CO2 laser excision of a CHP

By María Suárez, DVM, PhD, CVA and Anya Glazkova, Ph.D.
For The Education Center

C amine hemangiopericytoma (CHP) is a malignant tumor that can be found in subcutaneous and subcutaneous tissues. Histologically, CHP is characterized by perivascular formation of spindle-shaped cells arranged in distinctive wheel patterns.1,2

These tumors are most common in extremities, although other locations have been reported. CHP usually affects middle-aged and older dogs, and large breeds are more prone to develop it.3,4 Treatment is usually surgery.1,5

Typically, the treatment for CHP is an excision with wide and deep safety margins. Occasionally, more radical surgery, such as limb amputation, is required. However, because the necessary margin extent is often underestimated, tumors tend to recur with a 26 percent to 60 percent rate and re-growth is typically more aggressive.1

Factors that affect the possibility of complete excision include the surgeon’s skill, histological grade, and the infiltrative nature, size and location. The surgical margin (skeletal, electrocauterization) or laser can also influence the outcome of the tumor removal. For the CHP case described in this article, we used an Asclepion Surgilase CO2 laser, CO2 laser surgery has become a well-established treatment modality in veterinary medicine.6 The laser’s wavelength of 10.6000 nm is very well absorbed by water, its main chromophore. This unique wavelength allows for efficient cutting, ablation, and coagulation of soft tissues, which is rich in water. Moreover, the laser is an excellent magnification-achieves hemostasis by coagulating small (≥50 µm) blood and lymphatic vessels. This translates into better visualization and higher precision of tissue cutting and removal.7–9 In addition, sealed lymphatic vessels mean less swelling post-operatively.

Clinical literature suggests that adding blood and lymphatic vessels with laser energy can help to prevent the spreading of tumor cells.8,10 “Rich and Masood”11 indicate that the non-contact operating mode of the CO2 laser, which allows the laser beam to “see” the affected region, minimizes damage to the normal tissues around the tumor bed and reduces the risk of recurrence. The laser-transcutaneous and the degree of thermal necrosis are well controlled through use of proper laser settings, such as power density, continuous wave or pulsed mode, pulse durations and exposure time. The zone of thermal damage may be as small as 50 µm thick. Also, the non-contact cutting/ablation ensures no mechanical trauma to the tissues.

Case

Chiko, a 9-year-old intact male Ibizan dog, was presented with a 1.1 cm tumor on the left forelimb of the same site. 18 months earlier with a smaller tumor. Since the tumor was infiltrating and aggressive, and there was a possibility of tissue ablation in palliative procedures, we recommended CO2 laser surgery.

Figure 1. Marking the incision with the CO2 laser. Safety margins included 1.2 cm.

Technique

To ensure complete removal of all malignant cells, the laser beam is guided by the surgeon’s judgment and the safety margins of apparently healthy tissues—1 cm laterally and distally from the incision (Figures 3, 4, 6 and 7). The laser handpiece was held perpendicular to the target tissue (shown in Figures 1, 3, 6 and 7). A flexible hollow waveguide and tipless adjustable handpiece (shown in Figures 1, 3, 6 and 7) was used. These laser devices were used because they are designed for veterinary use. The laser handpiece was designed for veterinary use. It includes a flexible hollow waveguide and tipless adjustable handpiece (shown in Figures 1, 3, 6 and 7).

Figure 2. The initial laser incision could be handled with ease. The tumor was clamping a large blood vessel. (Figures 1, 3, 6 and 7)

Figure 3. Beginning of incision.

Figure 4. Deep incision shows more extensive infiltration than initially expected.

Figure 5. Laser dissection allows to excellent exposure of anatomic structures.

Figure 6. Hemostasis was held parallel to the tissue surface to minimize beam exposure and thermal damage at a given power.

Laser Equipment

For the CHP case described in this article, we used an Asclepion Surgilase CO2 laser with a flexible hollow waveguide and tipless adjustable handpiece (shown in Figures 1, 3, 6 and 7). We did not use electrosurgery or scalpel, as the laser is an excellent coagulator.12

CO2 laser both for its surgical advantages and for the possibility of tissue ablation in palliative procedures. It should be noted that the histopathological analysis of the laser-excised tumor specimen ruled out our initial diagnosis of fibrosarcoma. The owners did not want to leave the limb amputated. It was decided to use the CO2 laser both for its surgical advantages and for the possibility of tissue ablation in palliative procedures. The surgical modality (scalpel, electrosurgery or laser) depends on the tumor bed, reduces the intraoperative wound contamination and distal compression.

For the CHP case described in this article, we used an Asclepion Surgilase CO2 laser. This laser is an excellent coagulator and the non-contact cutting/ablation ensures no mechanical trauma to the tissues. Histologically, CHP is characterized by peri-vascular formation of spindle-shaped cells arranged in distinctive wheel patterns.1,2

The prepared tissue was handled with ease. The laser-gated blood vessel was evident. The tissue surface was minimally damaged. We did not use electrosurgery or scalpel, as the laser is an excellent coagulator.12

Figure 7. Histomorphological properties of the CO2 laser eased gland visualization of the surgical site.

Figure 8. Dissection around tendon.

Figure 9. Dissection and ablation completed.

Figure 10. End of procedure, like margins are apposed and sutured only proximally, far from the joint and without bone and distal compression.

Conclusions

Our laser enabled us to excise the tumor with maximum accuracy. Due to its hemostatic ability, it provided excellent visualization of the operating site. The histopathological analysis of the laser and the non-contact cutting/ablation ensured no post-operative hemorrhage. The post-operative care was handled with ease. The patient was leading a normal life and did not disturb the owners. There were no tendons retraction or loss of ROM in the carpus. The owners were very happy with the outcome and the course of recovery, and are grateful that the CO2 laser surgery enabled us to avoid the limb amputation, at least for now. We have been monitoring the patient regularly and will continue to see him every three months.

Acknowledgements

The authors thank UCD students, residents and especially Dr. Pedro Urresti and Dr. Olga Garcia Sastre for the clinical photographs of the case.

REFERENCES

FOR THE ASTUTE VETERINARIAN

Circle No. 102 on Reader Service Card

www.wvc.org/conference
Cytomegalovirus is a herpesvirus that can be transmitted from person to person. The virus is common in children and young adults and can cause a range of symptoms, including fever, sore throat, cough, and body aches. In immunocompromised individuals, such as those with HIV/AIDS, CMV can cause serious infections of the lungs, kidneys, liver, and central nervous system. Tobacco smoke and other environmental factors can increase the risk of CMV infection. The virus is spread primarily through respiratory droplets and can also be transmitted through blood transfusions, organ transplants, and from mother to baby during childbirth. There is no vaccine available for CMV, and treatment options are limited. Prevention strategies include avoiding close contact with individuals who are sick with CMV and practicing good hygiene, such as washing hands frequently and avoiding touching the face. It is important to consult a healthcare provider for proper diagnosis and management of CMV infections.