Title:
Pain management: what do we do now?

Session Description:
Opioids have been the cornerstone of treatment for veterinary patients with acute pain. Unfortunately, with the opioid shortage we are forced to step back and examine our approach to patient care as it relates to pain management. This hour is dedicated to exploring techniques for managing post-operative pain in dogs and cats with and without opioids.

Lecture Notes:
One by one our injectable opioids are going away either due to lack of production or their price being cost prohibitive. We already have limited numbers of opioids available to us and the expectation is that we will continue to have fewer options as time goes on. While we can hope for their return, other treatment modalities may be necessary to treat our patients with acute pain. We will explore medications and methods that can help belay or at least reduce the need of opioids.

Ketamine, an NMDA receptor antagonist, can be useful when managing peri-operative and chronic pain. Ketamine, when used as a CRI, has been demonstrated to decrease MAC for anesthetized patients and may also decrease opioid requirement for post-operative patients. It is typically used in combination with an opioid such as fentanyl or morphine at a CRI dose of 2-10μg/kg/min. Ketamine can also be helpful for patient who experience chronic pain and the wind-up phenomenon.

Amantadine is also an NMDA receptor antagonist that may antagonize central pain sensitization and decrease tolerance to analgesics such as opioids. It is not expected to provide analgesic effects as a sole therapy, but may enhance the analgesic effects of NSAIDs, opioids, or gabapentin. Amantadine is well absorbed in dogs and the half-life of amantadine is short: 5 hours after 30 mg/kg. Due to its short half-life, dosing every 12 hours may need to be used in dogs and cats. A randomized, placebo-controlled and blinded clinical trial evaluated the efficacy of adding amantadine to meloxicam for the management of NSAID-refractory hind limb

osteoarthritis pain in dogs. Significant improvement was noted using client-specific outcome measures for activity in the amantadine treatment group (3–5 mg/kg by mouth every 24 hours) on day 42 of treatment, but not on days 7 or 21. No controlled clinical trials are available for amantadine use in cats. One downside to be considered is its relatively high cost, especially for large dogs.

Gabapentin is an anticonvulsant and as an analgesic that has been more commonly used recently. It is a structural analog of GABA but does not bind directly to its receptors. The mechanisms for gabapentin's anticonvulsant and analgesic effects have not been definitively identified. Gabapentin increases the brain concentrations of GABA either through increased

GABA synthesis, increased vesicular release, or decreased GABA metabolism. The half-life of

gabapentin is short in dogs (3–4 hours) and cats (3 hours), necessitating dosing at least every 8 hours. A dosage of 10 to 20 mg/kg every 8 hours maintains targeted concentrations in dogs and cats. Unfortunately, evidence for its use in both dogs and cats is low.

Cerenia (maropitant) is a neurokinin-1 inhibitor that is widely used as an anti-emetic. There was recent excitement regarding its utility for managing post-operative pain. However, several studies have shown that, despite the ability of maropitant to decrease MAC in anesthetized dogs, post-operative rescue analgesia and pain scores are not affected. Also of note its ability to decrease post-operative nausea and vomiting is questionable as well.

While tramadol is an FDA approved treatment for moderate to severe pain in people, it's effects on pain have been disappointing in dogs. About 10% of dogs metabolize tramadol to an active metabolite. Although patients may appear more restful after dosing, this may be attributable to its serotonin effects rather than opioid effects. Several studies have failed to identify anti-nociceptive effects or reduction in pain scores in post-operative patients. Unfortunately, it appears tramadol may not be helpful in managing post-operative pain in dogs. However, cats do metabolize tramadol to active metabolites. Studies to back it efficacy for pain management in cats is lacking and they are particularly sensitive to its taste.

Codeine is an FDA-approved mu opioid agonist for the relief of mild to moderately severe pain in humans. Codeine tablets are available as a sole ingredient or in combination with other drugs, including acetaminophen. In contrast with humans, the oral bioavailability of codeine in dogs is 4% and morphine was not detected in measurable concentrations. However, codeine-6-glucuronide, which is an active opioid metabolite, was formed in high concentrations and may provide analgesic effects in dogs. Unfortunately, clinical data for its use in both dogs and cats is

lacking.

References

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