How to use CO2 laser for paraphimosis

By William E. Schultz, DVM
For The Education Center

Paraphimosis is the inability of the penis to reenter the sheath completely into the sheath. This problem can be caused by etiological factors such as priapism, excessive sexual activity, entrapment of preputial hair, trauma, erosion caused by trauma or surgery, and restricted preputial coverage. Preputial atony, surgically preserved with chlorex-yol. A marker was used to indicate the point of desired preputial advancement (Figure 2). 

When Yogi was presented for surgery, the condition of the penis was improved and the exposed area was reduced to approximately 1.5 cm (Figure 3). Surgical correction was performed using measurements from the day of surgery and from the first visit. 

Laser Equipment

The surgeon used a 40-watt Aesculight CO2 laser with the flexible hollow waveguide and a nominal spot size hand piece (Figures 4, 5, 6 and 12). 

Anesthesia

Pre-anesthetic blood testing showed normal results. Yogi was given a pre-anesthetic of Torbutrol, acepromazine and atropine, induced with Propofol and prepared for surgery using measurements from the previous standard. Yogi returned two weeks later for suture removal (Figure 14). No complications were found, and the recovery progressed very well. The owners noted that during the first week the distal 2 to 3 mm of the tip of the glans was visible, but that at the second week it was no longer visible and Yogi urinated normally.

Conclusion

The CO2 laser provides control of intraoperative hemorrhage, which preserves good visibility of the surgical field. Furthermore, the CO2 laser is less traumatic and causes less pain and is among other benefits of carbon dioxide laser surgery. Healing typically progresses without complications. Therefore, the CO2 laser is the preferred surgical tool in my practice.

REFERENCES


For The Education Center article was underwritten by Aesculight of Woodbridge, Wash., the manufacturer of the only American-made CO2 laser.
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Paraphimosis is the inability of the penis to re- turn completely into the sheath. This problem can be caused by etiological factors such as priapism, excessive sexual activity, entrapment of preputial hair, trauma, erosion caused by trauma or surgery, and restricted preputial coverage. Preputial stretching after a pre-scrotal castration can damage the retractor penis muscle, causing paraphimosis.

This article describes a case of paraphimosis secondary to castration.

Patient

Yogi, a 4-year-old male neutered Chihuahua, was referred to us after two failed attempts to correct paraphimosis. The patient developed paraphimosis approximately two weeks prior to the sequelae involved placing a purse-string suture in the opening of the sheath. At the second surgery, the sheath opening was narrowed surgically. Both procedures failed, leaving Yogi with a fistulous tract on the ventral surface of the sheath.

Typically, surgical shortening of the muscles yields very good results. In Yogi’s case, however, too much time had passed since the original surgery, and his paraphimosis persisted for almost a year. The possibility of the retractor penis muscle atrophying made the situation for the muscle less likely. It was, therefore, decided to conduct a cranial preputial advancement without muscle shortening. The goal was to correct the penile exposure caused by the lack of preputial coverage. The surgery advances the prepuce cranially, thus allowing the penis to stay within the sheath. This was performed using measurements from one of the previous unsuccessful surgeries.

Yogi was examined two weeks prior to surgery. He had a 2 to 3-cm paraphimosis with desecration and erosions of the exposed penis. His owners instructed to keep the exposed area lubricated to decrease the risk of damage to the unprotected portion of the penis. When Yogi was presented for surgery, the condition of the penis was improved and the exposed area was reduced to approximately 1.5 cm (Figure 3). Surgical correction was performed using measurements from the day of surgery and from the first visit.

Laser Equipment

The surgeon used a 40-watt Aesculight CO2 laser with the flexible hollow waveguide and a 0.25-mm spot size hand piece (Figures 3, 4, 5, 6 and 12).

Anesthesia

Pre-anesthetic blood testing showed normal results. Yogi was given a pre-anesthetic of ketamine, acepromazine and atropine. Induced with Propofol 28 and maintained on Sevoflurane. Morphine was administered preoperatively, and epinephrine was given post-operatively for pain management.

Procedure

Yogi was placed in dorsal recumbency. His penile sheath was flushed with saline. A 20-cm spring and 5 French red rubber catheter were used to remove amputated material from the base of the deep preputial area. The planned surgical area was shaved and surgically prepped with chlorhexidine. A marker was used to indicate the point of desired pre-putial advancement (Figure 2).

The surgical laser was set to 15 watts in the SuperPulse mode for the dissection. The variable handpiece was set to a 0.25-mm focal spot diameter. An incision was made from the lateral aspect of the penis sheath to the previously marked cranial abdominal area (Figure 3).

The incision was continued until a rounded-triangular segment was outlined (Figures 4 and 5). Traction was applied with the tissue forceps to aid the incision and the tissue was undermined and excised (Figure 6). The sheath was advanced with sutures using 2-0 Monocryl (Figures 7, 8, 9, 10). At this stage, it is important that the suture be in the muscle fascia (tissue) cranially at the advancement point and in the connective tissue of the proximal sheath. This prevents slippage of the sheath and stretching of the skin caused from the point of advancement. Because tension was required to advance the sheath, the suture material was passed through the tissue twice in a cruciate pattern before knotting. This allowed for better distribution of the tension forces. Then, multiple faecial/sheath sutures were placed. Finally, the caudal closure was achieved with a single interrupted cruciate suture (Figures 11, 12, 13). A 2-0 Monocryl was utilized for both subcutaneous and cutaneous closures.

The small fistula present from one of the previous unsuccessful surgeries was corrected during the same surgery. The laser was utilized at 10 watts SuperPulse with the 0.25-mm spot size to freshen the edges of the fistula, which then was closed with a single 2-0 Monocryl cruciate suture (Figures 13, 14). The fistula had been present for several months, suturing without freshening the margins likely would have resulted in failure for a permanent closure.

Yogi was released the day of surgery. Oral antibiotics and carprofen were given post-operatively for pain management.

Follow-up Visit

Yogi returned two weeks later for suture removal (Figure 14). No complications were found, and the recovery progressed very well. The owners noted that during the first week the distal 2 to 3 mm of the tip of the penis was visible, but that at the second week it was no longer visible and Yogi urinated normally.

Conclusion

The CO2 laser provides control of intraoperative hemostasis, which preserves good visibility of the operative field. Although effective control of bleeding is significant in any soft tissue procedure, it is crucial in urogenital surgery due to the rich vasculature of the area. The ability of the CO2 laser to coagulate blood vessels helps to assure accurate incision while creating only a tiny zone of thermal change on the surface of the tissue. SuperPulse allows tissue to relax, or cool, in between laser pulses, thus reducing the risk of thermal trauma. When the proper parameters are selected (i.e., power, spot size, pulsing, surgeon’s hand speed, and so on), the zone of such thermal change can be as narrow as 50 micrometers or the width of a human hair. During coagulation and cutting and pain are among other benefits of carbon dioxide laser surgery. Healing typically progresses without complications. Therefore, the CO2 laser is the preferred surgical tool in my practice.

REFERENCES


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

Dr. William E. Schultz graduated from Michigan State University in 1973, went into private practice and opened his companion animal practice in 1974. He has been a board member on the SYmbiotics Reproduc- tive Advisory Panel, The Society for Theriogenology and The Theriogenology Foundation. He has spoken at several veterinary conferences, veterinary associations and national specialities because of his special interest in canine reproduction. He also has lectured and published articles on transrectal and surgical vasectomies using fresh, chilled and frozen semen. He is interested in soft tissue and orthopedic surgery, and he has more than 20 years of experience with laser surgery. Schultz uses a 40-watt flexible hollow waveguide CO2 laser with constant wave and SuperPulse modes.