

## Clinical Features and Outcomes of Primary Omental Lipoma in a Dog

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**Abstract :** A 12-year-old intact male Cocker spaniel dog was presented for evaluation of lethargy and abdominal distension. Clinical examination revealed a round, palpable mass in the middle of the abdomen. Abdominal computed tomography showed a round soft tissue mass (width × height × length, 25 × 13 × 15 cm<sup>3</sup>) without regional invasion and distant metastasis. Cytologic evaluation of the mass revealed adipose tissue-derived cells having vacuolated cytoplasm, indistinct borders, large nucleus and ropy chromatin pattern with variable sized lipid droplets. Complete surgical resection of the mass was performed and the mass was histopathologically diagnosed as primary omental lipoma. The dog has been recovered well without any additional clinical signs, and there was no relapse over the 8 months follow-up period. The clinical features and prognosis of the dog with primary omental adipocytic tumors have been described in this report.

**Key words :** canine, lipoma, primary omental tumor.

### Introduction

Adipocytic tumor arises from lipoblasts and it is classified as non-angiomatous, non-lymphomatous soft tissue tumor (5). Lipomas are benign tumors of adipose tissue cells, commonly in adult or elderly obese female dogs (13,17). Lipomas occur frequently in the subcutaneous tissues, but they have occasionally been localized in the thorax and the ventral abdomen (9,14). Especially, visceral origin of the tumor is a very rare form in dogs (1,12,16). Lipomas can be diagnosed only through cytology or biopsy with histological evaluation and treated by surgical excision (8,9). Recurrence is very rare and only occurs in cases of incomplete removal (13).

Intra-abdominal tumor, which could have various origins, was diagnosed as primary omental lipoma by precise examination in this report. Although primary omental adipocytic tumor in dogs is relatively rare, it should be included as a differential diagnosis in dogs with a solitary abdominal mass.

### Case

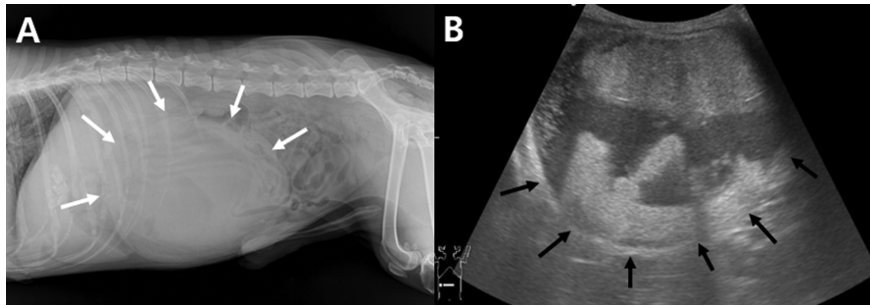
A 12-year-old intact male Cocker spaniel dog was presented due to abdominal distention and lethargy. A physical examination revealed low body condition score (2/5) and round firm mass on cranial to middle abdomen. Thoracic auscultation revealed arrhythmia with an increased respiratory effort. Hematological examination showed low red blood cell ( $5.59 \times 10^6/\mu\text{l}$ ; reference,  $5.65\text{-}8.87 \times 10^6/\mu\text{l}$ ), low hemoglobin (12.9 g/dL; reference, 13.1-20.5 g/dL), mild non-regenerative anemia (HCT 35.2%; reference, 37.3-61.7%, the

reticulocyte index 0.78) and thrombocytosis (861 K/ $\mu\text{l}$ ; reference, 200-500 K/ $\mu\text{l}$ ). There were no remarkable findings in serum biochemical profiles. Abdominal radiograph displayed a large round soft tissue opacity mass on cranial to middle abdominal causing caudal deviation of intestines, and abdominal ultrasonographic imaging showed the round well-marginated, lobulated cystic mass without attachment to the liver, spleen or any other structures (Fig 1). The mass had heterogeneous echotexture with mixed echogenicity of necrotic center and irregular discontinuous hyperechoic capsule, showing the possibility of malignant tumor. Ultrasound-guided fine needle aspiration of the mass showed cells having vacuolated cytoplasm, indistinct borders, large nucleus and ropy chromatin pattern with variable sized lipid droplets (Fig 2). According to cytologic evaluation of the mass, it was considered that the abdominal mass was originated from benign or malignant adipocytic tissues. Thus, computed tomography (CT) was performed to confirm origin of the mass, evaluate local or distant metastasis, and set therapeutic plan appropriate to this dog.

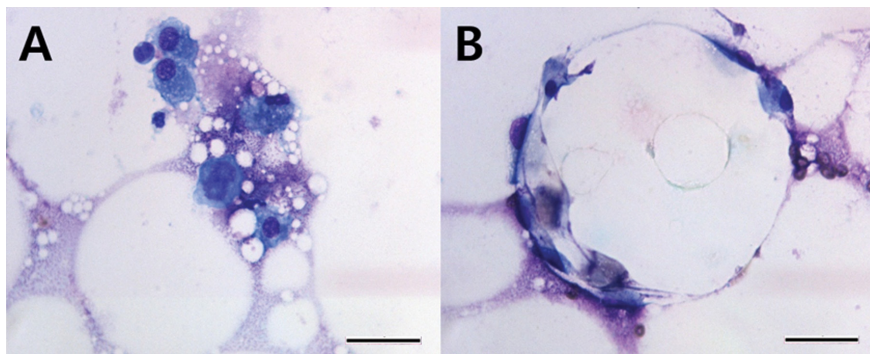
CT (RT-4550 GEL, QUANTUM, USA) revealed the omental mass (width × height × length, 25 × 13 × 15 cm<sup>3</sup>, Fig 3), and local invasion such as splenic infiltration or distant metastasis was not found. The mass was encapsulated, originating from omentum and mixed attenuation with focal areas of fat attenuation was shown. Thus, primary omental lipoma or liposarcoma was tentatively diagnosed.

The owner agreed to surgical removal of the mass and the dog recovered uneventfully after surgery. The resected tumor was histologically diagnosed as a omental lipoma, (Fig 4). The mass was thinly encapsulated and comprised of extensively necrotic and inflamed adipose tissue. Any evidence of malignant transformation was not exhibited from lipid cells. The dog's condition was improved after the surgery, and

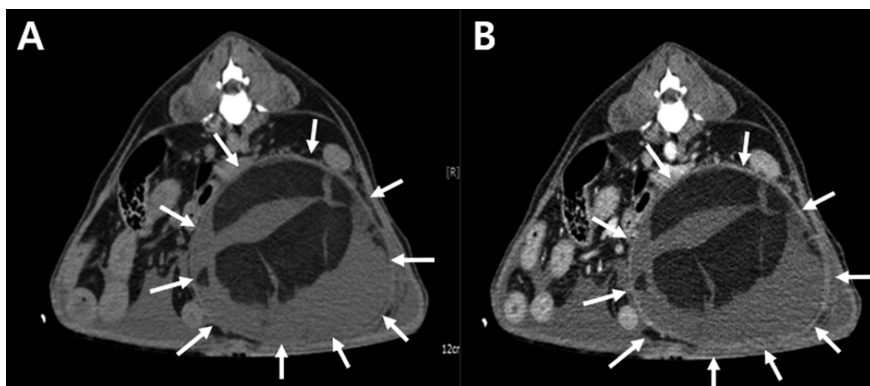
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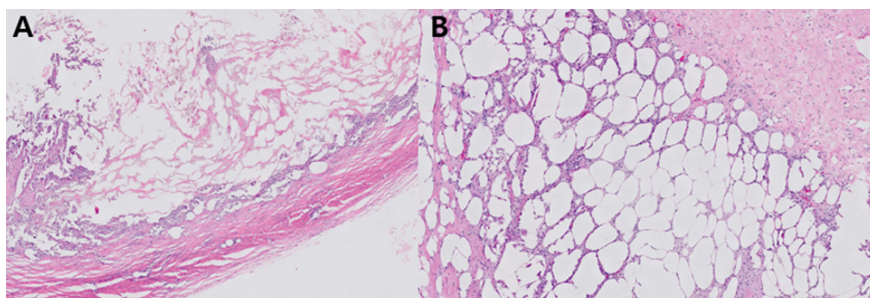
**Fig 1.** (A) Right lateral radiograph of abdominal cavity in a dog diagnosed as lipoma. A round soft tissue opacity mass (white arrows) is shown on cranial to middle abdomen, inducing deviation of intestines. (B) Abdominal ultrasonographic finding of the heterogenous omental mass. The mass has heterogenous necrotic center and irregular discontinuous capsule with hyper-echogenicity (black arrows).



**Fig 2.** Ultrasound-guided fine needle aspiration biopsy from the omental mass diagnosed as lipoma in a dog. The presence of vacuolated cytoplasm, indistinct borders, large nucleus and ropy chromatin pattern with lipid droplets and variably sized lipid droplets are found near cells (A) and the presence of irregular, spindle-shaped cells is noted (B); Diff-Quick stain; Bar = 50  $\mu$ m (A, B).



**Fig 3.** Computed tomographic images in a dog diagnosed as omental lipoma. Well-delineated omental mass (white arrows, width  $\times$  height  $\times$  length, 25  $\times$  13  $\times$  15 cm<sup>3</sup>) is shown and regional metastasis is not found. The mass is encapsulated originating from omentum and mixed attenuation with focal areas of fat attenuation is shown (A: pre-contrast, B: post-contrast).



**Fig 4.** Histopathology of the omental lipoma in a dog demonstrating the uniform and mature lipocytes (B) with encapsulation of connective tissue (A); Bar = 200  $\mu$ m (A) and 100  $\mu$ m (B).

there was no relapse over the 8 months follow-up period.

The origins of abdominal visceral tumors are various including spleen, liver, and gastrointestinal tracts, but primary abdominal visceral soft tissue tumors are rare in dogs (10,11). In case of ovarian cancers in female dogs without ovariohysterectomy, severe abdominal distension might be possible. Abdominal soft tissue tumors, such as lipoma and liposarcoma can be originated from omentum, intra-peritoneal and retro-peritoneal fat, fat within the urachal remnant and periprostatic fat in dogs. According to the previous reports, especially in dogs (1,12,16), abdominal lipomas and liposarcomas are rare, and lipomas are characterized by a long subclinical period and may become very large before they cause clinical signs within body cavities (11). Intra-abdominal tumors other than lipoma or liposarcoma can cause severe abdominal distention. Any type of intra-abdominal tumors can cause non-specific clinical signs, such as abdominal pain, vomiting, constipation, anorexia and lethargy. Clinical signs caused by abdominal tumors are a result of space-occupation, and therefore they are not related to malignancy of the tumor. Therefore, accurate diagnosis for a tumor is needed to predict prognosis and therapeutic response and inform the caregiver.

Morphologically, it has been reported that canine lipomas are typically homogeneous and hyperechoic with striated appearance, sharp edges, and a thin hyperechoic capsule (14), but in this case, heterogenous echotexture with hypoechoic center were found, instead of typical homogenous echogenicity. Moreover, in case of CT findings showing mixed attenuation with at least one focus of fat attenuation in dogs with abdominal mass, liposarcoma is highly suspected (4), and at the first time, the dog in this case was also suspected to be malignant tumor according to its CT findings. However, cytologic and histopathologic results of the mass were lipoma and after surgical resection, the dog's condition was improved without any additional clinical signs during long followed-up period, showing good prognosis. Therefore, even though an abdominal mass is suspected as malignant form showing its huge size, central tumor necrosis or heterogenous imaging, it should be considered that the mass can be benign type like in this case. Based on a report described previously (17), the prognosis with intra-abdominal lipomas is excellent after surgical removal. Thus, malignancy of the tumor should not be concluded by its size and/or imaging characteristics, and histopathological samples should be collected and analyzed (16).

## Conclusions

This report describes the dog with an abdominal mass diagnosed as primary omental lipoma through cytologic and histopathologic examination. The precise diagnosis including histopathologic evaluation is needed to distinguish abdominal lipoma from other malignant tumors, which may be mistaken when diagnosed based on the tumor's physical and radiological appearance.

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