

Prostate as Sole Unusual Recurrence Site of Lymphoma in a Dog

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Abstract. *A ten-year-old intact male Rottweiler dog was examined for sudden onset of stranguria and pollakiuria. The dog had an intestinal lymphoma treated three years before with chemotherapy. Ultrasonographic examination of the abdomen showed a large dyshomogeneous prostate with an over-distended bladder. Cytological examination of the fine-needle aspirate from the prostate yielded a diagnosis of lymphoma. The diagnosis was confirmed by histopathological examination. The dog was treated with multi-drug chemotherapy and achieved a complete remission. The dog remained in complete remission for one year from the re-institution of chemotherapy before dying of recurrence. Lymphoma rarely invades the prostate in the dog. To the best of our knowledge this is the first report of prostatic recurrence of lymphoma in a canine patient originally affected by intestinal lymphoma and treated with chemotherapy.*

Lymphoma is the commonest malignancy in dogs and the annual incidence has been estimated at 13 to 24 cases per 100,000 dogs at risk. This neoplasms accounts for 7% to 24% of all canine tumors and 83% of all hematopoietic malignancies (1). The most common forms include multicentric, mediastinal, gastrointestinal and cutaneous locations, while the extranodal locations comprise central nervous system, bone, testicles, bladder, heart and nasal sinuses (1). Prostatic involvement has been signalled only once in the context of a lymphoma affecting the urogenital tract of a young male dog (2).

Case Report

A ten-year-old, intact male rottweiler dog was presented for a sudden onset of pollakiuria and stranguria associated with

dysorexia and weight loss (3 kg). The dog had been treated for intestinal lymphoma five years earlier and had a splenic recurrence three years after the diagnosis of malignancy. The dog had been out of chemotherapy for one year prior to the onset of urinary problems.

The dog was depressed but still reactive and responsive. The urinary bladder was very large and painful on palpation. The dog had episodes of urine leakage (3-5 ml) during the examination. Rectal examination evidenced a firm and enlarged prostate that restricted the rectal canal. A complete blood cell count (CBC), biochemistry profile and urinalysis were performed. Thoracic and abdominal radiographs were taken; moreover abdominal ultrasonographic examination with bladder catheterization were also performed. The CBC showed neutrophilia 26,000 WBC; the biochemistry profile evidenced hyperazotemia (60 mg/dl; reference range 8-29 mg/dl), high creatinine level (3.8 mg/dl reference range 0,8 to 1.9 mg/dl) and elevation of alkaline phosphatase (450 U/l; reference range 12-121 U/l), The catheter passed through the penile urethra without resistance but was hardly passed through the prostatic urethra. The bladder was emptied and an urinalysis performed. Specific weight was 1015 and no abnormalities were noted on urine sediment. Chest radiographs were within normal limits, while abdominal radiographs evidenced a distended bladder and an enlarged prostate. Prostatomegaly and bladder distension were confirmed during ultrasonographic examination. The bladder showed normal walls and contents. The prostate was enlarged with a dorsoventral dimension of 7 cm. The prostatic parenchyma appeared inhomogeneous due to the presence of large hypoechoic areas that occupied the central areas and extended to the capsule (Figure 1). The hypoechoic areas had poorly defined margins. No anechoic areas were noted. No calcifications were noted in the prostate gland. The left and the right kidneys had mildly dilated pelvis with normal cortical and medullary definition. Both urethras were also uniformly dilated.

Based on the imaging findings, a diagnosis of prostatic disease with secondary partial urethral obstruction and mild bilateral hydronephrosis was formulated (3). The differential

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Figure 1. *M-mode* ultrasonographic imaging of the prostatic lymphoma at presentation.

diagnosis for this presentation was benign prostatic hyperplasia with or without concurrent inflammation or prostatic neoplasia. Ultrasound-guided fine-needle aspirate and biopsy were taken in order to ascertain the nature of the prostatic disorder. Aspiration cytology yielded a mixed population of atypical prolymphocytes and lymphoblasts, suggestive of prostatic involvement by lymphosarcoma. The histopathology report gave a diagnosis of prostatic lymphoma. In Figure 2 the histopathological characteristics of the neoplasm can be seen.

A diagnosis of recurring lymphoma was made. The dog was treated with a rescue protocol for six months. The symptoms of urinary obstruction subsided by the end of the second week of therapy and the animal's status greatly improved. An ultrasonographic examination was made at one month after the reinstatement of chemotherapy and showed a complete clinical remission (Figure 3). After one year from the diagnosis, the dog experienced a tumor recurrence and died of progressive disease despite the institution of a rescue chemotherapy protocol.

Discussion

Lymphoma is the commonest canine malignant neoplasm and its presentation can range from the multicentric form to less common patterns such as intestinal, ocular, renal, cutaneous, nasal and central nervous system (1). In this article, we report an unusual and previously undescribed pattern of recurrence in an adult male dog. There is only one other publication describing the features of prostatic involvement by lymphosarcoma in a dog (2). In that report, the obstruction of the urethra secondary to prostatic involvement was responsible

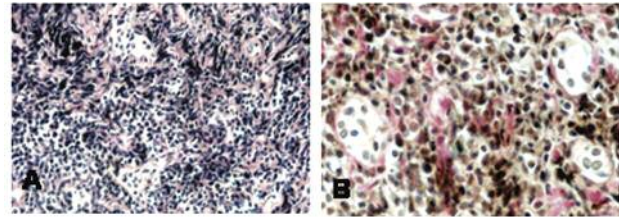


Figure 2. A) Hematoxylin/eosin staining of the neoplasm, showing a prominent neoplastic lymphocytic infiltrate destroying the normal structure of the prostate gland; some residual glandular acini are still visible (original magnification $\times 20$). B) Hematoxylin/Van Gieson staining of the neoplasm, showing at higher magnification the residual glandular acini dispersed in the neoplastic lymphocytic infiltrate (original magnification $\times 40$).



Figure 3. *M-mode* imaging of the prostate after institution of the rescue protocol. Note the complete response following induction chemotherapy.

for secondary renal hydronephrosis, as reported for other lymphosarcomas involving the urinary tract (4-6). As reported (2), the features of prostatic lymphoma cannot be differentiated from those of other prostatic diseases. Differentials for the ultrasonographic patterns observed in our case include benign prostatic hyperplasia, prostatitis and non lymphomatous neoplasia (7-8). All these diseases may lead to prostatic enlargement, variable echogenicity and echotexture with formation of cystic structures (7-8). In our patient, the ultrasonographic features of large hypoechoic areas and the absence of other organ involvement, led to suspicion of a prostatic carcinoma, benign prostatic hyperplasia, or a secondary infection in a patient with a history of lymphoma and immunodepression. The diagnosis of prostatic recurrence of lymphoma was possible only by means of fine-needle aspiration and tru-cut biopsy, followed by cytological and histopathological characterization of the disorder.

Lymphomas affecting the prostate have occasionally been described in human patients, where they occur as primary entities or as part of a more diffuse presentation (9). Primary lymphomas of the prostate are a rare but well-recognized entity in human patients. They account for 0.09% of prostate neoplasms and 0.1% of all non-Hodgkin's lymphomas (10). Criteria to classify these entities include urinary symptoms at presentation and prostate-confined tumor without hematopoietic involvement within one month from diagnosis (11). Of interest, this primary form affects older individuals and is frequently diagnosed during prostatic surgeries performed to solve urinary obstruction, although sometimes young patients develop this neoplasm (11-14). Patients develop signs of urinary incontinence, weak urinary stream, pollakiuria and dysuria that may rapidly evolve into anuria (3, 13). The prostatic involvement by a lymphomatous neoplasia is usually diagnosed through ultrasonographic evaluation of the prostate and by nuclear scintigraphy (12, 13). Unfortunately, the imaging appearance of these lesions is not specific, although a tendency to infiltrate the muscular rather than the glandular component of the prostate has been described (14). The fact that in our case the lymphosarcoma invaded the gland, sparing the muscular stroma, compressing the acini against the capsule, thus almost completely replacing the normal prostatic tissue, was most inconvenient and misleading. Clinicians should be warned of the possibility of prostatic recurrence of lymphoma in order to prevent unnecessary surgeries in intact male patients. Further research is needed to characterize the ultrasonographic features of this tumor.

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References

- 1 Vail DM, MacEwen EG and Uowens KM: Canine lymphoma and lymphoid leukemias. *In*: Small Animals Clinical Oncology. 3rd ed. Withrow SJ, MacEwen EG (eds.). Philadelphia: W.B. Saunders, pp. 558-589, 2001.
- 2 Winter MD, Locke JE and Penninck DG: Imaging diagnosis-urinary obstruction secondary to prostatic lymphoma in a young dog. *Vet Radiol Ultrasound* 47: 597-601, 2006.
- 3 Ruel Y, Barthez P, Mailles A and Begon D: Ultrasonographic evaluation of the prostate in healthy intact dogs. *Vet Radiol Ultrasound* 39: 212-216, 1998.
- 4 Benigni L, Lamb CR, Corzo-Menendez N, Holloway A and Eastwood JM: Lymphoma affecting the urinary bladder in three dogs and a cat. *Vet Radiol Ultrasound* 47: 592-596, 2006.
- 5 Maiolino P and De Vico G: Primary epitheliotropic T-cell lymphoma of the urinary bladder in a dog. *Vet Pathol* 37: 184-186, 2000.
- 6 Bennett SL, Holland JA and Meehan MC: Mural lymphoma associated with urinary bladder of a cat. *Aust Vet Pract* 33: 155-159, 2003.
- 7 Feeney DA, Johnston GR, Klausner JS, Perman V, Leininger JR and Tomlinson MJ: Canine prostatic disease-comparison of ultrasonographic appearance with morphologic and microbiologic findings: 30 cases (1981-1985). *J Am Vet Med Assoc* 190: 1018-1026, 1987.
- 8 Mattoon JS and Nyland TG: Prostate and testes. *In*: Small Animal Diagnostic Ultrasound, 2nd ed. Nyland TG, Matton JS (eds.). Philadelphia: W.B. Saunders Company, pp. 250-266, 2002.
- 9 Bostwick DG, Iczkowski KA, Amin MB, Discigil G and Osborne B: Malignant lymphomas involving the prostate: report of 62 cases. *Cancer* 83: 732-738, 1998.
- 10 Ferry JA and Young RH: Malignant lymphoma of the genitourinary tract. *Curr Diag Pathol* 4: 145-169, 1997.
- 11 Sarris A, Dimopoulos M, Pugh W and Cabanillas F: Primary lymphoma of the prostate: good outcome with doxorubicin-based combination chemotherapy. *J Urol* 153: 1852-1854, 1995.
- 12 Antunes AA, Dall'Oglio M and Srougi M: Primary lymphoma of the prostate: a rare case of urinary obstruction. *Int Braz J Urol* 30: 410-412, 2004.
- 13 Choi WW, Yap RL, Ozer O, Pins MR and Schaeffer AJ: Lymphoma of the prostate and bladder presenting as acute urinary obstruction. *J Urol* 169: 1082-1083, 2003.
- 14 Terris MK and Freiha FS: Transrectal ultrasound appearance of hemolymphoid malignancies involving the prostate. *Urology* 51: 339-341, 1998.

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