

The following pain management protocol is tiered to ensure a global relevance, recognizing that not all analgesic modalities are available to veterinary practitioners and vary from region to region around the world. Its implementation will be guided by the various analgesic modalities available along with the needs of the individual patient requiring treatment. This protocol is reproduced from the WSAVA Global Pain Treatise, a succinct yet comprehensive review of pain assessment, various pain modalities, and the treatment of various clinically painful scenarios in both dogs and cats. The WSAVA GPC Pain Treatise published in the *Journal of Small Animal Practice* and is available for open access at the GPC pages of www.wsava.org.

Orthopaedic surgery

Orthopaedic surgery can result in moderate-to-severe postoperative pain. Surgery should be performed under general anaesthesia combined with aggressive perioperative analgesia. Preventive and multimodal analgesic techniques should be employed for all procedures. The balance between pre-, intra- and postoperative analgesia will depend on the severity of the preoperative condition and the location and magnitude of surgical trauma. Frequent pain assessment should be performed and when pain is not successfully controlled, alternative or additional analgesics or analgesic techniques should be employed to improve patient comfort. NSAIDs provide excellent perioperative analgesia, and should be used unless contraindicated. The administration of an approved NSAID is recommended. The same NSAID should be used postoperatively as is used preoperatively – that is, switching between drugs should be avoided. Nerve transection (e.g. during limb amputation) or manipulation, may lead to severe chronic pain (neuropathic pain). In such cases, anecdotal evidence suggests gabapentin, included in a multimodal regimen, may have a role in prevention of chronic neuropathic pain in veterinary patients; however, no suitably designed clinical studies have investigated this. (Refer to Sections 17 and 36 of the full Guidelines).

Note: The choice of opioid, α_2 adrenoceptor agonist or NSAID used will vary based on availability, personal preferences and contraindications. Local-regional anaesthetic techniques such as intra-articular, incisional and specific nerve blocks, wound infusion catheters or combinations thereof before and/or after surgery are highly recommended in all cases. Such techniques become mandatory when opioids and other controlled analgesic drugs are not available. Longer acting local anaesthetic agents such as bupivacaine or ropivacaine are recommended due to their prolonged duration of action. The systemic administration of lidocaine is contraindicated in cats due to its cardiovascular depressant effects.

Protocol for orthopaedic surgery

Preoperative: Combination of an opioid and a NSAID, \pm α_2 adrenoceptor agonist, \pm ketamine (cats).

Intraoperative: Boluses and/or infusions of opioids, α_2 adrenoceptor agonists, ketamine and/or lidocaine. These drugs may not be required if an effective local anaesthetic block has been performed.

Immediate postoperative (24 hours): Combination of a NSAID (if not administered preoperatively) and continue intraoperative infusions or boluses with gradual reduction in doses. Adjunctive analgesics, non-drug therapies (especially cold therapy), careful padding and positioning, and gentle massage of compensatory regions (back, and non-operated limbs)

Later postoperative days: Opioid administration (injectable, transdermal, oral, transmucosal) with titration to effect and gradual discontinuation and/or NSAIDs. Icing of the affected regions should be continued for a minimum of 3 days, at which point it can be alternated with heat therapy prior to stretching and gentle weight-bearing (with icing following these therapies). Adjunctive analgesics including lidocaine patches (evidence supports their use in human studies) and non-drug therapies, local anaesthetic administration via a diffusion catheter may be employed until discharge from hospital if needed.

Example of a protocol for dogs undergoing femoral fracture repair

- *Preoperative:* NSAID (24 h dose; ideally one approved for dogs), morphine 0.5 mg/kg IM, acepromazine 0.05 mg/kg IM.
- *Induction of anaesthesia:* propofol to effect IV.
- *Maintenance of anaesthesia:* Inhalation anaesthesia with lumbosacral epidural administration of bupivacaine 0.5% (1 mL/5 kg before surgery).
- *Immediate postoperative (for 24 h):* Morphine 0.3–0.5 mg/kg IM (every 4–6 h depending on evaluation or as needed), icing, range of motion, and other non-drug techniques.
- *Later postoperative days:* Buprenorphine 0.01 mg/kg IM, q6–8 h for up to 3 days and NSAID (same drug as preoperative, starting 24 h after preoperative dose), q24h for up to 7 days after surgery and continue with non-drug techniques.

Example of a protocol for cats undergoing femoral fracture repair

- *Preoperative:* NSAID (24 h dose; ideally one approved for cats), morphine 0.3 mg/kg IM, medetomidine 0.01 mg/kg IM.
- *Induction of anaesthesia:* Propofol to effect IV.
- *Maintenance of anaesthesia:* Inhalation anaesthesia with lumbosacral epidural administration of 0.5% bupivacaine (1 mL/5 kg before surgery).
- *Immediate postoperative (for 24 h):* Morphine 0.2–0.3 mg/kg IM (every 4–6 h depending on evaluation or as needed), icing, range of motion, and other non-drug techniques.
- *Later postoperative days:* Buprenorphine 0.02 mg/kg IM or OTM, q6–8 h for up to 3 days after surgery and NSAID (same drug as preoperative, starting 24 h after preoperative dose), q24h for up to 7 days after surgery. Please see label for approved NSAIDs for use in cats. Continue with non-drug techniques.

Protocol without controlled drugs:

See above, without the opioid. Injectable tramadol may be administered in the perioperative period. The use of local anaesthetic techniques, particularly regional blocks, intravenous lidocaine infusion intra- and postoperative, non-drug therapies combined with NSAIDs becomes critical when opioids are not available.

Protocol with limited availability of analgesic drugs:

See above without the opioid. Non-drug therapies, ketamine, and lidocaine infusions, and acupuncture may be used in the intraoperative period. A combination of low dose α_2 adrenoceptor agonist, tramadol, NSAID (not if administered preoperatively), non-drug therapies, further regional blocks or continuous wound block (wound catheters) are employed in the immediate postoperative period. Continuous intra-articular infusions of local anaesthetic are contraindicated as this can result in significant cartilage damage, and the risk of ascending contamination leading to infection is high. For *later postoperative days*, NSAIDs are administered as required-paracetamol (acetaminophen) (not in cats) or dypirone, amantadine and/or gabapentin, non-drug therapies are employed.

If pain is severe, cannot be controlled with the available resources and is likely to be prolonged, euthanasia should be considered.

For additional pharmaceutical dosing information, see the dosing tables in the WSAVA GPC Treatise at www.wsava.org