

Recognition and quantification of pain in small animals – an introduction

James Hunt BVetMed CertVA MRCVS. Wood Veterinary Group, Quedgeley, Gloucester.

Introduction

This article is written for general practitioners with a limited knowledge of pain recognition in animals. It introduces the topic and provides information about pain scoring systems, particularly in cats. Links to websites where tools to quantify pain in animals are given.

Animal pain

The past three decades have witnessed a growing acceptance, supported by experimental data, that conscious perception of pain can occur in all species of mammals from birth.

Attempting to moderate pain resulting from disease or surgery is an important element in care of human and animal patients. In human patients appropriate pain management results in quicker clinical recovery, shorter hospital stays, fewer readmissions, and improved quality of life, leading to increased efficiency within operating departments¹.

Different species present markedly different behavioural expressions of pain perception. Whether this relates to the degree to which the species 'suffers' - i.e. experiences an unpleasant and aversive emotional response which we would associate with a similar painful stimulus, or whether the behavioural expression of pain is shaped by the survival strategy of the species (i.e attempting to disguise pain from potential predators) is currently debated.

Different types of pain may produce differing behavioural expressions, for example an acute nociceptive stimulus may provoke a well defined reflex such as a skin twitch or limb withdrawal, accompanied by behavioural signs such as moving away from the stimulus, biting, hissing or whining.

Acute pain arising from an inflammatory lesion or surgical wound may be relatively straightforward to recognise, for example the animal may show reduced mobility and guarding of the affected area.

More chronic pain states, which may have both inflammatory and neuropathic components, or pain associated with neoplasia may provoke non specific changes in behaviour such as aggression, self mutilation, increased sleeping and decreased appetite. These behaviours can be challenging to identify and, because there are many potential causes of these general behavioural changes, it can be difficult to ascribe them to a painful stimulus.

In many instances in which human beings are subjected to deliberate painful procedures, health providers can ascertain some indication of their patient's discomfort by direct questioning and asking them to rate the intensity of their pain. Similarly, in human medicine self report can be used to monitor the efficacy of analgesic treatment. Human patients can be instructed how to use Patient Controlled Analgesia systems, allowing them some control over opioid drug administration in the acute post-operative period.

In contrast, veterinary patients have no means of verbally communicating their pain to us and cannot be instructed to self administer analgesic drugs in a clinical setting, therefore veterinarians and specialists in analgesia provision must rely mainly on behavioural observations in order to try and identify pain states in animals. Research has revealed certain characteristic behaviours of pain in different species and awareness of these

behavioural changes is essential in pain assessment. For example Professor Paul Flecknell's research group at the University of Newcastle have identified writhing and back arching behaviours to be cardinal and easily identifiable behaviours in rats and mice that are indicative of pain. The frequency of expression of these behaviours also appears to be correlated with the magnitude of pain experienced by the animal².

Attempts have also been made to produce pain scales for clinical assessment of animals. One of the first pain scales to be validated in veterinary patients was the Glasgow Composite Pain Scale for assessment and quantification of acute pain in dogs. The tool can be downloaded free of charge from the University of Glasgow website:

<http://www.gla.ac.uk/departments/painandwelfare/researchgroup/downloadacutepainquestionnaire/>

Why is quantification of pain important?

Pain has the potential to seriously compromise patient welfare. A significant amount of work in humans identifies inadequately treated acute pain as a cause of delayed recovery, increased risk of post op complications and a major risk factor for development of chronic pain³.

Individual patients may have markedly different requirements for analgesics, even when subjected to what we would expect were similarly painful treatments. Therefore in order to tailor analgesic administration to meet the individual requirements of the patient quantification of pain in each patient is ideal. Practical limitations may make this problematic in laboratory animals when a large number of animals might undergo the same surgical procedure in a single day. Certain human genotypes and phenotypes are recognised to be poorly responsive to opioid analgesics and require higher doses in order to achieve similar analgesic effects; differences in individual drug metabolism can also result in analgesic drugs having unexpectedly shortened or extended durations of action. Anxious patients report more intense pain experiences than relaxed patients⁴.

Although understanding of genetic and phenotypic susceptibilities to pain is currently limited, evidence is emerging in felines that individuals may have differing responses to opioid drugs. In a thermal analgesia model in experimental cats different researchers working with different colonies of research cats all report individual animals that do not show thermal analgesia to buprenorphine, whereas analgesia to butorphanol is demonstrated⁵. This may be evidence of individual differences in opioid receptor populations resulting in variability in analgesia provided by opioid drugs acting at μ and opioid receptors. It is therefore likely that some analgesic drugs will be more effective in some individuals than others and monitoring individual responses of patients by pain assessment enables the clinician to review analgesic strategies if they are not producing adequate analgesia.

Pain scoring, using a validated method enables us to identify animals that are in pain and guides our use of analgesics. Quantifying (on an arbitrary but reproducible scale) the amount of pain our patients experience can enable us to be more responsive to their analgesic needs, and employ alternative strategies if required.

In cats a validated pain scoring system is still awaited, but a tool is currently under development by researchers at the University of Glasgow, based on similar principles as those used to design the GCPS in dogs. Simple descriptive (SDS) and numerical rating scales (NRS) and visual analogue scales (VAS) have all been used in cats to quantify pain.

Simple descriptive scales usually consist of 4 or 5 expressions used to describe various values of pain intensity (eg. no pain, mild, moderate or severe pain). Each expression is

assigned a number which becomes the pain score for that animal. SDS are considered to have low sensitivity.

Utilising a numerical rating scale, an observer assigns a whole number score from 0 to 10 which he considers most accurately represents the current level of pain, the end points relating to extremes in pain intensity. A familiar example would be assessment of the degree of single limb lameness in animals and subsequent assignment of a numerical value which relates to the severity of lameness. The inter-observer variability on the NRS scale is low. Numerical rating scales have been shown to be sufficiently sensitive for use in a clinical setting while minimizing variability between observers⁶.

Visual analogue scales comprise a line 100 mm long, with anchor points at 0mm indicating no pain and 100mm indicating the worst pain imaginable for that procedure. The assessor makes a mark on the line corresponding to the amount of pain they think that the animal is in and the distance between the 0 mm anchor point and the mark is measured to provide a score. Visual analogue scales show good reproducibility for the same observer but significant inter-observer variability. They are therefore a sensitive tool for a research setting where there is only one observer but are not very useful in a clinical setting where multiple observers are likely.

Colorado State University have produced a feline pain scale which encompasses psychological and behavioural elements, response to wound palpation and body tension and can be downloaded from: <http://www.ivapm.evetsites.net/refId,20467/refDownload.pml> Currently a collaborative project between the Universities of Glasgow and Florida is in progress to identify feline pain behaviours and develop a validated scale to quantify acute pain in cats.

It is to be hoped that increasing awareness of animal pain will lead to more effective treatment using the currently available modalities and employing novel agents as appropriate.

References

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