EducationSeries
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CO_2 Laser Beneficial in Oncologic Surgery

By Barbara R. Gores, DVM, Diplomate ACVS
For The Education Series

Cancer is one of the most common causes for mortality in companion animals, affecting one in two pets over the age of 10. Surgery is still the most effective modality for the treatment of cancer because it can often provide an immediate cure or palliation of pain, with minimal and temporary side effects.

Laser techniques in oncologic surgery have become effective alternatives to radical tumor resection and to palliative tumor treatment methods.[1] CO_2 and Nd:YAG laser excision has been shown to provide almost a 50 percent improvement in the control of local disease in vivo compared with scalpel resection in rodent mammary gland tumors and human oral mucosal lesions.[2-5]

Lasers provide light with the necessary wavelength at the intensity sufficient for photodynamic therapy (PDT) for treating cancerous and non-cancerous lesions.[6,7]

The carbon dioxide (CO_2) surgical laser operates at a wavelength that is highly absorbed by water, therefore making it the most versatile and commonly used surgical laser available in veterinary medicine today. Despite the incredible development and advances that lasers have undergone in human surgical and therapeutic applications, lasers in veterinary practice have long been regarded as "surgical toys," given their expense and cumbersome size that previously made them impractical for use in private practice.

In the past two decades, technologic breakthroughs have resulted in compact, portable and reliable lasers that are economically feasible for both the general and specialty veterinary hospital. Laser use in clinical veterinary practice has become a beneficial tool for improved patient care and wider therapeutic options.

The human literature has demonstrated these beneficial effects in lab animal studies and human clinical trials. These studies support the use of laser energy for the enhancement of quality of life and control of disease in the veterinary patient, and provide a foundation for the commonly accepted laser surgical techniques and procedures that are continuously being implemented and refined in thousands of private veterinary practices around the world. Our pets can finally benefit from the very technology for which many research animals were utilized to perfect these laser surgical procedures in people.

Development of the light and flexible CO_2 laser hollow wave guide fiber technology in the early to mid-1990s, along with re-usable metal focused hand pieces that allow the surgeon to vary between large tissue ablation and precisely focused excision, has made this laser a highly beneficial tool in the veterinary practice.

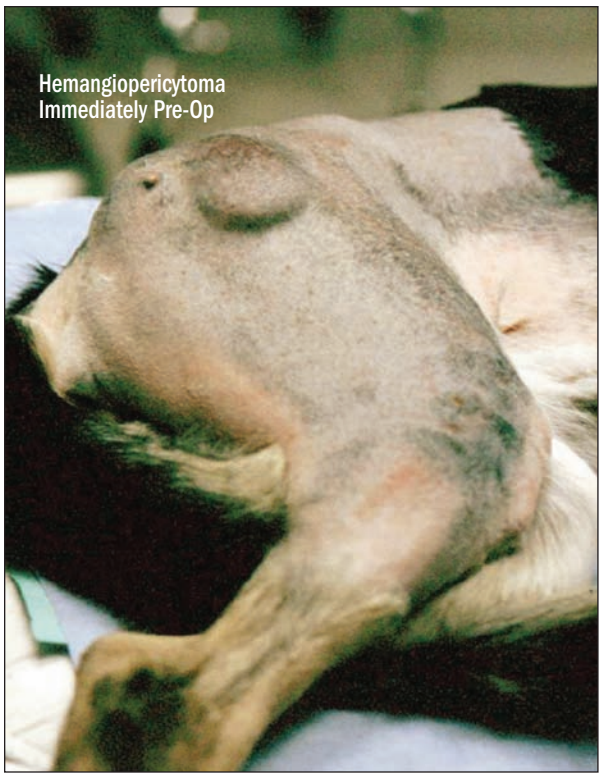
Laser techniques in oncologic surgery have become effective alternatives to radical tumor resection and to palliative tumor treatment methods.[1] Treatment will vary with the tumor type, extent of disease, prognosis and the owner's wishes. Thus, the surgical objective may vary from curative to palliative therapy.

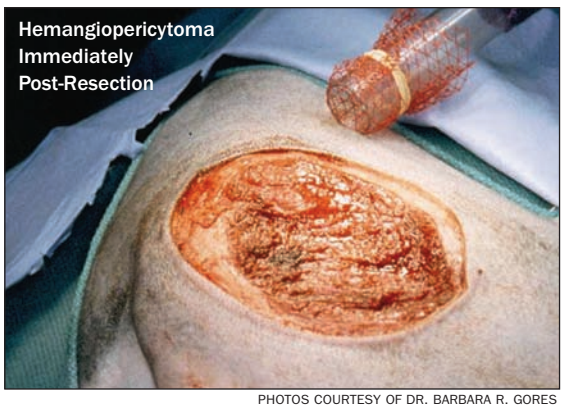
I have used a CO_2 laser in my surgical practice for the past 16 years. The accompanying photos are a few case examples of the benefits of the CO_2 laser in in veterinary oncologic surgery.

Soft Tissue Sarcomas

These can vary from low (hemangiopericytomas) to high grade and typically are slow to metastasize but have a high local recurrence rate due to the diffi-

Hemangiopericytoma





PHOTOS COURTESY OF DR. BARBARA R. GORES

Grade 2 Soft Tissue Sarcoma

Grade 2 Soft Tissue Sarcoma Right Hip Immediately Pre-Op

Grade 2 Soft Tissue Sarcoma Right Hip Intra-Op

Grade 2 Soft Tissue Sarcoma Right Hip 1.5 year Post-Op with No Recurrence

culty in achieving wide surgical excision margins.

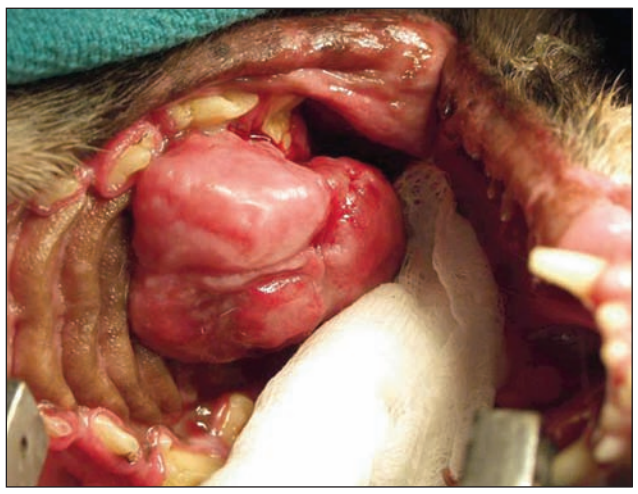
The CO_2 laser allows the surgeon to aggressively excise the underlying fascial plane while controlling hemostasis and providing good visualization. The laser light is absorbed by the tissues and converted to heat energy, sealing the small blood vessels and lymphatics by which microscopic tumor cells spread. Heat and decreased tissue manipulation decrease the chances of tumor seeding and recurrence.[4,5] ●

Oral Neoplasia

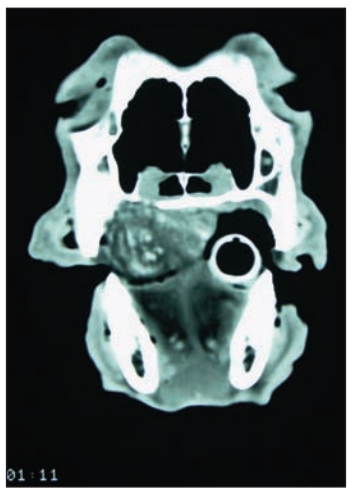
The oral cavity is the fourth most common location for neoplasia in small animals. Many times, tumors are very large by the time they are discovered and diagnosed. Often, curative excision is not possible. The CO_2 laser is an exceptional tool for palliative cytoreduction of these large oral tumors allowing tumor ablation, superior hemostasis and immediate comfort and return of function for the pet.

Barbara R. Gores, DVM, Dipl. ACVS, is a small-animal board certified surgeon in Tucson, Ariz., where she is the founding co-owner of the Veterinary Specialty Center of Tucson. She was the first laser-licensed veterinarian in the state. Before that she taught at the University of Minnesota College of Veterinary Medicine, Tufts University School of Veterinary Medicine and Angell Memorial Animal Medical Center, where she completed her small animal internship and surgical residency. Dr. Gores currently uses both the CO_2 and diode wavelengths in her practice.

Osteosarcoma of the Hard Palate/Maxilla CO_2 Laser Palliative Ablation



Immediately Pre-Op



CT Scan Pre-Op

1 Week Post-Op

Squamous Cell Carcinoma CO_2 Laser Curative Excision (Commissuroplasty)

Immediately Pre-Op

Intra-Op

Intra-Op Oral Mucosal Closure

Immediately Pre-Op

Malignant Melanoma CO_2 Laser Palliative Ablation

Immediately Pre-Op

1 Week Post-Op

FOOTNOTES...

1. Paiva, MB et al. Nd:YAG Laser therapy for palliation of recurrent squamous cell carcinomas in the oral cavity. Lasers Surg Med 2002;31:64-69.
2. White JM, et al. Nd:YAG and CO2 laser therapy of oral mucosal lesions. J Clin Laser Med Surg 1998;16:299-304.
3. Maker VK, Elseth KM, Radosevich JA. Reduced in-vivo local recurrence with contact neodymium:yttrium-aluminum garnet (Nd:YAG) laser scalpels. Lasers Surg Med 1995;111:290-298.
4. Lanzafame RJ, et al. Mechanisms of reduction of tumor recurrence with carbon dioxide laser in experimental mammary tumors. Surg Gynecol Obstet 1988 Dec;167(6):493-6.
5. Lanzafame RJ, et al. Comparison of local tumor recurrence following excision with the CO2 laser, Nd:YAG laser, and Argon Beam Coagulator. Lasers Surg Med 1988;8(5):515-20
6. McCaw, D. Photodynamic Therapy Can Successfully Treat Tumors. Vet Pract News 2001; 23.
7. Lucroy, MD. Photodynamic therapy for companion animals with cancer. Vet Clin Small Anim 32 (2002) 693-702

This Education Series story was underwritten by Aesculight LLC of Woodinville, Wash., manufacturer of the only American-made CO_2 laser.