



RADIATION THERAPY

Overview

Radiation therapy has been in use as a treatment for cancer for more than 100 years. Its earliest roots have been traced from the discovery of the x-ray near the turn of the twentieth century. Clinical trials in animals have established the efficacy of radiation therapy for both adjuvant and palliative treatment. Before treatment is begun, a CT Scan or MRI is often performed to identify the tumor and surrounding normal structures. The advent of these imaging technologies has allowed radiation oncologists to better see and target tumors, resulting in better treatment outcomes, more organ preservation and fewer radiation induced side effects.

Purpose

In general, radiation therapy is used for either local tumor control in a specific location or palliative treatment for pain management and to retard tumor progression. Ionizing radiation injures cells by the discrete deposition of energy on or near DNA, a process that eventually leads to cellular death. Proliferating cell populations are by definition radiation sensitive. The typical radiation protocol is to deliver a total dose (measured in the units called Gray or Gy) over a specific period of time. Each time a radiation dose is delivered to a patient it is referred to as a "fraction." More frequent and smaller doses of radiation generally lead to a better probability of tumor control and a lower risk of normal tissue damage. Normal tissues have better ability to repair radiation damage.

Tumors Commonly Treated with Radiation Therapy

Different cancers respond differently to radiation therapy. It is important to establish the radiosensitivity of a particular tumor. Delivery parameters of a prescribed dose of radiation are determined during treatment planning (part of dosimetry). The planner will try to design a plan that delivers a uniform prescription dose to the tumor while minimizing the dose to surrounding tissues. The patient will receive skin marks to guide the placement of treatment fields.

Oral tumor

- > Acanthomatous Epulides – 85 to 95% success.
- > Oral Squamous Cell Carcinoma – 65% control at 1 year in dogs; relatively poor prognosis in cats.
- > Fibrosarcomas – Best results are achieved if the mass is completely excised surgically prior to radiation. Complete excision is best achieved by planning with CT Scan.

Nasal and Sinus Tumor

- > Feline Nasal Squamous Cell Carcinoma (Solar induced) - Generally have a favorable prognosis.
- > Intra-nasal Carcinomas and Sarcomas are radiation responsive and have a one to two year control in most cases.

Brain Tumor

- > Meningiomas and Pituitary Macroadenomas are usually controlled for one to two years
- > Metastatic Neoplasia in the brain is treated with palliative radiation protocols

Mast Cell Tumor

Grade I and Grade II tumors are very sensitive to radiation and have an 80% cure rate following surgical removal and radiation.

Soft tissue sarcomas such as peripheral nerve sheath tumors, hemangiopericytoma and fibrosarcomas have a good prognosis with surgery and radiation therapy combined.

Osteosarcoma

Dogs that are not able to have limb amputation are generally good candidates for palliative radiation therapy. This is a once a week protocol for four weeks, with the goal being pain relief.

Melanoma

Oral melanomas that cannot be resected with margins can gain local control for a limited time with radiation therapy. The protocol is twice a week for 3 consecutive weeks.