

Laparoscopic Treatment of Ovarian Remnant Syndrome in a Queen

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Abstract : A 1-year-old, 2.35 kg spayed female American short hair cat was referred with episodic signs of heat at 3 months after ovariohysterectomy. Through the screening tests, bilateral cystic, ovary like masses were shown at the caudal to both kidneys with high serum estradiol concentration. It was considered that the patient was suffered from ovarian remnant syndrome. Laparoscopic exploration was performed, and each of mass lesions was resected by ultrasonic scalpel. Patient was recovered favorably and has been doing well without recurrence of estrus signs until 2 years after surgery.

Key words : ovarian remnant syndrome, laparoscopy, ultrasonic scalpel, queen.

Introduction

Ovarian remnant syndrome (ORS), the presence of the functional ovarian tissue in a previously ovariohysterectomized animal was first reported in companion animal in 1973 (7,11,18,20). ORS in women is associated with parovarian inflammatory disease, pelvic mass, pain, or previous difficult salpingo-oophorectomy in patients who have endometriosis or dense pelvic adhesions after multiple surgeries (4,9). In veterinary medicine, however, it is not related to pathologic condition but considered as a complication of elective ovariohysterectomy (OHE)/ovariectomy (OVE) (20). Causes of ORS include incomplete removal of the ovary, or entrapped ovarian tissue by improper placement of clamping and ligation, revascularization of inadvertently dropped fragment of ovarian tissue into the abdominal cavity during surgery (auto-transplantation), and accessory ovary or ovarian tissue that has extended into the ligament of the ovary (ectopic extraovarian tissue) (7,10,11).

ORS is more common in cats than dogs and may occur bilaterally or unilaterally with similar incidence (20). As for unilateral ovarian remnant, right-sided is suspected more common as its deeper and cranial location (5,7), however, similar incidence of each side was also reported (11,18). Age at the time of sterilization, breed, any presurgical conditions (obesity, deep chest, pyometra, pregnancy, salpingitis), and the career of the surgeons do not influence the risk of the ORS (7,10,18). Neoplastic change of the remnants is also not a cause of ORS (10). The interval of time from previous OHE/OVE to return to estrus is variable (2 weeks to 10 years), but the cycles should mimic normal estrus cycles in length (2,11,20). The interval in patients of ORS with neoplastic change of the ovarian tissues (mean: 96 months, range:

47-120 months) was longer than that of patients without it (mean: 12 months, range: 1-60 months) (13).

Queens suffering from ORS may show signs of estrus like increased vocalization, lordosis or crouching, rolling, quick treading motions with hind limb, holding tail to one side, being attractive to tomcat, and allowing copulation, but not all patients show overt signs (5,7). Diagnostic methods of ORS with behavior change involve vaginal cytology, blood hormonal analysis (resting estradiol and progesterone, LH, and hormone challenge assay with GnRH or HCG), and exploratory laparotomy with histopathologic examination (7,10).

The differential diagnoses that must be concerned are urinary tract disorder, vaginitis, exposure to exogenous estrogen, adrenocortical carcinoma, and idiopathic behavioral alterations (7). There are three options to treat ORS; [1] leaving the remnant, [2] medical therapy using synthetic progestagens or androgens, [3] removal of the remnant by exploratory laparotomy (7,20). Surgery is most recommended as first two options still have the risk of mammary gland neoplasia or granulosa cell tumor, and stump pyometra sometimes with hormonally functional ovarian remnant tissue (7,12,17,20). Some surgeons prefer to perform surgery when the patient is in estrus, because increased vascularity or the active follicles on the ovarian remnant make it more obviously identified (7,20).

Laparoscopic treatment for ORS has been performed for decades in women patients and its feasibility was demonstrated. It is more complicated to maneuver than in bitches and queens due to the possibility of tissue adhesion or inflammatory conditions mentioned above (9,14).

This report describes a laparoscopic resection of bilateral ovarian remnants in 1-year-old queen.

Case

A 1-year-old, 2.35 kg spayed female indoor living American short hair cat was referred with episodic signs of heat of

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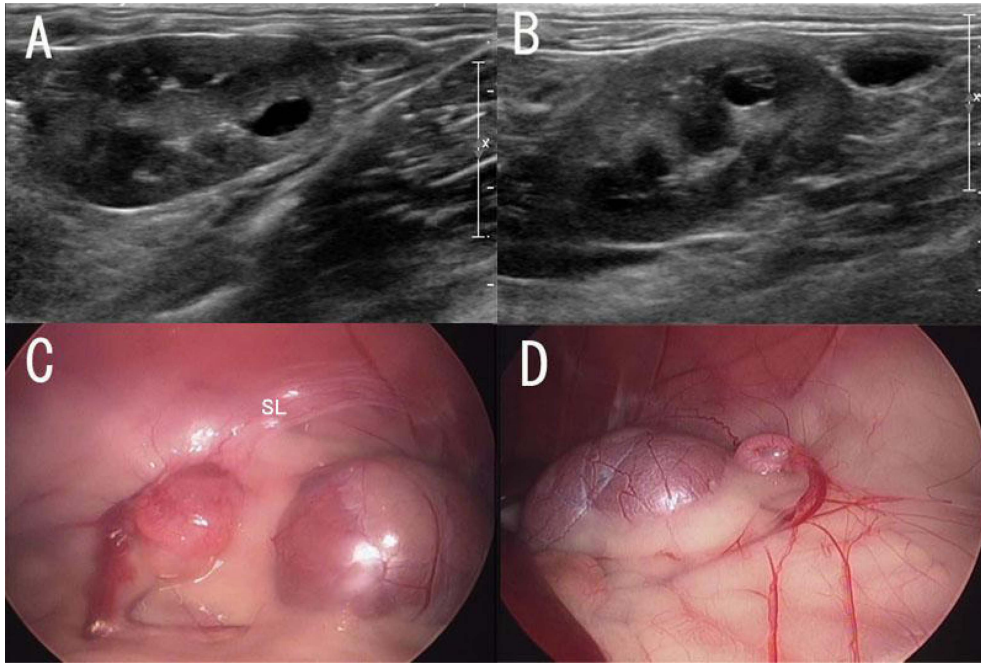


Fig 1. Ultrasonographic findings (A-right, B-left) and laparoscopic images (C-right, D-left) of ovarian remnant in a queen. Cyst-like hypoechoic structures are located directly caudal to the kidney of each side. Suspensory ligament (SL) and kidney are good landmarks.

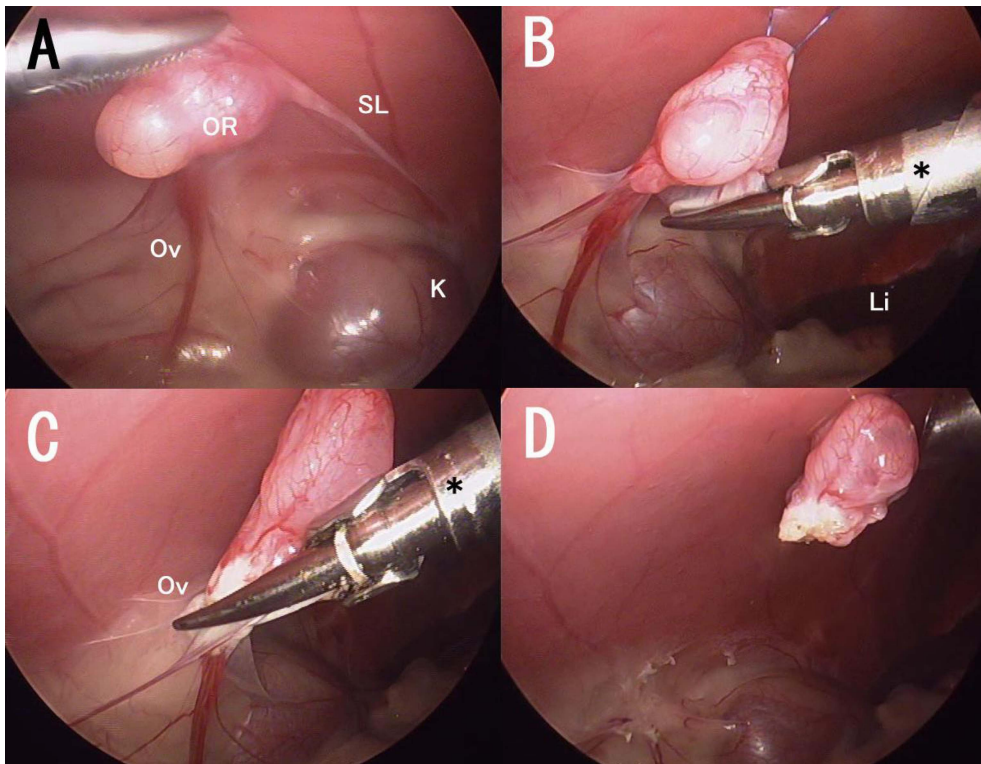


Fig 2. Laparoscopic resection of the right ovarian remnant using ultrasonic scalpel. Ovarian remnant was grasped and elevated to the right ventrolateral abdominal wall (A). Suspensory ligament was grasped and transected with ultrasonic scalpel (B). Ovarian vessels were transected in the same way (C). Clear cut surface showed excellent hemostasis. Transected ovarian remnant attached to the abdominal wall was removed by the portal site (D). OR; ovarian remnant, SL; suspensory ligament, Ov; ovarian vessels, K; kidney, Li; liver, *; ultrasonic scalpel.

vocalization, rubbing, and lordosis. These signs appeared first at 3 months after ovariectomy and lasted for 2 months. There is no history associated with hormonal exposure and

suspected adrenal cortical abnormality.

The queen was bright, alert, and in favorable body condition. There was no remarkable finding in blood examination

(CBC, serum chemistry, electrolytes panel) and thoracic/abdominal radiography. On the abdominal ultrasonography, however, round, cyst-like hypoechoic structures less than 1 cm in diameter were identified at the caudal pole of both kidneys (Fig 1A, B). High serum estradiol concentration was measured with 118 pg/mL (reference range; spayed cat < 15 pg/mL, queen in diestrus or pregnancy < 20 pg/mL, 25 < queen in proestrus or estrus < 50 pg/mL)(6).

Ovarian remnant syndrome was suspected and surgical removal was planned. The owner, however, did not want repetitive laparotomy again and then, laparoscopic exploration was performed under general anesthesia.

Procedure was achieved with two 5 mm ports in dorsal recumbency. Primary trocar was placed by Hasson technique (16) caudal to umbilicus and secondary trocar was located at 3 cm caudal to the primary trocar. Abdominal cavity was explored under 5 mmHg CO₂ pneumoperitoneum. Cystic round ball-like masses with vasculature were obviously identified in the peritoneum directly caudo-lateral to each kidney (Fig 1C, D). These masses connected to the suspensory ligament were putative ovarian remnants. There was no finding of retained uterine. Removal of the bilateral masses were fulfilled with the similar way in routine laparoscopic OVE one by one (Fig 2) (8). Remnant was grasped with Babcock forceps and elevated to the ventrolateral abdominal wall. Percutaneous anchoring suture played a role as a retraction (Fig 2B) and the pedicle of remnant was transected with ultrasonic scalpel (Lotus[®] ultrasonic scalpel, SRA Developments, UK). Transected masses were removed through the portal site and the portal sites were closed after desufflation. Total anesthetic time was 35 minutes and surgery time was 20 minutes. There was no need to converse to laparotomy.

The patient was recovered without unwilling event and discharged on the day of surgery. The analysis of serum estradiol and LH level was planned at 3 months after surgery, but, the owner did not consent. With the follow-up on the phone, estrus signs were disappeared after surgery and she has been doing well for 2 years.

Discussion

Feline vulvar labia do not respond to estradiol, so there is no typical change in appearance during estrus (6). Vaginal smear also is not a routine examination in queen because of its anatomical limitation and more subtle cytologic changes than in the bitch (6,20).

Some studies reported that hormonal assays were not helpful in confirming ORS in animals (2,10,20). Care must be needed on interpreting estradiol level because it is known to exhibit considerable fluctuation over time. Besides, it may be affected by serum lipids and behavior signs of estrus often continue for a few days after the estrogen level has declined. Diagnosis cannot be ruled out if estradiol level is low. Moreover, as queen is an induced ovulator, and does not have diestrus phase with elevation of the progesterone level unless there is appropriate stimulation like copulation or hormonal challenge test for ovulation. So, resting serum progesterone levels are little of value (7,10,20). Consequently, these hormones have poor diagnostic success when used alone, but, it is

the most efficient when evaluated with hormonal challenge assay (7). LH concentration has been used successfully to determine if a female cat has been spayed or not. But, it has not been evaluated in queens with ORS and should be used with caution (10). There was a problem in using the facility of measuring laboratory test at this time. It is known that commercial canine LH assay is compatible with feline LH (7).

Ultrasonography was found to be helpful as an adjunct diagnostic test other than measurement of hormonal concentration. It is useful just not to identify the remnant of ovary and uterus, but also to check the status of the abdominal organs including adrenal gland. An ovarian remnant was suspected on the basis of ultrasonographic appearance in 13 of 14 examinations in previous study (2). Ultrasonography was also useful in this case showing typical appearance of the ovary with its anatomical location. But, the success of identification and location of remnant may be related to the expertise of the ultrasonographer, stage of the estrus cycle of the patient at the time of examination, and size of the remnant (2).

Histopathologic examination is performed to confirm the ovarian structure in the sample tissue and to identify further pathologic progression of the remnant. Ovarian remnant contained cystic follicles, granulation tissue, corpora lutea, and oviduct in 46 ORS of queens and bitches (11). It may develop to pathologic condition sometimes; one granulosa cell tumor of the remnant in 11 queens with ORS, and ORS accompanying stump pyometra in four queens were reported. (3,17,20).

Thorough exploration of each side of the abdominal cavity should be performed during surgery from the caudal pole of the kidney to the uterine stump. Most commonly, ovarian remnants are located in their original anatomical location, ovarian pedicle and omental fat around (7,10,11,20). Accessory ovarian tissue located within the proper ligament has been reported in cats, cows, and women (2). Experimental studies of autotransplantation of free floating ovarian tissue also reported settlement of functional ovary in the peritoneal wall, serosal wall of the viscera (ie. stomach), and subcutaneous tissue layers (4).

OHE is one of the most common surgical procedure in veterinary medicine. It has been performed as a routine in elective sterilization in bitches and queens. In these days, however, OVE is also occupying in some degree of selection. This tendency is more obvious, especially, in the field of minimally invasive surgery, moreover, OVE is a routine choice even in open surgery in some European countries. OVE showed similar incidence of long-term urogenital complications such as cystic endometrial hyperplasia-endometritis complex and urinary incontinence (15), and had a lower risk of ureteral ligation, ovarian remnant, and uterine stump compared to OHE (19).

Goal of female sterilization is complete removal of the ovary; the amount of uterine tissue remained is not a problem. As for ORS, prevention is the best. Decreased visualization by an inappropriately limited spay incision might increase the risk of ORS. Regardless of which method is selected, meticulous surgical maneuvers using correct technique can avoid ORS. Who concerns about the length of the incision may select the OVE with little more cranially positioned shorter incision than OHE. Prepubertal sterilization may be

another method to avoid ORS because it is technically easier to perform OHE/OVE in young animal as exposure of the ovarian pedicle is simpler (5). Moreover, there is no report of ORS in animals spayed at younger than 4 months (11).

Even dogs and cats just 1 year or older have significantly more fat around ovarian pedicle and broad ligament than 6-month-old juvenile. This fat increases the friability of the tissue, so elevating ovary through the spay incision may be troublesome. It also makes difficult to isolate and ligate the vasculature, even tearing of the pedicle can be occurred (8). Compared with laparotomy, laparoscopy provides the advantages of better visualization with greater magnification and microdissection of the structures to surgeons, less pain with less tissue trauma to patients, and cosmetic satisfaction to owners (1,9,14). Laparoscopic gonadectomy reduces the amount of tissue elevation required to transect the pedicle properly and remove the ovary and uterus (in case of OHE) (8). In these respects, laparoscopic OVE/OHE may decrease the occurrence of ORS allowing adequate isolation and preventive hemostasis.

Successful laparoscopic treatment of ORS in 5 bitches and 2 queens was reported (13). Only one dog in this study had undergone a laparoscopic OVE previously. Granulosa-theca cell tumors were diagnosed in the resected remnants of 2 dogs. Regarding exploration, kidney, suspensory ligament, and ovarian fat are good landmarks for the ovary and table tilting is also helpful to find the remnant sometimes, which is same in primary laparoscopic OVE/OHE (8). However, if there is not obviously identifiable remnant or there is a massive adhesion, conversion to laparotomy should be considered for tactile evaluation (13). There was no need to conversion to laparotomy in present case.

Although histopathologic confirmation was omitted in current case, it was reasonable to assess the patient's condition as ovarian remnant syndrome based on her behavior, ultrasonographic finding, laparoscopic exploration, high serum estradiol level. Bilateral remnants were easily identified on the ovarian pedicle of each side. Peritoneum continued from the suspensory ligament and wrapping around the mass was used in grasping and elevating ovary to the abdominal wall. It was instead of unclear ovarian bursa and the proper ligament previously removed. It was durable enough but care was taken not to tear the membrane and damage the mass or ureters. Laparoscopic resection of ovarian remnant was accomplished briefly owing to good position of remnants, scanty fat around the remnant, no tissue adhesion associated with previous surgery, and by means of ultrasonic scalpel. Ultrasonic scalpel provided easy, safe, fast and effective hemostasis by one step grasping-ligation-transection. Laparoscopic OVE was suitable for the surgical management of ORS in a queen.

Acknowledgments

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고양이에서 발생한 난소 잔존 증후군에 대하여 복강경을 이용한 치료 증례 1

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요 약 : 1년령의 중성화 암컷, 2.35 kg의 아메리칸 숏헤어 고양이가 난소 자궁 절제술을 실시한 후 3개월 시점으로부터 2개월간 지속된 발정 증상을 주증으로 내원하였다. 방사선 및 초음파 검사상, 양쪽 신장 후방에 위치한 낭성 구조물을 확인하였고, 이는 혈액검사상 나타난 고에스트로겐혈증을 고려하여 난소 조직으로 의심되었다. 복강경을 이용한 복강 탐색을 실시하였고, 양측 신장 후방의 낭성 병변을 초음파 수술도를 이용하여 절제하였다. 환자는 특이사항 없이 회복하여 술 후 2년간 증상의 재발 없이 지내고 있다. 증례를 통하여, 선택적 난소 절제술뿐만 아니라 잔존 난소의 경우에도 복강경을 유용하게 적용할 수 있음을 확인하였다.

주요어 : 난소 잔존 증후군, 복강경, 초음파 수술도, 고양이