ME-OUCH! FELINE PAIN ASSESSMENT AND INTERVENTION

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Veterinary analgesia has made enormous strides since the 1980s and 1990s, when it was first realized that small animal patients could benefit from multimodal analgesia. Prior to that time, analgesics were rarely prescribed for canine and feline patients and principles of analgesia were seldom taught in veterinary professional programs for DVMs and technicians. In the intervening decades, veterinary medicine has come to understand that untreated pain has detrimental effects on quality of life, glycemic regulation, cortisol regulation, wound healing, and immune function. Veterinary research has established dose recommendations, safe drug classes, modes of action, and pharmacokinetic data for a variety of animal species. The specialty of veterinary anesthesia and analgesia has emerged for both veterinarians and veterinary technicians. Practitioners continue to explore new drugs and to adapt advanced analgesic techniques from human medicine for animal species, including felines—yet in many studies, feline patients are prescribed analgesic medications less than canine patients and chronic pain in cats is poorly understood. This is concerning given that there are approximately 75 million companion cats in the Unites States. Veterinary technicians are on the front line of pain recognition, evaluation, and intervention in feline patients; as client educators, they are also in an excellent position to help clients understand feline pain and the value of appropriate pain management.

Pain is defined as "a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components." In applying this definition to clinical practice, almost every facet of animal disease and most clinical procedures have the potential to induce or intensify pain. Acute pain and perioperative pain are not the only analgesic concerns in small animal medicine. Sensitization of the central nervous system and pain pathways lowers pain thresholds, inducing responses to both noxious stimuli (referred to as hyperalgesia) and to non-noxious stimuli (referred to as allodynia). Chronic pain in cats is under diagnosed and under treated. Many factors affecting the recognition and treatment of pain in cats have been proposed, including the following: challenges in pain assessment in this species, lack of validated pain scoring instruments for cats, deficiencies in the education of DVMs and technicians in regard to feline pain, concern over drug diversion/side effects/drug availability/drug cost, and the fear that analgesic use will blunt recognition of patient decompensation/worsening clinical condition. Cats "behaving badly" may not have their pain addressed due to concerns about personnel safety.

Much "bad" feline behavior in the clinical setting can be attributed to pain, fear, or the misinterpretation of the cat's communication by handlers. Escalated restraint frequently results in an escalation of fight/flight behavior by the cat, is never appropriate in a cat that may be in pain, results in an increased number of bite/scratch injuries, and an increase in worker's compensation claims. Feline pain responses are not synonymous with canine pain responses although their nociceptive pathways are identical. A better understanding of feline body language can minimize miscommunication. When assessing behavior or temperament, it is important to consider the role of pain, especially since degenerative joint disease is under-diagnosed in cats. Pain behaviors in cats include, but are not limited to reduced activity, including jumping onto higher perches; hyporexia/anorexia, reduced curiosity/exploring/interactive behavior, hiding/vocalization/hissing, guarding parts of body, excessive or reduced grooming, stiff gait/altered body posture, tail flicking, increased sleep/more time spent in one place, and periuria (urinary or fecal accidents near the litter box or outside the box). It is reasonable to assume that if a condition or injury is painful for a person or dog, it is also painful for a feline patient (for example, a laceration, arthritis, pancreatitis, exploratory laparotomy, or liver disease).

Recent attention to the recognition of pain as "the fourth vital sign" has led to the development of a variety of pain scoring systems for cats. Pain scales are classified as unidimensional or multidimensional. Visual Analog Scales (VAS), Simple Descriptive Scales (SDS), and Numeric Rating Scales (NRS) are examples of unidimensional pain scoring scales; these scales commonly feature a horizontal line with vertical right and left borders; sometimes segmental dividers are present with or without numeric ratings. The user selects a numeric signifier that correlates to the patient's perceived level of pain—in human medicine, the patient selects their own level of pain. The signifiers may range from 0 (least painful/no pain) to 10 (worst pain imaginable/severe pain). These scales are prone to bias and lack objectivity. Multidimensional pain scales are also known as composite pain scales and use quantitative assessments of pain behaviors to assign a score; these scales are evaluated for objectivity, reliability, repeatability, and applicability across individuals and disease states. Assessment includes evaluation of spontaneous behavior (for example, when the evaluator is not handling or stimulating the patient) and evoked behavior (for example, when a surgery site is palpated). An advantage of multidimensional pain scales (aside from their rigorous

validation process) is that many establish a score where interventional analgesia (rescue analgesia) is recommended. Several multidimensional pain scales for cats have been developed in the past decade including the Colorado State University Feline Acute Pain Scale (CSU-FAPS; http://www.vasg.org/pdfs/CSU_Acute_Pain_Scale_Kitten.pdf), the UNESP-Botucatu multidimensional composite pain scale for cats (http://www.animalpain.com.br/assets/upload/escala-en-us.pdf), the Glasgow Composite Measure Pain Scale (CMPS-Feline; https://www.aprvt.com/uploads/5/3/0/5/5305564/cmp_feline_eng.pdf), and the Feline Grimace Scale (FGS; https://www.felinegrimacescale.com/about). When selecting a pain scale and reviewing the available literature, it is important to remember that sample populations in veterinary research are significantly smaller than in human medicine. A veterinary study may have a sample size of 8, 12, 24, 60, or 200 patients rather than the several thousand found in a human study exploring a similar hypothesis. Each practice should select a validated, multimodal pain scale that meets the needs of their practice, ensure that all personnel are trained in use of the pain scale, and use it consistently.

The CSU-FAPS is relatively easy to use and can help drive analgesic assessment and intervention but has not been fully validated in all settings and patient populations. It is somewhat subjective. A 2018 study by Shipley et al evaluated 68 female cats after OHE using the CSU-FAPS and found it to have moderate to good inter-rater reliability when used by veterinarians with advanced training in anesthesia; however, their conclusion was that the scale required further refinement before being widely applied in clinical practice. It is mentioned in the most current version of the AAHA/AAFP pain management guidelines.

The UNESP-Botucatu pain scale was originally developed in Brazilian Portuguese but has since been translated into and validated in English, Spanish, French, and Italian. It is easy to use but can be time-consuming to execute. The instrument is 3 pages long and uses three subscales encompassing 10 variables grouped around pain expression, psychomotor change, and physiologic variables. Pain expression variables include elements like vocalization, reaction to palpation, and other miscellaneous behaviors (tail movement, eye shape, limb movement, etc.). Psychomotor changes include activity, attitude, comfort, and posture. Physiologic variables include elements like appetite and blood pressure. The UNESP-Botucatu scale has been found to be discriminating, reliable, sensitive, specific, and valid in cats undergoing OHE when used by trained veterinary professionals (DVM and technician); however, it has not been applied to cats with chronic pain, other types of surgical pain, orthopedic pain, or trauma. Training materials, including a video tutorial, are available. Ketamine use may affect scoring of the psychomotor elements. Shy or fearful cats may score differently than extroverted, confident cats; scores should be interpreted carefully in these patients.

The CMPS-Feline or Glasgow feline pain scale has been revised intensively since its creation; it has good validity and responsiveness but requires further evaluation for reliability. It is less time consuming than the UNESP-Botucatu scale and has the advantage of being applicable to any type of acute pain, not just that associated with OHE; it also provides a score cut-off for rescue analgesia (≥5/20). It includes similar elements to the UNESP-Botucatu (activity, demeanor, facial expression, posture, vocalization, etc.). The CMPS-F is 2 pages long. Training materials including video tutorials are available. Fearful, introverted cats may score differently than extroverted, more interactive cats.

The FGS was first presented in 2019 after several years of development. Grimace scales have been in use for many years in laboratory animal medicine and have also been developed for horses, ferrets, piglets, and sheep; they are predicated on facial expressions that can be assessed using facial action coding systems, or FACS. FACS measure action units, or specific changes in the elements of expression (ears, eyes, whiskers, lips, etc.) and have been validated by thousands of measurements. Alterations in action units can be specific to individual species (for example, mice exhibit bulging cheeks when painful while horses show lip tightening). To develop and validate the FGS, photo analysis software was used to assess video stills of cats believed to be painful and those from a colony who had no documented health problems. Five action units were identified: ear position, orbital tightening, muzzle tension, whiskers change, and head position. Each action unit is graded on a scale of 0 (absent), 1 (moderately present), or 2 (markedly present) for a composite score of 0-10. Rescue analgesia is recommended if the score is ≥4. The FGS has demonstrated high correlation with the CMPS-F, internal consistency, and good to excellent intra-rater reliability. It has not been validated in brachycephalic cats or in black cats. Further evaluation has shown that the FGS provides good agreement between scores assessed by DVMs and those assessed by veterinary technicians, pet owners, and veterinary students; it can also be used with reliability by untrained raters.

There are a wide variety of safe analgesic drugs currently available for cats; many are injectable, and some are reversible. Multimodal analgesia is recommended (administration of a variety of drugs from different classes that will reduce the dose needed of all drugs while also addressing all potential pain pathways). Common classes of drugs used in multimodal feline analgesia include opioids, alpha-2 adrenergic agonists, nonsteroidal anti-inflammatory drugs (NSAIDs), and adjunctive medications such as local anesthetics, ketamine, or gabapentin.

Loco-regional anesthetic techniques, such as epidurals, line blocks, or fascial plane blocks are also effective to provide analgesia in the immediate post-op period. If possible, analgesic drugs should be administered before a painful event occurs (such as a surgery). The ideal protocol is one that takes the patient's comorbidities, temperament, pain score, vascular access device(s), hydration, and perfusion status into account. There is no "one size fits all" analgesic protocol for feline patients, and the best protocol is one that preserves normotension and cardiorespiratory function while also alleviating pain.

Opioid drugs, such as buprenorphine, fentanyl, hydromorphone, and methadone are an excellent choice for moderate-to-severe and acute pain. They can be titrated to effect, combined with other drugs, given as an intermittent bolus, or delivered as a constant rate infusion and are reversible with naloxone or partially reversible with butorphanol, which halts the objectionable effects of opioids while preserving their pain-relieving properties better than naloxone. Documented side effects of opioids in cats include euphoria, mydriasis (eye dilation), nausea/vomiting/ptyalism, and hyperthermia. Opioid drugs that are well studied in cats include methadone, buprenorphine, butorphanol, morphine, hydromorphone, oxymorphone, fentanyl, and fentanyl analogues. Not all are considered 100% safe (for example, morphine may cause histamine release when administered IV). Butorphanol is best reserved as a sedative since it has weak analgesic properties. Nonsteroidal anti-inflammatory drugs such as robenacoxib can be added once hypovolemia is corrected and kidney function has been evaluated. Robenacoxib is labeled specifically for feline patients and has good analgesic and anti-inflammatory effects. It can be administered orally or subcutaneously. Other drugs such as ketamine or gabapentin also have a role in multi-modal pain relief. Gabapentin has also been shown to improve stress behaviors in hospitalized cats and may be a good adjunct for cats who require extended hospitalization and associate handling with pain. If surgery is required, soaker catheters and regional blocks provide additional analgesic coverage. Specific dosing information is available elsewhere.

The understanding and recognition of feline pain have grown by leaps and bounds in the past 30-40 years. Multiple multimodal, validated pain scoring instruments are available for use in cats and many provide comprehensive training in the use of the instrument (for example, interactive practice scoring scenarios are available for the FGS). Regardless of which instrument is selected, veterinary technicians have the unique ability to drive practice improvements in feline analgesia by advocating for their patients, educating themselves and their peers, staying current on new research, using analgesic medications with confidence, and being a bridge between the patient, the client, and the DVM.

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