J Vet Clin 24(1) : 38-41 (2007)

Journal of Veterinary Clinics
www.ksvc.or.kr

Granulosa Cell Tumor of Ovary in a Yorkshire terrier Dog

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(Accepted: March 14, 2007)

Abstract : A 12-year-old, intact female Yorkshire terrier was presented with progressive abdominal distention. On radiographic and ultrasonographic evaluation, a large mass was detected in right upper abdomen and it had several discrete anechoic follicles and large cysts. The mass was removed by complete ovariohysterectomy and the resected specimen was histopathologically examined. Based on the gross and histopathologic findings, the mass was definitely diagnosed as malignant granulosa cell tumor (GCT). Until now, the dog has been successfully managed more than a year without complications.

Key words : granulosa cell tumor (GCT), ovarian neoplasm, dog.

Introduction

Ovarian tumors are relatively uncommon forms of canine neoplasm (9). They can be categorized according to cell types of the ovary, including epithelial cell, germ cell and sex-cord stromal cell (1,3,15). The higher incidence of granulosa cell tumor has been reported among the neoplasms of sex-cord stroma origin (3,9,11). Granulosa cell tumor (GCT) is also the most common ovarian tumor (3,9,11). GCT is usually unilateral and tends to be firm and lobulated, although cysts are commonly apparent on cross section and these tumors can be developed into quite large mass (6).

GCT can produce sex hormone such as estrogen, progesterone, testosterone and inhibin, which are strongly related to clinical signs, such as estrogenic effects (e.g. vulvar enlargement, vaginal discharge and persistent estrus) and progesterone effects (e.g. pyometra) (8,12). The definitive diagnosis of GCT can be obtained by physical examination, ultrasonography, radiography, and biopsy with histopathologic assessment.

This report describes a case of malignant GCT in a Yorkshire terrier dog. The diagnosis of GCT was supported by exploratory laparotomy and histopathologic evaluations. To the author's knowledge, this is the first case report of canine GCT in Korea.

Case

A 12-year-old, intact female Yorkshire terrier dog weighing 3.04 kg was referred for abdominal distention. The patient had presented with progressive distending abdomen following an estrus two months ago. On the initial presentation, the dog revealed bilaterally distended abdomen with labored respiration. In addition, a large mass of the right upper abdomen and enlarged uterine cervix was palpated. The dog had generalized erythematous skin, bilaterally severe erythematous otitis and cataract, severe tartar, and bilateral submandibular lymph node enlargement. The patient was evaluated by complete blood count, serum biochemical analysis, thoracic/abdominal radiographs and ultrasound examination. Hematological prarameters were within normal ranges. Serum biochemical analysis revealed mildly elevated alanine amino transferase (ALT, 91 U/L; reference range, 17 to 78 U/L) and mild hyponatremia (Na, 137 mmol/L; reference range, 141 to 152 mmol/L). Abdominal radiographs visualized a large soft tissue-density mass causing caudolateral displacement of small bowel on the right middle abdomen (Fig 1A). Several discrete anechoic follicles, large cysts filled with hypoechogenic material, anechogenic fluid in the mass and endometrial hyperplasia were detected on ultrasonographic examination (Fig 1B). An exploratory laparotomy was undergone and ovariohysterectomy was performed. Metastasis was not detected grossly in the surgical field. The resected mass weighed about 680 g and its size was 15 cm× 11 cm×8 cm, which was equivalent to about 20% of total body weight. It had well-circumscribed, solid to cystic appea -rance with proliferative growth of abnormal vessels. A cystic structure, composing a half of the mass, was filled with watery fluid (Fig 2A). No abnormalities were observed on inspection of left ovary and uterus. The resected tissues were

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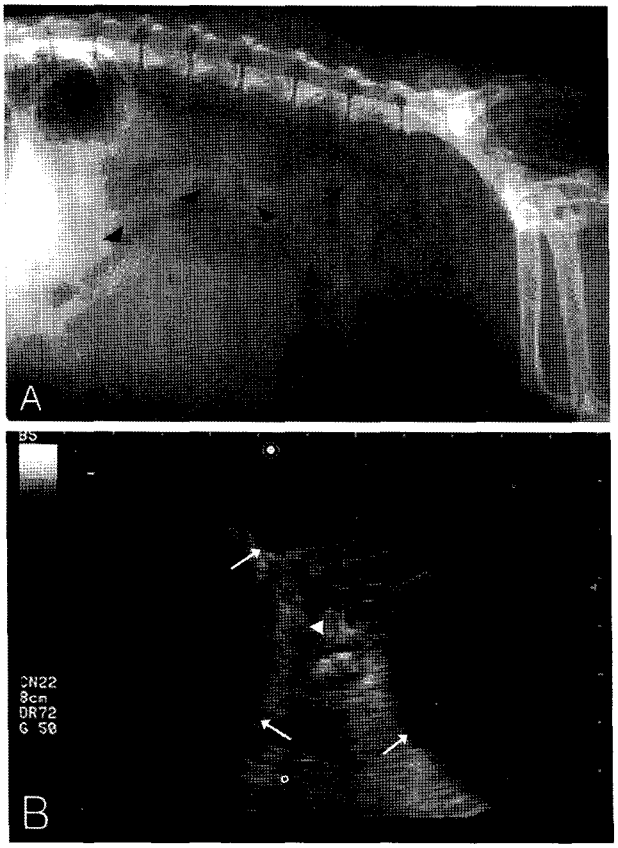

Fig 1. (A) Abdominal radiography revealed a large soft tissue-density mass (arrow heads). (B) Several discrete anechoic follicles (arrows) and irregular masses of heterogeneous echogenicity (arrow head) were found on abdominal ultrasonography.

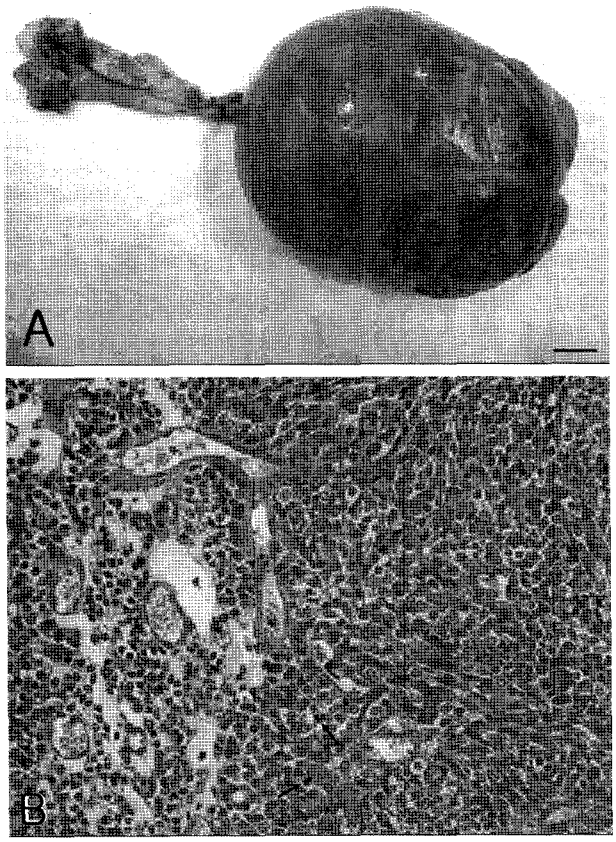

Fig 2. (A) Photograph of the ovarian mass (15 cm×11 cm×8 cm). The mass was composed of a large cyst occupying a half and solid multiple follicles (Scale bar: 2 cm). (B) Histological cross-section of the mass. The mass appeared a various patterns: diffuse sheets of cells, follicular patterns and Sertoli cell-like tumor. Various sized cystic spaces contain blood. These neoplastic cells have a relatively moderate mitotic index (arrows) (H&E, × 400).

fixed in 10% neutral buffered formalin, processed routinely, sliced at 6 μm, and stained with hematoxylin and eosin (HE). On histopathologic assessment, neoplastic cells proliferated in variety patterns, including trabecular and Sertoli cell like tumor, as well as in diffuse sheets varying sized cystic spaces containing hemorrhage (Fig 2B). The microscopic appearance of Sertoli-form pattern and spindle shape inferred the growth of the neoplastic granulosa cells. These tumor cells had slight-to-minimal anaplastic features and a relatively moderate mitotic index. Metastatic cells appeared in the lymphatic duct of connective tissue which located to the outer ovary. Based on these findings, the dog was ultimately diagnosed as a malignant GCT. The day following surgery the bitch was bright, alert and eating. The owner did not agree with further investigation or chemotherapy, although the tumor was malignant form. However, this patient has been surviving after surgical removal more than a year without any complications.

Discussion

Since ovarian tumors are uncommon in dogs and reports in the literature are based largely on necropsy surveys and biopsy submissions, their true prevalence is unknown (6,9,10). Occurrence is reported mainly in aged bitches, with a mean age of approximately 10 years (6). GCT is the most common canine ovarian tumors and tends to occur in a slightly young age group than other ovarian tumors (9).

GCT can be often functional, produce varying amounts of progesterone, estrogen, testosterone and inhibin. Clinical signs of GCT are referable to these hormones and manifest a variety of reproductive, endocrinological, and behavioral abnormalities, which include anestrus, constant or erratic estrus, masculinization, change in extraovarian tissues, endocrine alopecia, bone marrow suppression and cystic endometrial hyperplasia (2,3,5,7,8). The present dog showed the enlargement of uterine and ovary on ultrasonography but did not have evident history of reported other signs described above. One retrospective study showed that hyperplastic endometrium was the most

common clinical signs of GCT producing sex-hormone (11). The present case was unclear whether it is functional or not. The measurement of sex-hormone concentration may benefit when evaluating the influence of it (8). However, regrettably we could not made further diagnostic approach since the owner did not want the additional tests.

The malignant GCT is uncommon and it has a metastastic rate of less than 20% (1,3,9). The most common form of metastasis is peritoneal carcinomatosis, although it can metastasize with the involvement of deep parenchyma of the other organs including myocardium, lungs and lymph node (1,3,13). Occasionally metastasizing GCT seeds the abdomen or spreads via lymphatics (1). This case was diagnosed as malignant neoplasm by the neoplastic cells in the lymphatic duct. However, on the physical examination and exploratory laparotomy, we could not detect any evidences of metastasis, and clinical signs were not relapsed after surgery. Thus metastasis was supposed to be restricted to the ovary although the ovary is rare metastatic site of cancer (6).

Surgical removal of affected ovary or ovariohysterectomy together with the removal of observable metastatic lesions is the most common treatment of GCT (9). If metastatic tumors are inoperable, chemotherapeutic or immunotherapeutic regimen may be useful, but standard recommendations have rarely described (4,6,9). In human medicine, latinum combinations with taxanes is considered the regimen of choice but has not been evaluated in the dog (6). The prognosis is good when single tumors are completely excised at surgery, which is consistent with that of the present case. However, if there is any evidence of metastastic disease, the prognosis must be considered poor (6,11-15).

We diagnosed this patient as malignant GCT based on physical examination, radiography, ultrasonographic finding and final histopathologic examination. This patient has survived more than a year without any complications.

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요크셔테리어에서 발생한 난소의 Granulosa cell tumor

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요 약 : 12년령의 중성화 되지 않은 암컷 요크셔 테리어가 점진적인 복부 팽만을 주증상으로 내원하였다. 종괴는 방사선 검사, 초음파 검사를 통해 우측 상복부에 위치한 여러 분엽으로 나뉘어진 무에코성의 낭성 구조물로 확인되었다. 이 환축은 난소자궁적출술을 받았고 절제된 검체는 조직학적으로 평가되어졌다. 종괴는 육안 및 조직학적 소견을 토대로 악성 과립층세포종양 (malignant granulosa cell tumor)로 확진 되었다. 개는 1년이 지난 지금까지 특이한 합병증 없이 성공적으로 관리되어져 오고 있다.

주요어 : 과립층세포종양, 난소 신생물, 개