



RESEARCH ARTICLE

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Two-Portal Access Endoscopic Bilateral Ovariectomy in Bitches

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This study aims to evaluate spaying (bilateral ovariectomy) in female dogs using a two-portal endoscopic approach. In this context, 19 female dogs of various breeds with body weights ranging from 15.2 to 38.4 kg and ages between 1 and 9 years were used. Endoscopic bilateral ovariectomy was performed via linea alba in all bitches. Two-portal access endoscopic method was used for this procedure. When preprocedures were not taken into account, 12±3 minutes were needed for intra-abdominal cauterization of both ovaries. All surgeries were completed without any intraoperative or postoperative complications. In the following days, no postoperative complications were reported by the owners. It has been concluded that endoscopic spaying in dogs could be a significant alternative spaying method compared to traditional surgical interventions, especially in terms of animal welfare. As seen in many countries, the demand for endoscopic spaying from dog owners in Türkiye is likely to increase shortly due to the minimal invasiveness of the method, shorter recovery time, and reduced intra- and post-operative complications.

Key Words: Spaying, bitch, endoscopy

Dişi Köpeklerde Çift Portal Erişimli Endoskopik Bilateral Ovariyektomi

Bu çalışma, dişi köpeklerde iki portal endoskopik yaklaşım kullanılarak yapılan kısırlaştırma işlemini (bilateral ovariyektomi) değerlendirmeyi amaçlamaktadır. Bu bağlamda, farklı ırklara ait, vücut ağırlıkları 15,2 ile 38,4 kg arasında ve yaşları 1 ile 9 yaş arasında değişen 19 dişi köpek kullanılmıştır. Tüm dişi köpeklerde endoskopik bilateral ovariyektomi linea alba üzerinden gerçekleştirilmiştir. Bu işlem için iki portal erişimli endoskopik yöntem kullanılmıştır. Ön işlemler dikkate alınmadan, her iki overyumun intra-abdominal koterizasyonu için ortalama 12±3 dakika gerekmektedir. Tüm operasyonlar herhangi bir intraoperatif veya aatif komplikasyon olmaksızın tamamlanmıştır. Takip eden günlerde sahipleri tarafından herhangi bir postoperatif komplikasyon bildirilmemiştir. Endoskopik kısırlaştırmanın, geleneksel cerrahi yöntemlere kıyasla özellikle hayvan refahı açısından önemli bir alternatif kısırlaştırma yöntemi olabileceği sonucuna varılmıştır. Birçok ülkede olduğu gibi, Türkiye'de de bu yöntemin minimal invaziv olması, daha kısa iyileşme süresi ve düşük intraoperatif ve postoperatif komplikasyon oranları nedeniyle köpek sahipleri tarafından talebinin yakın gelecekte artması muhtemeldir.

Anahtar Kelimeler: Kısırlaştırma, dişi köpek, endoskopi

Introduction

Spaying (ovariectomy/ovario-hysterectomy) is an essential procedure for controlling the dog population and preventing mammary tumors. Therefore, the demand for and expectations regarding spaying dogs are frequently addressed in modern pet clinics. Various medical and surgical methods have been developed for this purpose (1, 2). Among medical procedures, the side effects of steroids, which were preferred in previous years, have now been well established. Pyometra and mammary tumors, among these side effects, can have fatal consequences in dogs (3). On the other hand, Deslorelin, a long-acting medical agent that suppresses ovarian activity (downregulation) and provides effective contraception, has a limited duration of action (4, 5).

Surgical spaying remains the most effective and radical solution for controlling reproduction in dogs. However, traditional surgical procedures have invasive effects (6). This situation may lead to various complications for veterinarians, dogs, and owners. Due to these drawbacks, endoscopic spaying has recently become increasingly preferred in pet clinics by both veterinarians and pet owners. This technique has become increasingly preferred in veterinary medicine due to its many advantages over conventional surgical methods, such as shorter hospital stays, faster recovery time, less stress and pain, and better visualization of abdominal organs (7-9).

In Turkey, endoscopic spaying has not yet been widely adopted in clinical practice. There is also a serious lack of research on the subject in our country. To our knowledge, only a doctoral dissertation (8) and a subsequent research article derived from this dissertation (9) have been conducted on this topic in Turkey. In traditional surgical spaying procedures, the surgeon directly visualizes and manipulates the genital organs manually. However, in endoscopic spaying, the veterinarian performs the necessary

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the necessary excision procedures using the visual guidance provided by the endoscopic screen and specialized surgical instruments. Therefore, in endoscopic spaying, proper optical visualization and precise handling of intra-abdominal instruments are crucial. On the other hand, there are different techniques for endoscopic spaying in dogs. Different endoscopic methods also need to be described in detail in practice. Therefore, this study aims to evaluate spaying (bilateral ovariectomy) in female dogs using a two-portal endoscopic approach. It may contribute to the widespread adoption of endoscopic spaying in dogs in Turkey.

Materials and Methods

Research and Publication Ethics: This study is not subject to the permission of HADYEK in accordance with the "Regulation on Working Procedures and Principles of Animal Experiments Ethics Committees" 8 (k). The data, information and documents presented in this article were obtained within the framework of academic and ethical rules.

Animals: This study included 19 bitches of various breeds (6 crossbreeds, 5 Labrador, 2 Golden retriever, 1 German bracke, 1 Collie, 1 Malamute, 1 German shepard, 1 Australian shepard, 1 Airedale terrier), aged between 1 and 9 years, with body weights ranging from 15.2 to 38.4 kg. In our study, to maintain a high number of large breed dogs undergoing endoscopic spaying, a second control group was not formed from dogs with conventional surgical procedures. The dogs were part of the population brought to our clinic for spaying. Dog owners were informed about the need to fast for 12 hours before the surgery and the importance of washing and cleaning their pets before the procedure. Informed consent forms were obtained from all dog owners. The dogs were positioned in the ventrodorsal recumbency, and the surgical site along the linea alba was disinfected using alcohol and iodine-based solutions.

Anesthesia Protocol: Midazolam (0.3 mg/kg IM), levomethadone (0.5 mg/kg IM), and ketamine (1 mg/kg IM) were used as preanesthetic agents. Propofol (3 mg/kg IV) was administered for induction. Anesthesia was maintained with isoflurane gas anesthesia. For postoperative analgesia, meloxicam was administered at a dose of 0.2 mg/kg, and amoxicillin was used as an anti-infective agent at a dose of 20 mg/kg.

Surgical Equipment: Monitor (Sony, Germany), Light Source, Light Cable, Air Supply, Air hose Endoscope/Optical Lens (Hopkins II Straight Forward Telescope, 0°, 5 mm diameter, 29 cm Karl Storz GmbH & Co. KG, Tuttlingen), Electrocautery and Generator (LigaSure, Covidien-ForceTriad, Germany), Data Storage Device, Abdominal Trocars (Endopath Xcel Trocar, Ethicon EndoSurgery Inc., 12 mm + 5 mm, Germany), Ovarian Suspension Hook, Veress Pneumoperitoneum Needle (10 cm, Karl Storz GmbH & Co. KG, Tuttlingen) Fully Adjustable Operating Table (Figure 1 and 2).

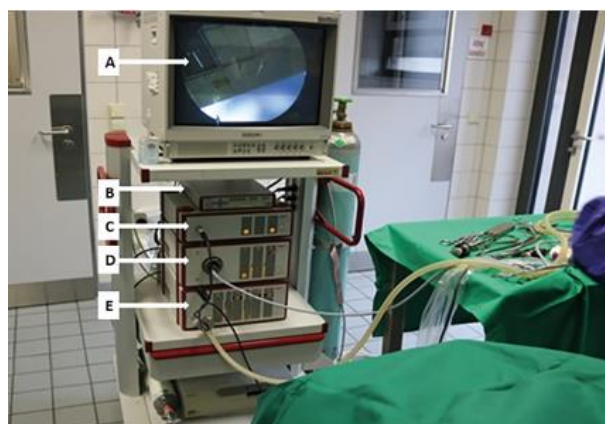


Figure 1. Endoscopic equipment, A. Monitor, B. Data storage device, C. Optical source, D. Light source, E. Air supply



Figure 2. Endoscopic equipment, A. Trocar; B. Hook, C. Optic (Lens), D. Veress needle, E. Air hose, F. Light hose

Surgical Technique: A two-port laparoscopic spay technique was used for endoscopic ovariectomy in dogs (Figure 3). The bilateral ovariectomy procedure was performed as follows:

- A small skin incision was made approximately 2–3 cm caudal to the umbilical cord, parallel to the linea alba.
- The abdominal cavity was accessed through this incision using a Veress needle.
- The Veress needle was connected to an air hose, and pneumoperitoneum was established by insufflating the abdominal cavity.
- The Veress needle was then removed, and a trocar was placed in its position.
- A second small skin incision was made cranial to the umbilical cord.
- A second trocar was introduced into the abdominal cavity through this incision.
- The electrosurgical system (LigaSure) was inserted through the cranial trocar, while the endoscopic system was introduced through the caudal trocar to visualize the uterine horn and ovary on the monitor.

- The surgical table was tilted approximately 45 degrees to the side (right side for left ovary access and left side for right ovary access).
- The uterine horn was grasped with electrocautery forceps near the ovary within the abdominal cavity. At this stage, an externally inserted sharp-tipped hook was used to bluntly perforate all abdominal layers. The ovary was then stabilized by the hook via its suspensory ligament.
- The ovary was detached by coagulating its cranial (ligamentum ovarii proprium) and caudal connections using electrocautery while keeping it fixed on the hook.
- The ovary was carefully grasped with electrocautery forceps, detached from the hook, and removed from the abdominal cavity.
- The same procedure was repeated for the removal of the contralateral ovary.
- The time until the intra-abdominal cauterization and removal of both ovaries was, in the meantime, determined by an assistant.
- Both trocars were withdrawn from the cranial and caudal umbilical regions. The residual intraperitoneal gas was expelled with slight abdominal pressure. Finally, the incision sites were closed with simple sutures.
- Postoperative antibiotic and analgesic protocols were administered to all animals for seven days.

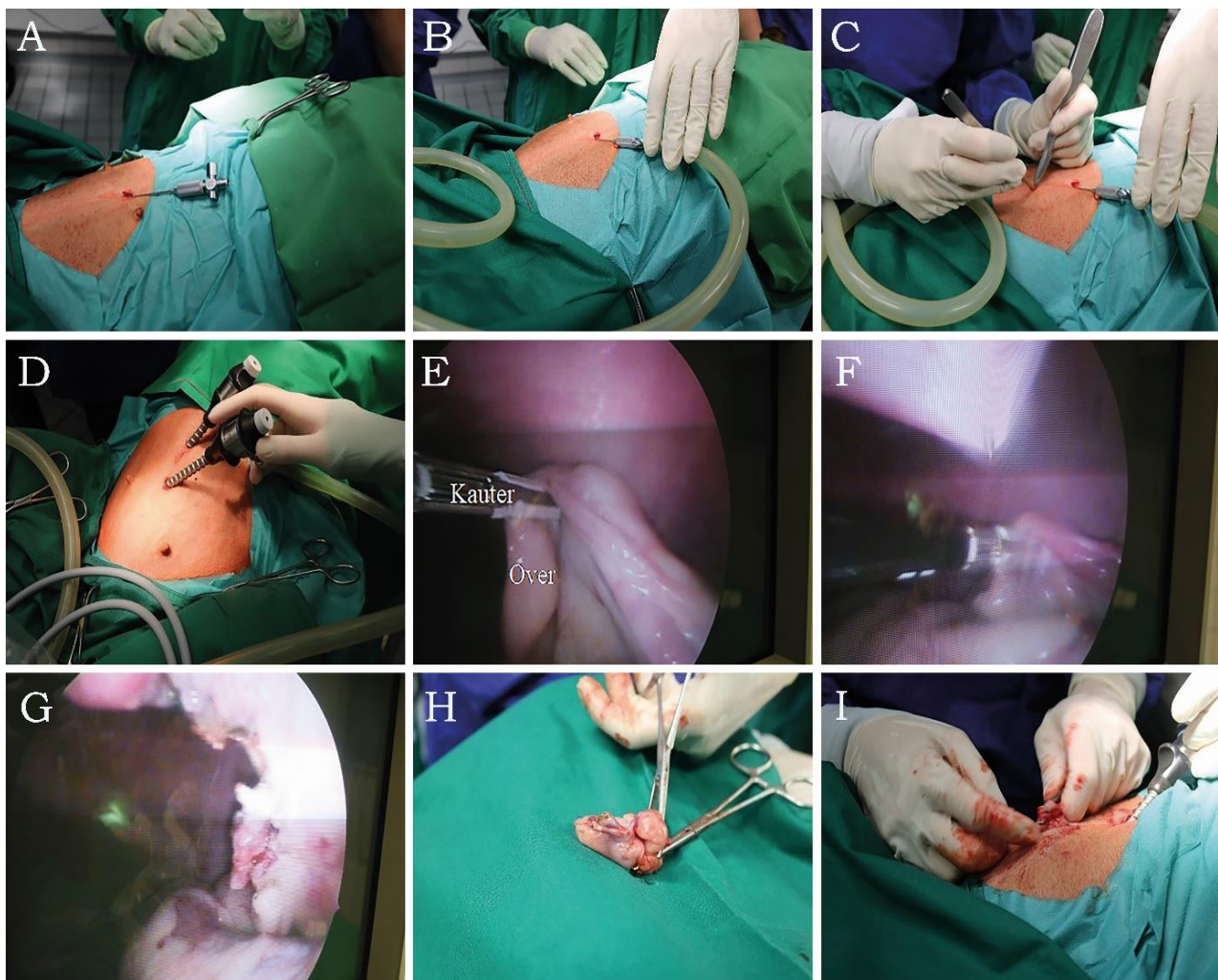


Figure 3. Steps of the ovariectomy procedure. **A.** Insertion of the first Veress needle, **B.** Connection of the air hose, **C.** Making the second skin incision, **D.** First and second trocars were inserted, **E.** Holding the uterine horn with electrocautery forceps, **F.** Fixing the ovary with a hook, **G.** Coagulating the ovary with electrocautery, **H.** Removal of the ovary from the abdominal cavity, **I.** Incisions are closed with simple sutures

Results

The duration of the laparoscopic spay procedure, measured from the placement of the two trocars in the linea alba to the removal of the ovaries, was approximately 12 ± 3 minutes in all dogs. All surgeries were successfully completed without any intraoperative or postoperative complications. Additionally, all dogs were discharged one day after surgery without any signs of general health deterioration. In the following days, no postoperative complications were reported by the owners. Since the dogs were discharged shortly after the endoscopic operation, daily serial checks could not be carried out. Due to the owners' transportation problems, daily controls were not requested from them. However, the owners were called to our clinic after 10-12 days to check the abdominal puncture points. In our clinical examinations during this period, the dogs' general health status was within physiological limits.

Discussion

Ovariectomy or ovariectomy has been used for centuries as a method for contraception and fertility control in female dogs (10, 11). Such procedures, commonly referred to as spaying or sterilization, need to be reconsidered in light of advancements in surgical techniques. In this context, interest in endoscopic spaying, which has been modified for use in dogs in recent years, has been increasing. The demand for this technique among pet owners is primarily due to its minimally invasive nature. Several studies have demonstrated that endoscopic spaying is more tissue-preserving, has a lower mortality rate, and causes less postoperative pain compared to traditional surgical methods (7, 9). Notably, in recent years, this technique has also been used for sterilization in some exotic animal species (12).

In traditional ovariectomy procedures in bitches, significant pain may be experienced due to the force applied to the ovaries during ligation (13). In this study, endoscopic spaying was observed to offer significant advantages over conventional surgical methods. These advantages included the elimination of traction on the ovaries and ligaments, which is a common source of additional pain in open spay procedures. Even minor bleeding could be precisely visualized and coagulated via the monitor. Additionally, the magnification provided by the endoscopic monitor allowed for a clear and detailed view of the intra-abdominal ovarian tissue. This suggests that endoscopic spaying may help minimize the risk of ovarian remnant syndrome and inadvertent ureteral ligation. Another notable advantage was that postoperative movement restrictions and the use of an Elizabethan collar were not necessary. The findings of our study align with previous research supporting these benefits (7, 8, 14). In our study, to maintain a high number of large breed dogs undergoing endoscopic spaying, a second control group was not formed from dogs with conventional surgical procedures. However, in our next study in our clinic, we will develop a second control group with dogs that are treated with classical methods and compare the two

methods clinically. Muraro and White (15) reported that higher body weight and prolonged anesthesia duration are risk factors for complications in traditional ovariectomy procedures. Endoscopic spaying may serve as an effective alternative for minimizing such complications (7, 8, 16). Davidson et al. (14) stated that the duration of endoscopic spaying is significantly longer than that of the conventional method, with the difference being statistically significant. In the present study, the duration of endoscopic spaying (specifically the time required for intra-abdominal ovarian removal) was approximately 15 minutes. However, this duration was not directly compared with that of conventional spaying. Tez (8) noted that the duration of endoscopic spaying can decrease as the surgeon gains experience. Furthermore, Dupré et al. (16) emphasized that factors such as body condition score, ovarian ligament fat score, and intraoperative bleeding can influence the duration of endoscopic spaying beyond the operator's level of experience.

In contrast to our study, Davidson et al. (14) reported that the rate of operative complications in endoscopic spaying is higher compared to conventional surgical methods. Basically, complications in abdominal surgery in dogs can occur depending on many factors such as the experience of the operator, the general immune system of the animal, the hygienic conditions of the operating room, and the asepsis of the surgical materials used. Therefore, the results of our study do not support the findings of Davidson et al. (14) because postoperative complications were poly-factorial. In our study, no intraoperative or postoperative complications were encountered in all dogs. This result, subjectively, may be due to the expertise of the operators in our study. Our study did not assess the impact of endoscopic spaying on postoperative pain scores. Post operative pain scores can be determined according to subjective and objective parameters. Personality or attitude, activity level, sleeping ability, facial expression, vocalization, licking, biting, scratching, or shaking, posture and ambulation, physiological variables, hair coat changes, and appetite and thirst were all subjective behaviors (14). In the present study, we observed that all bitches were able to move and started feeding approximately 15 hours after the endoscopic surgery. These findings could subjectively indicate that the pain was minimal in the dogs. However, since the dogs were discharged after the operation, blood C-reactive test (CRP) and other objective pain score parameters (such as heart rate and respiratory rate) could not be analyzed. However, Davidson et al. (14) noted that pain objective scores in endoscopic spaying were significantly lower compared to those in conventional spaying. In this context, we can say that endoscopic spaying has more advantages than classical surgical interventions in reducing pain.

Future studies in which many more animals are subjected to endoscopic spaying, a control group including the classical surgical method, and objective pain scores at short intervals in the clinical setting before

the bitches are discharged will contribute to the understanding of the subject in all aspects.

Conclusion; it has been concluded that endoscopic spaying in dogs could be a significant alternative spaying method compared to traditional surgical interventions, especially in terms of animal welfare. As seen in many countries, the demand for endoscopic spaying from dog owners in Turkey is likely to increase in the near future due to the minimal invasiveness of the method, shorter recovery time, and reduced intra- and post-operative complications. However, the major disadvantage of endoscopic spaying is the high cost of the necessary

equipment, the requirement for the operator to be highly skilled, and the lengthy learning process for mastering this technique. For beginners, learning this technique will depend on theoretical and intensive practical training under the guidance of expert operators. The learning process will of course vary according to the number of cases. Additionally, the inability to use this technique in small dogs presents another significant limitation. In the future, with additional modifications to be made by the manufacturer on the endoscopy equipment, this technique may become widespread in small-breed dogs.

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