

What's your diagnosis?

Signalment: 11 y MC Maltese Mix

Presenting complaint: Pollakiuria with hematuria.

History: Zippy presented with a 4 day history of pollakiuria. Straining to urinate had not been noted, however pink tinged urine had been seen by the owner. On presentation he had been drinking excessive amounts of water, had a good appetite, but seemed nauseous.

PE Findings: Zippy was bright, alert, and responsive. Heart rate was 168 beats per minute. He was panting and his temperature was normal. Potential enlargement of prostate was noted on rectal exam. All other physical exam findings were within normal limits.

Diagnostic Plan:

- **Complete blood count:** Mild elevation of red blood cells, platelets, and protein. Attributed to dehydration.
- **Serum Chemistry:** Elevated proteins and elevated liver enzymes (ALT- 336U/L, ALP- 4701U/L)
- **Urinalysis via catheterization:** red blood cells were present along with some epithelial cells.
- **Urine culture:** no growth
- **Abdominal radiographs**



Figure 1: VD abdomen

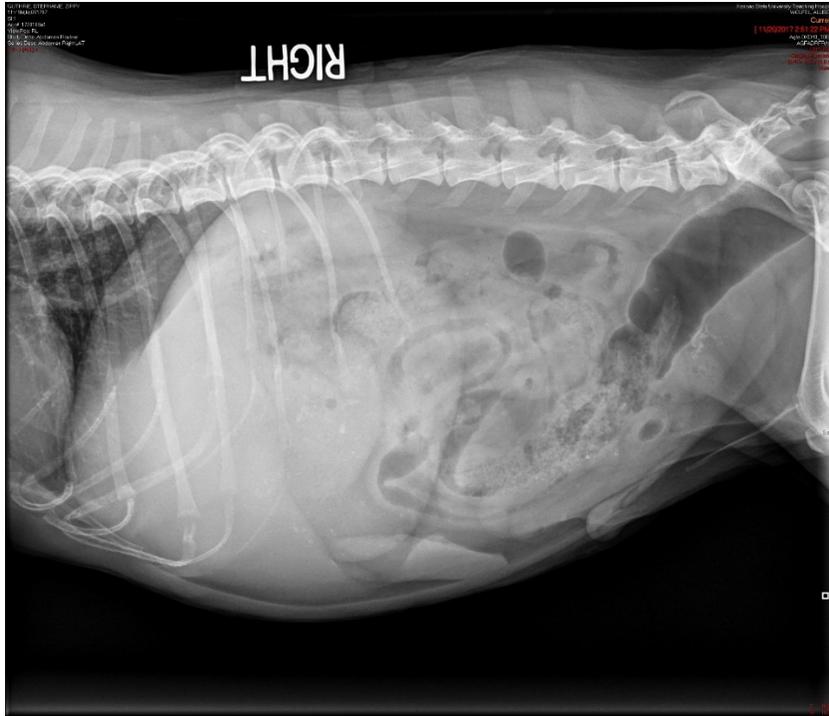


Figure 2: Right lateral abdomen

- **Radiographic findings**
 - Mildly enlarged liver with rounded margins
 - Moderately gas distended stomach
 - Feces and gas distended colon
 - Enlarged prostate for neutered male
 - Multiple mineral opacities in caudal abdomen- suspect urinary bladder or prostate
- **Radiographic impressions**
 - Hepatomegaly with causes including infiltrative disease (inflammation, infection, or neoplasia), nodular hyperplasia, or a metabolic/endocrine disease.
 - Prostatomegaly possibly due to neoplasia.
 - Mineralization differentials including neoplasia or cystic calculi.

Suggest compression study and perineal views to determine mineralization organ of origin, and rule out calculi within the urethra.

- **Radiographic impressions**
 - Mineralized material in bladder with differentials of neoplasia or cystic calculi.

Abdominal ultrasound recommended

Abdominal Ultrasound



Figures 5 & 6 Urinary bladder with bladder mass

Ultrasound findings

- In the dorsal central body and neck of the urinary bladder there is a soft tissue, irregularly marginated mass with linear mineral opacities.
- **Ultrasound impressions**
 - Mineral opacity mass in bladder, most likely differential is neoplasia.
- **Urine catheterization for cytology**- Epithelial cell proliferation. Higher number than normal, however there was no apparent signs of malignancy to lead to a cytological diagnosis of transitional cell carcinoma. Potential differentials include transitional cell carcinoma, based on appearance, and unlikely a benign polyp or hyperplasia.
- **CADETSM BRAF Mutation Test**- DNA isolated from a urine sample detected the BRAF gene. 19% of the copies of the BRAF gene were detected as mutant.

Diagnosis- Transitional cell carcinoma localized to the bladder.

Discussion- Transitional cell carcinoma is the most common neoplasia of the bladder. It develops from the transitional epithelial cells that line the bladder and in dogs can invade deep into the bladder walls even involving muscle layers. As it is difficult to remove bladder masses surgically, it is most often treated medically.

There have been studies that show the non-steroidal drug Piroxicam has an effect on transitional cell carcinomas. It has been shown to have an effect of decreasing tumor size or decreasing the chance of continued growth of the tumor. Chemotherapy is also utilized in the treatment of transitional cell carcinoma. Mitoxantrone is a chemotherapy agent whose mechanism of action is through Topoisomerase II inhibition and is indicated for the treatment of transitional cell carcinoma.

85% of canine transitional cell carcinoma cases have a gene mutation of the BRAF gene. The CADETSM BRAF gene assay provides a highly sensitive method to detect the presence of the BRAF gene mutation in urine samples of dogs. The gene is not detected in healthy dogs or dogs with cancers other than transitional cell carcinoma.

Case Follow Up- Patient will be started on piroxicam and mitoxantrone.

“The CADETSM BRAF Assay for Diagnosis & Monitoring of Canine TCC/UC.” *Sentinel Biomedical*, Sentinel, www.sentinelbiomedical.com/shop/cadetsm-braf-diagnosis-monitoring/.

Knapp, Deborah W. “Canine Bladder Cancer.” *Purdue Comparative Oncology Program*, www.bing.com/cr?IG=312C2D30E58449609F2EDAAADD06E903&CID=2F92C2A2DC9C6C490BCBC9F0DD336D94&rd=1&h=MV5gdOnj49L-d3afVIIOb_jwSdOqHJCdjqKPVJzGqg&v=1&r=https://www.vet.purdue.edu/pcop/files/docs/CanineUrinaryBladderCancer.pdf&p=DevEx,5065.1.

Mohammed SI, Deepika D, Abraham S, Snyder PW, Waters DJ, Lu M, Wu L, Zheng R, Stewart J, Knapp DW. Cyclooxygenase inhibitors in urinary bladder cancer: in vitro and in vivo effects. *Mol Cancer Ther* 2006; 5:329-336.