Journal of Nephrological Science

Case Report Open Access

Clinicopathological Description of a Urinary Bladder Leiomyosarcoma in a Dog

Derick S Alves[1], Fabiana Elias[2], Helvécio L S Junior[3], Guilherme Thizen[3], Rômulo S A Eloi[4], Carlos E Fonseca-Alves[1]*

[1]Institute of Health Science, Paulista University – UNIP, Bauru – SP, Brazil.
[2]Universidade Federal da Fronteira Sul (UFFS), Realeza, PR, Brazil.
[3]Departamento de Medicina Veterinária, Faculdade UPIS, Brasília, DF - Brazil.
[4]HistoPato-Análise Anatomopatológica Veterinária, Brasília, DF, Brazil

Article Info

Article Notes
Received: September 18, 2020
Accepted: December 09, 2020

***Correspondence:**
Dr. Carlos Eduardo Fonseca Alves, Institute of Health Science, Paulista University – UNIP, Bauru – SP, Brazil;
Email: carlos.e.alves@unesp.br.

Keywords
Canine
Leiomyosarcoma
Urinary bladder

Abstract

Urinary bladder cancer is uncommon in dogs, corresponding to 1% of all reported canine malignancies. Smooth muscle neoplasms can be benign (leiomyomas) or malignant (leiomyosarcoma) and are rare in humans and animals. As the incidence of urinary bladder leiomyosarcoma in dogs is low, our report presents the clinical and pathological aspects of primary urinary bladder leiomyosarcoma in a dog. A 10-year-old boxer breed dog was referred to the veterinary hospital presenting with dysuria for a month, appetite loss for seven days, abdominal distension for two weeks, and anuria for the last three days. After a physical examination and laboratory tests, an abdominal mass was diagnosed, and a laparotomy was performed. During the surgery, it was found that the urinary bladder neoplasm occupied the bladder trigone region, involving the ureters, and causing obstruction. The urinary bladder was reconstructed successfully, and the patient was kept under post-operative evaluation. In the post-operative recovery, an acute kidney disease was observed, which was irresponsive to the clinical treatment. Due to the advanced stage of the disease and the non-response to treatment, euthanasia was performed after surgery, and the animal was sent for necropsy. In this case, leiomyosarcoma was manifested as an expansive, low infiltration, and non-metastatic disease, causing obstruction of the ureters and consequent hydronephrosis.

Introduction

Leiomyosarcoma is an uncommon malignant mesenchymal neoplasm originating from the smooth muscle. It commonly presents as a slow-growing tumor, being an expansive disease with a low metastatic rate[1]. It can affect the intestinal and reproductive tracts, being more common in the urinary bladder in comparison with the other parts of the urogenital system[2]. It is histologically characterized by spindle cells with marginalized fascicles, an abundant eosinophilic cytoplasm, and elongated and hyperchromatic nuclei. Macroscopically, the neoplasm does not have a capsule, and usually, areas of necrosis are observed. Metastases are not common, but when present, can affect the spleen, duodenum, mesentery, and mesenteric lymph nodes[1-3]. Bladder neoplasms can block or invade the ureters, which obstruct the urinary flow and increase ureteral pressure, causing hydronephrosis[4].

This neoplasm is rare in dogs, accounting for less than 1% of malignant neoplasms associated with the species and being less common in cats[5]. It has no racial predisposition, being common in animals aged six and 11 years old[1,6]. A higher occurrence was observed in females. Obesity, insecticides, herbicides, use of

cyclophosphamide, and urine retention are considered predisposing factors[3,5]. The clinical signs include hematuria, dysuria, pollakiuria, urinary incontinence, and a mass in the urinary vesicle on rectal examination[7,8]. The blood count and biochemical tests can be normal or can present with azotemia[7].

Ultrasound is the most used diagnostic imaging method for the identification of neoplastic alterations in animals with clinical signs such as hematuria; however, cytological or histopathological evaluation is necessary for the definitive diagnosis[9]. Intraluminal masses of the bladder can originate in the bladder trigone, urethra, or prostate, and these structures must be carefully evaluated[4]. Due to a lack of information about leiomyosarcoma in the urinary bladder of canine patients, the aim of this study was to report a case of primary bladder leiomyosarcoma in a dog.

Case Description

A 10-year-old, female, boxer breed dog presented with dysuria for one month, hyporexia for seven days, abdominal distension for two weeks, and anuria for the last three days. On physical examination, an abdominal mass of consistent aspect was identified, occupying a large part of the abdominal cavity in the hypogastric region. Complete blood count, serum urea, creatinine, alanine aminotransferase, and alkaline phosphatase were performed, in addition to abdominal radiography and ultrasound.

The blood count showed no abnormalities, while urea (351 mg/dL) and creatinine (10 mg/dL) levels were found to be increased. The abdominal radiographic examination identified a large mass occupying the abdominal cavity. Thoracic 3-view radiographic examination revealed no abnormalities in the lungs (no evidence of metastasis). Ultrasound showed an immeasurable mass with no distinct limit associated with hydronephrosis in the right kidney. The bladder was displaced caudally to the pelvic floor, moderately filled with homogeneous anechogenic content, with a thin and regular wall and the presence of an echogenic, heterogeneous mass with hypoechogenic areas occupying the abdominal cavity. Due to the dimensions of the mass, it was not possible to specify the organ from which the mass originated via ultrasound examination.

Based on the suspicion of neoplasm, the patient underwent an exploratory laparotomy procedure. During the procedure, a neoplastic mass was identified, with a vascularized and irregular appearance and areas of necrosis (Figure 1). The animal had a urethral obstruction and accumulation of urine in the bladder, and cystocentesis was performed (Figure 2). After this procedure, it was noticed that the mass originated in the bladder trigone and due to the involvement of the ureter, a surgical procedure was performed to replant the ureter in the urinary bladder. Figure 3 shows the urinary bladder after reimplantation.

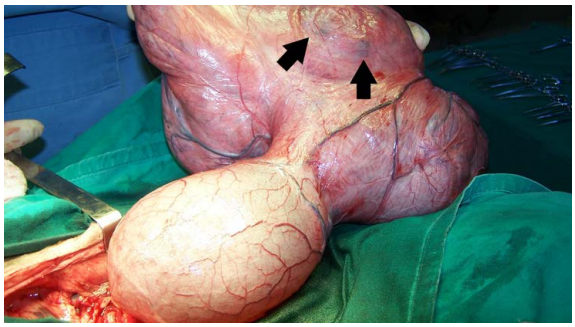

Figure 1. Exploratory laparotomy procedure revealing neoplastic mass with irregular appearance, vascularized and with areas of necrosis (arrows).

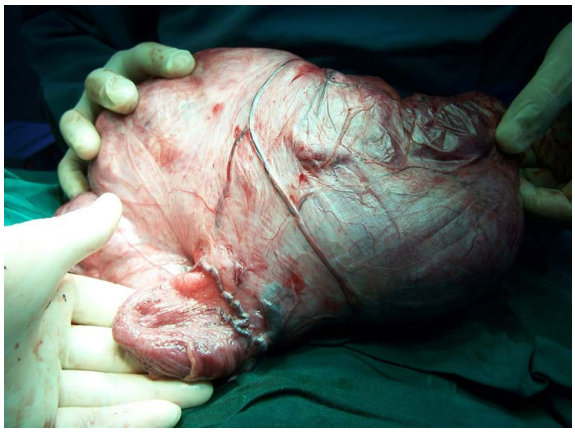

Figure 2. During laparotomy and identification of a bladder mass, cystocentesis procedure was performed due to accumulation of urine in urinary bladder. After cystocenteses, it was performed tumor removal and bladder reconstruction.

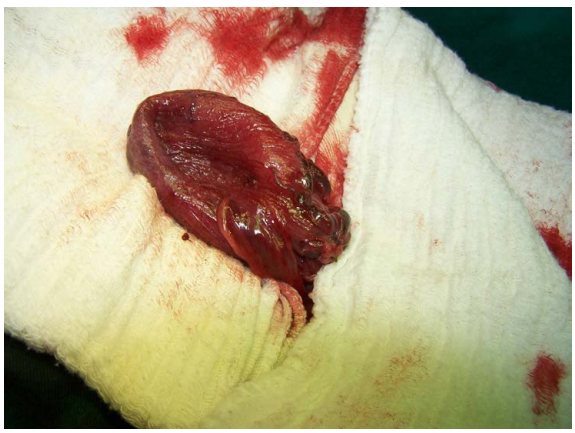

Figure 3. After tumor removal, urinary bladder was reconstructed and the ureter was reimplanted in the bladder mucosa.

After total mass removal, the bladder mass became evident with a dimension of 80x40x30 cm and weight of 4,6 kg, with an irregular aspect and an intense vascularization. Right nephrectomy was performed due to the hydronephrosis resulting from the obstruction due to the expansive growth of the neoplasm (Figure 4).

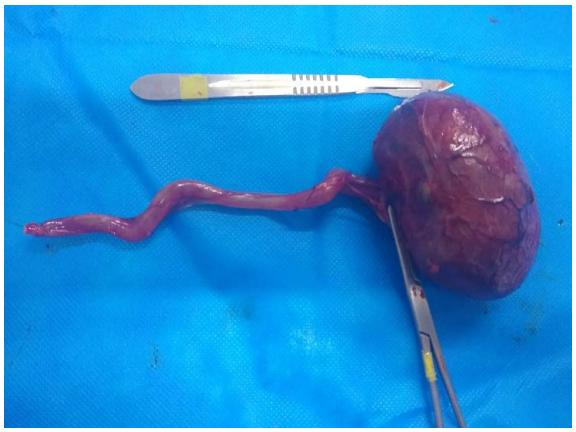

Figure 4. Evaluation of the kidney and ureter after surgical procedure. It is possible to observe the dilated ureter and kidney and shape modification.

During the surgical procedure, urethral catheterization was performed, and the patient was kept in the intensive care unit. After 24 hours of the surgical procedure, the patient did not show urine production, and presented with intense azotemia (creatinine: 9.0 mg/dL and urea: 350 mg/dL). The patient was maintained with a permanent urinary catheter to measure the urinary volume, and saline solution (NaCl 0.9%) was administered intravenously with a continuous infusion of furosemide (1 mg/kg/h) in a period of six hours. The patient did not pass out urine, and dopamine at a dose of 2 µg/kg/min was administered without success. Due to the poor clinical condition, failure to replant the ureter in the urinary bladder, and the neoplastic extension, euthanasia was chosen.

The macroscopic findings of the neoplastic mass and kidney revealed dilation of the left ureter and stenosis of the lumen due to neoplastic infiltration. The left kidney was swollen, with a preserved capsule, and when sliced, there was total loss of the renal parenchyma with the presence of intense serosanguinous fluid inside. The neoplasm invaded the right ureter lumen, causing total obstruction. The right kidney was increased in volume, with preservation of the renal capsule and medullary cortical region. The mass was encapsulated with an irregular shape and several peripheral blood vessels with a high caliber. Necropsy was performed and no macroscopic abnormalities were observed. Tissue fragments from the spleen, liver, lungs, kidneys, ureters, and three mesenteric lymph nodes were randomly collected.

Histopathological examination of the neoplasm revealed spindle cell proliferation, moderately pleomorphic and elongated nucleus, dispersed chromatin, and evident nucleoli (Figure 5). Some of these cells had a fusiform and hyperchromatic nucleus, the cells were arranged in multidirectional bundles, and the cytoplasm of these cells was eosinophilic and indistinct. There were mitotic figures

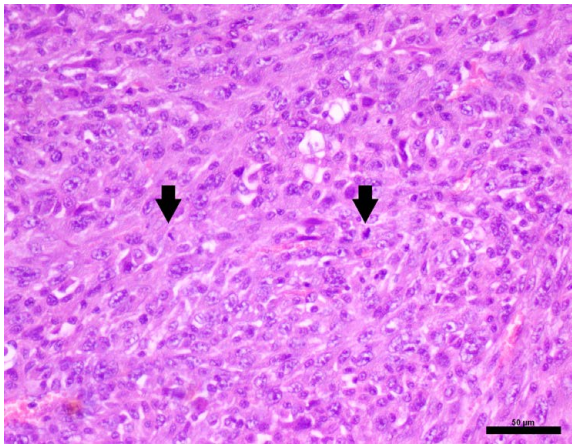

Figure 5. Morphological evaluation of the urinary bladder mass showing neoplastic cells with spindle-cell morphology, with moderate pleomorphism and anisokaryosis. It was also observed nucleolus evident and mitotic figures (arrows). Hematoxylin and eosin staining, 400x.

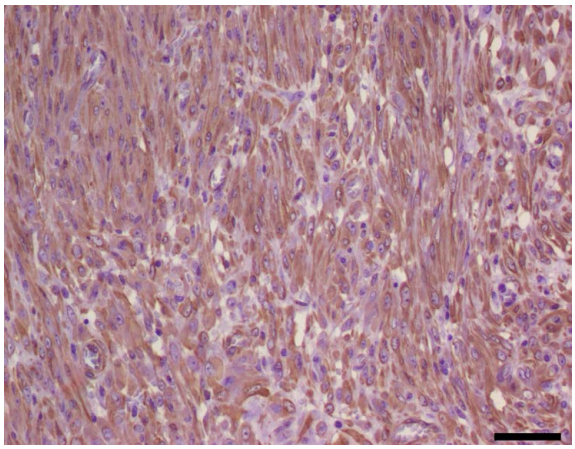

Figure 6. Alpha-actin immunostaining in the urinary bladder tumor. Note the intense cytoplasmic expression (brown color) by neoplastic cells. Harris hematoxylin, 400x.

noting discreet and diffuse bleeding with discreet necrotic areas. The special Masson's Trichrome tumor cells stained red, indicating a tumor of muscle origin. To confirm the diagnosis, immunohistochemistry analysis was performed according to the previous literature[5] for the markers S100 (Dako Cytomation, Carpinteria, CA, USA) at 1:400 dilution, MyoD1 (Novocastra, Wetzlar, Germany) at a 1:200 dilution and Alpha-actin (Dako Cytomation, Carpinteria, CA, USA) at a 1:100 dilution. The tumor cells were negative for S100 and MyoD1 and presented a diffuse cytoplasmic positive expression for alpha-actin (Figure 6). The association of morphological findings, Masson's trichrome, and immunohistochemistry supported the leiomyosarcoma diagnosis.

Discussion

Bladder leiomyosarcoma is a rare mesenchymal

neoplasm with few reports in the literature[8-13]. The clinical signs of dysuria and anuria were related to the mechanical compression of the urethra by the neoplasm. Anuria was attributed to the fact that the neoplasm affects the bladder trigone causing obstruction in the ureters. During the laparotomy, the urinary bladder was observed to be full of urine, and after tumor exposure (from the abdominal cavity), bladder catheterization was performed and there were no signs of obstruction.

The animal presented with hydronephrosis and due to its irreversible nature, associated with ureteral obstruction, we opted for the surgical removal of the kidney. Due to the enlarged right kidney and the necessity to perform tumor removal associated with nephrectomy, prolongation of anesthesia could contribute to acute kidney failure. Based on the macroscopic and histopathological findings, a bladder leiomyosarcoma of the urinary vesicle was diagnosed. The leiomyosarcoma presented expansive growth, with ureteral obstruction and consequent hydronephrosis, and it showed a little infiltrative and non-metastatic neoplasm. In a previous report by our group, we described a case of bladder leiomyosarcoma in the urinary bladder of a cat that was successfully removed by a surgical procedure (Buzatto et al., 2019). However, the tumor that was removed was a small tumor (1.5 cm) with margins of 1.0 cm.

The immunohistochemistry analysis revealed tumor cells expression Alpha-actin, indicating a tumor from smooth muscle fibers. The bladder submucosa has a muscular layer, which is probably the origin of this tumor. In this report, we observed an expansive tumor growth, with a large intraabdominal mass, and we believe the tumor appeared several months ago. Even as a chronic lesion, the dog did not show any evidence of metastasis, corroborating with the literature indicating that leiomyosarcomas is a tumor with a low metastatic rate.

Regarding the surgical procedure, the urinary bladder reconstruction was successfully performed. However, the patient had one kidney left with the reimplanted ureter. We believe that due surgical manipulation and inflammation, the remaining reimplanted ureter could be swollen or edematous due manipulation, obstructing the urinary flow. Besides that, we performed a protocol for urinary production with no success. Thus, due the prolonged surgical procedure and anesthesia, the dog could develop acute kidney disease.

Conflict of Interest statement

The authors declare that there is no conflict of interest.

Acknowledgment

We would like to thank Editage (www.editage.com) for English language editing.

References

1. Layane SMJ. Leiomiossarcoma Vaginal em Cadela: Relato de Caso. UFRB, 2018. Available from: http://www.repositoriodigital.ufrb.edu.br//handle/123456789/1408.
2. Kapatkin AS. Leiomyosarcoma in dogs: 44 cases (1983-1988). J Am Vet Med Assoc. 1 out 1992; 201: 1077-1079.
3. Hanzaike T, ITO I, Ishikawa T, et al. Leiomyosarcoma of soft tissue in a cow. J Comp Path. 2006; 112(3): 237-242.
4. Heng HG, Lowry JE, Boston S, et al. Smooth muscle neoplasia of the urinary bladder wall in three dogs. Veterinary Radiology & Ultrasound. 2006; 47: 83-86.
5. Buzatto AB, Elias F, Franzoni MS, et al. Long-Term Survival of a Cat with Primary Leiomyosarcoma of the Urinary Bladder. Vet Sci. 2019 Jun 27; 6(3): 60. doi: 10.3390/vetsci6030060. PMID: 31252551; PMCID: PMC6789653.
6. Norris AM, Laing EJ, Valli VEO. Canine bladder and urethral tumors: A retrospective study of 115 cases (1980-1985). Journal of veterinary internal medicine. 1992; 6: 145-153.
7. Vetchten M. Embryonal rhabdomyosarcoma of the urinary bladder in dogs. Compendium of continuing education practice in veterinary. 1990; 12: 783.
8. Fondacaro JV, Richter KP, Carpenter JL. Feline gastrointestinal well differentiated lymphocytic lymphoma: 39 cases. Proceedings of the 17th annual ACVIM. 1999; 722.
9. Walker M, Breider M. Intraoperative radiotherapy of canine bladder cancer. Veterinary Radiology & Ultrasound. 2005; 28(6): 200 – 204.
10. Yuki M, Naitoh E. Complete Remission of Associative Immune-Mediated Hemolytic Anemia in a Dog Following Surgical Resection of Intestinal Leiomyosarcoma. Vet Sci. 2019; 6(2): 55.
11. Aleksandra Sobczyńska-Rak, Izabela Polkowska, Beata Żylińska, et al. Case report of leiomyosarcoma, a very rare type of urinary bladder tumour. Med Weter. 2017; 73 (7): 439-444.
12. Souza junior P, Teixeira ALS, Menezes L. Urinary bladder leiomyoma in a bitch (canis lupus familiaris): Case report. Ars veterinaria jaboticabal sp. 2011; 27(1): 007-010.
13. Cartagena Albertus JC, Moya García S, Moise A, et al. Urethral Leiomyosarcoma in a Bitch. Israel Journal of Veterinary Medicine. June 2018; 73 (2).