

into the frontal sinus. Treatment with artificial tears and cyclosporine (to encourage new tear production) is often indicated and monitoring for and treating corneal ulcers is essential.

DELAYED SIDE EFFECTS occur many months to years after therapy. These effects are on slowly dividing tissues such as nerve, bone, and vessels. These tissues cannot easily repair, and may be life-limiting if they occur in a vital organ; therefore every effort is made to avoid vital structures such as the spinal cord, brain, heart, and kidneys. If these areas need to be in the field for tumor control, the dose given each day is decreased because it is that dose that determines late side effects. Where acute side effects happen every time, the occurrence of late, life threatening side effects is usually less than 5%.

Radiation is an important tool in control of many local invasive tumors. Treatment requires a large time, emotional and financial commitment. As an owner, you need to have every tool necessary to make the best decision for you and your pet. It must be remembered that the rewards can be great, and the end often does justify the means.



During your visit to Garden State Veterinary Specialists, we will discuss your particular pet, and the special and individual needs and wishes of your family in battling this devastating disease.

Our Oncology Service consists of two board certified specialists: Kathy J. Kazmierski, VMD, MS, Diplomate ACVIM (Oncology) and Michele Cohen, DVM, MS, Diplomate ACVIM (Oncology), Diplomate ACVR (Radiation Oncology). The service is staffed by specially trained technicians and a certified Radiation Therapist/Dosimetrist. A multi-disciplinary approach is used in every patient's care providing advanced veterinary diagnostics and treatment.



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Directions



GSVS is centrally located in Tinton Falls, New Jersey, approximately 1/2 mile east of the Garden State Parkway.

From Northern New Jersey:

Take the Garden State Parkway south (or the New Jersey Turnpike south to Exit 11 to the Garden State Parkway south). Continue on the GSP (either the local or express lanes) to Exit 102. After exiting the parkway bear right off the exit ramp onto Asbury Avenue. Approximately 1/2 mile from the exit ramp make a left onto Pine Street. The Hospital will be directly in front of you.

From Southern New Jersey:

Take the Garden State Parkway north to Exit 100A. Upon exiting the Parkway you will be on Route 66. Take Route 66 to the first light, make a left at the light (Jumping Brook Road). After the left turn, bear left onto Essex Road. Take Essex Road to the end, then make a left onto Asbury Avenue. Make the next right, which will be Pine Street. The Hospital will be directly in front of you.

From New York City:

Take the Holland or Lincoln Tunnel to the New Jersey Turnpike, south. Follow the Turnpike to Exit 11, Garden State Parkway south. Continue on the GSP (either the local or express lanes) to Exit 102. After exiting the parkway bear right off the exit ramp onto Asbury Avenue. Approximately 1/2 mile from the exit ramp make a left onto Pine Street. The Hospital will be directly in front of you.

From Brooklyn, Long Island, Staten Island:

Take the Verrazano Bridge to the Staten Island Expressway. Follow the SI Expressway to the Outerbridge Crossing. After the Outerbridge Crossing take the Garden State Parkway south (either the local or express lanes) to Exit 102. After exiting the parkway bear right off the exit ramp onto Asbury Avenue. Approximately 1/2 mile from the exit ramp make a left onto Pine Street. The Hospital will be directly in front of you.



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RADIATION THERAPY



"He who does not hope to win has already lost".

Jose Joaquin Olmedo



RADIATION THERAPY

is becoming a prominent and demanded modality as a tool for treating canine and feline patients with cancer. It plays an essential role in both primary treatment and as an adjuvant to surgery for local control of tumors. Many, but not all tumors can be controlled with radiation therapy, either alone, or in combination with surgery and chemotherapy. Our ability to treat cancer patients is optimized with the availability of modern equipment and trained therapists and doctors. With our advanced technologies, we are able to create a customized 3-D treatment plan based on CT scan images in order to optimize tumor control while limiting side effects. Side effects are limited to the area that is treated and are typically mild and usually heal quickly without long-term consequences. Radiation patients are very specially cared for; we understand that they have a long road in battling cancer, and we are with them every step of the way.

What follows is a practical guide to radiation therapy: its indications, the nitty-gritty on how it's delivered, and expected side effects.

INDICATIONS ~

- Best for local control when surgery is not an option or surgery has failed (i.e. incomplete surgical margins)

As primary therapy:

- Brain & Spinal Tumors
- Nasal tumors
- Oral melanoma
- Single site lymphoma in cats

As adjuvant therapy:

- Soft tissue sarcomas
- Mast cell tumors
- Feline vaccine associated tumors
- Some oral tumors
- Anal sac (apocrine) adenocarcinoma

As palliation:

- Osteosarcoma
- Non-resectable mast cell disease
- Cutaneous hemangiosarcoma



Mucositis on tongue.

tumor will be imaged by CT scan. The field, dose and schedule will then be planned to optimize tumor coverage, while limiting normal tissue exposure. This is done via a state of the art computerized imaging and planning system and a trained radiation therapist. On the planning day, the field of treatment will be shaved and ink marks will be placed as reference for consistent beam alignment from day to day (treatment to treatment).

Patients can be treated as an outpatient if the owner's wish, or they can remain in hospital during the week for convenience, and go home for the weekend.

SIDE EFFECTS ~

Radiation side effects are divided into **acute** side effects and **delayed** side effects.

Acute side effects happen during, or immediately after therapy. These side effects are predictable, and happen to normal tissues that are in the field of treatment. Acute side effects will heal over time, but nursing care and pain management is required during the initial phases. Side effects vary with the site treated, as well as the total dose; some tumors are treated more intensely than others, which will alter the severity and duration of side effects.

MOIST DESQUAMATION describes the side effect seen to the skin, similar to a severe, blistering sunburn. The skin will get red, moist, itchy and painful. The most important steps to managing this side effect are:

1. **Hygiene** - keeping the site clean and dry with warm water misting or rinsing. No cleansing products or moisturizing products should be applied. We also don't like to wrap the site, as this may retain dirt and moisture.
2. **No licking!** - E-collars are absolute necessities during this time. Constant moisture will slow healing. Also, that skin is very fragile and if it is torn or ulcerated, infection may get in and further delay healing. Sometimes, dogs may need to be sedated (benadryl often works) for a couple of days at the peak of itchiness.
3. **Pain management.** The first line of defense is usually anti-inflammatories, but other medications such as codeine or fentanyl patches (narcotic pain management) are added as needed.

LOGISTICS ~

A gray is a unit of radiation dose. Most curative intent radiation doses to treat cancer are between 45 and 57 gray. (500 times what a diagnostic x-ray machine puts out). This amount of radiation cannot be tolerated at one time; therefore it is broken into many small doses, or fractionated. The dose of a fraction is usually 2.5 - 3.2 gray. Here at GSVS, we treat 5 days a week Monday through Friday. Therefore, a course of treatment usually will take 3-4 weeks. The first day is a simulation and planning day, where often the dog's



Nasal tumor - 4 days after end of treatment.



Same nasal tumor dog - 2 weeks after treatment completion.

As the healing process moves forward, skin will slough off, then the site will form crusts, which should be allowed to fall off on their own (or this can be encouraged with warm water rinsing which will loosen the crusts), and fresh new skin will be underneath. The whole start to finish process is about

2-3 weeks, with 3-7 days in the middle being the toughest. When the skin heals completely, the only noticeable persistent effect may be a change to the coat color in that area.

Note: Cats get dry desquamation rather than moist desquamation, which consists of dry, flaky skin and mild-moderate itchiness.

MUCOSITIS describes the changes to the oral mucosa that may be in the field when treating oral or nasal tumors. The oral mucosa will get very red and painful, and ulcers may occur on the gums, lips or tongue. The signs that mucositis is beginning is halitosis (bad breath) and ropery saliva. Most dogs and cats will continue to eat and drink through this side effect. Sometimes dogs will need subcutaneous fluids to ensure adequate hydration. Occasionally, a small dog or cat may need a feeding tube if a large portion of their mouth is in the field. Fortunately, the mouth heals very quickly, and once again, there are no long term effects once healing is complete.

KCS (keratoconjunctivitis sicca) or dry eye can happen when dogs undergo radiation therapy for a nasal tumor, since many nasal tumors extend back



On-site Linear Accelerator for Radiation Therapy