HOW DO WE KNOW WHEN THEY HURT? ASSESSING ACUTE PAIN IN CATS

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Abstract

To treat pain, we must first recognize it and quantify it in some way so we can assess the efficacy of our treatments. Pain is a complex multidimensional experience with both sensory and emotional components. In cats, physiologic variables (e.g. heart rate, respiratory rate, and blood pressure) are not, on their own, good indicators of pain because these are altered by other factors including fear and stress. It is now accepted that quantitative measurement of behaviour is the most reliable method for assessing pain in animals. Normal behaviours should be maintained post-operatively if a cat is comfortable. There are now validated tools for assessing acute pain in cats including the Glasgow Composite Measures Pain Scale-Feline (rCMPS-Feline) and the UNESP-Botucatu Multidimensional Composite Pain Scale. These tools assess specific domains including vocalization, posture, attention to the wound, facial expressions and response to palpation and interaction with the observer. Intervention levels for treatment are also suggested. New developments include the development of a standalone grimace scale for cats and a scale to assess oral and maxillofacial pain. These tools can be easily integrated into veterinary clinics and will improve pain management and welfare of cats.

Keywords: pain, acute, facial expression, validated, behavior, intervention

Introduction

Pain must be scored in some way so we can assess the outcome of treatments. Pain is a complex multidimensional experience. It is an emotion and an "internal state" which is unique to each individual and it is always unpleasant. One updated definition of pain is as follows: "Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components".(1) In humans who can self-report, pain is what the patient says it is but in neonates, cognitively impaired people and animals, pain is what the observer says it is. In veterinary medicine we and our health care team make proxy assessments on our patient's behalf which put the responsibility on us to "get it right" so that our patients receive the care they require and deserve.

Acute pain assessment

Many attempts have been made to correlate objective measurements such as heart rate and blood pressure with pain. In cats, no study has found a consistently reliable objective measure because these parameters are influenced by other factors. The stress of a journey to a veterinary hospital will alter heart rate, respiratory rate and blood pressure.(2) Healthy cats in a feline friendly facility show changes over time in appetite, urination, defecation and behavior during short term hospitalization.(3) Mechanical nociceptive threshold testing can detect primary and secondary hyperalgesia suggesting that an assessment of wound tenderness should be incorporated into an overall assessment of post-operative pain.(4) Currently there is no gold standard for assessing pain in cats. Any instrument that is used must be validated, reliable and sensitive. Without strictly defined criteria and use of well-trained and experienced observers, many scoring systems are highly variable. Basic pain scales include simple descriptive scales, numerical rating scales and visual analogue scales but have high inter-observer variability.(5)

It is now accepted that quantitative measurement of behavior is the most reliable method for assessing pain in animals and that if the methodology used to develop and validate these systems is rigorous, they can be objective with minimal observer bias. Multidimensional or composite systems are particularly important when self-reporting is not possible. However, they must incorporate components that have been proven as sensitive and specific indicators of pain in the species being studied. Reliable assessment tools also have two major components; one section is observational to assess spontaneous pain behaviors and the second section is interactive to detect evoked pain in a patient. Some painful animals will be overlooked if it is assumed that a cat sitting silently at the back of the cage is not in pain. Often animals are reluctant to move because doing so is painful therefore without interaction we miss these patients. Other things that must be considered with cats is their dislike of restrictive dressings or bandages which may cause them to may roll around and make attempts to remove them. These behaviors could indicate agitation or dislike of the bandage or pain, so it is important to differentiate between these by performing a careful assessment or removing the bandage and observing again. Knowledge of the normal behavior for the cat being evaluated is important and deviations from normal behavior may suggest pain, anxiety or fear, or some combination of stressors. Normal behaviors should be maintained post-operatively if a cat is comfortable. Grooming is a normal feline behavior but licking excessively at a wound or incision can be an indicator of pain, so the two should be differentiated. The occurrence of new behaviors such as a previously friendly cat becoming aggressive, or the loss of a normal behavior, for example a playful and friendly cat becoming reclusive should raise our suspicion that pain may has not been adequately addressed. Another thing to consider is that after a cat wakes up it normally performs a stretch; they put their hind

end in the air, and front paws out in front (**Figure 1.**); a cat with abdominal pain (e.g. a painful midline incision) will either not perform this behavior or abbreviate it.

Figure 1. This normal feline behavior but will be absent or modified if abdominal pain is present.

A simple way to think of behavior in relation to pain is as follows:

1. In normal behavior maintained after surgery (or trauma)?
2. Is there loss of a normal behavior?
3. Is there development of a new behavior?

Acute pain assessment tools for cats

We are learning what pain looks like in our feline patients and two validated multidimensional composite scales are available. Brondani and colleagues developed a multidimensional composite scale based on observing cats that underwent ovariohysterectomy.(6, 7) This tool is sensitive but the drawbacks are that it takes time to perform, includes blood pressure measuring an assessment of appetite and was only developed and tested for one surgical procedure. Based on its lack of utility in a busy clinical setting, it is being retooled by some of the original developers in conjunction with the University of Montreal. The new version does not include

physiologic parameters, has fewer sections to complete, is being tested on cats with different causes of pain and will be available in eight different languages.

Another tool is the Glasgow Composite Measures Pain Scale-Feline (rCMPS-Feline) which has been updated to include facial expressions of pain.(8-10) This tool was developed using cats undergoing different types of surgery or with medically related pain. The instrument includes observational and interactive components. When pain has been well managed, it should be possible to palpate gently around a wound or injury with minimal response by the cat. Cats that adopt a hunched or "tucked-up" posture are likely experiencing abdominal pain. In one study detailed behavioral ethograms were constructed for cats before and after abdominal surgery and with different analgesic interventions; a hunched or tucked up posture was rarely recorded in cats before surgery but occurred on a frequent basis afterwards.(11) Each domain in the rCMPS-Feline has different weighting and the total possible score is 20. An intervention level of 5 is suggested. This tool has been tested with trained and untrained groups of observers. Of the 7 domains (see below), numbers 3, 4 and 5 show broad agreement and numbers 1, 2 and 6 show dichotomy. The last domain – overall demeanor – is a subjective evaluation and not surprisingly results in wide interobserver disagreement. The developers of the tool have set an intervention score of 5, which guides but should not dictate treatment.

The 7 major acute pain assessment domains in cats are:

1. Vocalization
2. Posture
3. Attention to the wound
4. Facial expressions (muzzle and ears)
5. Interaction with people (response to stroking)

6. Response to palpation of the wound or painful area
7. Overall demeanor

Facial expressions of pain

Facial expressions have been studied in humans, including newborns and the cognitively impaired to measure emotional states. Similar studies are now being done with a wide range of mammalian species ranging from rodents to horses and many "grimace" scales are becoming available; some of these can be coded using facial recognition software and specifically designed computer algorithms. Each animal, including humans has different facial action units based on the anatomy of their face and facial muscles, therefore the details of a "pain face" will be different in each species but there are remarkable similarities across species that include the eyes, jaw / muzzle and ear and head position. Descovich and others stated that "facial expression may be a more honest signal of internal state than general behavior" and deserves more investigation in animals.(12)

The facial expressions of pain in cats include changes in ear position and tension in the muzzle.(10) Work is currently underway to develop a "stand alone" Feline Grimace Scale. Results so far, suggest that ear position, orbital tightening, muzzle tension, whisker position and position of the head (a lowered head is indicative of pain) are different between painful and non-painful cats.(13) **Figure 2** shows facial expressions suggestive of pain in a cat (left) and the same cat after analgesic drugs have been given (right).

Figure 2. The cat on the left has his ears in a lowered position, eyes almost closed (orbital tightening) and the tension in the muzzle retracts the whiskers caudally. After rescue analgesics were given the ear position changed, the eyes are open and in a more horizontal plane and the whiskers are facing down and laterally due to decreased tension in the muzzle.

Using pain assessment tools in practice

A scoring system should be user friendly, quick to complete and easily performed by all team members and it should be an integral part of the animal's evaluation. After temperature, pulse and respiration are checked, pain, which has been coined the "fourth vital sign," in veterinary medicine should be assessed. An evaluation should include both non-interactive and interactive components and rely heavily on changes in behavior and facial expressions. The scale can be laminated and hung on cat's cage so that scores can quickly be made and transferred to the record. There are confounding factors to consider such as the cat's personality and demeanor especially when it is first hospitalized.(3) Many cats are fearful and stressed in a clinic environment and behaviors and postures related to this must be taken in context. Pre-operative demeanor scores did have an effect on some pain scoring tools and also feeding behavior in cats undergoing castration, with the authors concluding that there is potential for demeanor to confound pain assessment.(14) If ketamine is used in the anesthetic protocol some of the behaviors seen early in recovery (first hour) can resemble pain behaviors, but ketamine does not alter response to palpation if the cat is painful.(15)

The severity of surgery or trauma, the patient's response to analgesic therapy and the expected duration of action of the analgesic drug(s) administered will help to determine the frequency of

evaluations. For example, if a cat is resting comfortably following administration of an opioid, it may not need to be re-assessed for two to four hours. Patients should be allowed to sleep following analgesic therapy. Vital signs can often be checked without unduly disturbing a sleeping animal. In general, cats should not be woken up to check their pain status; however, this does not mean they should not receive their scheduled analgesics. Undisturbed observations coupled with periodic interactive observations (e.g. palpation of the wound) are likely to provide more information than only occasionally observing the animal through the cage door. The observer must also use their clinical skills, and not treat based solely on a number or recommended intervention score; if one you think the cat could look better, review the analgesic record and treat with additional or different drugs then reassess. No cat should have to earn its analgesic treatment by having to score a specific number. Routinely using a pain assessment tool enhances the care of our patients.

Assessing oral and maxillofacial pain

As stated in the World Small Animal Veterinary Association's Global Dental Guidelines, "Dental/oral disease is the most common medical issue in small animal medicine and oral disease is painful. However, veterinary patients rarely show signs of pain". (www.wsava.org/Guidelines/Global-Dental-Guidelines). Because oral pain in cats is underrecognized and undertreated we need validated scales to document oral and maxillofacial pain. A recent publication describes an owner questionnaire and a scoring system for the veterinary examination so that the pain associated with oral disease in dogs and cats can be measured.(16) The tool also allows monitoring of the efficacy of treatment. Although further validation of the English version is needed this scale should assist in standardizing and focusing the profession on elevating the importance of dental care.

"I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind." ~ Lord Kelvin, Popular Lectures and Addresses "Electrical Units of Measurement" (1889). I think this quote applies very well to our quest to improve pain management in animals.

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