

Evaluation of postoperative pain in dogs

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Introduction

The primary purpose of this study was to develop a tool that would facilitate clinical management of post operative pain in dogs. The objective was to:

- Create a pain measurement scale:

Secondary aims were to:

- Determine whether the scale could differentiate between dogs that underwent general anaesthesia only and those that underwent an ovariohysterectomy while under general anaesthesia
- To determine whether the scale had an acceptable degree of repeatability when used by different observers.

Discussion

The ability to quantify the degree of pain experienced by animals is an important component in the assessment of an animals welfare (Barnett,1997).

Pain has been defined as an unpleasant sensory and emotional experience (Wall,1992). It is widely accepted that a fundamental step toward adequate care for all animals is the provision of effective pain management (Holton et al, 1998). Accurate assessment of pain is a tool that could aid clinicians in their assessment of a patient's need for analgesia and thus alleviate much of the pain and distress of surgical procedures.

It has been shown that severe prolonged pain, as that caused by surgery, could cause lactic acidosis, gastrointestinal ileus, increased metabolic rate, increased protein catabolism, decreased food intake, delayed wound healing, decreased removal of airway secretions, can lead to self mutilation and can lead to debilitating changes in CNS function (Taylor, 2000). All of these could extend recovery time and in some instances cause more harm than the patient's initial condition.

By alleviating pain the autonomic and endocrine responses associated with pain which may lead to the above problems can be prevented, postoperative morbidity can be decreased and the animal returned to normality much faster (Johnson, 1991).

In the past the assessment of pain in dogs was based solely on subjective criteria that varied widely depending on the experience of the observer. Methods of recording pain had often been adaptations of subjective scales used in pain measurement of human infants. These have included the:

- Single descriptive scale (SDS)
- Numerical rating scale (NRS)
- Visual analogue scale (VAS)

The VAS most commonly consists of a 100-mm line, the ends of which relate to extremes in pain intensity eg "no pain" and "pain could not be worse" (Joyce et al, 1975). Observers placed a mark on the line that corresponded to the pain intensity for the animal. The distance between the end

of the scale representing no pain and the mark is the pain score. The NRS is similar, but observers assign a numerical score for pain intensity rather than placing a mark on a line. These scores range from 0 to 10 or 0 to 100 with the end points relating to extremes of pain intensity. The SDS the simplest of the three scales, usually consists of four or five 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.

The limitations of these methods are obvious. Even though the objective assessment of pain in dogs is difficult it is an important clinical aid in the recovery process. To this end the work of Firth and Haldane (1999) has provided the clinician with a more reliable pain assessment scale.

In their study the pain scale used was modified from the CHEOPS design (Children's Hospital of Eastern Ontario Pain Scale). Here pain associated behaviours are assigned scores, and these scores are summed to create a total pain score for the patient. The scale included multiple descriptions in six categories incorporating both physiological data (heart and respiratory rates) and behavioural responses (responses to palpation, activity, mental status, posture and vocalisation) see table 1.

The study compared the responses of four groups of dogs to pain associated with the following surgical procedures:

Group 1: Control group. Anaesthesia given. No analgesics used. No surgery performed

Group 2: Anaesthesia followed by butorphanol preceding an ovariohysterectomy. Butorphanol is an opioid agonist-antagonist analgesic with an onset of action of 15 to 30 minutes and a duration of four to five hours.

Group 3: Anaesthesia and carprofen preceding an ovariohysterectomy. Carprofen is a nonsteroidal anti-inflammatory drug with an onset of action of one to two hours and a duration of action of eight to 12 hours.

Group 4: Anaesthesia preceding an ovariohysterectomy. No analgesics administered.

Results were analysed for significant differences in pain scores for single categories and total pain scores among groups. The entire procedure was video taped and the various segments were scrambled and then scored by a second assessor to test the repeatability of the results, using the pain assessment scale.

The results showed that the pain scores were significantly different between the groups of dogs that underwent general anaesthesia only and each group of dogs that underwent general anaesthesia and surgery. Pain scores for the analgesic- treatment groups reflected the known onset and duration of action of the analgesic used.

Agreement between the internal and external assessors was excellent and indicated a high precision between the two assessors for the population of dogs as a whole.

The clinical implications of this research are that behavioural and physiological measurements when taken together can be used reliably to evaluate the degree of pain in dogs during the postoperative period and that this scale can be used by different people with a degree of precision.

An interesting finding of this report was that the mean total pain score of dogs receiving analgesics after surgery did not differ significantly from the mean total pain score of dogs that did

not receive analgesics after surgery when measured 18 hours after the surgery. This implies that analgesics may not be necessary after 18 hours for ovariohysterectomy procedures in dogs.

These findings also indicate that for optimum analgesic effects, carprofen should be administered intravenously one to two hours before surgery. This finding has also been reported by Lascelles et al, 1998 who found that carprofen given to dogs preoperatively elicited lower pain scores.

Even though the assessment of pain based on both physiological and behavioural data has provided the best method to date in assessing pain in dogs the pain score developed I believe still has some problems, namely:

- The observed behaviour may not accurately reflect intensity of pain
- The degree of socialisation of a dog may influence the animal's perception of whether it is advantageous to display overt behaviour
- The function of a particular behaviour may vary among dogs
- Vocalisation during the postoperative period may express anxiety, fear, or anaesthesia-induced delirium rather than pain
- Withdrawal responses, behavioural depression or suppressed movement are not necessarily accompanied by a corresponding degree of pain
- Physiological changes such as heart rate and respiration may be due to stress rather than pain

Clearly further study in this area is required if the postoperative welfare of dogs is to improve. Further studies could also look at:

- Pain associated with other procedures
- Other species
- The use, effectiveness and timing of analgesics.

Table 1 Pain scale

Category	Descriptor	Score
Physiologic data		
a.	Physiologic data within reference range	0
b.	Dilated pupils	2
c. Choose only one	Percentage increase in heart rate relative to preprocedural rate	
	>20%	1
	>50%	2
	>100%	3
d. Choose only one	Percentage increase in respiratory rate relative to preprocedural rate	
	>20%	1
	>50%	2
	>100%	3
e.	Rectal temperature exceeds reference range	1
f.	Salivation	2
Response to palpation		

Choose only one	No change from preprocedural behaviour	0
	Guards/reacts* when touched	2
	Guards/reacts* before touched	3
Activity		
Choose only one	At rest -sleeping	0
	-semiconscious	0
	-awake	1
	Eating	0
	Restless (pacing continuously, getting up and down)	2
	Rolling, thrashing	3
Mental status		
Choose only one	Submissive	0
	Overtly friendly	1
	Wary	2
	Aggressive	3
Posture		
a.	Guarding or protecting affected area (including fetal position)	2
b. Choose only one	Lateral recumbency	0
	Sternal recumbency	1
	Sitting or standing, head up	1
	Standing, head hanging down	2
	Moving	1
	Abnormal posture (eg, prayer position, hunched back)	2
Vocalisation**		
Choose only one	Not vocalising	0
	Vocalising when touched	2
	Intermittent vocalisation	2
	Continous vocalisation	3

The pain scale includes 6 categories. Each category contains descriptors of various behaviours that are assigned numeric values. The assessor examines the descriptors in each category and decides whether a descriptor approximates the dog's behaviour. If so, the value for that descriptor is added to the patient's pain score. Certain descriptors are mutually exclusive (eg, a dog cannot be in sternal recumbency and standing up at the same time). These mutually exclusive descriptors are grouped together with the notation "choose only one." For category 4, mental status, the assessor must have completed a preprocedural assessment of the dog's dominant/aggressive behaviour to establish a baseline score. The mental status score is the absolute difference between preprocedural and postprocedural scores. The minimum possible total pain score is 0 points, the maximum possible total pain score is 27 points.

* Includes turning head toward affected area; biting, licking, or scratching at the wound; snapping at the handler; or tense muscles and a protective (guarding) posture. ** Does not include alert barking.

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