscular or epidural. Tramadol is an attractive alternative for practitioners with cases that require chronic pain medications. Local anesthetics can be used as intravenous infusions, topically with patch placement, in epidural drug administration or in regional limb perfusion. Ketamine can be used as part of a continuous intravenous infusion, by intramuscular injection or as an intravenous bolus or “stun”. It has also been suggested for topical administration in laminitis cases when a hoof wall resection has occurred. The combination of a ketamine infusion with oral tramadol was found to be effective for improving limb loading in chronic laminitis cases. Anti-anxiety and anti-depressant medications should be included for animals that appear to be nervous, hyper-excitabale or depressed. Although members of this group of drugs have been associated with negative potential side effects, the alternative option if anxiety is not dealt with is self-injury or euthanasia.

Procedures like perineural catheter placement are useful for constant rate infusion of local anesthetics, particularly for laminitis cases. Botox injection has been recommended for stringhalt or other site-specific neural pathology. Regional limb perfusion of local anesthetic or lidocaine patch placement over an affected area is useful for laminitis or neuroma associated pain.

Long-term management of chronic or neuropathic pain should be tapered as appropriate to treatment response. A team approach with the veterinarian, the owner or manager and other veterinarians or para-professionals allows the best result for long-term care. The inclusion of a nutritionist, acupuncturist and massage therapist is ideal for a positive outcome. Non-steroidal anti-inflammatory drugs, tramadol, sublingual methadone and gabapentin can be part of a maintenance protocol depending on the situation and patient. Keep in mind that 100% improvement is unusual when dealing with neuropathic pain. Owner communication is essential during treatment to establish goals and limits throughout the process.
References


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