



# Treating Companion Animals Using HDR Brachytherapy At A Dedicated Veterinary Center

C. WATKINS<sup>1</sup>, J. HAYES<sup>2</sup>, J. BRYANT<sup>3</sup>, T. WALSH<sup>3</sup> and T. SKIDMORE<sup>2</sup>

<sup>1</sup>VetMed Consultants, Salt Lake City, Utah

<sup>2</sup>Companion Curietherapy, Salt Lake City, Utah

<sup>3</sup>Mountain States Medical Physics, Salt Lake City, Utah



## CONTACT INFORMATION

John Hayes: jkhayes@gammawest.com  
www.vetmedutah.com

## INTRODUCTION

Cancer is a significant cause of morbidity in dogs and cats, who get many of the same cancers as their human biological cousins. Despite this, in 2017, in addition to the fact that there were roughly 0.4 M dogs and 0.5 M cats in Utah, there were no facilities for veterinary radiation therapy.

The smaller the patient or body part to be irradiated, the stronger the rationale for a form of radiation that does not require dose buildup, such as brachytherapy; however, veterinary radiation oncology training does not include HDR brachytherapy.

Encouraged by initial experience treating pets with brachytherapy at a human cancer center, in 2018 we built the first radiation center for pets in Utah, and, to our knowledge, the first veterinary brachytherapy center in the world.

## PURPOSE

Our aim here is to illustrate with case studies our success in treating pets with Iridium-192 HDR Brachytherapy.

## METHOD

This work is a collaboration between a veterinarian with special expertise in diagnostic ultrasound, endoscopy, and interventional radiology, and MDs with expertise in brachytherapy.

## RESULTS

We treated 76 companion animals with HDR brachytherapy from June, 2015, to December, 2018: 59 dogs and 17 cats.

The most common tumor site treated was nasal in both canines and felines. Nasal tumors were treated with endoscopic subtotal resection and multicatheter brachytherapy, 15 Gy in one fraction. 16 of 17 (94%) canine nasal carcinomas were locally controlled. 10 of 11 (90%) feline nasal tumors were locally controlled.

Overall, 51 of 59 canine cases maintained local control (86%), and 15 of the 17 feline cases maintained local control (88%).

## CONCLUSION

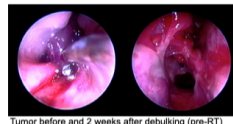
HDR brachytherapy shows promise as a versatile and effective treatment for many types of cancer in companion animals. Using CT and endoscopy, we have documented more than 2 year NED FU in nasal carcinomas, raising the possibility of cure.

We have witnessed successful limb- and function-sparing treatments, when the alternative would have been amputation, as in the control of extremity mast cell tumors, tonsillar squamous cell carcinoma, odontogenic tumor of the maxilla, mandibular ameloblastoma, and SCC.

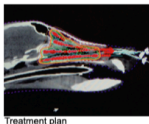
This is a fertile area for research and development, and a mutually beneficial DVM/MD collaboration. Brachytherapy, by virtue of its incomparable ability to spare normal tissues, deserves study for a role in veterinary oncology to the end of more successful and less toxic therapy for companion animals.

### NASAL CARCINOMA

- 11 yr, spayed female, Sheltie
- Endoscopic debulking prior to RT
- Multicatheter HDR BT: 7 needles, 15 Gy HDR BT



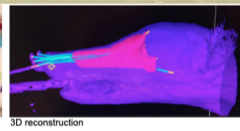
Tumor before and 2 weeks after debulking (pre-RT)



Treatment plan



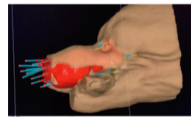
Catheter placement



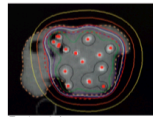
3D reconstruction

### NASAL PLASMACYTOMA

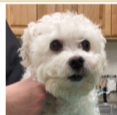
- 13 yr, castrated male, Maltese Poodle
- Rostral left maxillary mass
- Osteolytic plasmacytoma
- Rapid recurrence after excision
- HDR BT: 14 catheters, one Fx 16 Gy
- No recurrence after 1 year



3D reconstruction



Treatment plan



Tumor before treatment



Tumor during treatment implant



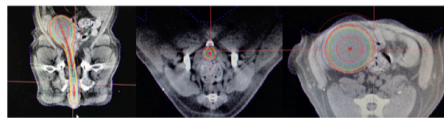
1 year FU



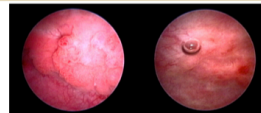
1 year FU

### BLADDER & URETHRA TCC

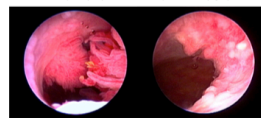
- 11 yr, spayed female, Westie
- 3-4 month history of pollakiuria and stranguria
- Cystoscopy: bladder mass filling trigone & panurethral TCC
- Tx: debulking endoscopic surgery, mitoxantrone
- 14Fr 30cc balloon Foley catheter
- 3 fractions of 8 Gy = 24 Gy



Treatment plan: urethra & bladder (left), urethra (middle), bladder (right)



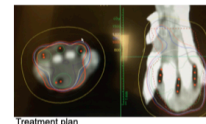
Bladder wall: pre- (left) and 1-month post-HDR (right)



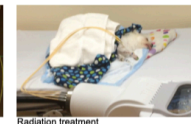
Bladder neck: pre- (left) and 1-month post-HDR (right)

### MAST CELL TUMOR

- 9 yr, spayed female, Chihuahua
- Grade 2 MCT between 3rd and 4th digits of left front paw
- Mass was excised but recurred involving whole paw
- Was scheduled for left forelimb amputation
- HDR brachytherapy, 2 fractions of 10 Gy each
- Mass resolved within 1 week
- No recurrence after 17 months



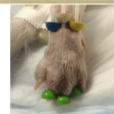
Treatment plan



Radiation treatment



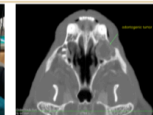
Mast cell tumor



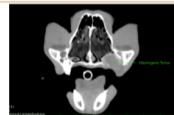
Brachytherapy catheters

### ODONTOGENIC TUMOR

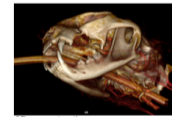
- 9 yr, castrated male, Domestic Long Hair
- Tumor identified after extractions
- Odontogenic tumor diagnosed
- Tx HDR brachytherapy, single fraction 18 Gy



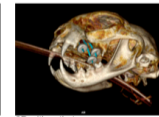
CT coronal view



CT transverse view



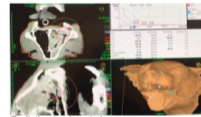
3D reconstruction



3D with catheters



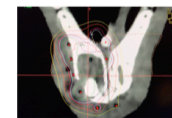
Catheter placement



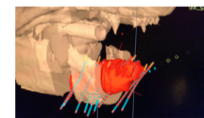
Radiation treatment plan

### ACANTHOMATOUS AMELOBLASTOMA

- 8 mo, male, Labrador retriever
- Unerupted right lower canine tooth with associated gingival mass eroding mandible
- CT: odontogenic expansile osteolytic tumor
- Tx: 11 catheter brachytherapy implant, 19 Gy single Fx
- NED 17 months



Treatment plan



3D reconstruction with catheters



Tumor after debulking, pre-RT



Catheter placement



1 year after treatment