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## Innovative technique of keyhole ovariohysterectomy in bitches for post-operative pain management

**Taziyun Imtiyaz, Dil M Makhdoomi, Moin Ansari, Massarat Khan, Mehrajud din Niakoo, Pankaj Goswami and Umer Amin**

### Abstract

Present study was undertaken to determine the intraperitoneal analgesic effect of bupivacaine in bitches undergoing keyhole ovariohysterectomy. The pain assessment was done before surgery and at different time intervals up to 18<sup>th</sup> hour after surgery using two pain scales {Glasgow composite pain scale (GCPS) and University of Melbourne pain scale (UMPS)}. To undertake the study animals were divided into two groups, group A and group B (each containing 12 animals). The animals of group B were given bupivacaine intraperitoneally and in group A animals normal saline was used intraperitoneally. Significant number of animals in Group B showed earlier recovery after 8 hours post-operatively of the study and group A showed recovery at the end of the study that is at the 18<sup>th</sup> post-operative hour.

**Keywords:** Intraperitoneal, keyhole, bupivacaine, normal saline solution

### 1. Introduction

Spaying means surgical removal of the reproductive organs in animals. Elective sterilization of female dogs is one of the most common procedures performed in veterinary practice. For routine spaying, the best age for spaying in dogs is before puberty (Asrat and Melkamu, 2018) [14]. Spayed animals do not go through heat cycles or produce unwanted puppies (Blender, 2012) [1]. Ovariohysterectomy (OHE) is the surgical removal of ovaries and uterus conducted for elective sterilization of female dogs to control over population of stray dogs thereby preventing inter-and intra- species disease transmissions. It is indicated in cases of pyometra, uterine tumours, or other pathologies (Asrat and Melkamu, 2018) [14]. Ovariohysterectomy is done mostly to control the population of animals (Asrat and Melkamu, 2018) [14]. Canine ovariohysterectomy (OHE) is a high frequency surgical procedure in veterinary practice. This procedure despite being performed under general anesthesia gives rise to mild to moderate abdominal pain. Mostly pain originates from the surgical incision, manipulation of the abdominal viscera, stretching of associated ligaments (Gaynor and Muir, 2014) [15]. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Merskey, 1979) [11]. Molony and Kent (1997) [13] described pain as an aversive sensory and emotional experience. Broom and Fraser (2007) [2] described pain as an aversive sensation and feeling, associated with actual or potential tissue damage. The understanding of pain is very important and it is viewed from four points based on its pathophysiology nociception, pain, suffering and pain behavior (Woolf, 2004) [19].

Local anesthetic techniques are part of the multimodal and preemptive analgesic approach to postoperative pain management (Slingsby 2008 and Gurney 2012) [17, 4]. The use of local anesthetic infiltration around wound for postoperative pain relief may be an attractive method because of its simplicity and low cost (Moiniche *et al.*, 1998) [12]. Local anesthetics are very versatile with regard to clinical use and routes of delivery. This class of drugs is commonly administered as infiltration anesthesia, field blocks or spinal anesthesia with the aim of inhibiting transmission of nociceptive stimuli from the periphery to the spine (Skarda & Tranquilli 2007) [18].

Bupivacaine is a long acting local anesthetic that is becoming extensively used in clinical practice. The potency to toxicity ratio (anesthetic index) is favorable when compared to other currently used local anesthetics (Ekenstam and Petterson, 1957). Bupivacaine is widely used in obstetris (Belfrage *et al.*, 1975) Intraperitoneal administration of local anesthetics was first reported in the early 1950s in human medicine (Hanson and Hingson, 1950) [5]. This technique reduces early postoperative analgesic requirements, pain scores, and time to first-intervention

Analgesia after abdominal surgery in humans (Kahokehr *et al.*, 2011) [6]. Intraoperative Intraperitoneal administration of bupivacaine can reduce pain scores and blunt surgery-induced stress responses in dogs undergoing ovariohysterectomy (Kim *et al.*, 2012) [7] The technique has been recommended by a panel of experts as an adjuvant technique for pain relief in dogs and cats undergoing abdominal surgery (Mathews *et al.*, 2014) [10].

**2. Material Methods**

**2.1 Place of Study**

The present study was conducted in the Division of Veterinary Surgery and Radiology SKUAST-K, Shuhama, on stray female dogs of faculty campus and present in its vicinity. The catching of the dogs was performed by the use of sack and loop.

**2.2 Kenneling**

The kenneling of the dogs was done by placing the dogs into the faculty kennels. Each dog was provided a separate kennel.

**2.3 Operation protocol**

Bitches so were kept under identical managemental conditions for 48 hrs before surgery, preoperative evaluation was done by checking the baseline. Food and water was withheld overnight until administration of the premedication. Premedication was induced by triflupromazine @ (1 mg/ kg) and Atropine Sulphate intramuscularly @ 0.044 mg/kg. The anesthesia was induced by Xylazine (20mg/ml) and injection Ketamine (50mg/ml) at recommended doses for dogs. The anesthesia was given 5-6 minutes prior to surgery (Plate 1). Once the anesthesia was established following procedures was adopted systematically. The animals were shaved by using shaving machine. The area was scrubbed using povidone iodine solution (Plate 2). The bitches were positioned in dorsal recumbency to facilitate proper positioning for surgery. In key hole ovariohysterectomy one centimeter long incision was given along linea Alba, two inches below the umbilicus. Ovary hook was introduced in the direction of flank and the horn of the uterus was scooped out (Plate 3). The horn of the uterus was taken as a landmark by pulling it gently through the incision to reach the ovary of corresponding side. To identify the ovary, suspensory ligament was broken down with gentle manipulation. The ovarian artery was ligated with vicryl and the arteries were transected. The ovary and the horn of the uterus were resected out. Taken the second horn as guideline, the same procedure for the next ovary and horn was carried out (Plate 4). The uterine body and middle uterine artery was ligated in front of the cervix and severed. The free stump of the cervix was closed by omentalization. The entire uterus and ovaries was removed. The abdomen and pelvic cavity was moved out to check for any clot.

**2.4 Experimental Grouping**

Intraperitoneal instillation of Bupivacaine (group B) and normal saline (group A) was done before closing the last muscle suture (Plate 5) in respective groups (Table 1). The wound was painted with an antiseptic solution; abdominal wound was closed in single layer using vicryl followed by a layer of subcutaneous sutures with the same suture material. The wound was closed by intradermal suture (Plate 6).

Postoperative pain measurements and assessments were recorded at 0hr (pre surgery), 0.5, 1, 2, 4, 6, 8, 12 and 18 hours after surgery with the help of two pain scales {Glasgow composite pain scale (GCPS) and other is University of Melbourne pain scale (UMPS)} that included physiologic and behavioral variables. If the total score was greater than or equal to 24 in GCPS animal was excluded from the study.

**Table 1:** Experimental design for pain management using Bupivacaine by innovative key Hole technique.

Groups	No. of Animals	Analgesic	Dose
A	12	NSS	0.88ml/kg (0.9%)*
B	12	Bupivacaine	5mg/kg (0.5%)*

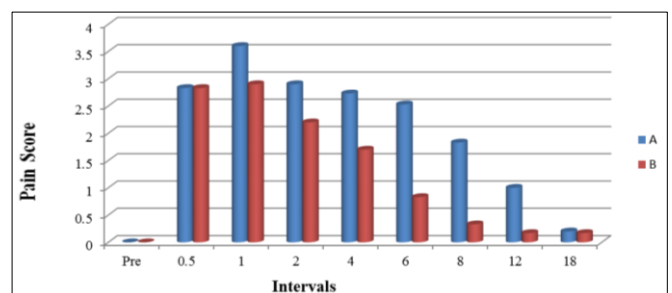
**3. Result and Discussion**

**3.1 Glasgow Composite Pain Scale.**

Efficacy of the treatment was evaluated with the help of two pain scales Glasgow composite pain scale and University of Melbourne pain scale. No adverse side-effects were noted in any of the bitches participating in the study. There was no significant difference between Glasgow composite pain scale score at 0 hour of the study and 18<sup>th</sup> post-operative study hour between the groups. After the 1<sup>st</sup> 30 minutes of the surgery it was observed that all the animals of both the groups were depressed. Animals of both the groups showed maximum pain after 1<sup>st</sup> hour of the surgery which was significantly different from the base value. In Glasgow composite pain scale the group B animals which were given bupivacaine showed lower pain score and animals start recovering earlier and score was near to base line at the 8<sup>th</sup> post-operative hour of surgery. On the other hand group A animals which were given normal saline solution showed higher pain score and score was near to base line after the 18<sup>th</sup> hour of the study. Overall result was that group B had an early pain relief than the group A.

**3.2 Melbourne Pain Scale**

The result obtained during study rating the animals with university of Melbourne pain scale shown in (fig 2). Between the groups there was no significant difference in UMPS score at 0 hour and 30 minutes of the study. After the 1<sup>st</sup> 30 minutes of the surgery all the animals of both the groups were seen depressed and initially at 0 hour (pre surgery) no pain was observed in the animals. After that at all the other time intervals pain score observed was significantly different from the base value. The animals of both the groups showed maximum pain score at the end of 1<sup>st</sup> hour of surgery. There was significant difference in pain score between the group B and group A were bupivacaine and normal saline was used respectively. Pain score was lower in group B then in group A.



**Fig 1:** Glasgow composite pain scale.

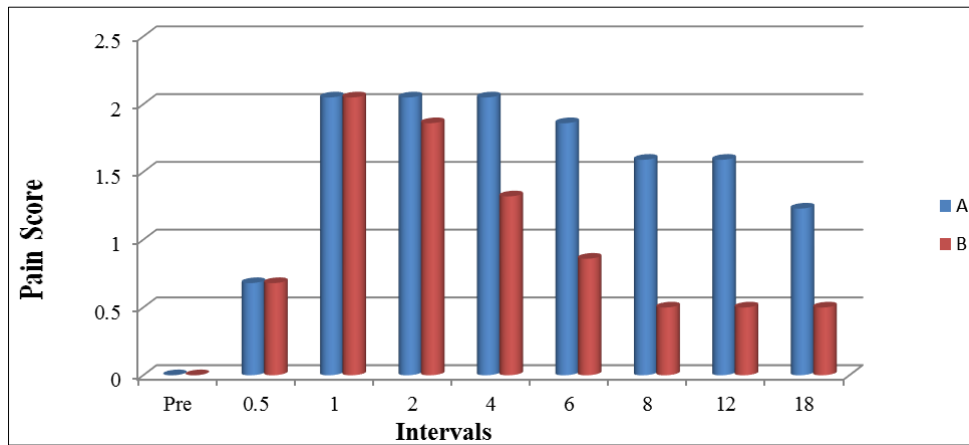


Fig 2: University of Melbourne pain scale (UMPS)

In the present study group B animals showed rapid recovery than group A animals. Present study indicates that Intraperitoneal administration of bupivacaine provided adequate analgesia which resulted in earlier recovery in group B than group A where normal saline was used intraperitoneally after key hole ovariohysterectomy in bitches. This result coincides with (Campagnol *et al.*, 2012 and Carpenter *et al.*, 2004) where incisional and intraperitoneal bupivacaine and lidocaine was used after ovariohysterectomy. In dogs where intraperitoneal bupivacaine administration was used they showed the better result. It is further supported that Bupivacaine a local anesthetic actually produce blockade of sensory nerve fibers and prevent the development of central sensitization to pain (Lemke and Dawson 2000) and bupivacaine relatively shows long duration of action of about 180-600 minutes (Lumb and Jones)

**4. Conclusion**

The key hole surgery procedure is more meritorious on account of lesser pain involved, reduced time of healing and recovery and reduced time of surgery. Intraperitoneal instillation of Bupivacaine provided effective analgesia in bitches undergoing ovariohysterectomy. Overall the pain scores in this study was not much higher, the normal saline group also recovered at the end of the study and bupivacaine group recovered fast as compared to other revived studies this is because the ovariohysterectomy performed in this study was key hole where only one centimeter long incision was given which resulted in minimal trauma and earlier recovery.

**5. Acknowledgment**

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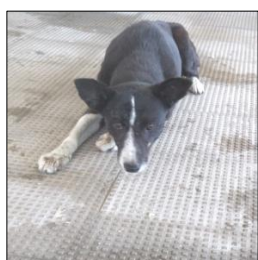


Plate 1



Plate 2



Plate 3



Plate 4



Plate 5



Plate 6

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