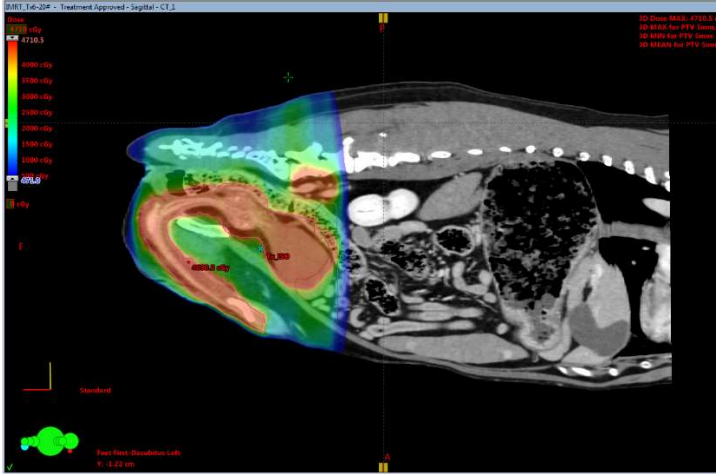


Urinary bladder cancer accounts for 2% of all malignancies in the dog. With more than 70 million dogs in the United States, even uncommon forms of cancer can affect thousands of dogs a year. The most common tumor type of the urinary system in dogs is transitional cell carcinoma (TCC). TCC is most often located in the trigone of the bladder, where the ureters coming from the kidneys and the urethra intersect. This makes surgical resection difficult to impossible in many cases. This also means even small tumors can cause significant clinical signs if the flow of urine is obstructed (straining to urinate, blood in the urine, urinary accidents, or vomiting, diarrhea, or lethargy due to kidney damage). Many other urogenital diseases can cause these clinical signs, including bladder stones, inflammation of the bladder wall, benign polyps and urinary tract infections. A complete diagnostic work-up, including blood work, imaging and biopsies, is recommended before pursuing treatment. Generally about 50-60% of dogs also have urethral involvement, and 30% of male dogs have involvement of the prostate. Spread of the cancer to other parts of the body (metastasis) is present in about 15% of patients at diagnosis, and as high as 50% of patients at the time of death.

Due to the lack of surgical options for many patients with bladder cancer, chemotherapy and/or radiation have become widely used treatment options. In the past, radiation was delivered in a non-specific fashion or following surgery. Survival rates tended to be less than 1 year, side effects were more common, and complications following surgery + radiation were sometimes life-limiting. With the evolution of radiation over the years, many radiation facilities have become extremely sophisticated in their methods of delivering radiation. Since November 2008 the Flint Animal Cancer Center has used a Varian Trilogy linear accelerator. That allows us to deliver conformal radiation therapy through state of the art technology. The gantry (head of the machine) is capable of delivering radiation from 360 degrees around our patients. As well there are 120 small, 0.5cm wide tungsten leaves, each with its own individual motor, that move back and forth across the radiation field to protect normal tissues. With this machine we are capable of limiting the severity of many of the side effects previously seen during radiation therapy.

Once your pet has been diagnosed with a bladder tumor +/- urethral or prostatic involvement, the first step needed for radiation planning is a CT scan of the abdomen-pelvis. This scan is uploaded into our planning software, and from there we can create a radiation plan. The standard protocol for treating bladder tumors is a small dose of radiation daily for a total of 15 treatments. These treatments are given Monday-Friday (unless there is a weekly holiday), and for each treatment your pet will be under a light plane of general anesthesia. The day of the CT scan and the first day of treatment usually require 1-3 hours of anesthesia, and for each subsequent treatment day, most patients are anesthetized for < 1 hour. The cost of the protocol including the CT scan, radiation treatment, and miscellaneous medications is \$9,000-10,000. Additional chemotherapy or adjunct treatment options would be additional.



Left top: Intensity-modulated radiation plan (IMRT) for bladder, prostate and urethra with dose in color wash (red=prescription dose, blue=low dose). Sagittal CT image of a dog.

Left bottom: The Varian Trilogy linear accelerator used at the Colorado State University Veterinary Medical Center.



About 60% of patients treated with IMRT will have a favorable reduction in clinical signs and improved quality of life. Median survival time for patients receiving IMRT for genitourinary carcinomas (of which TCC is one) has been reported between 375 to 654 days. The prognosis and radiation prescription for your pet may vary depending on other clinical factors, and should be discussed with your primary oncologist or radiation oncologist.

Thank you for considering bringing your pet to us for treatment. We understand and value the trust you have placed in us. Should you have any questions regarding radiation therapy for the treatment of urogenital tumors, please do not hesitate to ask to be put in contact with a member of our radiation oncology team. We would be happy to spend time making sure you have all the information required to make an informed decision with regards to the treatment of your pet.

Animal Cancer Center

Colorado State University

Website: <http://www.csuanimalcancercenter.org/>