

LAPAROSCOPIC-ASSISTED CYSTOTOMY

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A cystotomy is commonly performed in veterinary medicine for numerous reasons which include biopsy of masses, evaluation/treatment of ectopic ureters, evaluation of hematuria, and cystic calculi retrieval. Urolithiasis left untreated can result in urinary obstruction and subsequent post-renal azotemia. A traditional cystotomy is performed through a laparotomy incision. Recently, non-invasive and minimally invasive techniques have been developed to treat cystic calculi. Medical dissolution has been utilized but ineffective for calcium oxalate calculi. Both urohydropropulsion and laser lithotripsy have patient size limitations and usually limited to large female canine patients. Laparoscopic-assisted cystotomy is a procedure that can afford the benefits of minimally-invasive techniques for cats and small male dogs; rapid return to activity and decreased pain. A case example will be used to describe the technique.

A 6 year old male intact 3.2kg Pomeranian was initially presented to his primary veterinarian for hematuria without evidence of stranguria for seven days duration. Urinalysis and culture were performed and empirical antibiotics were provided for treatment of a suspected urinary tract infection. Urinalysis results were consistent with increased red blood cells, a few transitional epithelial cells, and calcium oxalate crystals. The urine culture results were negative for bacterial growth. After a two week course of antibiotics, the hematuria was persistent on recheck examination and abdominal radiographs were performed which revealed cystic calculi (Figure 1). The clients were interested in a minimally invasive procedure and were then referred to the ASEC Surgery Department.



Figure 1 – Right lateral abdominal radiograph. Arrows identify cystic calculi.

Based on his small size, laser lithotripsy and uro-hydropropulsion were not options. A laparoscopic-assisted cystotomy was elected. A urinary catheter is placed to flush the urethra clear of cystic calculi. The patient is positioned in dorsal recumbency, similar to positioning for a traditional laparotomy. Recently, non-invasive and minimally invasive techniques have been developed to treat cystic calculi.

A sub-umbilical laparoscopic camera port is placed by modified Hasson technique and then to allow insufflation of the abdominal cavity with carbon dioxide. A cursory exploration of the abdominal viscera is performed with a 5mm 30 degree laparoscope. The bladder is identified and a second instrument port is placed at the level of the apex of the bladder.

Laparoscopic Babcock forceps is then introduced and elevates the ventral apex of the bladder to the body wall. Stay sutures are then placed in the bladder wall to exteriorize and secure the bladder (Figure 2).

Figure 2 – Exteriorization of the bladder for scope placement

A small stab incision is then made into the bladder to allow placement of a 2.7mm 30 degree cystoscope with a working channel utilizing a basket wire to retrieve the calculi (Figure 3).

Figure 3 – Cystoscopic view of bladder calculi, identified by arrows.

The small cystotomy incision is closed with simple interrupted absorbable sutures. The stay sutures are removed and the instrument portal site in the linea is closed with a single interrupted suture. The abdomen is then re-insufflated to re-examine the abdominal cavity, a urinary catheter is passed retrograde to instill the bladder with sterile saline. The cystotomy site is observed for leakage. The abdomen is then evacuated of carbon dioxide and the camera portal site through the linea is closed with a single interrupted suture. All skin incisions were closed with *cyanoacrylate adhesives (skin glue)*. Post-operative radiographs were performed to document successful removal of all calculi. Calculi were submitted for quantitative chemical analysis which confirmed calcium oxalates. The patient's recovery was rapid and due to the small incisions an e-collar was not necessary but provided as a precautionary measure. The client had no concerns during the two week recovery at home and was very pleased with the cosmesis (Figure 4).

Figure 4- One day post-operative site (left). Two weeks post-operative site (right).

Benefits of a laparoscopic-assisted cystotomy include rapid recovery, decreased pain, and can be performed as an outpatient procedure. This procedure can also be used to thoroughly evaluate the bladder mucosa through a magnified view provided by the cystoscope and obtain bladder biopsies. The procedure can be combined with laser lithotripsy to break up larger stones which then can be removed through the small incision. Contraindications for the laparoscopic-assisted cystotomy include any patient with pre-existing cardiopulmonary conditions or compromise. Abdominal insufflation can decrease respiratory function and decrease cardiac return. Post-renal azotemia should be resolved medically prior to abdominal insufflation procedures as not to compromise blood supply to the kidneys. The procedure should be limited to patients that are free from systemic disease. Case selection and appropriate pre-operative planning, via radiographs and/or ultrasound, is necessary to account for the number and size of the calculi for successful outcome.

Reference

Use of laparoscopic-assisted cystoscopy for removal of urinary calculi in dogs. Rawlings CA, Mahaffey MB, Barsanti JA, Canalis C. J Am Vet Med Assoc. 2003 Mar 15;222(6):759-61, 737.

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