Surgery of the Lower Urinary Tract

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The urinary bladder is a muscular urine reservoir and its anatomic position depends upon the degree of filling with urine. Abnomalities of the bladder including infection, stones, and neoplasia cause signs relativer to the lower urinary tract such as poilakiuuria, stranguria and hematuria. Signs or changes in urinary patterns are usually noted by the owner and are the reason for presentation. Usually, the animal is not systemically ill unless urinary obstruction occurs either ureteral by neoplasia at the trigone of the bladder or if the urethra becomes obstructed by stones and the animal becomes uremic.

Principles of bladder surgery

Cystotomy and partial Cystectomy are the most common surgical procedures of the bladder in small animals. Although the bladder is weak, incisions heal quickly gaining almost 100% of the presurgical strength by 14-21 days post surgery. It is thought that 75% of the bladder can be excised if the trigone and proximal urethra are spared. The animal will urinate more frequently but normal volumes may be obtained after several months.

Cystotomy for calculi

Preoperative studies include routine blood work and chemistry and either survey radiographs or ultrasound. Remember that U/S emphasizes mineralization by shadowing. I prefer survey radiographs initially to avoid negative cystotomy.

A caudal abdominal apporoach is made to the bladder with the incision made from the umbilicus to the pubis. The bladder is located and a stay suture of 3-0 PDS placed in the apex of the bladder. A needle and syringe can be used to empty the bladder and laparotomy pads placed to pack off the bladder. A Ventral_cystotomy is preferred in almost all cases and the incision is made in the least vascular spot possible. Additional stay sutures are placed along side of the incision to improve visualization of the bladder interior. Many surgeons collect a piece of bladder wall for culture and or/histology. A stone may be submitted for culture as well. A cystotomy spoon may be used to remove all calculi; a finger can be used to explore the bladder interior. A urinary catheter should be passed retrograde in the male and the urethra flushed to assure patency and removal of all calculi.

- 1. Remove all calculi and flush bladder interior with saline.
- 2. Bladder closure is with an appositional (S continuous) or inverting pattern depending on the bladder wall thickness. The GOAL is a leak-proof closure and no suture in contact with the urine.
- 3. I usually use 4-0 PDS on an SH needle and use a Cushing pattern if the bladder wall is thin. I f the wall is thickened I use a continuous pattern making an effort to split thickness the wall of the bladder while engaging the submucosa.
- 4. In either case I leak-test the bladder with saline following closure to test my suture line.
- 5. Submit calculi for quantitative stone analysis.
- 6. Appropriate follow-up therapy of UTI if present and appropriate diet modification based on stone analysis are the keys to decreasing further stone formation.
- 7. Urinary catheters are NOT placed postoperatively.

Cystectomy for neoplastic disease

Generally not performed or is a challenging undertaking since neoplastic disease in the dog usually is located in the trigonal area. If exploration reveals a mass or masses within the bladder lumen incisional biopsy is performed to confirm the diagnosis. Dogs with TCC often can be palliated over a length of time with chemo that includes piroxicam therapy. Occasionally, masses are located more in the body or apically and partial cystectomy can be performed, taking care to preserve the ureteral papillae and normal ureteral openings.

Scrotal urethrostomy

Scrotal urethrostomy is the urinary diversion procedure of choice in the dog. Indications for scrotal urethrostomy include dogs that are chronic stone formers (Dalmatians and urate calculi or dogs that repeatedly obstruct), animals with neoplastic disease of the penis/prepuce, or animals with urethral stricture caused by earlier stone damage to the urethra.

Dogs are continent following this surgery although they are at increased risk for UTI postop. Bleeding in the immediate perioperative period is a common complication that may be minimized by careful suture technique.

- If the dog is intact neutering is required. An elliptical incision is made around the scrotum and the dog neutered and the scrotal skin removed. The penile urethra is grasped between fingers and elevated from the incision. The retractor penis muscle is retracted laterally and the urethra incised on the midelin over a catheter if cathterization is possible. The incision into the urethra is lengthened with iris scissors to the area where the urethra begins to curve dorsally.
- The urethral mucosa is sutured to the skin with 4/0 PDS or prolen on a tapered needle taking care in the sequence of needle bites. The needle should engage mucosa and then tunica albuginea just lateral to the spongiosusm tissue which is

bleeding. Finally the needle engages the skin in a split thickness manner. This sequence of needle bites will decrease hemoorhage in the postoperative period for the surgical site. A continuous pattern is preferred to decrease bleeding.

- An Elizabethan collar is applied for 10-12 days postop until sutures are removed from the surgical site.
- Periodic urine cultures are performed to assure no UTI.