Treating moderate and severe pain in small animals

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Recently, publications in scientific veterinary journals have explored the topic of pain management and analgesic agents in small animal patients (1–3). These timely reviews may be motivating you to re-evaluate your approach to analgesia. Based on my experiences with and strategies for pain management and postoperative analgesia, I describe in this article a range of options available for analgesia in your practice.

Before going into details about pain management, I will give you the good and the bad news about it. The good news is that clients place a high value on the treatment of pain in their pets, and addressing pain relief in pets will foster tremendous client loyalty. The bad news is that to be most effective in treating pain, you must add control substances, such as, morphine and oxymorphone, to your pharmacies, to which, I sense from frequent conversations with my veterinary clients, there is resistance. I reserve the use of nonsteroidal analgesics, such as the nonsteroidal anti-inflammatory drugs (NSAIDs), to the treatment of mild soft tissue pain; I will not discuss these drugs in this article.

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My interpretation of signs of pain and my approach to treating pain have changed since I completed my residency training in anesthesia. Two events were responsible for this change. The first was my ongoing experience as a primary clinician at an emergency clinic, when I spent extended periods with large numbers of trauma victims and became much more aggressive in the frequency and doses of opioid analgesic administration to better control severe pain and make my patients comfortable.

The second came a couple of years ago as I treated my own cat for acute necrotizing pancreatitis. I was preparing to euthanize her, since her condition appeared to be deteriorating rapidly, when a clinician at the intensive care unit suggested administering oxymorphone to determine if pain was contributing to the symptoms. I did this, and 1 h later, she was sitting up and purring. I then proceeded to aggressively treat the cat's pain with epidural morphine over the next 5 d. She went on to make a full recovery.

Signs of pain in small animals can include any combination of the following: depression, sometimes severe; reluctance to assume a certain position, such as lying down; trying to sleep in the sitting position rather than lying down; anorexia or reduced appetite; resistance to handling; aggressive behavior when approached; aggressive behavior when touched; tachycardia; hypertension; shallow, guarded breathing; anxious facial expressions; splinting of the abdomen on palpation; and vocalizing on palpation.

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Interpretation can be complicated when you are attempting to differentiate an animal's behavior in a strange environment from signs of pain. In addressing this difficulty, I assume that if an animal is suffering from a condition known to cause pain or discomfort in humans, similar pain is present in the animal, and I treat it accordingly. When in doubt, treat for pain.

What about the potential side effects to the administration of opioid analgesic drugs? Administration of these agents in appropriate doses is seldom associated with adverse effects, especially when pain is present. Respiratory depression and bradycardia are extremely uncommon in animals that are awake and in pain.

My main concerns are the deleterious effects of opioids on intracranial pressure in animals with certain types of brain disease, and the alterations to bowel motility, which can be an important concern when treating abdominal disorders. Epidural morphine analgesia, which I shall discuss later has helped to reduce the impact of opioids on bowel motility. I can't remember the last time I used naloxone to reverse the effects of opioids because of undesirable side effects.

Vomiting, a frequently cited side effect, is not often encountered in the immediate postoperative period. At other times, it can be eliminated by the administration of potent antiemetics, such as, 0.02 mg/kg body weight (BW), IM, of acepromazine or 0.05 mg/kg BW, IM, of chlorpromazine, 10 min before opioid administration.

As for the question of analgesic agents masking the signs of disease, I have not found this relevant in clinical practice. However, I seldom administer opioids to an

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animal with a disorder of the central nervous system (CNS), because they hinder my assessment of the animal and may cause pronounced respiratory depression and increased intracranial pressure.

I have yet to encounter a situation in which the judicious use of pain medication has adversely affected the medical or surgical management of a patient, whether it be by masking signs of pain in an animal in need of exploratory surgery or in an animal bearing inappropriate weight on a recently repaired fracture of a limb.

Improvement in the animal's demeanor after opioid administration is a sure sign that pain was indeed contributing to the observed clinical signs. Of course, this is a very subjective interpretation. However, experience and careful observation will quickly make you more comfortable with your assessment. You will also come to interpret sleeping, not as a sign of inappropriate depression, but rather as a sign of effective pain relief that enables an animal to rest comfortably. Verifying the vital signs of such a sleeping animal will reinforce this interpretation.

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There are a number of available options for moderate and severe pain management in dogs and cats. The most consistently effective are the opioids (narcotics), such as, morphine, oxymorphone, meperidine, butorphanol, or buprenorphine (not yet available in Canada), which are also appropriate for use in cats.

The most pronounced differences among the above mentioned agents are in their duration of effect. Buprenorphine (5 to 20 μg/kg BW, IM) is the longest acting analgesic, with a suggested duration of effect of about 8 to 12 h, although I find 4 to 6 h to be a more realistic period when dealing with moderate to severe pain. Morphine (0.2 to 0.5 mg/kg BW, IM, in cats, and 0.5 to 1 mg/kg BW, IM, in dogs) is next, with a duration of effect of about 2 to 3 h in severe pain and up to 6 to 8 h in mild to moderate pain. The effects of oxymorphone (0.05 to 0.1 mg/kg BW, IM) and butorphanol (0.2 to 0.4 mg/kg BW, IM) last 2 to 4 h and of meperidine (4 to 6 mg/kg BW, IM) about 30 min. In cases of extreme intractable pain, I administer morphine (0.25 to 2.0 mg/kg BW/h) as a continuous infusion.

Unfortunately, with butorphanol and buprenorphine, there is a ceiling effect, whereby administration of higher doses of drug does not result in increased analgesia. This makes these agents poor choices in circumstances of severe pain, such as, fractured bones, declaw and orthopedic surgery, pancreatitis, enteritis, and crush injuries.

You should consider applying the concept of preemptive analgesia whenever possible. Preemptive analgesia is a powerful tool, involving the application of pain relieving agents prior to the painful stimulus whenever possible. By blocking the transmission and perception of painful stimuli before they occur, preemptive analgesia lowers the necessary doses of systemic analgesic agents during the postsurgical period. Preemptive analgesia is practised by using local anesthetic agents and opioid analgesics preoperatively to block pain sensation; it includes the use of lidocaine, mepivicaine, or bupivicaine in local nerve blocks; infiltration of local anesthetics at the surgical site; epidural local anesthesia; and epidural opioid analgesia.

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I apply the concept of preemptive analgesia by incorporating opioid analgesics into my premedication protocols for any painful surgical procedure. I also administer this same dose of systemic opioid as I discontinue inhalant anesthesia, and follow up with the administration of analgesia q4h for 12h. Thereafter, I taper my dose as dictated by the patient's clinical signs. Delayed recovery is not a problem with this approach. It does, however, promote smooth, quiet, stress-free return to consciousness.

A recent addition to our analgesic armament has been epidural morphine. This approach also applies the concept of preemptive analgesia in that, whenever possible, the morphine is administered epidurally prior to surgery. Furthermore, the pain relief provided can last from 12 to 24 h. It does not interfere with ambulation and does not cause CNS depression, because it effects analgesia through the opiate receptor in the dorsal horn of the spinal cord.

Epidural morphine can also be applied for nonsurgical pain, such as the pain of parvovirus enteritis or acute pancreatitis. In these circumstances, an additional advantage of epidural morphine is that it does not interfere with bowel motility, already severely compromised by the disease process.

I routinely administer preservative-free epidural morphine for all abdominal (including cesarian section), hind limb, thoracic, and forelimb surgeries in dogs and cats. Its effectiveness in providing forelimb analgesia has been inconsistent. However, in all other circumstances, it levels out the intraoperative course of anesthesia, reduces the necessary dose of inhalant anesthesia, and significantly reduces the need for systemic postoperative pain relief. In addition, epidural morphine can be combined with epidural lidocaine or bupivicaine to improve intraoperative muscle relaxation during hind limb, pelvic, or abdominal procedures.

The only disadvantages of administering epidural morphine, besides requiring a little practice, are urinary retention in the first 24 h and the possibility of delayed respiratory depression, which may occur from 6 to 12 h after the epidural administration (when many veterinary hospitals are without staff on premises). Unfortunately, prospective studies have not reported on the incidence of this phenomena in small animals, although they are well documented in humans. Over the past 4 y, I have not encountered postepidural respiratory depression, but

the incidence and risk of this side effect have not yet been fully determined in veterinary patients.

Innovative use of morphine is its administration intra-articularly at a dose of 1 mg after elbow, carpal, tarsal, or stifle surgery. Again, the target is the peripheral rather than central opiate receptor. This technique is limited to the above mentioned joints, because a tourniquet must remain in place for 10 to 15 min after opioid administration. This is carried out at the termination of surgery via a sterile catheter into the joint cavity, after the joint capsule has been closed. Tourniquet application may be technically difficult in some joints. This use of preservative-free morphine will provide 8 to 12 h of post-operative analgesia and does not harm the joint.

One problem that concerns me and for which I do not have any easy solutions is how to address the needs for overnight analgesia in hospitals without staff on duty. Since the duration of effect of most systemic analgesics is not sufficient to provide relief from severe pain overnight, patients may be suffering. The use of cutaneous fentanyl patches in dogs and cats may partially resolve this problem. The fentanyl patch is a cutaneous adhesive patch that, when applied to bare skin, will continuously release a constant dose of fentanyl. Information about the kinetics of this sustained release formulation is just becoming available. It appears to require 12 h to take effect and to be active for up to 5 d. The patch is commercially available in 4 strengths of 25, 50, 75 and 100 μg/h formulations. A 25 ug patch is usually sufficient in cats and small dogs, with the larger sizes being reserved for larger animals.

Those of you who have found ways of addressing requirements for analgesia during the overnight hours could communicate them to us through the correspondence columns of the Journal. The benefits of any creative solution to this problem, and to pain relief in general, will undoubtedly be a shortened number of days of hospitalization and convalescence for our patients.

References

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