

Pain Management in Practice

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When it comes to pain assessment in small animal practice, it is often difficult to discern a painful response from anxiety, nervousness or dysphoria. The truth is, pain can be multi-factorial and this overlap in clinical presentation makes selection of medications challenging for our patients. Pain can disrupt the stability and recovery of our patients through changes in their physiologic status, depressed appetite, delayed wound healing, immune compromise, increased incidence of infection, as well as adding to fear and anxiety. Therefore, by controlling pain, we are benefiting not only the patient, but also our clients and our practice. For our patients, we increase their comfort, reduce their stress, support organ and immune function, enhance healing, improve mobility, and improve post-operative recovery. For our clients, we address their concerns, fulfill their expectations for their pets' comfort, demonstrate the practice's commitment to pain control, increase the level of medical care we can provide, and strengthen the human-animal bond. Benefits for our practice lie in increasing staff morale, enhancing public relations, strengthening client loyalty, improving client compliance, adding to income, providing a marketing opportunity, and offering best care practices.

In order to effectively treat pain, we must recognize it. Monitor your patient's unprovoked behavior: vocalization, absence of normal behavioral patterns, attempts to escape, changes in sleep or appetite, temperament (increased anxiety/fear, quiet/withdrawn nature, lethargy), guarding the affected area, self-mutilation (biting, chewing, scratching at the site or remote areas), unusual posture, restlessness, slow movements, lameness/limb disuse, among others. Then assess behavioral responses to stimuli, including interactions with humans, increased body tension/flinching, and response to gentle handling. Physiologic parameters may also be observed, often in association with acute pain. These can include increased heart rate, blood pressure, respiratory rate, and temperature, peripheral vasoconstriction (pale mucous membranes), cardiac dysrhythmias, hyperventilation, reduction in peristalsis, and dilated pupils. Cats, in particular, will hide, decrease grooming behaviors, have a reduction in appetite and activity, become quiet, disinterested, excessively lick, groom, tail flick, hiss or spit.

Pain scales exist to provide a more subjective evaluation of our patients. They are an important adjunct to our physical assessment and should be used to ensure that we are monitoring pain in all our patients. They allow for frequent reevaluation of a patient's pain, with low scores reflecting more effective analgesia. Remember that limitations exist and that a patient's pain may supersede their designated pain score. Therefore, a patient should never be denied analgesia based on their score. These scales can be used to help taper pain medication and monitor a patient's response. Also, if we are uncertain, as in the case of sedated or severely ill and compromised patients, we can provide a test dose of analgesia and observe for any beneficial effects. Three main types of pain scales exist, including the visual analog scale, ranging from no pain to the worst possible pain, the simple descriptive scale (0 = no pain, 1 = mild pain, 2 = moderate pain, 3 = severe pain, 4 = worst possible pain), and the numerical rating scales (of which the Glasgow Composite Measure Pain Score in dogs is one example – Moran CE, et al. J Vet Emerg Crit Care 2013;23(1):29-36).

The best modality for pain control in our patients will vary between individuals and also with their duration and type of pain response. The pain pathway helps us to understand the neural connections involved in the perception and response to pain such that we can provide a multifaceted approach to comforting our patients. The pain pathway has 5 main components: transduction, transmission, modulation, projection and perception. Transduction involves the conversion of a noxious stimulus into an electrical signal. It involves the nociceptors, the pain receptors found in superficial and deep tissues. A noxious stimulus can be chemical, mechanical, or thermal in nature. In the next phase, transmission,

peripheral nerves transmit sensory and motor impulses. Afferent nerve fibers transmit sensory impulses toward the dorsal horn of the spinal cord and efferent nerve fibers transmit motor impulses away from the ventral horn of the spinal cord. During modulation, in the dorsal horn, signals are amplified or dampened based on excitatory or inhibitory mechanisms. If nociceptive signals are amplified, they are then relayed to the brain in the projection phase. Lastly, there is perception, which is integration, processing and recognition of sensory information that takes place in the cerebral cortex and other higher brain centers. It is where signals transform into motor responses and memories to give us the experience of pain. Administration of analgesic drugs in combination and at multiple sites can alter more than one part of the nociceptive process to provide more complete pain control for our patients. This multi-modal analgesia relies on additive or synergistic effects of two or more drugs working through different mechanisms of action. For example, local anesthetics, opioids, NSAIDs, and corticosteroids will block transduction, local anesthetics and $\alpha 2$ agonists will target transmission, local anesthetics, opioids, $\alpha 2$ agonists, NSAIDs, anticonvulsants, tricyclic antidepressants, and NMDA antagonists affect modulation and anesthetics, opioids, benzodiazepines, $\alpha 2$ agonists, and phenothiazines inhibit perception.

Several types of pain exist in our patients, ranging from acute vs. chronic pain, somatic vs. visceral pain, physiologic vs. pathologic pain, neuropathic, and referred pain to name a few. Of special note is wind-up pain. This is where prolonged noxious stimuli produce greater sensitivity to subsequent stimuli. It can last hours to days or longer and is not prevented by general anesthesia. Wind-up is the rationale for pre-emptive analgesia, which is introducing an analgesic regimen before the onset of noxious stimuli to prevent sensitization of the nervous system to subsequent stimuli that could amplify pain. The NMDA receptor antagonists (ketamine, amantadine, methadone) as well as gabapentin have action to reduce wind-up.

Strategies for pain control include limitation of nociceptor stimulation, such as gentle tissue handling and minimization of tissue trauma, as well as pre-operative NSAIDs if not contraindicated (dehydration, hypovolemia, shock, trauma, renal insufficiency, for example). Another goal is interruption of peripheral neural transmission through local anesthetics, regional nerve blocks, or infiltration of the surgical site with analgesics. Also, we can inhibit nociceptive transmission at the spinal cord by considering epidurals, opioids, $\alpha 2$ agonists, or local anesthetics. We can modulate brain pathways through opioids, $\alpha 2$ agonists, and some NSAIDs.

It is important to recognize that balanced pre-emptive analgesia helps maximize pain control, minimize drug dosages, reduces clinically significant side effects, suppresses the stress response and shortens recovery. This not only includes medications, but also non-pharmacologic methods such as exceptional nursing care, warm/cool compresses, massage, acupuncture/acupressure, and complimentary methods such as chiropractic care, herbal remedies, and laser therapy.

Other considerations for pain management include ensuring normothermia, minimizing environmental stressors, reducing anxiety and fear (through medications such as tranquilizers/anxiolytics/ $\alpha 2$ agonists – trazodone, acepromazine, dexmedetomidine or non-pharmacologic means), maintaining compassion, and voiding the bladder. Remember to rotate recumbency, provide comfortable bedding, allow time for the patient to sleep by scheduling treatments together, and continuing pain control even when a patient is resting. Probably most important are to consider multi-modal therapy whenever possible and to constantly monitor your patients and monitor them frequently to gain better control over their immediate and long-term pain.