Diagnostic Imaging of Lipoma in the Retroperitoneum and Pelvic Cavity in a Dog

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Abstract : An 11-year-old, spayed female, weighing 10 kg miniature Schnauzer was admitted for abdominal distension, anorexia, pollakiuria, and constipation. A large, homogeneous fat opacity mass was identified in the retroperitoneum and pelvic cavity on the abdominal survey radiography. The mass displaced the descending colon peripherally and ventrally, and the urinary bladder ventrally. On the abdominal ultrasonographic examination, the mass was uniformly hyperechoic with a coarse internal echo texture and had outer hyperechoic capsule, and it showed homogeneously same attenuation (-180 ~ -110 HU) as adjacent fat on the computed tomography. There was no evidence of invasion into the surrounding structures or organs. Cytological findings from fine needle aspirates were numerous sheets and clusters of adipocytes. The dog showed complete resolution of clinical signs after surgical resection of the mass. The mass was confirmed as simple lipoma through histopathological examination.

Key words : lipoma, retroperitoneum, pelvic cavity, diagnostic imaging, surgery, dog.

Introduction

Lipomas are benign tumors of adipose tissue which are the most common mesenchymal tumor in dogs (13). Labrador retriever, Doberman pinscher and miniature Schnauzer are the breed with a predilection for development of lipomas (4). They arise in sites where fat is present, particularly in subcutaneous fat tissue (6). Intrathoracic, intraabdominal and intrapelvic locations are the other sites that have been described (11). Within body cavity, lipomas can remain undetected for long periods of time and may become very large in size before they cause clinical signs. The clinical signs caused by body cavity lipoma are the result of space-occupation and depend upon which body cavity the lipoma locates (11). In this report, an uncommon case of lipoma in retroperitoneum and pelvic cavity is presented.

Case

An 11-year-old spayed female, weighing 10 kg miniature Schnauzer was admitted to the Seoul National University Hospital for Animals with signs of abdominal distension, anorexia, pollakiuria and constipation. The dog showed heavy body condition score (7/9). Physical examination revealed soft, mobile and painless masses in breast and rump. On the blood profiles, mild leukopenia (5,830/μl, reference range: 6,000~17,000/μl), mildly increased ALT (146 U/L, reference range: 17~78 U/L), mild hypercholesterolemia (330 mg/dl, reference range: 111~312 mg/dl), mildly increased amylase (2,764 U/L, reference range, 269~2,299 U/L), and severely increased ALP (2,794 U/L, reference range: 47~254 U/L) were shown.

The thoracic radiography did not reveal remarkable findings except for thin interlobar fissure lines, most likely, consistent with pleural fibrosis. On the abdominal radiography, there were mild to moderate abdominal distension and mild hepatomegaly. And a large, homogeneous fat opacity mass was visible in the retroperitoneum and pelvic cavity. The mass displaced the descending colon peripherally and ventrally, and the urinary bladder ventrally (Fig 1).
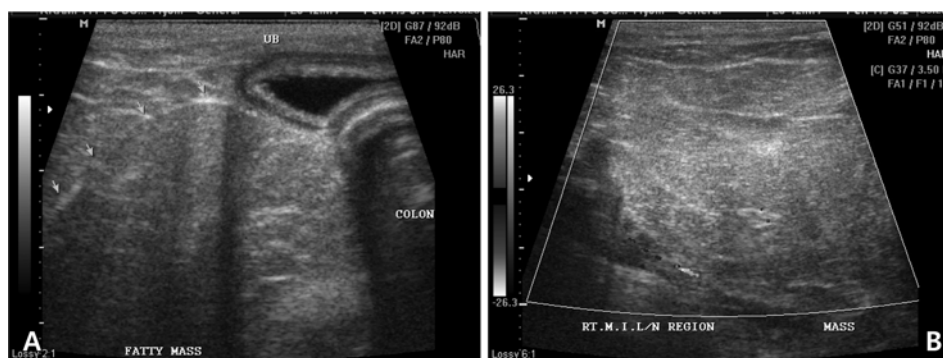
On the abdominal ultrasonography, hyperechoic materials with acoustic shadowing were observed in gall bladder and diffusely dispersed ill-defined, hypoechoic nodules were shown in liver parenchyma. Multifocal distribution of small and anechoic nodules was seen in spleen. And a uniformly hyperechoic mass with having a coarse internal texture and outer hyperechoic capsule was identified in the retroperitoneum. The blood flow signal was almost absent within the mass on the color Doppler examination (Fig 2).

In order to further characterize the mass for surgical planning, helical computed tomography (CT) scans were performed through the abdomen and pelvic cavity. The mass showing almost identical homogeneous attenuation (-180 ~ -110 HU)

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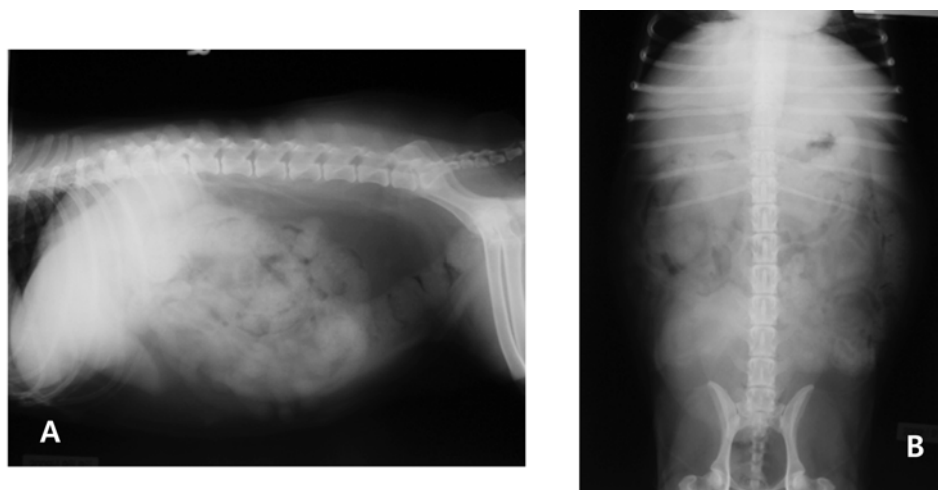
Fig 1. Abdominal survey lateral (A) and ventrodorsal (B) radiography. A large, homogeneous fat opacity mass displaces the descending colon peripherally and ventrally, and the urinary bladder ventrally in the retroperitoneum and pelvic cavity.

Fig 2. The mass shows uniformly hyperechoic with a coarse internal echo texture and has outer hyperechoic capsule (arrows) on the abdominal ultrasonography (A). On the color Doppler examination, the mass appears almost absent of blood flow signal (B).

to adjacent fat was located from the 5th lumbar through pelvic cavity. There was no contrast enhancement and no evidence of invasion into the surrounding structures or organs on CT (Fig 3). Based on these findings, our tentative diagnosis was simple lipoma.

Fine needle aspirates for cytological examinations were performed in liver, spleen, and fatty mass. Cytological findings included vacuolar hepatopathy or pigment hepatopathy in the liver, reactive spleen in the spleen, and numerous sheets and clusters of adipocytes in the mass. The mass was considered as a fatty mass.

After two weeks, a ventral midline laparotomy was performed. A well-encapsulated fatty mass was found in retroperitoneum and pelvic cavity (Fig 4). The mass was surgically removed and submitted for histopathologic examination. The dog had complete resolution of clinical signs after surgical mass resection. The mass was confirmed as a simple lipoma through histopathological examination. On the follow-up abdominal radiography 2 weeks after surgery, it was identified that the previously displaced descending colon and urinary bladder were located back in its normal position (Fig 5).

Discussion

The veterinary literature describes about three types of adipose tumors: simple lipomas, infiltrative lipomas, and liposarcomas. Simple lipomas consist of well-differentiated lipocytes, which can be difficult to distinguish from normal adipose tissue unless there is a fibrous component or a capsule (3). Infiltrative lipomas are locally invasive with infiltration to surrounding normal muscle and fibrous tissue, but do not metastasize (12). Liposarcomas are uncommon neoplasm of dogs that consist of malignant lipoblasts and mesenchymal tissue (2), which are locally invasive, and the metastasis to the liver, lung, and bone has been reported (2).

Cytological and histopathological examinations should always be performed for differentiation of these three types of adipose tumors. But infiltrative lipomas can not be diagnosed accurately with either cytology or with histopathological examination because the cellular and histologic feature of simple lipomas and infiltrative lipomas can be the same (12). In this circumstance, diagnostic imaging can provide useful information for differentiation of these three types of adipose
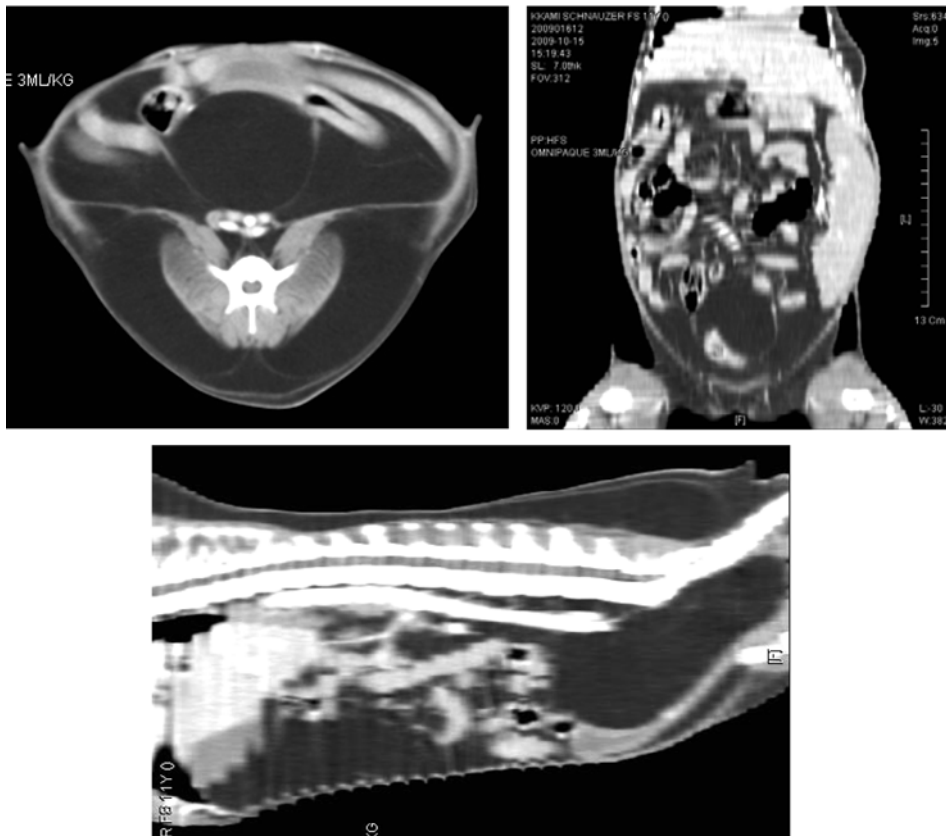
Fig 3. The axial (A), reformatted dorsal (B), and sagittal abdominal CT images. A fatty mass with homogeneous attenuation is identified from 5th lumbar to pelvic cavity. The mass does not show contrast enhancement and evidence of invasion into the surrounding structures.
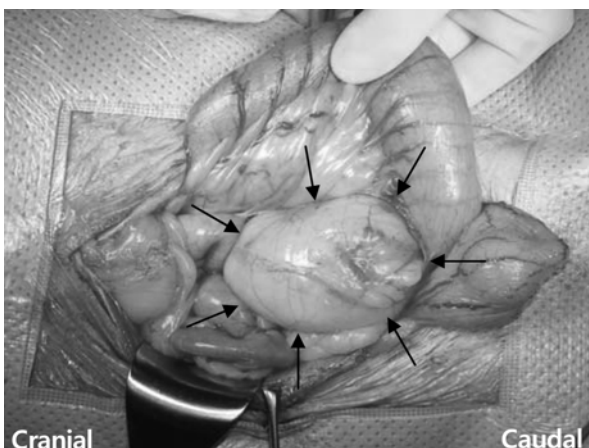
Fig 4. Surgical findings of a mass before resection. A well-encapsulated fatty mass (arrows) is found in the retroperitoneum and pelvic cavity during ventral midline laparotomy.

tumors.

Although lipomas have a variable appearance depending on the presence of necrosis, a uniform hyperechogenicity with a coarse internal echo texture, sharp edge, and a thin hyperechoic capsule are typical ultrasonographic features of canine lipomas (5,8,10,15). And lipomas are poorly vascularized with some peripheral blood flow (5,8). In case of the pedunculated lipoma to deep region of the muscle, infiltrative lipoma should be included in differential diagnostic list (15). Liposarcomas were imaged as heterogeneous mass consisted of multiple, echogenic lines and hyperechogenic or hypoechogenic nodules (1,9). And they can be more vascular and invade surrounding structure (1). Ultrasonography has an additional advantage allowing accurate guided fine needle aspiration or needle-core biopsy of the lesion.

On the CT, lipomas are homogeneous and sharply marginated, with attenuation similar to normal fat, and they do not exhibit contrast enhancement (1,7). Conversely, the presence of inhomogeneity with fibrous septa and nodules, poor margination, tissue density intermixed with fat and contrast enhancement, or evidence of invasiveness suggests liposarcomas (1,7). Infiltrative lipomas are imaged as fat opacity mass with variable degrees of muscle infiltration on the CT (12).

In the present case, a diagnosis of lipoma in retroperitoneum and pelvic cavity was made by radiography, ultrasonography and CT followed by cytological and histopathological examination. Although histopathological examination confirmed that the mass was simple lipoma, diagnostic imaging could provide useful information on making a diagnosis of
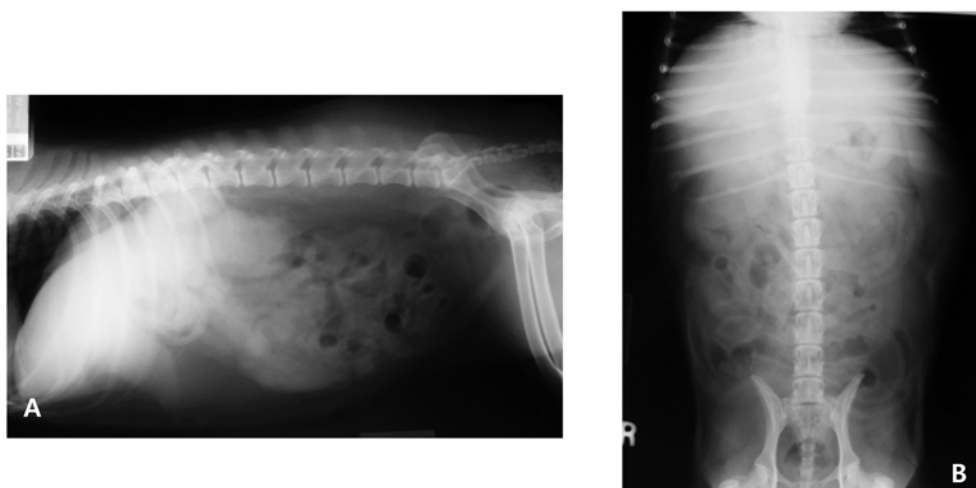
Fig 5. Follow-up abdominal survey lateral (A) and ventrodosal (B) radiography 2 weeks after surgical resection of the mass. Previously displaced descending colon and urinary bladder by lipoma are seen in their normal position.

lipoma and establishing surgical planning. Despite radiography could not determine the full extent of the mass, it was also thought useful diagnostic tool for detecting a fat opacity mass within the body cavity. Abdominal ultrasonography and CT could provide additional and useful information on typical features for the diagnosis of canine lipoma. And CT could accurately evaluate the extent of the lesion prior to surgery.

Although other sites of lipomas have been described, ninety-eight percent of lipomas occur at subcutaneous region (14). In this report, the lipoma was located from retroperitoneum to caudal pelvic cavity associated with displacing the descending colon and urinary bladder, which was considered not usual type of lipoma in dogs. The authors thought that the surgical resection of the mass could contribute to the complete resolution of clinical signs including pollakiuria and constipation caused by the mass compressing the descending colon and urinary bladder, because a potential space became available and compensatory in the pelvic cavity. Conclusively, diagnostic imaging such as abdominal radiography, ultasonography, and CT could help to find out the cause of the clinical signs and provide useful information on making diagnosis of lipoma.

Acknowledgements

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개의 후복강과 골반강에 발생한 지방종의 진단영상 증례

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요   약 : 11살의 중성화 암컷 miniature Schnauzer 견이 식욕부진, 복부팽만, 빈뇨증상과 변비증상으로 내원하였다. 복부 일반 방사선 검사에서 하나의 큰 균질한 지방 밀도의 종괴가 후복강과 골반강에서 확인되었다. 그 종괴는 내림결장을 변연부와 배쪽으로, 방광을 배쪽으로 변위시켰다. 복부 초음파 검사에서 종괴는 내부의 거친 에코구조와 바깥쪽에 고에코성 막을 갖고 있으며, 컴퓨터단층촬영에서 균질하게 주위 지방과 같은 (-180 ~ -110 HU) 감쇄성을 보였다. 주위 조직으로의 침습의 증거는 없었다. 세침흡인을 통한 세포검사 결과는 많은 층과 군집의 지방세포들이었다. 환자는 수술적으로 종괴를 제거한 후 임상증상이 완전히 해소되었다. 조직병리학적 검사를 통해 그 종괴는 지방종으로 진단되었다.

주요어 : 지방종, 후복강, 골반강, 진단영상, 제거수술, 개.