A pyometra managed by laparoscopic ovariohysterectomy in a dog

F. COLLARD*, E. VIGUIER²

1Service de Chirurgie, Faculté de Médecine Vétérinaire, Université de Montréal, 3200 rue Sicotte, Saint-Hyacinthe, Québec J2S 2M2, CANADA.
2Service de Chirurgie, Ecole Nationale Vétérinaire de Lyon, 1 av. Bourgelat, 69280 Marcy l’Etoile, FRANCE.

*Corresponding author: collardfab@yahoo.fr

SUMMARY
The objective of this article is to describe a case of pyometra managed by laparoscopic ovariohysterectomy. A 15-year-old poodle bitch with hyperadrenocorticism was presenting vulvar discharge. Abdominal ultrasonography confirmed "open" pyometra. Laparoscopic ovariohysterectomy was performed in order to decrease incision size and to limit risk of wound dehiscence, which is frequently associated with hypercorticism. Surgical time was 85 minutes, the bitch was ambulatory 3 hours later and no complication was encountered. Ovariectomy and ovariohysterectomy are frequently performed on healthy bitches. This procedure can also be carried out on “open” pyometra without increasing the complication rate. In our case, by performing a coelioscopy, we limited complications such as wound dehiscence on an old and overweight bitch with weak abdomen wall.

Keywords: Dog, Laparoscopy, Ovariohysterectomy, Pyometra.

RÉSUMÉ
Traitement d’un pyomètre chez une chienne par ovariohystérectomie sous coelioscopie

L’objectif de cet article est de décrire un cas de pyomètre traité par ovariohystérectomie sous coelioscopie. Une chienne Caniche de 15 ans atteinte d’un syndrome de Cushing présente des pertes vulvaires purulentes. Une échographie abdominale confirme l’existence d’un pyomètre à col ouvert. Une ovariohystérectomie sous coelioscopie est décidée afin de limiter la taille des plaies et diminuer les problèmes de cicatrisation pouvant être associés à l’hypercorticisme. La chirurgie a duré 85 minutes, la chienne est ambulatoire 3 heures après l’intervention. Aucune complication n’a été rencontrée. Les ovariohystérectomies ainsi que les ovariohystérectomies sont fréquemment effectuées sur des chiennes en bon état général. Cette intervention peut aussi être envisagée lors de pyomètre à col ouvert sans accroître le taux de complication. Dans notre cas, la coelioscopie a permis de limiter les complications comme une déhiscence de plaie sur une chienne âgée, obèse et présentant une faiblesse de la paroi abdominale associée à son hypercorticisme.

Mots clés : Chien, Laparoscopie, Ovariohystérectomie, Pyomètre.

Introduction
Laparoscopic surgery represents an increasingly important procedure in veterinarian surgery because it allows numerous interventions to be carried out with less invasive procedure, a decrease in postoperative pain and faster return to normal activity [7]. During the last thirty years, the technical progress in optics and in video acquisition systems has allowed minimal access procedures to be developed with in human and veterinary medicine. Video assisted surgery has numerous applications from ovariohysterectomy to treatment of a medial coronoid process fracture or an intervertebral disc disease. The first case of laparoscopic ovariohysterectomy in a bitch was published in 1985 and in 1997 for ovariohysterectomy [7, 13]. Ovariohysterectomy currently represents the most widespread procedure in veterinary practice. In our case, what is interesting is to have carried out this surgery in an old bitch with a weak abdominal wall presenting a pyometra.

Case report
A 15 year-old poodle bitch was brought to the consultation for an adrenal gland ultrasound examination to confirm a hyperadrenocorticism.

During the clinical examination, alopecia and an abdominal ptosis were noted. The hair was wooled. Furthermore, a purulent and haemorrhagic drainage passed by the hypertrophied vulva during the abdominal palpation. A urinary analysis revealed a hematuria and a leucocytosis. The abdominal ultrasound examination was performed. Both adrenal glands were hypertrophied. Many cysts were observed on the right ovary, the uterine wall was thickened and hyperechoic, which were compatible with a neoplasia or a chronic inflammation. A ovariohysterectomy was suspected due to the purulent drainage and a surgical treatment was decided.

A complete blood count and biochemical analysis were performed, no major abnormality was encountered and laparoscopy assisted ovariohysterectomy was performed due to the weak abdominal wall and potential risk of abdominal hernia. A combination of morphine (0.2mg/kg, subcutaneously) and diazepam (0.3mg/kg intravenously (IV)) was administered for premedication. Induction was performed with propofol (4mg/kg, IV) and anesthesia was maintained by oxygen and isoflurane inhalation via a tracheal intubation. Antibiotherapy was carried out with cephalexin (30mg/kg, IV). Biological parameters were controlled with an ECG, a pulse oxymetre and a capnograph. The bladder was emptied by external taxis to avoid bladder injury during port placement and to allow complete abdominal exploration. The patient
was positioned in dorsal recumbency, and the ventral abdomen (from the xiphoid to the pubis and to each inguinal fold) was clipped and aseptically prepared as for a laparotomy. After draping, a small stab incision was made close to the umbilicus and a Verres insufflation needle was introduced with a caudal and right direction. Pneumoperitoneum was established using carbon dioxide and maintained by an inflation device. A 1cm skin incision was then made and a 12mm Ternamian trocar (Karl Storz Endoscopie France S.A., Guyancourt (78), France, Europe) was introduced. A 10 mm, 0° laparoscope was placed through the cannula. The light source was used to transilluminate the abdominal wall and localize the caudal superficial epigastric blood vessels prior to instrument port placement. One incision was performed, cranially to the inguinal fold, between the third and the forth teat on each side. The blade was introduced through the skin and the abdominal wall, and then two 5mm instrument trocars were placed under laparoscope control. To expose the right ovary, the animal was placed in the left oblique recumbent position. A Babcock forceps was passed through the left trocar to pull the intestines medially. The right uterine horn was visualized; a second forceps was introduced in the right port to grasp the suspensory ligament (Fig 1). The first forceps was removed and a monopolar scalpel was introduced. The suspensory ligament was transected cranially to caudally by coagulating tissue and vessels. The dog was turned to the right oblique recumbent position and the same procedure was applied to the left ovary. After the patient was returned to the dorsal recumbent position, a 2cm skin incision was performed cranial to the pubis and the linea alba was incised under laparoscopic control. Both ovary and horn were drawn out through this opening (Fig 2). The uterine arteries and the uterus were ligated and resected in a routine manner. The abdominal cavity was explored to control hemostasis. The body wall of instrument ports was closed using 2-0 polydioxanone (PDS) in a cruciate pattern. The laparoscope and its cannula were withdrawn and the pneumoperitoneum was reduced by applying pressure on each side of the abdominal cavity to facilitate the escape of CO₂ from within the abdominal cavity through the umbilical incision prior to closure. The prepubic incision was closed in the same pattern as described previously. The subcutaneous tissue and the skin were closed in a routine manner. Morphine (0.1mg/kg) was given subcutaneously after extubation. The dog showed good recovery from anesthesia and was ambulatory within 3 hours. The day after, the dog was discharged from the hospital because it was not in pain and had recovered appetite. After a one month follow-up, no clinical complications were observed. The hyperadrenocorticism was treated medically.

Discussion

Laparoscopy techniques were used first as diagnostic procedures. They allowed surgeons to visualize abdominal viscera and particularly ovaries [9]. The development of surgical equipment more and more accurate surgery to be performed. In the first stage, hepatic, renal, lymph nodes, prostatic or pancreatic biopsies were performed. Then, procedures became more and more complex. Currently, ovariecotomies, ovario-

![Figure 1: Intra-abdominal visualisation of the ovary (2) and its uterine horn (1). The suspensory ligament is transected cranially to caudally by coagulating tissue and vessels with a monopolar scalpel (3).](image)

![Figure 2: Ovaries and horns are drawn out by a 2cm incision over the linea alba.](image)
Nowadays, laparoscopy assisted ovariohysterectomy is the procedure the most frequently performed. Most of the time in the United States, this surgery is carried out to prevent or lessen the risk of development of mammary cancer and pyometra in young bitches, whereas in Europe ovarioectomy is preferred.

The use of laparoscopic surgery is more and more common both in veterinary surgery and in human surgery. It represents a great interest because it is less invasive but it necessitates training and expensive surgical equipment. Surgical incisions are smaller which limits tissue trauma, wound dehiscence and in cases of blood coagulation disorder, laparoscopy decreases parietal bleeding. In our case, this dog presented a Cushing’s syndrome so the abdomen wall was very thin, fragile and wound healing was supposed to be worse. That is one of the reasons why we preferred the laparoscopic procedure.

In dogs as in human surgery, laparoscopy is not possible in each case and surgeons must be aware of the conditions, which prevent them from doing a laparoscopy. Major contraindications are decompensate cardiac insufficiency, severe respiratory insufficiency, diaphragmatic hernia, pneumothorax or if a mass or a voluminous organ is occupying the abdomen (pyometra, splenic hemangiosarcoma…). On the other hand, abdominal exploration with a laparoscope can be more difficult or impossible with obese animals. In our case, pus was flowing through the vulva that is the reason why uterine horns were not occupying an important volume in the abdomen. Adrenal glands were not visualized due to the presence of a lot of fat.

Before performing a laparoscopy, some stages in dog preparation are obligatory. The patient must be anesthetized with propofol or ketamine [14]. Contrary to phenobarbital, these anesthetics cause no or little splenic dilation, which prevents risks of spleen injury during port introduction and allows a better abdominal exploration. In our case, the bitch was old that is the reason why we preferred inducing anesthesia with propofol. After induction, the bladder must be emptied to limit its volume for the same reasons as the spleen [9].

The abdomen is clipped from the xiphoid to the pubis and aseptically prepared as for a laparotomy. Abdominal insufflation with CO2 compresses the diaphragm, which limits thoracic volume, ventilation and hemostasis. A pulse oxymetre and a capnograph must be used to check respiratory parameters. Mechanical ventilation is not always necessary if CO2 abdominal pressure is low and the procedure quick; it should be used if spontaneous ventilation does not allow the patient to breathe correctly [12].

Hemostasis and tissue section could be performed with different electrocoagulation devices. The most frequently used is monopolar electrocoagulation. Bipolar electrocoagulation, surgical laser and harmonic scalpel are other effective devices but the bipolar electrocoagulation remains the method of choice [11]. Currently, the use of a bipolar vessel-sealing device decreases surgical time by reducing coagulation time and allowing section [6]. Surgeons need only one instrument and do not have to introduce bipolar forceps, scissors and Babcock forceps alternatively.

Moreover, it has been described in humans and dogs that postoperative pain and recovery after laparoscopic ovariohysterectomy are decreased [2, 3, 4, 5]. That is the reason why the dog recovered and was ambulatory so quickly. Non-steroidal anti-inflammatory drugs can be administered for a few days to limit abdominal and diaphragmatic pain due to excessive insufflation or incomplete pneumoperitoneum reduction.

But laparoscopic surgery presents some disadvantages. Surgical time is often prolonged, visera could be injured by trocar and equipment represents an important investment. The disadvantages, however, do not outweigh the advantages for patients. There is less postoperative pain and a more rapid return to normal activity [7].

Complications associated with laparoscopy are lower (3.9 to 11.8%) than those encountered with laparotomy [3, 10, 12]. Most of these complications concern the area of port introduction. Oedema, inflammation, leakage or wound dehiscence are the most frequently encountered [2, 10]. It is treated by local cares and healing by second intention. An abdominal hernia has seldom been described but the small incision size allowed only omental herniation [1].

Video-assisted surgery is becoming the treatment of choice for a great number of procedures. Improvement of surgical equipment allows more and more accurate surgery. Laparoscopic assisted ovariohysterectomy represents an interesting procedure allowing an abdominal exploration and hysterectomy without major skin incisions. For animals with parietal weakness, laparoscopic procedures decrease postoperative complication. To our knowledge, only a few cases of treatment of pyometra under laparoscopy and no case of ovariohysterectomy on a bitch presented with a hyperadrenocorticism have been published. In our opinion, video-assisted surgery will be more and more frequent as veterinary surgeons use and become aware of the advantages of this device.

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References


