COMPARATIVE STUDY OF LAPAROSCOPIC SURGERY OF FEMALE GENITAL APPARATUS IN SOW AND BITCH

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Abstract

The advantages of using the laparoscopic surgry to the detriment of traditional surgery are reducing pain and post surgery complications and obtaining a better view of the area. The aim of this study is to evaluate the efficacy of using ultrasonic scalpel and bipolar scissors in laparocopic ovariectomy (OV) and ovariohysterectomy (OVH) in bitch and sow. Also, it has been tried to assess the degree of difficulty of the ovariectomy and the ovariohysterectomy, espectively in the two species. The study was conducted on 6 animals (two sows and four bitches). The introduction of the pneumoperitoneum induction was performed using the Veress needle. The surgeries were performed through the abdominal cavity using three trocars helping to introduce the laparoscope, an atraumatic forceps and the ultrasound scalpel or the bipolar scissors, following a previous skin incision. Using the ultrasonic scalpel successfully complements other instruments such as the traumatic forceps, scissors and haemostatic tool. Through its excellent haemostatic capacities there have been not registered significant blood loos as a consequence of the surgical removal of the ovaries or the uterus with the ovaries, when either the ultrasonic scalpel or bipolar scissors were used. Due to the difficulty of surgical laparoscopic removal of the sow genital apparatus, connected to the similarities in the the two species genital apparatus, it is reasonable to conclude that the surgery in sow is a model for the surgery in bitch.

Key words*: bitch, estrus control, laparoscopy, sows.*

Introduction

Even if the laparoscopic surgery dates back in 1985, yet very few veterinary doctors are familiar with the method. It is estimated that less than 1% of vets master this method in England (12). In our country this percent is considerably small. The reasons for this niche surgery not to be known are the high price of equipment and though the costs of surgery, longer surgeries, and the difficulty of reaching a corresponding ability to perform the surgery (he need of training on different types of simulators for a long period of time) (4).

The ovariectomy and the ovariohysterectomy are the most used methods for surgical control of dog population. Numerous scientific papers reveal the advantages of using OV detrimental to OVH (8, 14). Minimally invasive surgery, particularly laparoscopic ovariectomy, has many advantages over traditional open surgery laparoendoscopic using either the single - or 3 portal site laparoscopic approach; namely, less postoperative pain, low morbidity, smaller incisions, better viewing of the ovarian pedicle, less risk of complications associated with surgical manipulation of the abdominal viscera, and faster recovery to normal activity (2, 6). Based on a study by Devitt et al. (3) the laparoscopic sterilization was found to be 62% less painful than traditional surgery in dogs.

In surgery, two types of energy are used: electromagnetic energy used n monopolar (ME), bipolar (BE) and advanced bipolar and laser surgery and mechanical energy which includes manual and mechanical sutures and ultrasonic scalpel. The latter is a system capable of producing clinical effects of cavitations, proteic fusion, coagulation and cutting due to the ultrasound energy which amplified and released in the tissues. The ultrasonic scalpel is a cutting, haemostasis and dissection device operating at 55.5 kHz resonant frequency (1, 11).

Materials and methods

Initially, the training period was accomplished using a digital SIMBIONIX LAP Mentor simulator, equipment belonging to the Centre for Laparoscopic Surgery and Microsurgery "Pius Brânzeu" within the University of Medicine and Pharmacy "Victor Babeş" Timisoara and another simulator that was practiced on, namely 3-D MED, was the equippent of the Zooprophylactic Institute in Palermo.

The study was developed at the Experimental Zooprophylactic Institute "A. Mirror" in Sicily and in the CLC Horia Cernescu in Timişoara. 6 intact females were studied, two crossbreed of Large White with Landrace sows, weighing 35 kilograms and 4 crossbreed bitches, weighing between 16 and 27 kilograms. All females included in the study underwent complete physical examination and had no previous or current history of illness. The animals were divided into two groups G1 and G2. A sow (which underwent OV surgery) and two bitches (which underwent OV and OVH, respectively) took part in G1. In this group of animals the female genital tract excision was performed using ultrasonic scalpel (Ethicon Ultrasonic Device - HARMONIC ACE 7). G2 had the same display, a sow (OV surgery) and two bitches (OV and OVH surgery, respectively). In G2 the female genital removal was performed using bipolar scissors (STORZ).

Pre-anesthesia was performed using ZOLETIL 50 VIBRAC, a product containing a combination of an analgesic opioid (tiletamine) and a benzodiazepine anesthesic (Zolazepam) in a dose of 10 mg / kg body weight administered intramuscularly. The induction occurred after the administration of propofol (2 mg / kg body weight) (Rapinovet 10 mg / ml). Maintaining of the anesthesia in all subjects in both groups was achieved with isoflurane (ISOFLO) and 100% oxygen administered by inhalation.

Preparing animals for surgery consisted in a diet based on fluids 12 hours before surgery. After the preanesthesia, the animals were intubated using a laryngoscope. Size 7 endotracheal tube placement was made after a preliminary lifting the animals epiglottis using the laryngoscope. The animal fur was trimmed and the abdomen skin was disinfected with betadine. The animals were restrained on the surgery table in the supine position, slightly inclined (10 - 15^{o}), with the hindquarters located above (Trendelenburg position) and limbs in extension. The urinary bladder was emptied by catheterization. To be noted that in the porcine species the bladder catheterization is very difficult, which is why only one of the two females could be catheterized.

The auricular vein (in sows) and the cephalic vein (in the bitches) were catheterized to enable administration of the anesthetic agents and fluids during surgery. Each subject was administered therapy with liquid, Ringer's lactate at a rate of 10 ml / kg / h.

The anesthesia monitoring of the subjects was carried out by assessing the vital parameters such as oxygen saturation, pulse, heart rate.

There were used two video monitors, one fixed of laparoscopic surgery belonging to Storz and the other mounted on a wheel winch, the image sending via wireless technology, surgery table electrically operated drive, electro-surgical unit (electrocautery) with electricity monitoring system, laparoscopic equipment mounted on a wheel winch and composed of a light source, gas insufflators , camera recorder on hard drive.

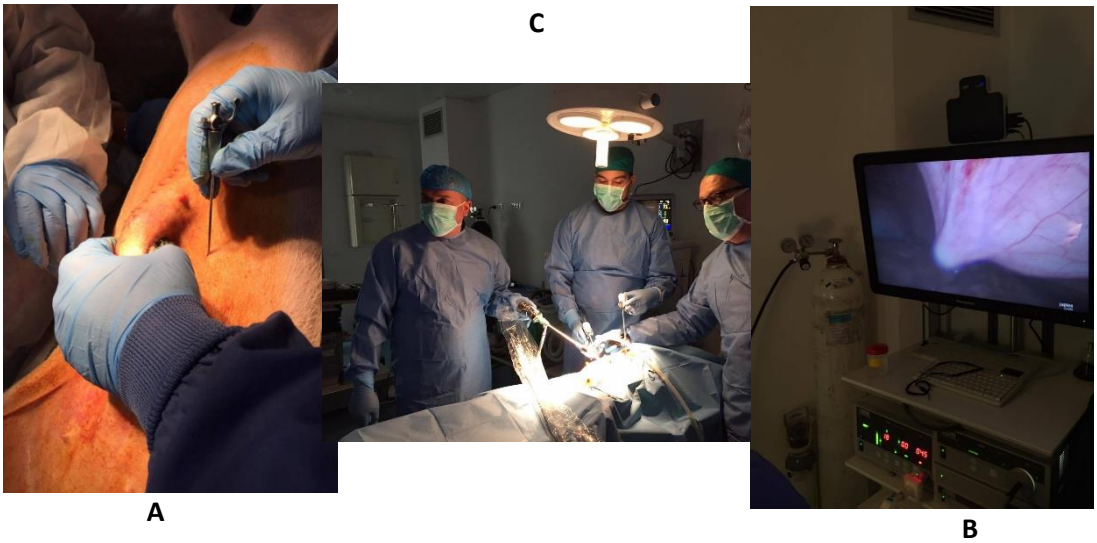


Fig. 1 **A** Introducing the pneuoperitoneum using a Veres needle, **B** Inserting the cannulas under endoscopic control, **C** Positionng the cannulas and the doctors during the surgery

The pneumoperitoneum induction was preceded by making an incision of about 3 mm at the umbilical scar of the bitch and easy aside the umbilical scar of sows (because of a recent surgery). The pneumoperitoneum induction was performed using the Veress needle (Fig 7) after a prior handhold of the abdominal wall and its pulling up. The pneumoperitoneum was established with an electronic insufflator to 10 -12 mmHg with a flow rate of 1 L / min Using CO2. After the pneumoperitoneum was induced, the Veress needle was withdrawn through the same hole and a 5 mm trocar was introduced. Throgh this trocar the laparoscope (STORZ, forward-oblique telescope Hopkins II 300, 5mm diameter) was inserted helping to visualize the abdominal cavity. The laparoscope used was one of 30 o and it is connected to a miniature camera and a cold light source, the camera control unit automatically taking parameters brightness and contrast settings. In the case of our surgeries, a laparoscope having a thickness of 5 mm was used.

The other two cannulas are introduced by visual contact, pressing with them on the abdominal wall and viewing the cone obtained by the pressure. (Fig. 1B). Provided that the endoscope is endowed with a light source, through transparency one can view any larger blood vessels in the abdominal wall. It is preferable that these vessels flagged by the light source to be avoided by the trocar.

After exploring visualy the abdominal cavity, the uterine horns were tried to be identified, this stage representing the initial one in the ovaries identification. After locating a uterine horn or uterine body it was proceeded to the genitalia visualising, using the a traumatic forceps, until the ovary is identified. Once the ovary is located, one of the atraumatic forceps is withdrawn and in its place the bipolar scissors or ultrasound scalpel were introduced in order to initiate the hemostasis. To initiate the electrical or ultrasonic coagulation the ovary is held with one atraumatic forceps and the suspensory ligament of the ovary is viewed upon, that being the place where the haemostasis begin.

In the OV method, the excision procedure by electrical coagulation started at the suspensory ligament of the ovary, continued in the mezovarium and ended at the own ovary ligament. In the OVH method, the excision was carried out starting the electro-coagulation to

the suspensory ligament of the ovary (Fig. 2 A) was continued at the mezovarium, mesometrium and the uterus was cut at the uterine body level. Due to the haemostasis performed by the electric scalpel it is no longer necessary to suture the uterine stump as it us in the classical surgery.

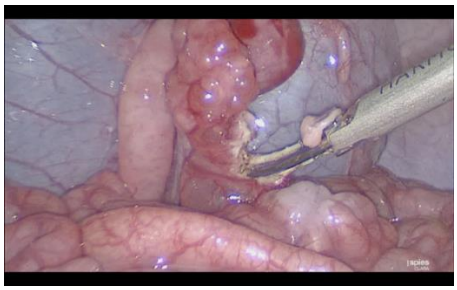
In females o which was carried out the OVH removal of the ovaries and uterus, or only ovaries in case of the females subject to OV method, any of these removals were performed after a prior expansion of the hole created by the introduction of the trocar. Widening the hole was done by using a scissors or a haemostatic forceps. After fixing one end of the uterine horn with a forceps, a portion of it is brought into the surgery spot. From now on, the genital is clutched to extract.

The abdominal incision was closed in two layers using a 3\0 USP braided absorbable material (3/0 Surucryl; SURU Int, India) and a simple interrupted suture pattern.

The aim of this study is to evaluate the effectiveness of using the ultrasound scalpel (Ethicon Ultrasonic Device - HARMONIC ACE +7) and the bipolar scissors (Storz) in OV and OVH in bitch and sow. Also, it has been tried to assess the degree of difficulty of an OV or OVH, respectively in the two species.

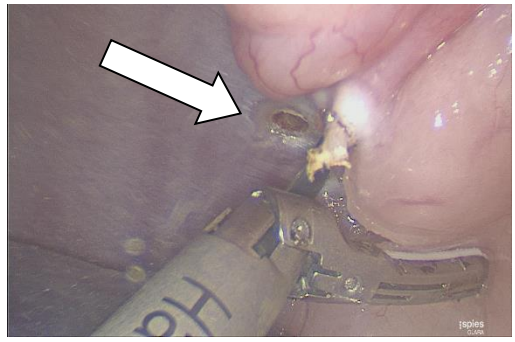
Results and discussions

For the both species studied, the ovary excision was made after a preliminary identification of the genital tract. In sows, the uterine horns are located with more difficulty, because the uterine horns show similarity with the small intestine.



A

B



C

Fig. 2 **A**. Exposure and coagulation of the ovarian pedicle area accomplished by traction of the proper ovarian ligament. **B** Removal of the uterine horns and ovarys **C**. Peritoneus burning during surgical procedure.

Because of the anatomical features of the female genital of the sow, the bladder catheterization is more difficult compared to bitch. The bladder could not be emptied by catheterization before surgery to one of the studied sows, which is why we found a slight difficulty in manipulating genitalia. Because of this through the use of ultrasonic scalpel a burn has been created, at the peritoneal level, the burn having a diameter of about 2-3 mm (Fig. 2 A).

According to data in the studies, the use of coagulation instruments can accidentally create burns to the visceral peritoneum or adjacently. This accident is indicated in the studies as one of the most common complications of laparoscopic surgery. The most complications in the laparoscopic surgery are related to abdominal cavity access and pneumoperitoneum establishment, haemorrhage, perforation viscera and tissue damage due to energy application (7). We believe that this accident was due to faulty perception of the depth of the work area from the vet, a fact noticed by other clinicians in the studies (2, 4, 9, 11).

The burns at the peritoneal area can create more pain to the patient after the surgery (2, 5). Burning in the peritoneum is considered a less serious accident compared to the burn in viscera. For example, the burn of the small intestine can cause injuries that will later produce stenosis, with all the shortcomings that occur. Production of injuries in a tense bladder due to its content or the intestine injury could cause the cavity organ to be damaged with major repercussions on the health of the animal (5, 10).

Using the ultrasonic scalpel allowed the use of a single instrument with clamping, cutting and coagulation properties. Due to the capacity of this haemostatic forceps to achieve a good haemostasis, there was no significant blood loss. Haemostatic forceps, due to its ability to achieve good haemostasis were not registered significant loss of blood, thus the vascular ligatures proving unnecessary. Both bipolar vessel sealer and the ultrasonic scalpel, which facilitates sealing and dividing the ovarian pedicle, has been shown in both groups (G1 and G2) to be feasible, safe and reduce surgical times in both the OV and OVH approach.

Because the sow uterine horns are longer, the OVH technique was estimated to be more difficult than the technical OVH in bitch.

Any attempt to learn a certain laparoscopic surgical technique must be preceded by a "workout" of the surgeon on the simulator to strengthen coordination brain - hands, so necessary in this technique.

Laparoscopic surgery entails challenges relating to instrumentation and optics and surgeon undertaking laparoscopic are required to have specific hand-eye coordination skills. These skills, including altered depth perception and the operation of long instruments with a fulcrum effect are not learned by performing conventional open surgery (14).

Conclusions

1. Because the laparoscopic surgical technique of ablation of the female genital sow has a higher degree of difficulty, along with similarities between the reproductive apparatus anatomy of the two species, the sow can be a model for the surgery of the female genitalia of the bitch.
2. There were no significant differences regarding the use of bipolar scissors or scalpel ultrasound on the proteic coagulation.

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