Co2 laser excision of a bladder mass

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Tumors of the urinary bladder include transitional cell carcinoma, squamous cell carcinoma, adenocarcinoma and fibroma, and comprise approximately 2 percent of all reported malignancies in canines. Invasive transitional cell carcinoma (TCC) is the most common, with a higher ratio occurring in females. Common clinical signs include hematuria, dysuria and pollakiuria, and may resolve temporarily with antibiotic therapy. Urine antigen tests for TCC have been found to be sensitive, but false-positive results may limit their value. A diagnosis of TCC by histopathologic confirmation should, therefore, always be recommended to the client even with positive antigen results. Recommended methods of biopsy include cystotomy, cystoscopy and catheterization; percutaneous methods may lead to tumor seeding and are best avoided.1

A CO2 laser cauterizes blood vessels up to 0.5 millimeters in diameter as it incises, allowing excellent visualization of the tissues as the surgery proceeds. The precise incision and hemostasis control the laser provides are especially valuable when care must be taken to watch for and preserve delicate structures. Nerves and lymphatics are also sealed, decreasing postoperative pain and swelling.2 It is the experience of the author that the use of the CO2 laser in cystotomy procedures results in reduced or eliminated hematuria, pollakuria and dysuria postoperatively and a more comfortable recovery when compared to cystotomy performed with a scalpel.

Case

Tarot is an 8-year-old female (spayed) Labrador-golden retriever mix who had a history of chronic hematuria and inappropriate urination in the house. Bloodwork was within normal reference ranges. Urinalysis revealed hematuria and rod bacteria and the presence of struvite crystals. Urine culture was positive for Proteus mirabilis, with high susceptibility to enrofloxacin, but enrofloxacin therapy failed to resolve the clinical symptoms. Abdominal X-rays were unrevealing. An abdominal ultrasound revealed the presence of a 4-by-2.5-centimeter intraluminal mass within the urinary bladder and a thickened bladder wall. There was no evidence of cystoliths, ascites or renal disease. A differential diagnosis of a polyp versus neoplasia (TCC) was made, and TCC antigen testing was positive. Tarot was started on D-Mannose (½ tsp BID), enrofloxacin (272 milligrams BID), Cerenia (80 milligrams EOD) and piroxicam (10 milligrams SID). A cystotomy was recommended, and Tarot came to our clinic for the procedure.

Anesthesia

The patient was premedicated with dexmedetomidine 125 mcg/m2 IM. The patient was induced with propofol 3 mg/kg IV, and general anesthesia was maintained with isoflurane via endotracheal tube.

Laser Equipment and Settings

A 20-watt Aesculight surgical CO2 laser with a flexible hollow waveguide and adjustable handpiece was used.

Technique

The patient was placed in dorsal recumbency. Approach was made to the abdomen via a ventral midline incision with the CO2 laser (0.26-millimeter focal spot size, 12 watts in the continuous wave mode [CW]) (Figure 1). A groove director was utilized during approach through the linea alba. Minor hemorrhage was controlled during approach via CO2 laser with a defocused laser beam (0.8-millimeter focal spot size) at 12 watts continuous were mode (Figure 2). The bladder was exteriorized and packed off with moistened lap pads (Figure 3), and two stay sutures of 3-0 PDS were applied (Figure 4). The bladder was opened at the apex in a 2.5-centimeter incision via CO2 laser (0.25-millimeter focal spot size, 10 watts in the SuperPulse mode), and hemorrhage was controlled via transfixation ligatures of 3-0 PDS (Figure 5). A groove director was utilized to complete the incision into the bladder lumen (Figure 6). The intraluminal mass was exteriorized (Figure 7) and found to be a 0.8-millimeter focal spot size 2.5-centimeter intraluminal mass with normal bladder mucosa near the apex via a single pedicle 8 to 10 millimeters in diameter.

Figure 1: Approach to the abdomen was made via a ventral midline incision with the CO2 laser

Figure 2: An Aesculight CO2 laser was used to control minor hemorrhage during approach to abdomen

Figure 3: The urinary bladder was exteriorized and packed with moistened lap pads.

Figure 4: Two stay sutures were placed.

Figure 5: The pedicle was clamped near the bladder wall

Figure 6: A groove director was utilized to complete the incision into the bladder lumen.

Figure 7: The intraluminal mass exteriorized

Figure 8: The intraluminal mass attached to normal bladder mucosa near the apex via a single pedicle 8 to 10 millimeters in diameter.

Figure 9: The pedicle clamped near the bladder wall

Figure 10: The pedicle tied with a Miller’s knot of 0-PDS

Figure 11: No hemorrhage was observed after the pedicle was transected with the CO2 laser.
tached to what appeared to be normal bladder mucosa near the apex via a single pedicle 8 to 10 millimeters in diameter (Figure 8). The pedicle was clamped near the bladder wall (Figure 9), tied with a Miller’s knot of 0-PDS (Figure 10), and transected via CO2 laser (0.25-millimeter focal spot size, 15 watts continuous wave mode). No hemorrhaging was observed (Figure 11). The bladder lumen was inspected and not found to harbor any other masses or abnormalities. The bladder was closed in three layers: the muscularis was closed with 3-0 PDS simple continuous pattern (Figure 12), followed by a double-layer inverting pattern using 3-0 PDS (Figure 13). No leakage was observed. The bladder was replaced and wrapped in omentum, and gloves were changed. The linea alba was closed with 0-PDS simple interrupted pattern. The SQ tissue was closed via 0-PDS simple continuous pattern, and the skin closed via 3-0 PDS simple interrupted pattern (Figure 14). The mass was sectioned, and a section harboring the entire pedicle was submitted for biopsy and margins examination.

Post-Operative Care
The patient was administered atipamezole 250 mcg/kg, recovered well, and was discharged home later the same day. The owner was most impressed with Tarot’s recovery, as hematuria and inappropriate urination were immediately alleviated with surgery. Biopsy results reported the mass to be a “marked chronic eosinophilic cystitis with dense submucosal fibroplasia,” and “a non-neoplastic nodular mass secondary to chronic urolithiasis and/or cystitis, with no evidence of neoplasm observed.” Piroxicam was discontinued as soon as the biopsy results were received. Tarot continues to do well following the procedure as of this writing with no evidence of post-operative pain or discomfort, hematuria or inappropriate urination.

Dr. Christopher Winkler graduated from Ross University School of Veterinary Medicine in 2001 and is the owner of Suffolk Veterinary Group Animal Wellness and Laser Surgery Center in Selden, Long Island, N.Y. He uses both CO2 and diode laser wavelengths in his practice, often combining them when possible. He is a diplomate of the American Board of Laser Surgery, a certified Veterinary Medical Laser Safety Officer, and a fellow member of the American Society for Laser Medicine and Surgery. He has appeared as a speaker and associate instructor on CO2 laser surgery for several national veterinary conventions, most recently the Western Veterinary Conference, and is available for consultation and training in small animal laser surgery and laser therapy. Visit the Aesculight booth (#715) at the New York Veterinary Conference in the Javits Center Nov. 9 - 10 to ask Dr. Winkler about laser surgery.

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REFERENCES

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