Research Article

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Surgical Time Evaluation of Traditional and Laparoscopic Unilateral Ovariectomy in Jennies

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Abstract

Surgeries are strenuous for the animal patient regardless of the procedure type. This study aimed to compare the surgical time that required to perform a traditional ovariectomy vs a laparoscopic ovariectomy. To achieve this; ten adult Jennies were divided equally into two groups, group A underwent ovarian lift by traditional surgery, while group B got an ovarian lift by laparoscopy. Surgical time evaluated from the scalpel incision till the last suture stitch. The finding showed a significant differences at the level of ($P \leq 0.01$) between the two groups, traditional ovariectomy group took from 50 to 70 minutes, while the laparoscopic group took from 120 to 158 minutes. In conclusion the duration of Jenny's laparoscopic ovariectomy operation is greater than that of the traditional ovariectomy surgery, and it gets shorter as additional surgeries are performed.

Keywards: Donkey, Laparoscopy, Surgical time, Jennies ovariectomy.

تقييم الوقت الجراحي لاستئصال للطريقة التقليدية والمنظارية لاستئصال المبيض احادي الجانب في اناث الحمير

الخلاصة

العمليات الجراحية شاقة للحيوان بغض النظر عن نوع الإجراء. هدفت هذه الدراسة إلى مقارنة الوقت الجراحي المطلوب لإجراء استئصال المبيض التقليدي مقابل استئصال المبيض بالمنظار. لتحقيق هذا؛ تم تقسيم عشرة أناث حمير بالغة بالتساوي إلى مجموعتين، المجموعة أ خضعت لاستئصال المبيض الأيسر بالجراحة التقليدية، بينما خضعت المجموعة ب لاستئصال المبيض عن طريق تنظير البطن. تم تقييم الوقت الجراحي من شق المشرط حتى آخر غرزة. وأظهرت النتائج وجود فروق ذات دلالة إحصائية عند مستوى ($P \leq 0.01$) بين المجموعتين فقد استغرقت المجموعة التقليدية من 50 إلى 70 دقيقة، بينما استغرقت مجموعة المنظار من 120 إلى 158 دقيقة. تستغرق مدة جراحة استئصال المبيض بالمنظار في اناث الحمير وقتًا أطول مقارنة بجراحة استئصال المبيض التقليدية، وتصبح أقصر مع إجراء عمليات جراحية إضافية.

Introduction

The ovary is the equine organ that is most frequently studied (1). Because to the limited access and visibility provided by a laparotomy approach, as well as the highest need for surgical intervention, ovarian and cryptorchid surgeries in equine have traditionally been difficult (1).

Ovariectomy is sometimes requested in equines for a variety of reasons, such as neutering, fertility issues, the removal of hormone-related abnormal behavior, ovarian tumors, nonregressive ovarian hematomas or cysts, ovary-related abdominal pain, the creation of a mount mare for stallion collection, and allowing chemically induced estrus. Long-lasting anestrus and irregular estrus cycles, in addition to subpar athletic performance (2) (3).

Throughout the spring and summer, Jennies experience repeated estrus cycles, which can make them tense and difficult. Ovariectomy is used to increase the biddability of equids, hence it may enhance the behavior of Jennies as working animals (4).

Several techniques can be used to accomplish an equine ovariectomy, including the flank approach in the standing and recumbent positions, the vaginal approach (Colpotomy), and the diagonal (oblique) Ventral midline celiotomy approach, paramedian approach, standing and recumbent laparoscopy (5).

The best procedure is chosen based on the surgeon's skill and preference, the equipment that is available, the available budget, and the patient's specific needs (temperament, activity, and pathologic condition) (6). Because of the hazards of abdominal contamination, tumor malignancy should be taken into higher consideration when choosing an ovariectomy procedure, however malignancy diagnosis is frequently difficult (7).

Abdominal surgery is common in the equids and surgical complications related to abdominal approaches are well documented. The most prevalent complications related to abdominal approaches in horses are incisional swelling, drainage and infection, which can predispose horses to develop dehiscence or herniation (8).

Laparoscopic ovariectomy has many advantages over laparotomy in which it improves visualization of the ovary and their associated blood supply, tension-free dissection of the vessels reduce the chances of hemorrhage, soft tissue dissection is minimized by the use of laparoscopic instrument versus the insertion of a hand into the abdominal cavity, smaller incisions (9) (10) therefor lower secondary risk of wound infection, reduces the postoperative pain, and earlier return to exercise (9) (10). These advantages lessen the complications and the hospitalization time that it's associated with ovariectomy (11).

Pooled analyses showed that, the chance of surgical site infection was found to be nearly twice as likely, indicating that the relationship between prolonged operative duration and surgical site infection typically remained statistically significant. Complicacies are more likely to occur when an operation lasts longer. Reduced surgical times should be a common goal for surgeons given the negative effects of complications (12) (13).

The length of the operation or the surgery may be a separate risk factor for complications that is possibly adjustable, according to an increasing number of studies from recent decades. Such complications include surgical site infection, venous thromboembolism, bleeding, hematoma formation, and necrosis. For example,

prospective and retrospective studies across a range of surgical procedures have reported a positive association between the length of surgical procedures and complications (14) (15).

There is evidence that speed may be important in laparoscopic surgery because longer operations were linked to higher likelihood of problems. The limitations of these analyses include their inability to account for all patient-related variables (16).

Materials and Methods

Ethical approval

This study was granted through the local committee of the animal care and use at the College of Veterinary Medicine within the University of Baghdad (Number 1601 at 05/09/2022) before starting this study.

Animal

In the current study, ten adult healthy Jennies aged (2-4 years) and weight (200-250 kg) wear used. The animals kept under similar good conditions of management and feeding, all animals administrated antihelminthic Ivermactine drug (Norbrook/ UK) at dose of (0.2 mg/kg BW) (17) before the experimental operation. Animals were housed in farm animals, College of Veterinary Medicine, Baghdad University. Animals were divided randomly into two equal groups (n=5) group A (traditional ovariectomy), and group B (laparoscopic ovariectomy).

Pre-surgical preparation

During 24 hours before to surgery, all experimental animals were denied food. Intramuscular injections of penicillin streptomycin (22,000 IU/kg and 10 mg/kg B.W.) (KELA®/Belgium) were given to the Jennies (18). Sedation was used during the procedure, Acepromazine (0.01 mg/kg B.W.) (vetoquinol®/ France) (19), and paravertebral nerve block with 2% lidocaine hydrochloride (0.01 to 0.014 mL/kg BW) (Mobedco-Vet®/ Jordan) (20). Aseptic preparation was done in the left flank area. For this experiment, a carriage with restraints was used to contain the animals.

Group A (Traditional ovariectomy)

On the left flank, a 15–20 cm longitudinal skin incision was created (between the last rib and tuber coxae about 5 cm down to the transverse process of lumber vertebrae). The muscles were split in the direction of their fibers, the peritoneum was bluntly punctured and the aperture widened to accommodate the surgeon's hand in order to expose the ovary. The ovary was then maneuvered into the incision site, dissection, and the mesovarium's hemostasis was secured using ligation with sutures (polydioxanone No.1) (Jamy®/ Taiwan). The residual stump was carefully examined for any bleeding after the ovary was removed. the peritoneum, muscles, and subcutaneous tissues were closed separately using an absorbable suture material (polydioxanone No. 1) (Jamy®/ Taiwan), and the skin was closed by an interrupted horizontal mattress by (Silk No 1) (Jamy®/ Taiwan) (figure 1).

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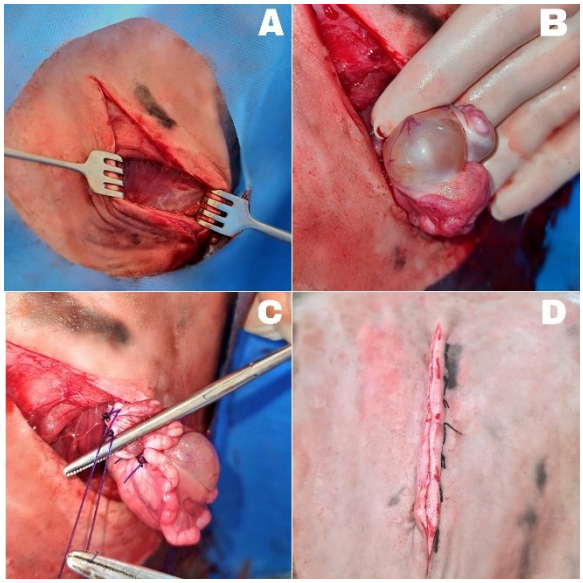

Figure 1: A. Split the muscles, B. maneuver the ovary, C. Crushing with artery and suture hemostasis, D. Skin suturing.

Laparoscopic Apparatus

A complete laparoscopic apparatus supplied by Karl Storz Company (Germany) was used. The apparatus consisted**,** monitor, insufflator, electrocautery, camera unit, light source, suction and irrigation machine, harmonic scalpel, D.V.D. recorder (figure 2).

Figure 2: A. Monitor, B. Insufflator, C. Electrocautery, D. D.V.D. recorder, E. Camera unit, F. Light source, G. Harmonic scalpel, H. Suction and Irrigation machine.

Group B (Laparoscopic Ovariectomy)

The trocar cannula unite was introduced into each portal site after a 0.75± cm skin incision was made using a scalpel. Three ports two measuring 10 mm and one measuring 5 mm were placed ass shown in (figure 3). The first port is for the insufflation tube and telescope, the second port is for the grasper, and the third port is for the clip applicator or harmonic scalpel. Induction an intra-abdominal pressure of 12 mmHg (4 L/min) then, using a telescope to examine the cavity to make sure the other port's insertion won't damage or bleed the abdominal viscera, and maintaining an intra-abdominal pressure of 12 mmHg, after that, the ovary was the target of the telescope, making a hole in the mesovariam ligament, securing hemostasis with clips, and cutting with a harmonic scalpel, the ovary was removed by extending the 10mm port. All port incisions were stitched shut using non-absorbable suture material (silk No. 1) in an interrupted cruciate pattern (figure 4).

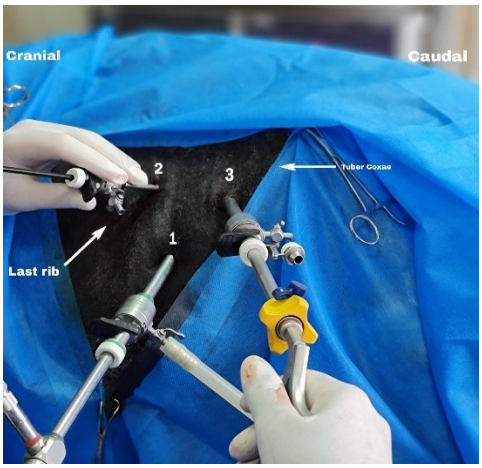

Figure 3: Showing the portal sites.

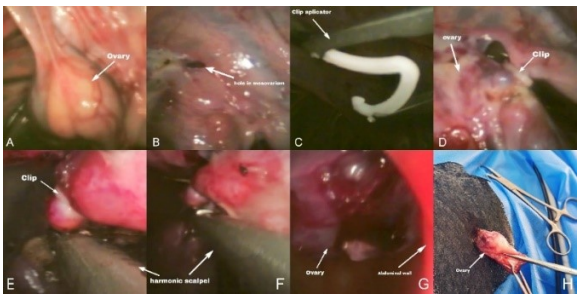

Figure 4: Showing the laparoscopic procedure, A: Identify the ovary. B: make a hole in the mesovarium. C,D: Appling clip. E,F: coagulate with harmonic scalpel. G: get out the ovary from incision site (inside view). H: get out the ovary from incision site (outside view).

Postoperative care

Experimental animals were given antibiotic intramuscularly (penicillin streptomycin) in dose (22,000 IU/kg and 10 mg/kg B.W.) (KELA®/Belgium) (18). The skin sutures were removed 15 days post-operative.

Statistical Analysis

The Statistical Analysis System- SAS (2018) program was used to detect the effect of difference factors in the study parameter. T-test was used to significant compare between surgical time means in this study (21). The Surgical time evaluated from the scalpel incision till the last suture stitch.

Result and discussion

In group A the duration of operation was ranged between 50-70 minute, while the range of operative time in group B was 120-158 minute. Statically analysis (Table1), (figure 5) is shown significant differences at the level of ($P \leq 0.01$) between traditional and laparoscopic groups in favor of group A. The sorts of surgeries that were performed in the study may have contributed to the disparities in the length of the operations (22).

At the beginning of the study, the operative consumes longer time, but later with more of familiar of (the operation, sedation, control) the duration of operation was decreased. The same result was concluded by (23) and (24) whom said that the surgery time decreased with experience with the procedure.

The long timing was affected by a number of variables, accustomation to the laparoscopic tools, ovariectomy procedure, temperament of the animal and their sedation. This note was also mentioned by (6) (25) which confirm that several factors played a role in determining the overall surgical time like maneuverability of ovary because of the absence of stereoscopic vision, temperament of the animal, equipment and personnel availability, skill and experience of the surgical team.

The surgical time of laparoscope surgery observed in this study were similar to those observed with previous laparoscopic ovariectomy techniques (26) and traditional surgery was short comparing to it. As also seen with (27).

The use of harmonic scalpel was favorable in this study, easy to use and fast to cut but the generator overheating shutdown extended the time, the same occurred with (28) that mentioned throughout their investigation, there were a few instances of system shutdown, although these incidents got less frequent as we got more experienced. The Harmonic Scalpel's system shutdown function prevents the generator or the active blade from becoming too hot. Also (29) confirm that laparoscopic ovariectomy performed with a harmonic scalpel is a time-saving surgical technique that works well.

Regardless of the longer time of the laparoscopic procedure but it caused less post-operative complications as intraabdominal adhesions, daily activity, and wound healing disorders. In which all animals showed adhesion formation post traditional ovariectomy (group A), but only one animals had adhesion after laparoscopic ovariectomy (group B), also two animals had problem to walk after traditional surgery, counter to the laparoscopic surgery all the animals had normal daily activity, in addition to one animal had wound dehiscence post traditional ovariectomy, which did not occur with the laparoscope ovariectomy. Same result was also mentioned by other researches, (9) (23) (28) (30) (31) mentioned that laparoscopic surgery is safe procedure and can be done without major complication, and that the animal can be return

to normal activity with a short time. Also the studies affirm that the laparoscopic procedure were more convenient comparing with the traditional open procedure in veterinary medicine, because early recovery due to smaller surgical incisions, fast healing, low post-operative illness, minimize postoperative pain, low infection rate. But it needs more practice and training (32) (33).

Group	Mean ± SE of Operation Time (minute)
A	63.20 ±3.77
B	143.60 ±7.10
T-test	18.549 **
P-value	0.0001
** (P≤0.01).	

Table 1: statically analysis of operation time

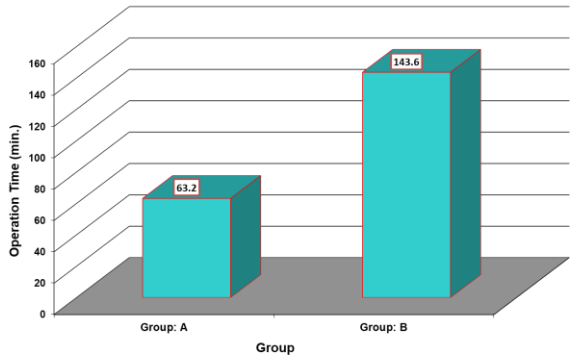

Figure 5: Statically analysis of operation time between different groups

Conclusion

Laparoscopic ovariectomy procedure takes longer time than the traditional ovariectomy procedure, and time of operation deceases with more experience of laparoscope device, tools and procedure.

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Conflict of interest

The authors declare that there are no conflicts of interest .

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