Canine fibroadnexal hamartomas treated by CO₂ laser excision

By David D. Duclos, DVM, Dipl. ACVD
For The Education Center

O pions differ on the origin of fibroadnexal hamartomas. Some authors think they result from a response to a trauma while others think they may originate as a primary malformation of follicle structures. These lesions occur in large-breed dogs, most often on the distal extremities around pressure points and interdigital spaces. The lesions are typically solitary, firm and well circumscribed. In this dog, the lesions were multiple and not well circumscribed.

Diagnosis and Treatment Plan
A 15-year-old female spayed Weimaraner dog was presented with large tumors that involved the two central digits (III and IV) of the right front paw (Figure 1). The tumors had been present for over a year and were getting larger. The dog would chew at them and make them bleed. The lesions consisted of mostly alopecic masses. The grooves covered the top of the distal digits and extended partially around the sides. One mass was so large that the claws were partially covered. The surface of the lesions had polyoid masses with surfaces that varied from smooth to verrucous. Some hae was present in very sparse amounts.

Treatment plan was to surgically remove the lesions with possible removal of the claws in these two digits. The plan was to use CO₂ laser and attempt to save the claws by removing only the tumor and leaving as much of the normal skin as possible to allow closure of the surgical site.

Anesthesia
Anesthesia consisted of propofol induction and anesthesia with isoflurane in oxygen. The dog was placed on a blood pressure monitor and oxygen via face mask. A nerve block was done on the right front leg with 2% lidocaine. The dog was then intubated and anesthesia was maintained with isoflurane. The veterinarian monitored arterial pressure, pulse, and respiratory rate during surgery.

Surgical Site Preparation
Aseptic preparation was done using surgical scrub solution and skin chlorhexidine solution. The surgical field was draped sterilely and normal saline was given intravenously. The operating area was then draped with a sterile surgical drape. The surgical site was cleansed with Betadine. A sterile pack of instruments were placed on the table, and the surgical site was covered with a drape before the patient was positioned. The surgical site was checked and anesthetized with a 2.5% lidocaine infiltration, and a surgical drape was placed over the site. The patient was anesthetized, intubated and started on oxygen.

Procedure
The tumors were excised with our Aesculight CO₂ laser using a 0.25 mm spot size tip (the smallest one available) with continuous wave mode at 30 watts. The excision required very high fluence (small laser spot size at high wattage) to cut through the dense tissue that consisted of primarily keratin and collagen, tissues with low water content. The use of such high fluence enabled quick removal of the tumor and easy visualization of normal underlying structures. The procedure was performed using the following techniques:

1. Excision of the main portion of the mass

The surgeon made the initial cut counter-clockwise toward the digital pad along the visible junction line of the hamartoma and normal tissue. Once the mass was completely circumcised, a few more laser passes were performed to deepen the incision (see Figures 2, 5 and 6).

Traktion tension was applied to facilitate cutting (Figures 3 and 7). The mass was then undermined and completely removed (shown in Figure 8).

2. Touch-up excision and ablation

Once most of the tumor was initially excised, the laser setting was changed to the C3 pulse mode set at 20 watts, and the final removal of abnormal tissue was done on pulse mode P9, set at 3 watts. Using these modes still provided good cutting and ablation but with the pulse mode we were able to keep the zone of collateral tissue damage to a minimum. The surgeon excised more abnormal tissue to ensure the complete removal of the mass (Figures 4 and 8). At one point, when hemostasis occurred the surgeon defocused the laser energy (by increasing the distance between the handpiece and the target tissue) to ensure efficient hemostasis and the surgery continued with excellent visualization of the anatomical structures.

Wound Closure
The tumor on digit IV was 2x3x6 cm and the tumor on digit III was 2x2x6 cm. The tumors had not progressed into the claw folders so it was decided to save the claws and to close the surgical sites. The surgical wounds were closed with 0-Dexon and 3-0 monofilament nylon suture.

Post-op Care
Post-op care involved pain control with deracoxib; systemic antibiotic consisted of cephalexin for the first week. The paw was kept wrapped during healing, which progressed well. Exercise was restricted to short daily walks on leash only.

Follow-up Exam
The paw was kept wrapped during healing, which progressed well. The majority of the surgical sites had regrown hair and the paw looked completely normal (as shown Figure 12, the photo was taken six months after the surgery). There were no further problems with hae pones and lanced for three more years before dying from a different disease.

Conclusion
Because of the superior ability to control the fluence by changing spot sizes, power setting and the ability to change from continuous wave mode to pulse modes, the surgeon has excellent control to remove abnormal tissue and to prevent unnecessary damage to healthy adjacent structures. Moreover, because the CO₂ laser coagulates small capillaries (less than 0.5 mm in diameter) in the surgical field, the surgeon has greater control thanks to better visibility in a bloodless surgical field.

Dr. Duclos is a small-animal practitioner from Lynnwood, Wash., where he has been the owner and clinical dermatologist at the Animal Skin and Allergy Clinic since 1991. He completed his residency in veterinary dermatology at the University of Pennsylvania. He also teaches veterinary students from WSU and from Western University of Health Sciences’ Veterinary School in Pomona, Calif.

For The Education Center article was undertaken by Aesculight of Woodinville, Wash., manufacturer of the only American-made CO₂ laser.

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Anesthesia was done with propofol induction and anesthesia consisted of propofol induction and isoflurane. The dog was intubated and mechanical ventilation was used throughout the procedure. The dog was maintained on 1.5% isoflurane and 100% oxygen with 1 L/min of inspiratory flow. The end tidal CO₂ was monitored and maintained at 4.5 mmHg.

Pre-operative view of fibroadnexal hamartoma.

Diagnosis and Treatment Plan

An 11-year-old female spayed Weimaraner dog was presented with large tumors that involved the two central digits (III and IV) of the right front paw (Figure 1). The tumors had been present for over a year and were getting larger. The dog would chew at them and get them bloody.

Assessment revealed large that the claws were partially covered. The surgery required very high fluence (small laser spot size at high wattage) to cut through the dense tissue that consisted of primarily keratin and collagen, tissues with low water content.

Procedure

The tumors were excised with our Aesculight CO₂ laser using a 0.25 mm spot size tip (the smallest one available) with continuous wave mode at 30 watts. The excision required very high fluence (small laser spot size at high wattage) to cut through the dense tissue that consisted of primarily keratin and collagen, tissues with low water content. The use of such high fluences enabled quick removal of the tumor and easy visualization of normal underlying structures. The procedure was performed using the following technique:

1. Excision of the main portion of the mass.

The surgeon made the initial cut counterclockwise toward the digital pad along the visible junction line (Figures 2 and 3). The mass was then undermined completely and removed (shown in Figure 4).

2. Touch-up excision and debriement.

Once most of the mass was excised, the laser setting was changed to the CO₂ pulse mode set at 20 watts, and the final removal of abnormal tissue was done with pulse mode P1, set at 3 watts. Using these modes still provided good cutting and ablation but with the pulse mode we were able to keep the zone of collateral tissue damage to a minimum.

The surgeon used more abnormal tissue to ensure the complete removal of the mass (Figures 4 and 8). At one point, when hemangiosarcoma occurred the surgeon defocused the laser energy (by increasing the distance between the handpiece and the target tissue). This ensured efficient hemostasis and the surgery continued with excellent visualization of the anatomical structures.

Wound Closure

The tumor on digit IV was 2x2x0.3 cm and the tumor on digit III was 2x2x0.5 cm. The tumors had not progressed into the claw so it was decided to save the claws and to close the surgical sites. The surgical wounds were closed with 0-Dexon and 3-0 monofilament nylon sutures.

The skin was sutured completely on digit III, and on digit IV the skin was closed with a 2-3 mm space in between the digital pads (Figure 5). The paw was kept wrapped during healing, which did not seem to cause any discomfort.

Post-op Care

Post-op care involved pain control with deracoxib; systemic antibiotics consisted of cephalixin for the three-week healing period. The dog was kept in an E-collar to prevent self-induced damage to the bandages. The bandages were to be covered with waterproof dressing to keep dry when going outside. Exercise was restricted to short daily walks on leash only.

Follow-up Exam

The paw was kept wrapped during healing, which took three and a half weeks (Figures 10 and 11). The surgical sites had regrown hair and the paw looked completely normal (as shown in Figure 12, the photo was taken six months after the surgery).

Conclusion

Because of the superior ability to control the fluence by changing spot sizes, power setting and the ability to change from continuous wave to pulse modes, the surgeon has excellent control to remove abnormal tissue and to prevent unnecessary damage to healthy adjacent structures.

Moreover, because the CO₂ laser coagulates small capillaries (less than 0.5 mm in diameter) in the surgical field, the surgeon has greater control thanks to better visibility in a bloodless surgical field.

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PHOTOS COURTESY DAVID D. DUCLOS

Our thanks to our veterinary photographer David Duclos for making this article possible.

Figure 1: Pre-operative view of fibroadnexal hamartoma.

Figure 2: Surgery starting on digit IV.

Figure 3: Tissue was applied to the lesion on digit IV. The mass was completely circumscribed and undermined with the laser.

Figure 4: After most of the mass was excised, the surgeon removed the remaining cutaneous tissue. "Leaving it free, healthy skin is the inside. Enough skin was salvaged for complete closure with no tension.

Figure 5: As with digit IV, after the excision of the majority of the mass, the surgeon gradually excised the remaining smaller segments.

Figure 6: Initial incision was deepened by several laser passes.

Figure 7: The mass was undermined and retracted, and the surgeon continued the excision.

Figure 8: Four weeks after the surgery. Area almost completely healed.

Figure 9: Immediately post-operative view with sutures in place.

Figure 10: Follow-up not at three and a half weeks after the surgery. Recovery was smooth and healing progressed well.

Figure 11: Four weeks after the surgery. Area almost completely healed.

Figure 12: Follow-up shot at six months after the surgery. Hair was restored and the entire surgical site.

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