REVIEW ARTICLE

Pain and analgesia following onychectomy in cats: a systematic review

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Abstract

Objectives To systematically review published studies evaluating pain associated with onychectomy in cats, and to assess the efficacy of the analgesic therapies applied.

Databases used Four sources were used to identify manuscripts for review. Databases searched were those of the National Library of Medicine, EMBASE and CAB International. In addition, pertinent references in the bibliographies of included articles were retrieved.

Results Twenty manuscripts published in refereed journals were reviewed. These included papers reporting 18 clinical trials and two studies conducted in conditioned research cats. Twelve analgesics were evaluated, including seven opioids, four non-steroidal anti-inflammatory drugs and one local anesthetic. Nine studies involved a direct comparison of analgesic agents. Limb use was abnormal when measured at 2 and 12 days following onychectomy, and neither fentanyl patch nor butorphanol administration resulted in normal use of the surgical limb. In another study, cats evaluated at 6 months after this surgery were not lame. Differing surgical techniques were compared in six studies; the results indicated that pain scores were lower after laser surgery than after scalpel surgery. The difficulties associated with assessing pain in cats and the lack of sensitivity of the evaluation systems utilized were highlighted in many of the studies. Huge variations in dose and dosing strategies had significant impacts on drug efficacy. Statistically significant differences among treatments were found in most studies; however, no clearly superior analgesic treatment was identified. A combination of meloxicam or robenacoxib with an opioid may provide more effective analgesia and should be evaluated.

Keywords analgesic, cat, onychectomy, pain assessment.

Introduction

A systematic review, as defined by Cook et al. (1995) is 'the application of scientific strategies that limit bias by the systematic assembly, critical appraisal and synthesis of all relevant studies on a specific topic'. Systematic reviews, along with meta-analyses where appropriate, can provide the best form of evidence to guide clinical decision making (Wright et al. 2007).

Onychectomy is an increasingly controversial, yet still apparently common surgical procedure, estimated to be performed in up to a quarter of owned cats in the USA (Landsberg 1991; Patronek et al. 1996; Pollari et al. 1996; Patronek 2001; Lockhart et al. 2014). In some countries the procedure has been banned and a veterinarian performing onychectomy can have his or her license to practice suspended. Pain is recognized

as a common short-term consequence of the procedure (Landsberg 1991; Tobias 1994; Patronek 2001; Yeon et al. 2001). The authors of this review have encountered considerable variability of opinion from fellow veterinarians regarding the perceived degree of pain experienced by cats following onychectomy and have found that a wide range of pain scores in cats after this procedure have been reported. Extremes of pain scores range from a score equal to the highest possible score (Carroll et al. 1998) to an average of <14% of the maximum possible score (Mison et al. 2002). A consensus opinion on the optimal analgesic strategy with which to manage pain in cats undergoing onychectomy is essential information for the clinicians caring for them.

Research question

The goal of this study was to determine an evidence-based, optimal analgesic strategy for domestic cats undergoing onychectomy. To achieve this, we aimed to summarize the relevant literature and to critically evaluate reported measures of pain and responses to analgesic interventions.

Materials and methods

Four sources were used to identify studies for review. The three literature databases searched were those of the National Library of Medicine, EMBASE and CAB International. Keywords entered were 'onychectomy' and 'cats'. The abstracts of all studies identified were evaluated by one investigator to determine their suitability for inclusion. Case reports were excluded. The bibliographies of retrieved articles were then examined for pertinent references, which were also retrieved. A study was included when some measure of pain or stress or an analgesia treatment was evaluated in domestic cats after onychectomy. All relevant studies (randomized clinical trials and observations) identified in the searches were included. No studies were excluded after review and data extraction.

Quality appraisal

Manuscripts were categorized according to their reported study design after evaluation by both investigators, according to the system reported by the Oxford Centre for Evidence-Based Medicine (Howick et al. 2011). This rating system allows

classification of a hierarchy of evidence based upon study format or design (Table 1). We also utilized a checklist of important elements, selected from those included in the Consolidated Standards for Reporting Trials (CONSORT), which referred to the use of randomization, description of the method of randomization, the use of blinded evaluators, and the description of study participants including those withdrawn from the study (Schulz et al. 2010). The results of this appraisal are presented in Table 2.

Results

We reviewed 20 manuscripts published in English in peer-refereed journals (no studies in other languages were found) that evaluated cats and reported some assessment of pain or stress following thoracic limb onychectomy. These included two studies in conditioned research cats and 18 clinical trials. Most studies ($n = 17$) used a randomized method of treatment allocation, but nine did not describe the method of randomization (Table 2). Seven studies utilized evaluators who were aware of treatment allocation. Ten of the 20 studies mentioned subjects

Table 1 Levels of evidence are categorized and documented according to Howick et al. (2011)

Level of evidence	Description
I	Evidence obtained from a systematic review of all relevant controlled trials
II	Evidence obtained from at least one properly designed, randomized controlled trial
III-1	Evidence obtained from well-designed, pseudo-randomized controlled trials (alternate allocation or some other method)
III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomized (cohort studies), case–control studies or interrupted time series with a control group
III-3	Evidence obtained from comparative studies with historical controls, two or more single-arm studies, or interrupted time series without a parallel control group
IV	Evidence obtained from case series, either post-test or pre-test and post-test
V	Expert opinion without explicit critical appraisal, or based on physiology, bench research or 'first principles'