CASE REPORT

Transitional Cell Carcinoma and Subsequent Rupture of the Canine Bladder: A Case Report and Review of the Literature

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Summary
A transitional cell carcinoma of the bladder is reported in a ten year old male Bull Mastiff. The presenting signs were a tender, enlarged abdomen, depression and weakness. Diagnostic tests suggested a ruptured bladder. The tumor was diagnosed by exploratory laparotomy and the dog was subsequently euthanized due to the poor prognosis. A review of bladder tumors with emphasis on transitional cell carcinomas is also presented.

Résumé
Rapport d’un épithélioma transitionnel et de la rupture de la vessie, chez un chien, ainsi qu’une revue pertinente de la littérature

L’auteur rapporte qu’un Bull Mastiff souffrait d’un épithélioma transitionnel de la vessie. Les signes cliniques se traduisaient par de la douleur et de la distension abdominales, ainsi que par la dépression et de la faiblesse. Les résultats des épreuves de diagnostic utilisées suggéraient une rupture de la vessie. Une laparotomie exploratrice permit de constater la présence du néoplasme; on procédait à l’euthanasie du chien, à cause de la gravité du pronostic. L’auteur présente une revue des tumeurs de la vessie, en insistant sur les épithéliomas transitionnels.

Literature Review
Primary neoplasms of the canine bladder are uncommon and account for 0.5% of all tumors in dogs (1,2,3,4,5,6,7,8). These occur generally in older dogs (1,7,8) with the exception being the embryonal rhabdomyosarcoma (7). The urinary bladder is the most common site for the origin of primary neoplasia in the urinary tract (1,6,9,10). The hypothesis proposed for the greater incidence of neoplasia in the bladder is due to the retention of urine and consequently, longer contact with carcinogenic agents (6,11,12). There is a greater frequency of bladder tumors in females (13). The transitional cell carcinoma is the most common type of tumor (7,9,11,13,14).

The types of tumors that may occur in the urinary bladder are numerous and vary in their cell type of origin. Some infrequent differential diagnoses are polypoid cystitis (15) and pyogranuloma (16).

The prognosis with most bladder neoplasms depends on the location of the tumor, the extent of neoplastic invasion and the presence of metastatic disease. The prognosis is often guarded due to possible obstruction of urine outflow when the growth is located in the trigone area (1).

In the male, transitional epithelium is found throughout the urethra whereas in the female, the distal two-thirds of the urethra is lined with squamous epithelium (1,3). This accounts for the high incidence of squamous cell carcinoma in the bitch as compared to their rarity in the male (1,3). There is also one recorded case of a primary transitional cell carcinoma arising in the ureter (2). Transitional cell carcinomas occur in both sexes in the proximal urethra and bladder (1), but there is an increased frequency in the female dog (11). The lack of tumors in males has been attributed to the prostatic secretions (9) and also to the increased frequency of urination (less retention) (11,13). Sex hormones are cited as having little effect on tumor development (11). Chronic inflammation has been incriminated in inducing cancer (5) along with several compounds, such as cyclophosphamide (5), beta-naphthylamine (13), benzidine (13), and metabolites of tryptophan (11). Cats metabolize tryptophan differently than dogs and this could explain their lower incidence of bladder tumors (1,6,8,11). It is suggested that up to 50% of transitional cell carcinomas have metastasized to the regional lymph nodes and lungs by the time they are detected (11,12,17).

There are no pathognomonic clinical signs of bladder neoplasia, thus the clinical diagnosis is sometimes difficult. There is usually constant or intermittent hematuria (1,4,7,8,11,12) and increased frequency of urination due to a concurrent cystitis (4,8,11,12). The pollakiuria may also reflect decreased bladder capacity due to a loss in the distensibility of the bladder wall (11). Obstruction of the urethra may occur producing variable periods of tenesmus (1,11,18). If the neoplasm impinges on local bladder innervation or mechanically causes compression, then incontinence may be a clinical feature (4,7,12). Vomiting may occur in the presence of postrenal uremia (12). In a few cases there is evidence of a regenerative or nonregenerative anemia due to kidney disease (12). There are reports of concurrent hyper-

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trophic pulmonary osteoarthropathy associated with some types of bladder tumors (8,19,20,21). Most clinical signs, with the exception of hematuria, are not seen until the neoplasm is well established (12).

Certain clinical tests are employed to eliminate other urogenital tract diseases but some diagnostic procedures are helpful in the diagnosis of bladder tumors specifically. Palpation can be used to diagnose a mass or a thickened bladder (4,7,8,12). Survey radiography, pneumocystography or double contrast cystography can be used (4,22). Exfoliative cytology has been used but varied results have been obtained (3,12,17). A urinary catheter can also be passed to determine if an obstruction is present (3). A definitive diagnosis is often made with exploratory laparotomy, visualization of the tumor and biopsy.

Due to financial consideration, dogs are often initially treated for cystitis (4). Specifically for transitional cell carcinomas, medical treatment is regarded as ineffective because they are usually radio-resistant and only moderately susceptible to chemotherapy (4,12). Surgical treatment is usually necessary in the form of partial cystonecctomy or if extensive involvement is present, radical removal with transplantation of the ureters to the intestine or skin (12).

Case Report
History and Clinical Findings
A ten year old, intact male, Bull Mastiff was presented with the complaint of a tender abdomen, depression and recumbency, of undetermined duration. There was no indication or history of trauma. The dog was in good physical condition, but was unable to rise. The abdomen was moderately enlarged, very painful on palpation, and was felt to be distended with fluid. The rectal temperature was 39.5°C.

Laboratory Data and Diagnostic Tests
Hematology was done. There was a marked inflammatory response with slight dehydration. The white blood cell count was \(40.8 \times 10^9\) /L consisting of 86% neutrophils, 5% band neutrophils, 6% monocytes and 3% lymphocytes. Blood urea nitrogen was very high (no quantitative value). Abdominal paracentesis was performed and a clear yellow fluid that smelled like urine was obtained. Bladder catheterization produced just a few milliliters of urine. Survey radiographs indicated a loss of detail with no bladder outline distinguishable. A pneumocystogram was done and the air was not contained in the bladder. A diagnosis of rupture of the bladder of unknown etiology was made and permission for an exploratory laparotomy obtained.

Surgery and Results
Surgery was performed under general anesthesia using sodium thiopental for induction and methoxyflurane for maintenance. An isotonic solution of saline was administered by intravenous drip throughout surgery. Upon entering the abdomen through a ventral midline incision, approximately 1000 mL of urine was drained from the abdominal cavity. The peritoneal vessels were injected and the serosa of the intestines congested. This was regarded as a chemical peritonitis due to the presence of urine in the abdominal cavity. A patent tear was located in the cranial ventral portion of the bladder. The interior of the bladder was explored and the urethra was found to be blocked by a mass. The growth involved the trigone area, encircling the exit from the bladder. After conferring with the owners, euthanasia was performed due to the inoperable nature of the growth. A biopsy was taken of the growth but the rest of the body was not submitted for necropsy. A tentative diagnosis of transitional cell carcinoma was made based on gross examination and was confirmed by histopathology.¹

Discussion and Conclusions
Transitional cell carcinoma is the most common tumor type that occurs in the canine bladder and it has a great tendency to be both invasive and infiltrative with a high percentage of them metastasizing. The majority of them have a poor prognosis at the time of diagnosis. This particular case exemplified these facts. The involvement of the trigone area and the proximal urethra together with the possibility of metastasis indicated a poor prognosis and the dog was subsequently euthanized.

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References

¹Central Lab for Veterinarians Ltd., 17735-56th Ave., Surrey, British Columbia.

ABSTRACTS


The rabies virus variant SAD B19 was selected from cloned BHK cells and yielded a minimum titre of $1 \times 10^8$ TCID/mL. Following the application of SAD B19 the residual pathogenicity for mice and rats was low. The vaccine virus was completely innocuous for muskrats. Following the feeding of foxes with baits containing vaccine, the 100% effective dose was $2 \times 10^7$ TCID/mL. The same virus dose proved, under laboratory and field conditions, to be very temperature stable and vaccine which was up to 8 days in the field was still completely effective in foxes. In parallel, problems of personnel and costs concerning the production and mass application of the vaccine in the field were reduced due to technical improvements in filling, packaging and storage of the vaccine. A new form of bait preparation proved to be effective for foxes. The so-called "gullet baiting system" with chicken heads reduces the personnel necessary as well as the risks for man and animal.

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Many viral infections contribute to the complex etiology of bovine respiratory diseases. Of these, only infectious bovine rhinotracheitis (IBR) and bovine viral diarrhea (BVD) present signs and lesions permitting clinical diagnosis. Bovine adenoviruses, rhinoviruses, parvoviruses, respiratory syncytial virus, parainfluenza-3 (PI-3) and the newer bovine herpesviruses require laboratory tests for recognition.

Because these viruses are ubiquitous and may have a carrier state, control by hygienic measures and limiting herd additions rarely succeeds. Thus, vaccination is currently the most feasible method of prevention.

Dairy cattle should be vaccinated against IBR, PI-3 and BVD prior to their 1st pregnancy, and earlier if management conditions permit. In general, modified live virus (MLV) vaccines are contraindicated for pregnant, stressed, sick, or exposed cattle. Inactivated vaccines, when available, are less hazardous than the MLV products but usually require repeated injections to induce partial protection. Vaccination schemes must be developed individually to suit the production-management systems on each farm.


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