Surgical CO2 laser in the small animal mobile practice

By Janine S. Dismukes, DVM
For The Education Center

In 2004, I attended the Ralph Lee Veterinary Conference in Myrtle Beach, S.C., and heard Dr. John Goddard speak about surgical lasers. I immediately recognized that less bleeding, less swelling and less pain were higher standards to which I would hold my practice. That same conference, I registered for the hands-on surgical laser lab, and I was hooked!

At that time, I was in an associate in a small animal practice. I returned from the conference insisting that the practice needed a surgical laser for our patients and to exemplify our state-of-the-art image. The practice purchased a laser, and during the next few years, I attended all the surgical laser CE courses I could. Interestingly enough, Aesculight is the only surgical laser company that provides and promotes surgical laser continuing education for veterinarians.

In 2008, I started a small animal mobile practice (Figures 1A-1B). All surgeries are done with the flexible waveguide Aesculight CO2 surgical laser (Figure 1C). My laser has the ability to work in the SuperPulse mode, which allows for sufficient tissue relaxation (cooling) between high-peak laser pulses to minimize the zone of thermal necrosis (Wilder-Smith and cri- niter’s report) sub 0.5 mm zone of thermal necrosis achieved with a 0.25 mm laser spot-size tip used with the flexible waveguide CO2 laser. The SuperPulse mode ensures clean-ablation incision, excision and incision. And it is easy to control the depth of coagulation/hemostasis on the margins of the cut. I use the laser almost every day that I am seeing patients. I perform all the usual surgeries of a small animal practice, such as spays, neuters, lump removers, trauma, neoplasia, melanoma, gland removal and more. The laser’s precision, and its control of bleeding, swelling and pain have removed my reluctance to dis-sections, aspersions and suture hematomas.

Advantages

I would emphasize the usefulness of the CO2 laser for oncologic surgeries. The laser operates photo-thermally, in other words, it cuts, ablates and coagulates soft tissue as a non-contact mode (with a beam of light). This mode of laser-tissue interaction can minimize the intraoperative free radicalization of the wounded tissue cells.1

Another advantageous peculiarity of the CO2 laser surgery is that it causes no muscle contraction (compared to electrocautery).2 F.A. Mann points out in the April issue of VPN the importance of the hemostatic ability of the CO2 laser (i.e., due to the bloodless surgical field).6

The ability of the laser to achieve pain-free hemostasis is unmatched in any type of soft tissue surgery, especially in highly vascular parts of the animal, such as around the ears, the eyes and the genital area.

Since having the laser, I have successfully performed incisional biopsies, which I would not have attempted with a scalpel—mass removal on a histopathologic cut, many soft-palate resections and tonsillotomies for brachycephalic breeds, chronicity to remove BCC on white data, excision of folial stenomata and removal of anal glands.

I get referrals from other veterinarians in my area to perform their procedures on their patients and even on my colleagues personal pets.

Clinical Cases

The following five clinical cases are examples of using the Aesculight CO2 laser in my mobile veterinary clinic:

CASE 1

A 9-year-old male neutered domestic short-haired cat presented for excision of a squamous cell carcinoma of the right pinna and nasal planum.

1A: Pre-operative view of the SCC of the nasal planum.
1B: SCC of the right area prepared for laser surgery.
1C: Laser incision of the pinna prior to suturing. Laser was set at 20 w with continuous-wave SuperPulse and with a 0.4 mm spot size.
1D: Laser incision made to the level of the cartilage with a 0.4 mm spot size. Note the bloodless surgical field.
1E: The entire nasal planum was excised with the laser taking generous margins.
2A: The pinna was externally and visually examined. The patient was seen for a check-up one month after the surgery. The ear healed beautifully without scarring.
2B: The poly was exteriorized and visualized through the help of the two channels put through the rectal exuna.
2C: Laser excision completed. Note the clean surgical wound margins and complete absence of bleeding.
2D: The surgical wound was sutured with subcutaneous and subdermal sutures. The patient was seen for a check-up three months after the surgery. The ear healed beautifully without scarring.
3A: Aphrodite, an 11-year-old female spayed domestic short-haired cat, presented for a low-grade nerve sheath tumor. The condition was complicated by the patient’s history of a left lower extremity amputation.
3B: The tumor was outlined with the laser with a 0.4 mm spot size. The laser was at 8-10 watts continuous-wave mode. The 0.8 mm spot size was used at 0.4 mm spot size. Note the bloodless surgical field.
3C: The polyp was externalized and visualized through the help of the two channels put through the rectal exuna.
3D: The polyp was exteriorized and visualized through the help of the two channels put through the rectal exuna.
3E: The tumor was excised with the laser with a 4-5 mm spot size. The laser was set at 12 watts in continuous-wave mode. The tips of the adjustable handpiece was set at 0.4 mm spot size. Note the bloodless surgical field.
3F: The polyp was exteriorized and visualized through the help of the two channels put through the rectal exuna.
4A: Cherokee, a 3-year-old male Irish setter, presented for intermediate congenital entropion of the left eye. It was decided to surgically correct the entropion with the Aesculight CO2 laser.
4B: Irrito- operative site. A narrow shallow amount of skin was excised from the lower lid with a 0.25 mm spot size with the Aesculight laser set at 13 watts SuperPulse C3 Flex Head. Note complete lack of bleeding or distortional swelling.
4C: Immediately post-excision view. The wound was sutured. Note minimal swelling. During the same visit, the kiss was performed along with the conjunctival correction. Both procedures took 45 minutes to complete.}

REFERENCES

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Another advantageous property of the CO2 laser surgery is that it causes no muscle contraction (compared to electrocautery).5 F.A. Mann points out in the April issue of VPN the importance of the hemostatic and coagulation advantages of the CO2 laser, i.e., due to the bloodless surgery area. Excesses can be more easily removed in comparison to conventional scalpels.6

The ability of the laser to achieve pain-free hemostasis is unmatched in any type of soft tissue surgery, especially in highly vascular parts of the animal, such as around the eyes, the ears and the genital area. Since having the laser, I have successfully performed biopsies for hemophiliacs, which proved a severe risk of intra-operative bleeding. I was able to perform a biopsy—a scarless—mass removal on a hemophiliac cat, many soft-palate resections and tonsillectomies for brachycephalic breeds, chinitomy to remove BCC on white cata, excision of follicle-ostomatous and removal of lip granuloma. I get referrals from other veterinarians in my area to perform laser procedures on their patients and even on my colleagues personal pets.

Clinical Cases

The following five clinical cases are examples of using the Aesculight CO2 laser in my mobile veterinary clinic:

CASE 1

A 7-year-old male neutered domestic short-haired cat presented for excision of a squamous cell carcinoma of the right pinna and nasal planum. The tumor was outlined with the laser with a 0.25 mm spot size with the Aesculight laser handpiece is shown.

FIGURE 1A: Dr. Dismukes’ mobile practice van.

FIGURE 1B: Dr. Janine S. Dismukes’ mobile practice van.

FIGURE 1C: Aesculight surgical handpiece.

FIGURE 1D: Aesculight CO2 surgical laser.

CASE 2

A 7-year-old female spayed Boston terrier presented for excision of a rectal polyp. The area presented a challenge due to its high vascularity and the risk of intra- and post-operative bleeding.

CASE 3

A 11-year-old female spayed domestic short-haired cat, presented for a low-grade nerve sheath tumor. The condition was complicated by the patient’s history of previous surgery. The tumor was cut out with the laser with a 3-mm spot size, the base was set at 8-10 watts continuous-wave mode. The 0.8 mm spot size was used. Multipolar 5.6 mm helixes were used with the laser for adequate hemostasis of the hematoma. The helix was cut on the surface of the plane. Cratered bleed was removed through the helix. Stay sutures were placed through the skin to suture the distal skin and ensure the adherence of abdominal cartilage to skin.

FIGURE 2A: Pre-operative view of the SCC of the nasal planum.

FIGURE 2B: Laser excision of the tissue prior to suturing. Laser was set at 20 watts with a 0.8 mm spot size with a 0.4 mm focal spot size.

FIGURE 2C: Immediate post-operative view. The cat was eating normally with 3 days of healing from laser surgery.

FIGURE 2D: 16 days post-operatively with sutures removed. No post-operative complications were reported and healing progressed very well.

REFERENCES


Janine Suzanne Dismukes, DVM, graduated from North Carolina State University’s College of Veterinary Medicine in 1998. Upon her graduation, she was recognized with a Clinical Proficiency Award and an Excellence in Aesthetics Award. Dismukes began her career as an associate at a small animal veterinary hospital in North Raleigh, N.C. A few years later, she joined an excellent small animal practice in Cary, N.C. Prior to joining Cary, she was a member of the Veterinary Surgical Laser Society and attended numerous lectures and hands-on laboratories using CO2 and diode lasers beginning in 2004. In 2006, she was certified by the Veterinary Surgical Laser Society with the American Veterinary Medical Association. She has taught laser laboratories at state and national veterinary conferences, including NAVCO in Orlando, WVC in Las Vegas and the AVMA Convention in Boston.

This Education Center article was underwritten by Aesculight of Woodside Wash., the manufacturer of the only American-made CO2 laser.