

Original Research Article

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Post-Operative Behavioural Assessment of Cats Undergoing Ovariohysterectomy

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ABSTRACT

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Postoperative pain was assessed and compared in cats subjected to ovariohysterectomy under two different anaesthetic regimen based on Glasgow Feline Composite Measure Pain Scale. Twenty queen cats were randomly divided into two groups comprising of ten animals each. Group I received dexmedetomidine (10µg/kg) and ketamine (5mg/kg) with butorphanol (0.2mg/kg) and group II received dexmedetomidine (10µg/kg) and ketamine (5mg/kg) with fentanyl (5µg/kg) by intramuscular route. In both the groups, maintenance of anaesthesia was carried out with isoflurane. After surgery, pain scores were assessed through Glasgow Feline Composite Measure Pain Scale continuously for 24 hours. Behavioural changes and pain expression were higher in fentanyl group compared to butorphanol group but total pain score showed no significant difference among two groups. The observation of spontaneous behaviours indicative of pain, combined with the qualitative assessment of the response to interaction and palpation of a painful area serves as an effective tool to evaluate analgesic effectiveness.

Introduction

Pain management is one of the most important steps of the perioperative period and has direct impact on quality of recovery. Opioids play an important role in the clinical management of pain in cats. Ideally,

analgesics should be administered before noxious stimulation (preventive analgesia) with the aim of preventing sensitization of the central nervous system, which could lead to the development of hyperalgesia (Bortolami and Love, 2015). Post-operative acute pain has aroused great interest due to its potential

risk of developing into chronic pain if not treated properly, which worsens the recovery and quality of life of the patient Pergolizzi *et al.*, (2014). Ovariohysterectomy (OHE) is one of the most common surgeries performed in cats. Besides reproductive control, the surgical procedure is indicated in cases of pyometra, metritis, dystocia, mammary tumours and reproductive disorders Oliveira *et al.*, (2014).

Surgical trauma is associated with activation of the sympathetic-adrenal axis, with consequent breakdown of homeostasis and increased recovery time. Thus, less invasive techniques are being incorporated into the veterinary practice to enable better surgical recovery Oliveira *et al.*, (2014).

Cats are one of the least studied species of domestic animals regarding pain recognition and its treatment (Al-Gizawiy and Rude, 2004). The inability of animals to self-report their symptoms provide a major challenge for observers attempting to assess pain and difficulty in postoperative treatment can often be inappropriate. Thus, the development of more accurate methods of evaluation is crucial for optimal management of pain.

Physiological changes like tachypnea, tachycardia, hypertension, mydriasis and salivation can be used as indicator for pain assessment in cats (Robertson, 2008). The aim of this study was to assess the post-operative pain in cats undergoing ovariohysterectomy through the Glasgow Composite Measure Pain Scale (CMPS-Feline) and in turn assess the analgesic rescue.

Materials and Methods

This work involved the use of client-owned animals only and followed individual clinical patient care. Ethical Approval from a Committee was not therefore needed.

Informed Consent in a written form was obtained from the owner of all animals described in this work for the procedures undertaken. The study was conducted in twenty apparently healthy queen cats subjected for ovariohysterectomy at Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal with the mean \pm SD body weight of 2.75 ± 0.85 kg. Food was withheld for 12 hours and given free access to water prior to anaesthesia. The selected cats were randomly divided into two groups comprising of ten animals each. Group I received dexmedetomidine ($10\mu\text{g}/\text{kg}$) and ketamine ($5\text{mg}/\text{kg}$) with butorphanol ($0.2\text{mg}/\text{kg}$) and group II received dexmedetomidine ($10\mu\text{g}/\text{kg}$) and ketamine ($5\text{mg}/\text{kg}$) with fentanyl ($5\mu\text{g}/\text{kg}$). In both the groups, maintenance of anaesthesia was carried out with isoflurane.

Ovariohysterectomy was performed in all the animals through right flank approach as per standard surgical procedure with the above anaesthetic protocol. Physiological variables like heart rate, respiratory rate and rectal temperature were assessed before and after drug administration at every 5 minutes interval.

After surgery, pain scores were assessed through CMPS-Feline continuously for 24 hours at five different time interval: one hour after surgery, two hours after surgery, five hours after surgery, twelve hours after surgery and twenty four hours after surgery. This scale comprises seven descriptive levels, which are ordered categorically. The total score was calculated from the sum of the items 'scores', ranging from 0 (no pain) to 20 (maximum pain).

Analgesic rescue was performed at the time the score reached 5 point and above (out of a total possible score of 20). The analgesic rescue was performed according to the need

of each animal by intramuscular administration of 2mg/kg of tramadol. The anaesthetic protocol chosen aimed to provide adequate analgesia during and after surgery, but without interfering directly in the pain assessment by the selected techniques.

Statistical analyses were performed using SPSS 20.0 version. The mean and standard errors were calculated and compared between both the groups. Two-way ANOVA evaluated pain scores within groups and student t-test compared pain scores between groups.

Results and Discussion

Total average score of CMPS-Feline recorded in the study as described in the questionnaire was calculated and are presented in (Table 1). All the cats were assessed for behavioural changes from each category at different time interval for analgesic intervention level. At one and two hours interval animal showed signs of sleeping, relaxed, ignoring the painful area and lack of response on gentle palpation of a surgical wound and scored 3.17 and 3.17 out of 20 in group I and II, respectively (Figure 1). At five hours interval animal showed signs of hunched/arched back posture, anxiousness, crying, response to stroking, painful reaction to surgical wound palpation, flatten ears with pulled back whiskers and scored 6.0 and 6.17 out of 20 in group I and II, respectively (Figure 2). At twelve and twenty four hours interval animal exhibited normal behaviour after adequate

pain management showing normal position of ears, response to stroking, relaxed and normal response to palpation of surgical wound and scored 1.5 and 1.67 in group I and II, respectively (Figure 3).

CMPS-Feline is a simple tool and its updated version was the first valid instrument to relate psychometric analysis of clinical acute pain in cats also using facial expressions Reid *et al.*, (2017). Facial expressions of acute pain in cats were described Holden *et al.*, (2014) and incorporated into the new version of the CMPS-Feline. It evaluates acute pain in seven behavioural categories: vocalization, activity/posture, attention to wound, caricature observation (ears and muzzle), response to manipulation/stroking, response to palpation of wound and general behaviour. Scores are attributed to each category and the maximum final score is twenty. Behaviour based pain score was found effective for assessing the analgesic intervention level at different time interval for adequate pain management.

In the present study, pain thresholds measured after each time interval, mean score was calculated, which showed fentanyl group had a higher pain than butorphanol group, indicating that thermal nociceptive threshold values of butorphanol on intramuscular administration increases up to 8 hours. All the animals were given an analgesic rescue at 5th hour postoperatively.

Table.1 Total pain score for behavioural changes at different postoperative time interval - Glasgow CMPS – F (5 point and above (out of a total possible score of 20)

Parameter	Group	Total score at different time intervals				
		1	2	5	12	24
Behavioural changes	I	3.50	3.50	6.17	1.67	1.67
	II	3.17	3.17	6.00	1.50	1.50
	III	3.17	3.17	6.17	1.67	1.67



Fig.1 Behavioural changes at one hour postoperatively Glasgow CMPS - F

A) Sleeping / Relaxed

B) Lack of response on gentle palpation of a surgical wound





Fig.2 Behavioural changes at five hour postoperatively Glasgow CMPS - F
A) and B) Hunched posture and arched back indicative of pain
C) Facial expression indicative of painful reaction to surgical wound palpation
D) and E) Distance between the slope of the line joining the base of the ear and tip of the ear
Painful cat demonstrating squinted eyes, flattened ears and pulled back whiskers



Fig 3: Behavioural changes at twenty four hour postoperatively Glasgow CMPS - F
A) and B) Animal exhibiting normal behaviour after adequate pain management – normal position of ears and response to stroking

Postoperative behavioural changes observed at different time interval using CMPS Feline was found effective for assessing analgesic intervention level. The total pain score observed using CMPS Feline scale observed that fentanyl group had elevated pain score compared to butorphanol group indicating that butorphanol produced better postoperative analgesia compared to fentanyl.

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