PERIOPERATIVE ANALGESIA II

Balanced Analgesia (Multimodal Analgesia)

As there are many different mechanisms of pain, the mechanism of action of each analgesic agent is different. The use of more than one analgesic agent with different mechanisms of action may provide more effective pain control. Analgesia provided by such combinations is called “balanced analgesia”. Proper combination reduces both the amount of analgesic agent used and minimizes side effects from these agents. It was found that the combination of NSAI agents with opioids decreased the opioid dose by 20% to 50%. Especially with the development of NSAI agents with high cyclooxygenase-2 (COX-2) inhibition, the use of NSAIs as preemptive analgesics has become safer. Preoperative morphine combined with NSAI agent (meloxicam or carprofen) at the end of the operation and NSAI agent continued orally for 3 days postoperatively is one of the sample combinations applied to a dog with orthopaedic surgery.

Classification of Analgesics

1. Opioid agents
2. Non-steroidal anti-inflammatory drugs (NSAI)
3. Other analgesic agents

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Local analgesics

Alpha 2 adrenergic receptor agonists

Ketamine

1. Opioid Agents (Narcotic Analgesics)

Opioids are agents that provide pain control by binding to specific opioid receptors (mu, kappa, delta receptors) found in both the spinal cord and the brain. It can be used alone or in combination with other agents. They are metabolized in the liver and excreted in the urine. Therefore, it should be used with caution in animals with liver disorders. Opioids can be divided into two classes as pure agonists (morphine, hydromorphone, oxymorphone and fentanyl) and less potent agents (meperidine, buprenorphine and butorphanol) that are strong enough to eliminate severe pain for clinical use. In this group, butorphanol and buprenorphine are agonist-antagonist opioids.

Morphine: It is the first opioid agent used in veterinary medicine. This pure agonist opioid, used as preanesthetic and analgesic, has affinity for both mu and kappa and delta opioid receptors. It is used for the treatment of severe and moderate pain in cats and dogs. In dogs and cats, slow IV morphine can be used as IM, SC, intraarticular, epidural and spinal injections. However, because IM

application causes vomiting and dysphoria in cats, SC route should be preferred. The most common side effects are vomiting, salivation and defecation especially in dogs. Morphine depresses the central nervous system and suppresses respiration. Stimulates histamine release. In addition, it should not be used in conjunction with other drugs that stimulate this area as it stimulates the reflex centers on the spinal cord. Otherwise, it may cause convulsions. Mild side effects include bradycardia, myosis in dogs, mydriasis in cats, urinary retention and hypothermia.

Fentanyl: Fentanyl, which is a very strong anesthetic, is used as IV infusion or transdermal patch due to its short duration of effect. Fentanyl, which rarely causes respiratory depression in animals, may form deep sedation and bradycardia. Although the duration of effect is short, it may take hours for the resumption of breathing. If atropine is administered before fentanyl administration, bradycardia is prevented. It is important to carefully monitor fentanyl-treated animals. Fentanyl IV administered during inhalation anesthesia is both effective and safe for analgesia. Unlike Morphine, there is no vomiting effect in dogs. Its effect is reversible with opioid antagonists. Carfentanyl, sufentanyl, remifentanyl and alfentanyl are the most known derivatives.

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Meperidine (Pethidine): Meperidine, which is used as analgesic and preanesthetic, is preferred because SC administration may be painful and IV administration may cause severe hypotension. It has the advantage that the effect on the cough center is minimal and that the respiratory effect of the respiratory depression and the gastrointestinal stimulation is less than morphine. However, the low analgesic effect and short duration of activity in cats prevent their use as postoperative analgesia.