PetCure ONCOLOGY

CASE STUDY

Spine • Suspected Osteosarcoma

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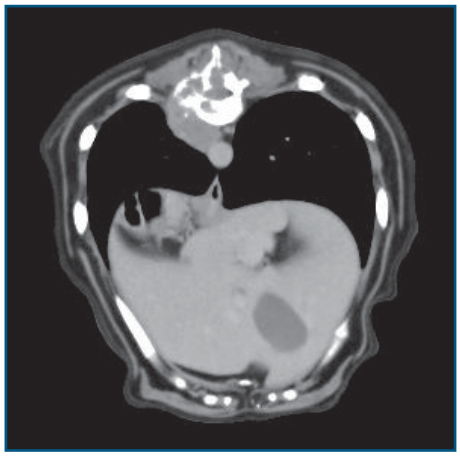

IMAGE A: Pre-Treatment CT November, 2013

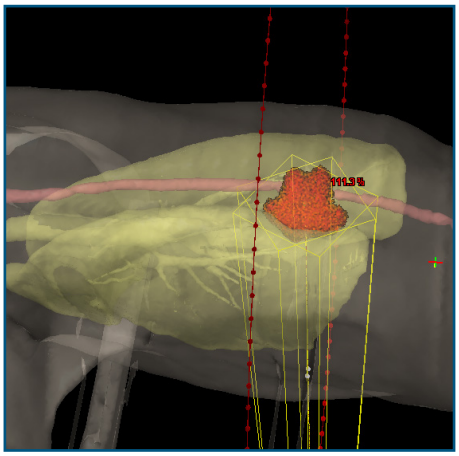

IMAGE B: 3D reconstruction of critical normal tissues with 95% dose cloud over target volume.

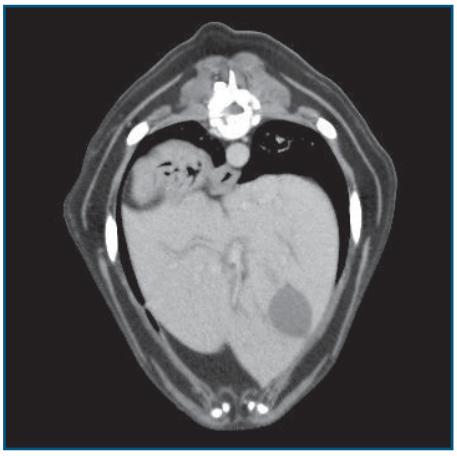

IMAGE C: Post-Treatment CT April, 2014

PATIENT: 11-year-old, male, Standard Poodle

TUMOR HISTOLOGY: Osteosarcoma (suspected)

ANATOMIC LOCALIZATION: Spine

BACKGROUND: Patient presented for evaluation and possible euthanasia due to acute paralysis and significant pain. He could not use back legs and was experiencing rapid neurologic deterioration. Two veterinarians, including a neurologist, had advised that nothing could be done and recommended euthanasia. A CT scan (IMAGE A) revealed a soft tissue mass that was destroying the vertebral bodies of T11-12. Mass extended into the thoracic cavity. Spinal cord was being compressed and displaced by the mass.

TREATMENT: The family elected stereotactic radiosurgery (SRS) rather than euthanasia. Patient was prescribed 27 Gy in 3 fractions of 9 Gy per fraction over three days. [NOTE: Reconstruction of case with VMAT/RapidArc® plan showed a conformity index of 1.05, indicating strong adherence of the prescribed dose to the target volume. Gradient index was 1.15cm, reflecting efficient dose fall-off outside of the target volume. This measure is critical for patients with spinal tumors since a rapid dose fall-off is essential to ensure the target volume is adequately treated while sparing the normal spinal cord. A dose-volume histogram revealed excellent dose to the target volume with minimal dose to lung and spinal cord, as reflected in IMAGE B.]

OUTCOME: Patient tolerated treatment well and experienced rapid improvement in pain score immediately following treatment. Follow-up CT (IMAGE C) five months post-treatment revealed significant reduction in tumor volume, reduction of the tumor within the thoracic cavity, and no obvious radiation injury to the lung itself. The vertebral body had undergone significant remodeling and the spinal cord was in a more natural position. The family reported a very good quality of life and return to normal neurologic function.

RELEVANCE: While radiation used to be considered inappropriate for spinal tumors, this case study illustrates how stereotactic radiosurgery can effectively treat tumors in high-risk locations, especially when delivered with VMAT/RapidArc® technology. The patient had to be carried in for his consult, yet following SRS treatment was able to walk out of the hospital independently. The patient survived an additional 15 months before being euthanized due to idiopathic pericardial effusion that was not found to be related to either the tumor or radiation treatment. The patient achieved both long-term survival and improved quality of life. While the tumor came off of a thoracic vertebrae and had an intra-thoracic component, good local tumor control was achieved with no damage to the normal tissues of the lung.

The patient documented in this case study was treated by Dr. Neal Mauldin, PetCure Oncology's Chief Medical Officer, at Western Veterinary Specialist & Emergency Centre in Calgary, Alberta.