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## POST-OPERATIVE RESCUE ANALGESIA: NEED ASSESSMENT THROUGH MODIFIED GLASGO COMPOSITE MEASURE PAIN SCALE

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### ABSTRACT

Accurate identification of post-operative pain of nonverbal veterinary patients is essential for effective management and client satisfaction in a clinical setting. Different methods, subjective, semi-objective as well as objective methods are available to assess pain in the postoperative period. One such is the Glasgow Composite Measure Pain scale (GCMPS), which is a semi-objective or composite method to score pain and is suitable for use in a clinical setting. The present study was aimed to determine the usefulness of a modified GCMPS for assessing the requirement of rescue

analgesia in the post operative period and to compare the analgesic efficacy of two anaesthetic protocols. The present pain scale could evaluate the post operative pain without personal bias.

**Keywords:** postoperative pain, pain score, rescue analgesia, dogs

### INTRODUCTION

The Global pain Council (GPC) has recommended to consider pain as the fourth vital sign during assessments in a clinical setting and to execute control measures if needed (Mathews et al., 2014). Post-operative pain is inevitable in surgical procedures be it human or veterinary

patients. But depending on the anaesthetic/analgesic protocols used, the intensity of postoperative pain varies and so does the requirement of postoperative analgesia. Unmanaged pain can increase in intensity over a period of time through a process called peripheral and central sensitization, by which the original pain is doubled or tripled. Increased response to a painful stimulus (hyperaesthesia) and painful response to even a touch (allodynia) are the characteristics of central sensitization.

The dogs experiencing central sensitization exhibit varying expressions of pain right from vocalization, aggressive behaviour, protecting the surgical site, bite, lick or scratch the affected area, prolonged recumbency, reduced or stiff movements, reluctance to move or take food (Murrel, 2015; Mathews *et al.*, 2014) Such behaviour or a high pain score definitely demands post operative rescue analgesia.

Thus, it becomes the duty of the veterinarian to identify the need for rescue analgesia. There are different methods, subjective, semi-objective as well as objective methods to assess pain in the postoperative period. Unidimensional tools to measure pain which just ask an observer to allot a score for pain on a scale from 1 to 10 or 1 to 100 are prone to be biased as it relies on the observer's perception of pain. Glasgow Composite Measure Pain scale (GCMPS) is a semi-objective or composite method to score pain which is suitable for use in a clinical setting. This has a set of questions related to the dog's status and behaviour with a set of answers for each question and corresponding scores. A sum of scores for each question forms the pain score of that particular case. In the present

study a modified form of the same was used to evaluate two anaesthetic protocols with respect to the postoperative pain evinced by the patients. The anaesthetic protocols included a balanced anaesthesia protocol and a multimodal analgesic protocol as an adjuvant to a balanced anaesthesia protocol.

A multimodal analgesic protocol includes the administration of multiple classes of analgesic drugs which act at different sites of the pain pathway and thus blocks the transmission of pain from the site of its origin to higher centers of brain (Brown *et al.*, 2018). The aim is to reduce the conduction /transmission of nociceptive signals through the pain pathway thus preventing peripheral and central sensitization. To achieve this, the analgesics need to be administered prior to the surgical procedure that evoke pain.

## **MATERIALS AND METHODS**

The study was conducted in twelve dogs undergoing mammary tumour surgery irrespective of age and breed. All the dogs were subjected to initial clinical examination and haemato-biochemical evaluation. Those dogs belonging to ASA class I or II were included in the study. The food was restricted for 12 hours prior to surgery and withdrawal of water was not insisted as there were geriatric patients included in the study.

The dogs selected for study were divided randomly into two groups namely Group I and II. Those belonging to Group I were given a multimodal analgesic protocol along with balanced anaesthesia. The drugs included gabapentin at the rate of 2

**Table No.1**

Sl. No.	Observation parameter	Score	Total
1.	<b>Look at the dog while at rest: is the dog?</b>		
	a) Quiet	0	
	b) Making low sounds of cry	1	
	c) Groaning (long sounds of cry)	2	
	d) Screaming	3	
	a) Is the dog	0	
	b) Ignoring the surgical site	1	
	c) lying curled up to protect site	2	
	d) Looking at the surgical site	3	
	e) Licking the surgical site	4	
	f) Rubbing the surgical site	5	
	g) Chewing the surgical site	5	
2.	<b>Apply gentle pressure 2 inches around the surgical site. Does it</b>		
	a. Do nothing	0	
	b. Contract abdominal muscles	1	
	c. Move a limb	2	
	d. Look around	3	
	e. Quickly react	4	
	f. Growl or guard the site	5	
	g. Try to bite you	6	
	h. Cry	7	
3.	<b>Overall is the dog</b>		
	a. Comfortable	0	
	b. Dull	1	
	c. Restless	2	
	d. Tense	3	
	e. Rigid	4	

**Total**

(Proforma -modified short form of Glasgow composite measure pain scale)

mg per kg body weight orally, meloxicam at the rate of 0.1 mg per kg body weight subcutaneously, administered two and one hour prior to surgery respectively. Pre-anaesthetic medication was done using butorphanol at the rate of 0.2 mg per kg and dexmedetomidine at the rate of 3.5 µg per kg body weight intramuscularly, which added to the multimodal analgesia.

Along with induction of anaesthesia using diazepam at the rate of 0.2 mg per kg body weight and propofol intravenously, loading doses of lignocaine at the rate of 2 mg per kg body weight and ketamine at the rate of 0.7 mg per kg body weight was also given intravenously.

In Group II, a balanced anaesthesia

protocol was administered with tramadol at the rate of 2 mg per kg body weight and dexmedetomidine at the rate of 3.5 µg intramuscularly as pre-anaesthetic, 20 minutes prior to induction of anaesthesia and diazepam at the rate of 0.2 mg per kg and propofol 'to effect' intravenously for induction of anaesthesia.

After induction, all the dogs in both the groups were preoxygenated with 100 per cent oxygen for two minutes and isoflurane in oxygen was used to maintain anaesthesia. In Group I, during maintenance of anaesthesia, lignocaine at the rate of 30 µg per kg per minute and ketamine at the rate of 10 µg per kg per minute were administered as constant rate infusion (CRI) until the surgical procedure was completed.

During the recovery period, one hour after surgery, the pain score was recorded using modified form of Glasgow composite measure pain scale short form

(**Table No.1**). Those who recorded the pain score were unaware of the anaesthetic / analgesic protocol used.

## RESULTS AND DISCUSSION

The signalment of the dogs under study are represented in the **Table No. 2**.

In Group I, the pain score was 1 in I<sub>1</sub> and score 0 for all other dogs. In Group II, score 0 was seen in one dog (II<sub>2</sub>), score 2 was seen in II<sub>1</sub> and II<sub>3</sub>, score 3, 4 and 7 in II<sub>6</sub>, II<sub>5</sub> and II<sub>4</sub> respectively. The values were statistically analysed using Mann Whitney U test and significantly lower values were seen in the pain scores in group I, when compared to Group II (P< 0.05).

Pain, an unpleasant sensory and emotional experience associated with an actual or potential tissue damage, has a basic protective role (Bell, 2018). But when left unmanaged or if no measures were taken to control it, can lead to manifold increase in pain and may lead to chronic pain, which

**Table No. 2.** Signalment of the dogs under study

Sl. No.	Group	Animal no.	Breed	Age in years	Sex	Body weight kg	ASA class
1	I	I <sub>1</sub>	Dachshund	13	F	9.7	II
2		I <sub>2</sub>	Cross breed	12	F	11.5	II
3		I <sub>3</sub>	Labrador retriever	13	F	37	II
4		I <sub>4</sub>	Chinese pug	5	F	9.2	I
5		I <sub>5</sub>	Labrador retriever	5	F	26.5	II
6		I <sub>6</sub>	Non- descript	10	F	17.5	I
7	II	I <sub>13</sub>	Dachshund	8	F	14	II
8		I <sub>14</sub>	Cocker spaniel	11	F	11.5	II
9		I <sub>15</sub>	Labrador retriever	5	F	16.3	I
10		I <sub>16</sub>	German Shepherd dog	7	F	36	II
11		I <sub>17</sub>	Spitz	5	F	7	I
12		I <sub>18</sub>	Dachshund	10	F	11	II

**Table No.3.** Pain score at one hour post operatively

Group	Dog number					
	1	2	3	4	5	6
I	1	0	0	0	0	0
II	2	0	2	7	4	3

affects the quality of life (Hellyer *et al.*, 2007; Bufalari *et al.*, 2009). In non-verbal veterinary patients especially surgical patients, proper assessment of pain and its management is an essential component of post operative care. Expression of pain can vary among species and individual animals and are expressed as change in behaviour or physiological responses. A composite pain scale like the GCMPS, allows a veterinarian to effectively evaluate their patient without being biased. According to the Glasgow composite measure pain scale (Short Form), pain score above 5 requires rescue analgesia. Scores below that indicate that the pain was well managed perioperatively through anaesthetic/ analgesic drug combinations.

In the present study, the dogs which received multimodal analgesic protocol showed zero to one as their pain score, whereas those which had received a single analgesic in their anaesthetic protocol showed pain score that ranged from zero to seven. Thus one dog in Group II required rescue analgesia and the pain score was significantly lower in Group I.

Gabapentin administered at the rate of 10mg per kg bodyweight reduced the requirement of post operative pain in dogs after mastectomy (Crocioni *et al.*, 2015)

Ketamine, administered as a sub-anaesthetic dose infusion in a multimodal protocol, prevents or decreases the

development of central sensitization, a condition that significantly amplifies pain intensity (Mathews *et al.*, 2014). It was used at a loading dose of 0.15-0.7 mg per kg body weight followed by CRI of 2-10 µg per kg body weight (Epstein, 2015). Schnellbacher *et al.* (2013) studied the effects of lignocaine administration through CRI on the minimum alveolar concentration of isoflurane in rabbits and reported that on administration of lignocaine as CRI at a dose rate of 50-100 µg/kg/body weight reduced the isoflurane MAC. Lignocaine IV administration acted as an adjunct in anaesthesia of rabbits. These two drugs are commonly combined in CRI formulations to provide intraoperative analgesia. Multimodal anaesthesia protocol had an effect on both peripheral and central sensitization of pain, which reduced postoperative pain without causing any adverse systemic effects. This in turn brings about patient recovery and satisfaction and has the potential to improve various aspects of anaesthesia and postoperative care (Ramankutty *et al.*, 2024).

## SUMMARY

A modified form of Glasgow composite measure pain scale was used to score and compare post operative pain after administration of two anaesthetic protocols to determine the requirement of rescue analgesia post operatively. It was found effective to clearly identify those

patients who required rescue analgesia and to avoid indiscriminate use of analgesic drugs postoperatively.

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