

Computed tomographic appearance of bladder and vaginal leiomyoma in dog: case report

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Abstract

An 18-year-old, female Shih Tzu dog was presented at Prasu-Arthorn Animal Hospital, Faculty of Veterinary Science, Mahidol University with the clinical signs of abdominal enlargement, constipation and urine incontinence. The survey abdominal radiographs demonstrated only a caudal large oval soft tissue abdominal mass and abdominal ultrasonography was suggested to indicate the mass origin. However, ultrasonographic finding did not identify the mass location and tissue invasiveness so computed tomography (CT) was requested. The CT result revealed that the mass was a mixed heterogenous attenuating and fluid attenuating mass (8.56 x 5.47 x 6.72 cm) at the uterine body and involved the vagina area without contrast enhancement soft tissue invasions. Moreover, CT presented a hyper-attenuated urinary bladder (UB) mass (1.31 x 1.31 cm) and bilateral ovarian cysts with cystic lesions at both uterine horns. According to the CT results, surgical excision was applied to remove vaginal and urinary bladder masses and ovariohysterectomy (OVH) was done. For the histological results, leiomyoma was diagnosed on the cranial vagina and UB. This case study suggests that CT is a useful diagnostic imaging modality that provides a very useful information for surgical planning and the treatment of large abdominal mass.

Keywords: abdominal mass, computed tomography, dog, urinary bladder leiomyoma, vaginal leiomyoma

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Introduction

Leiomyoma is a benign smooth muscle tumor which arises in the muscles of many organs (Klein, 2001). In dogs, leiomyoma is the most common tumor of the digestive tract but this tumor can also affect the female reproductive tract, especially the vagina and vulva, accounting for 85% of all tumors in the vagina and vulva (Susaneck, 1981; Weijer and Hart, 1983). Leiomyomas may arise from the muscular layer of the urinary bladder (UB) that are rare in dogs, approximately for 0.5 to 1% of all neoplasia in dogs (Pamucku, 1984). Several studies have reported vaginal leiomyoma which has appeared to be ovarian steroid hormone induced (Dow, 1959; Alexander and Lennox, 1961; Klein, 2001). Therefore, this tumor is usually found with ovarian follicular cysts, endometrial hyperplasia and mammary neoplasia and occasionally presented in older dogs (10-11-year-old) (Ahuja *et al.*, 2017; Karunakaran *et al.*, 2019). The treatment of choice is surgical resection of vaginal leiomyoma (Lee *et al.*, 2014). According to the intrapelvic location and vascularity of the vagina, radiographs and ultrasound are difficult to diagnosis for the mass position and surgical treatment plan

(Kang and Holmberg, 1983). The purpose of this report was to demonstrate the feasibility of CT in indicating the vaginal leiomyoma.

Case description

An 18-year-old, female Shih Tzu dog was presented at Prasu-Arthorn Animal Hospital, Faculty of Veterinary Science, Mahidol University with the clinical signs of abdominal enlargement, constipation and urine incontinence. A clinical examination revealed that the dog was depressed and had abdominal cramps. Vaginal discharge was not present. The diagnostic results included complete blood count (CBC), serum biochemical profile, coagulation profile and blood pressure results which were normal. Then, abdominal radiographs (Brivo DR-F, GE Healthcare, USA) were performed to indicate the soft tissue caudal abdominal mass and the result demonstrated an 8.5 x 5.4 cm, caudal large oval soft tissue abdominal mass without bone involvement (Fig. 1). Ultrasonographic examination (LOGIQ P6, GE Healthcare, USA) showed a 9 x 5.5 cm mix-echogenic mass at the ventral part of the urinary bladder (UB) or uterine body (Fig. 2).

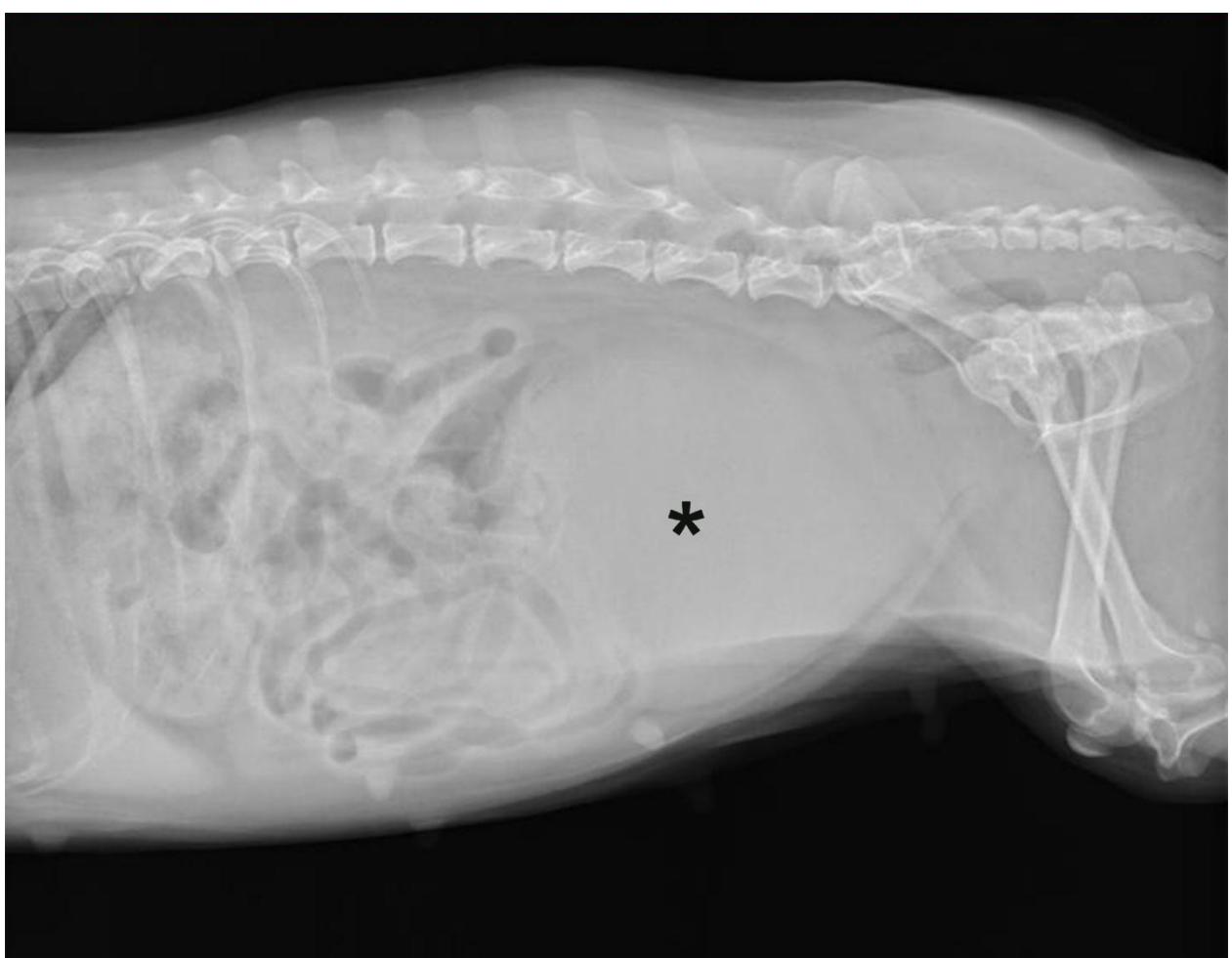


Figure 1 The abdominal radiographs showed soft tissue density mass, well-circumscribed at the caudal abdomen (asterisk), which caused abdominal enlargement and constipation.



Figure 2 The abdominal ultrasonography showed anechoic urine (small volume) and found a mix-echogenic mass diameter 9x6 cm at dorsal part of UB.

According to the difficulty in diagnosing where the organ originated, the dog was generally anesthetized for CT scanning of the abdominal mass. The dog's position used for the CT was sternal recumbency, using the 64-slice multiple detector computed tomography (MDCT) unit with a slice thickness of 1.25 mm, a pitch of 0.53 at 120 kV and 250 mA (Optima CT660 64 Slice, GE Healthcare, USA). The field of view was set to cover the thoracic and abdominal area. The iodinated contrast medium (600 mgI/kg; iohexol, Omnipaque®) were injected intravenously to enhance CT images using the automatic MDCT injector (2 mL/second). The extent of enhancement illustrated the bilateral ovarian cysts with contrast-enhanced uterine horns consistent with a few cystic lesions at both uterine horns. A large and well-defined with mixed heterogenous attenuating and fluid attenuating mass (8.56 x 5.47 x 6.72 cm), without contrast enhancement, was located in the uterine body that extended into the cervix, vagina and vulva area resulting in descending colon compression (Fig 3). A thickening urinary bladder wall with a well-defined hyper-attenuated mass (1.31 x 1.31 cm) was presented at the dorsal part of the urinary bladder wall (Fig 3).

For surgical procedures, premedication was with midazolam (0.2 mg/kg; F. Hoffmann -La Roche Ltd Basel, Switzerland) combined with an analgesic using morphine (0.3 mg/kg; M&H Manufacturing Co., LTD, Thailand) intramuscularly and generalized anesthesia with propofol (5 mg/kg; B.Braun Melsungen AG, Germany) was intravascularly administered for induction. The patient was intubated and maintained with sevoflurane (Baxter Healthcare of Puerto Rico, USA). An intravenous prophylaxis antibiotic using amoxycillin/clavulanic acid (20 mg/kg; Siam Bheasach Co Ltd, Bangkok, TH) and subcutaneous anti-inflammatory using carprofen (2.2 mg/kg;

Rimadyl®, Pfizer Thailand Ltd., Bangkok, Thailand) were administered. The patient was positioned in dorsal recumbency and the surgical site was prepared with aseptic technique. According to the imaging diagnosis, the differential diagnosis could be uterine, cervix or vaginal masses. Caudal midline exploratory laparotomy and ovariohysterectomy (OVH) were performed. An intraluminal mass of cranial vagina size 10 x 7 cm was observed and removed by colpotomy (Fig 4). The vagina was closed in one layer with a continuous glyconate suture (Monosyn®, 3-0 metrio, Spain). Cystotomy was performed to remove the UB mass (Fig 4). Stay sutures were placed at the apex and neck of UB using glyconate suture (Monosyn®, 4-0 metrio, Spain), approximately 2 cm incision with a scalpel blade. According to UB mass attached near the ureteral opening, the intraluminal mass was an excisional biopsy with submucosal layer of UB. UB submucosal layer and UB wall were closed in single layer apposition with a continuous glyconate suture (Monosyn®, 4-0 metrio, Spain). The linea alba, subcutis and skin were closed routinely with single layer appositional patterns. In addition to the administration of the intramuscular analgesic with morphine sulphate, 2.2 mg/kg carprofen was given for postoperative analgesia and amoxycillin/clavulanic acid (20 mg/kg; Clavamox®, Zoetis Thailand Ltd., Bangkok, Thailand) was given to prevent bacterial infection. Foley's catheter (8Fr/Ch; Well Lead Medical Co., Ltd, China) was placed to drain urine from the bladder. Based on the histological examination, the vaginal and UB mass were confirmed to be a leiomyoma (Fig 5a and 5b).

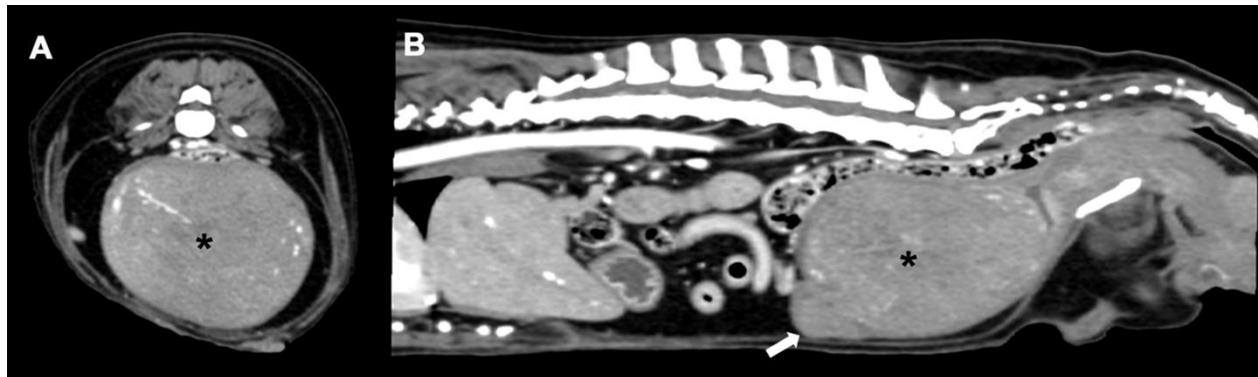


Figure 3 The axial (a) and sagittal plane (b) of computer tomographs (CT) presented a large soft tissue mass (asterisk) with mixed heterogenous attenuating and fluid attenuating mass at the caudal abdominal area and a small soft tissue mass at the urinary bladder (arrow).

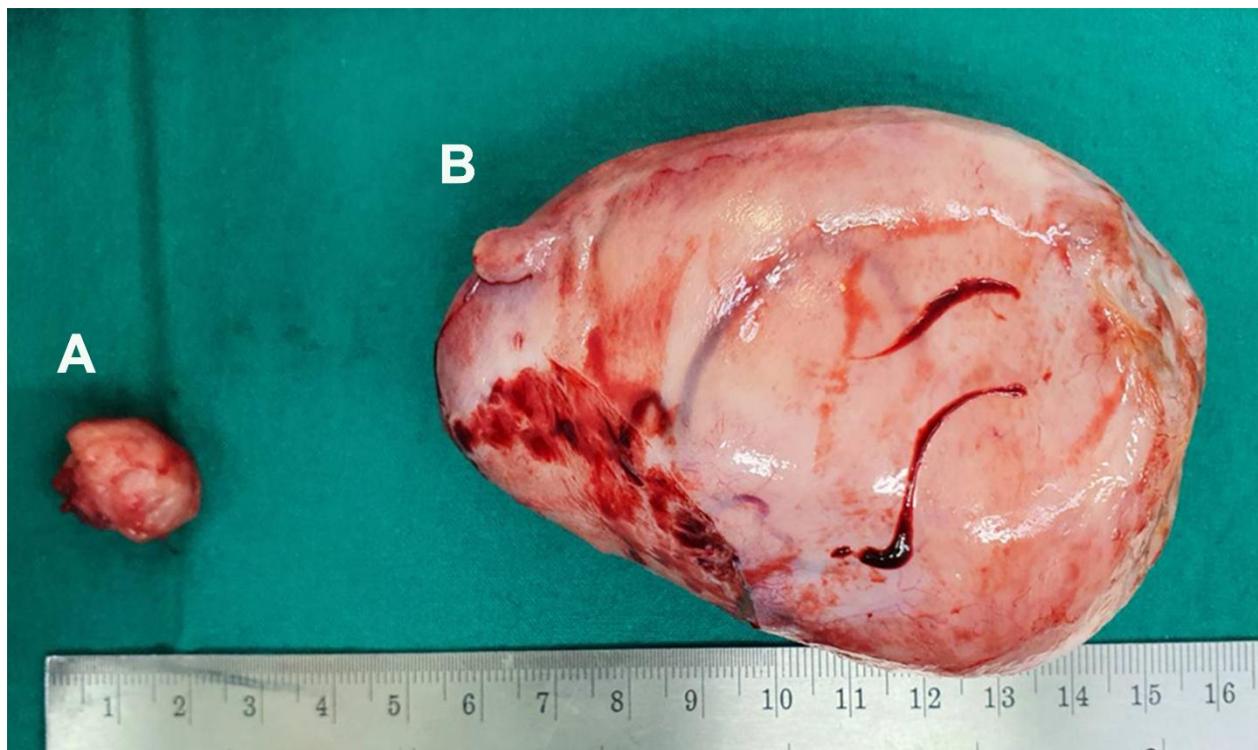


Figure 4 Mass at the urinary bladder (A): Oval shape, diameter 1.5×1.5 cm. Mass at the cranial vagina (B): Oval shaped, diameter 10×7 cm.

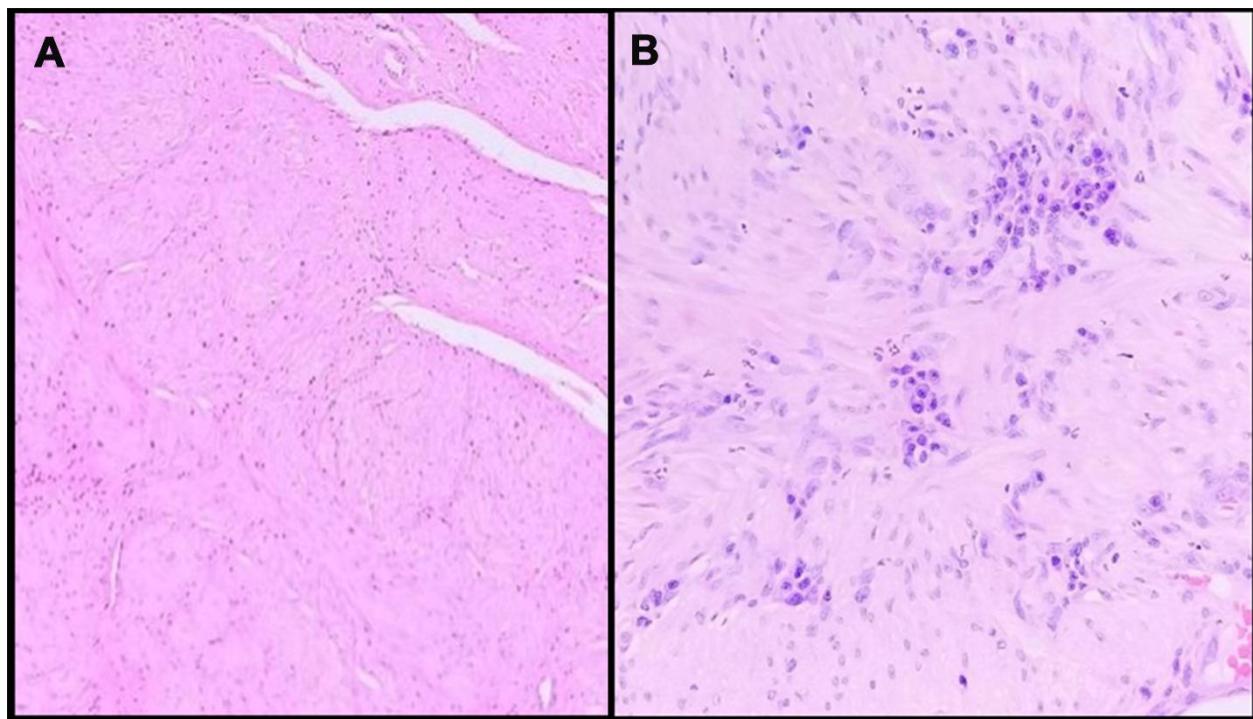


Figure 5 A submitted specimen collected from the urinary bladder revealed masses well-circumscribed which were composed of unencapsulated pleomorphic cells in deep muscular layer. H&E 100x (A). Tissue sample submitted from vaginal area (B) showed Neoplastic cells that were spindle to fusiform eosinophilic cytoplasm with occasionally intracytoplasmic vacuolation and multifocally fibrous tissue infiltration. H&E 200x (B).

Discussion

After the operation, the patient recovered smoothly from anesthesia without any complications. One week after surgery, the Foley's catheter was removed. The surgical wound revealed no inflammation and healed completely after 10 days. In this study, X-rays and ultrasound indicated the extrinsic mass arising from urogenital tract but these tools could not identify the origin of mass. According to the difficulty of mass origin determination, an advanced imaging diagnostic method, CT, was performed to classify among uterine body, cervix, and vagina masses. As a previous study had reported, superior imaging diagnosis using CT vagino-urethrogram was performed to indicate and characterize the mass in the vagina, which was the object of surgical planning (Weissman *et al.*, 2013). Although another case presented a limit of CT to classify mass origin among the uterine and vaginal mesenchymal neoplasm, CT was still more important to determine the location and invasiveness of neoplasia (Barozzi *et al.*, 2021). From the results, the tools can promote precise preoperative diagnostic information and surgical planning.

The dogs presenting with vaginal leiomyoma and bladder leiomyoma had not previously been reported. Vaginal leiomyoma occasionally occurs in senior female dogs with ovarian follicular cysts and cystic endometrial hyperplasia which might be caused by high estrogen and progesterone secretion (Susaneck, 1981; Ahuja *et al.*, 2017; Karunakaran *et al.*, 2019). Another dog with a large sized vaginal mass (12.7 x 6.5 x 8.3 cm), which originated from cranial vagina to pelvic canal and owner's concern about the general anesthesia risks in old age dog. Because the dog still had a good quality of life, aglepristone and alfaprostol

at 10 mg/kg were given to this bitch. However, the patient's mass did not decrease during treatment for four weeks, indicating that OVH was already effective (Ferré-Dolcet *et al.*, 2020). Therefore, the conventional method of OVH and surgical management is revealed for the vaginal leiomyoma. In the current case, we performed surgical management on this bitch because its clinical symptoms, such as abdominal cramps, urinary incontinence and constipation, were interfering with her quality of life. After surgery, the patient continues to be healthy with no evidence of metastasis.

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The authors have declared that no competing interests exist.

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