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*Original study*

# Clinical Evaluation of Elective Laparoscopic Ovariohysterectomy in Dog

**Jalal Bakhtiari, Ph.D**[1]
Associate professor of veterinary surgery
**Sarah Mokaram, DVM**[1]
Resident of veterinary surgery
**Alireza Khalaj, Ph.D**[2]
Assistant professor of surgery
**Davood Sharifi, Ph.D**[1]
Associate professor of veterinary surgery
**Tavakoli, Azin, DVM**[1]
Resident of veterinary surgery

[1] Department of Clinical Studies, Faculty of Veterinary Medicine, Tehran University, Tehran, Iran
[2] Department of surgery, Faculty of Medicine, University of Shahed, Tehran-Iran.

**Abstract**

**Objectives**-To introduce laparoscopic ovariohysterectomy in dog in Iran.
**Study Design**-Elective experimental study design.
**Animals**-Four mix-breed healthy female dogs.
**Methods**-Four healthy female dogs were undergone elective laparoscopic ovaryohysterectomy. Clinical parameters including: body temperature, heart rate, respiratory rate, appetite, surgical time, blood loss, surgical complications, CBC and pain scores were evaluated.

**Corresponding author:**
Jalal Bakhtiari, Department of Clinical Sciences, Faculty of Veterinary Medicine, Tehran University.
Telephone #.: +98-912-2729351
Fax #: +98-21-66933222
E.mail: bakhtiar@ut.ac.ir

**Procedures**-CBC of the dogs were not indicator of infection but the stress leuckogram was evident till 48 hours after the surgery. Median pain scores 2 and 4 hours after the surgery were low (pain scores less than 6) and 24 hours post operatively were very low (pain scores less than 2). The blood loss was minimum and the operations had no complications. Appetite, body temperature, respiratory and heart rate returned to normal values in a short period (48 hours).

**Conclusions and Clinical Relevance**-Laparoscopic ovariohysterectomy is safe and could be performed in a reasonable time with minimal pain in dogs.

**Key Words:** Laparoscopy, dog, ovariohysterectomy, pain assessment.

## Introduction

There have been several reports documenting the advantages of minimally invasive surgical procedures in humans when compared to open surgical procedures. It have been found that leads to reduce pain, surgical infections and hospital stays[1,2]. Decreased recovery time has been reported in laparoscopic nephrectomies[3]. Because of the advantages reported in humans, similar minimally invasive techniques are being used in veterinary medicine. Thoracoscopic pericardectomy, laparoscopic gastropexy and laparoscopic renal biopsy techniques have been demonstrated to be technically feasible and they produced similar results when compared to open procedures [2, 4, 5, 6].

Ovariohysterectomy is electively performed in many of the domestic companion animals as a means of population control, disease prophylaxis, therapeutics and behavior modifications[7]. Laparoscopic hysterectomy has been found in humans to reduce postoperative pain, blood loss, duration of hospital stays, time until normal gastric motility and recovery time when compared to open hysterectomies[7, 8, 9, 10]. The same advantages is predicted for laparoscopic procedures in veterinary medicine.

While the open technique is commonly performed in veterinary medicine, and it is taught in many veterinary schools as a basic surgery, there are benefits in development of alternative techniques. Open procedures are often performed with small incisions, which decrease visualization and increase the risk of incomplete resection of ovarian tissue. This could lead to ovarian remnant syndrome and increased risk of mammary cancer and pyometra. A repeat surgery is technically challenging, as the anatomical landmarks are distorted with the formation of scar tissue[11]. One of the advantages of laparoscopic technique is superior visualization which may reduce the risk of incomplete ovary resection and accidental ligature of the ureter[1]. In human medicine, minimally invasive surgical procedures are not only being developed as alternatives to the open approach, but some are becoming the preferred approach due to decreased pain and post operative hospital stays. It is unlikely that the post operative stay for OHE would be decreased much by the use of laparoscopic technique, however the impact of decreased pain is a potential benefit[13]. Nowadays there is no report of laparoscopic surgery in veterinary medicine in Iran. It is important for a veterinary surgeon to be informed about the advantages of laparoscopic surgery and be able to do the laparoscopic procedures. In human medicine laparoscopic procedures are becoming more popular each year so we should meet the future need for laparoscopic procedures in veterinary medicine for the future demands.

## Materials and methods

Four healthy female dogs weighting 15±5 kg were undergone elective laparoscopic ovariohysterectomy. Pain scores[1,16,17] evaluated a day before surgery, 2, 4, 24, 48 hours and 1, 2 and 3 weeks after the surgery and blood samples were obtained in days 0, 1, 2, 7, 14 and 21 post operatively for CBC and Heart rate and $SPo_2$ were documented every five minutes during the operation using a pulse oximeter. The body temperature, heart and respiratory rates and appetite were used for pain scoring after the operation[1,16,17] All dogs were preanesthetized with Atropin 0.02 mg/kg SC and Acepromazin maleate 0.05 mg/kg IM and combination of Ketamine and Diazepam (5.5 and 0.27 mg/kg IV) were used for induction of anesthesia and maintained with halothane. Prophylactic cefazolin (22 mg/kg) was administered before induction.

**Laparoscopic ovariohysterectomy**

The dogs positioned in a dorsal recumbency with a Trendelenburg (head down tilt) position. A one cm incision was made on the umbilical scar. The abdominal wall was hanged up by the assistant and the 10 mm trocar and cannula inserted with a controlled vertical pressure and inclined to the caudal part of the abdomen (to reduce the risk of penetration to the spleen) (Fig 1). The light cable and insufflator attached to the 10 mm cannula and A 10 mm, 0 degree viewing laparoscope (stryker company) was placed through the cannula (Figs 2 and 4) and was used to transilluminate the abdominal wall to identify epigastric vessels to guide the placement of the other two cannula from 5 mm skin incisions 6 to 10 cm cranial to the inguinal region on both right and left sides. The abdomen was insufflated with $CO_2$ gas to a maximum pressure of 12-14 mmHg using the 10 mm cannula. The abdomen was explored and an absence of abdominal pathology was confirmed. The intercornual ligament of the uterus was held with a grasping forceps and the right and left uterine corns were identified. The suspensory ligament of the both ovaries and the ovarian AV complex were coagulated using a bipolar cautery and cut using a metzenbaumian scissor. The broad ligaments of both right and left sides were cut with metzenbaumian scissor and the vessels were coagulated by a bipolar cautery. The cervix was identified by visualization and instrument palpation. One ligature was placed around the uterine body proximal to the cervix using a laparoscopic knot tying technique. A bipolar cautery (Fig 3) was used to coagulate the uterine artery if needed and the uterine body was transected using a laparoscopic metzenbaumian scissor. The abdomen was explored and the uterus was pulled into the 10 mm cannula and the uterine body removed through the cannula or after removing the cannula the uterine body protruded from the 10 mm portal incision was pulled through the incision. The remaining trocars were removed, and the abdomen was compressed manually. The 10 mm incision was closed in two layers of musculature and skin with vicryl (3/0). nylon (3/0) sutures. and nylon sutures were used to appose the skin for the 5 mm incisions.

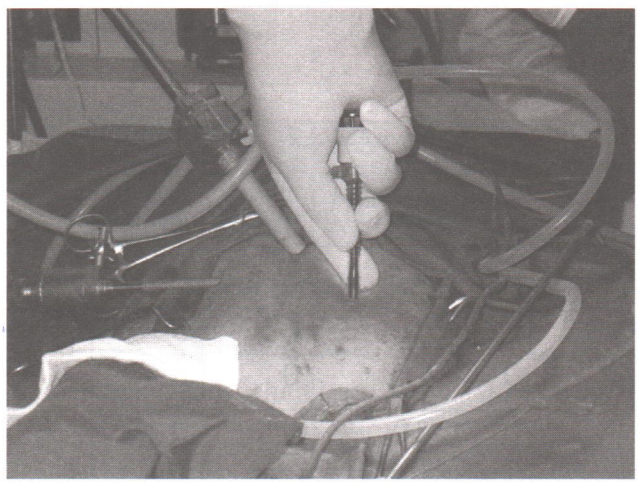

**Fig 1:** Sites for trocar entrance

**Fig 2:** Monitor, Light source, gas insufflator, $CO_2$ capsule

## Results

Mean intra operative heart rate was 126.75 base per minute, mean blood loss was 5.5 ml, mean surgical time was 60 minutes. Stress leuckogram was evident till 48 hours after the surgery without any signs of infection (table 1). Minimum scar tissue was evident on the surgical site. Pain scores obtained using a Melbourne Pain Scale showed low pain (scores less than 6) 2 and 4 hours after the operation and very low pain (scores less than 2) 24 hours after the surgical operation (table 2).

**Table 1:** Evaluated factors during the operation

Table 1

| | laparoscopy | | | | mean |
|---|---|---|---|---|---|
| Dog no. | 1 | 2 | 3 | 4 | |
| Surgical length | 65 | 45 | 67 | 65 | 60.5 |
| Mean heart rate | 139 | 90 | 133 | 145 | 126.75 |
| Blood loss | ml 5 | ml 1 | ml 1 | ml 15 | 5.5 ml |
| $SPo_2$ | 97.34 % | 98 % | 97.54 % | 90 % | 95.72 % |

**Table 2:** Pain scores (Melbourne Pain Scale)

Table 2

| | Dog no. | Day 0 | 2 hours after surgery | 4 hours after surgery | 24 hours after surgery | 48 hours after surgery | 1 week after surgery | 2 weeks after surgery | 3 weeks after surgery |
|---|---|---|---|---|---|---|---|---|---|
| Laparoscopy | 1 | 4 | 9 | 10 | 4 | 2 | 1 | 1 | 0 |
| | 3 | 1 | 11 | 10 | 3 | 1 | 0 | 0 | 0 |
| | 4 | 0 | 6 | 3 | 1 | 0 | 0 | 0 | 0 |
| | 5 | 1 | 4 | 2 | 1 | 0 | 0 | 0 | 0 |
| median | 3.5 | 1 | 7.5 | 6.5 | 2 | 0.5 | 0 | 0 | 0 |

## Discussion

Laparoscopic surgery is one of the rare surgical fields that primarily was used in human medicine and just in recent years has been introduced to veterinary medicine. However there are no reports of using laparoscopic surgery in veterinary medicine research works in Iran. Nowadays by paying more attention to pain in veterinary medicine, minimally invasive techniques are used to reduce pain in animals. Bojrab[1]

suggests that it is essential for veterinary surgeons to learn laparoscopic techniques because this field of minimally invasive surgery is developing each day and there will be more demand for elective laparoscopic surgeries in veterinary medicine and the veterinary surgeons should be able to fulfill this request in recent future. Laparoscopic hysterectomy is associated with shorter hospital stay in humans and the patients will return to daily work faster[3]. In the present study there was little blood loss (5 ml) that is in contrast with the results mentioned by Holub Z in 1999[14]. He noted that hemorrhage was the most common complication of laparoscopic ovariohysterectomy. One reason for this difference could be the use of bipolar electrocoutery in the present study and this also leads to less tissue damage[15]. The pain assessment results were the same as Devidson E (2004) and Hanckok R (2005). In one study it is mentioned that bipolar electrocoutery can reduce the surgical time from 53 to 47 minutes[5] however in another study the mean surgical time was 60 minutes[3] that is parallel to the results of the present study. The ovariohysterectomy is classified as a surgical operation with moderate pain (less than 8 scores in MPS) [16] and in this study we found that laparoscopic ovariohysterectomy has a moderate to slight pain (less than 6 scores) in 2 and 4 hours after the operation and is associated to very little pain (less than 2 scores) just 24 hours after the operation. Laparoscopic ovariohysterectomy can be an excellent method for teaching the surgical technique because it lets the students to watch all the operation and be familiar with the surgical anatomy. In the present study no bandage used to cover the surgical site and due to less pain the dogs had no tendency to the surgical site and even after 48 hours they did not respond to the palpation of the suture lines.

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چکیده:

# ارزیابی بالینی جراحی برداشت رحم و تخمدان به روش لاپاروسکوپی در سگ


**دکتر جلال بختیاری**
**دانشیار بخش جراحی، گروه علوم درمانگاهی، دانشکده دامپزشکی، دانشگاه تهران، تهران، ایران.**
**دکتر سارا مکرم**
**دامپزشکی، دانشگاه تهران، تهران، ایران.**
**دکتر علیرضا خلج**
**استادیار بخش جراحی، دانشگاه علوم پزشکی، دانشگاه شاهد، تهران، ایران.**
**دکتر داور شریفی**
**دانشیار بخش جراحی، گروه علوم درمانگاهی، دانشکده دامپزشکی، دانشگاه تهران، تهران، ایران.**
**دکتر آذین توکلی**
**رزیدنت جراحی دامپزشکی، گروه علوم درمانگاهی، دانشکده**



**هدف:** معرفی برداشت رحم و تخمدان به روش جراحی لاپاروسکوپی در سگ.

**طرح:** مطالعه تجربی انتخابی.

**حیوانات:** چهار قلاده سگ ماده سالم با نژاد مخلوط.

**روش:** چهار قلاده سگ ماده سالم به صورت انتخابی تحت جراحی برداشت رحم و تخمدان به روش لاپاروسکوپی قرار گرفتند. در این تجربه طول مدت جراحی، طول برش، تعداد بخیه ها، مشکلات حین عمل، تابلوی خونی حیوانات پیش از جراحی و ۰، ۱، ۲، ۷، ۱۴ و ۲۱ روز پس از جراحی، ارزیابی میزان درد مورد ارزیابی قرار گرفتند.

**نتایج:** تابلوی خونی سگها در هیچ یک از زمانهای مورد ارزیابی نمایانگر حضور عفونت به دنبال جراحی نبود ولی تا ۴۸ ساعت پس از جراحی تابلوی خونی استرس مشاهده شد. متوسط میزان درد ۲ و ۴ ساعت پس از جراحی در حد کم ( نمره درد کمتر از ۶) بوده و از ۲۴ ساعت پس از جراحی در حد بسیار کم (نمره درد کمتر از ۲) قرار داشت. تعداد بخیه ها و میزان خونریزی حداقل بوده و اعمال جراحی بدون هیچ مشکلی پایان پذیرفت.

**نتیجه گیری:** تکنیک جراحی لاپاروسکوپی، روشی کم خطر در جراحی برداشت رحم و تخمدان سگ بوده و در زمانی معقول و با حداقل درد قابل انجام می باشد.



**کلید واژه ها:** لاپاروسکوپی، سگ، برداشت رحم و تخمدان، ارزیابی درد.