

Surgery for Urolithiasis

Bruce L. Hull, DVM MS

Department of Food Animal Medicine

The Ohio State University, Columbus, OH 43210

Urolithiasis is an important disease of male ruminants of all species. It is an especially prevalent disease of castrated males, but is probably much more devastating in the breeding male. The immediate problem is the complete obstruction of the urethra and the inability to urinate, however, one must always remember the secondary sequelae such as skin sloughs, chemical peritonitis, abdominal adhesions and hydronephrosis or hydroureter. Although agents such as aminopromazine have been used to relax urethral spasm with some degree of success, the primary treatment for obstructive urolithiasis is surgical intervention. For any degree of success with medical therapy the animal must not be completely obstructed and must still be dripping some urine.

Urethrostomy

A urethrostomy is the primary means of correction of the signs and symptoms of urolithiasis in the castrated male animal. Other surgical procedures may be used in conjunction with a urethrostomy and these will be discussed later in this paper. There are many variations in the technique for performing a urethrostomy and they are all reported to be successful in the hands of those advocating them. Anesthesia for a urethrostomy can be epidural anesthesia or by local infiltration. Both are equally effective and should be left to the preference of the surgeon.

As most calculi are located at or near the distal sigmoid flexure, the surgical incision into the urethra needs to be made proximal to the distal sigmoid flexure. Therefore, the skin incision is made somewhere between the ischial arch and the base of the scrotum. The higher incisions have the advantage of having a larger urethral diameter and the disadvantages of 1) deeper location of the penis, 2) a sharp bend in the penis at the skin incision and 3) more urine scald in the perineal region after surgery. The lower incision has the advantage of the penis being easy to expose and less urine scald post operatively, however, it is a much more awkward position for the surgeon. If the incision is made right at the ischial arch a catheter may be able to be placed into the bladder. This incision right at the ischial arch is the most hemorrhagic approach and is, therefore, avoided by many. It should be noted in any lower incision in the urethra, that a catheter cannot be passed into the bladder as it catches in the urethral diverticulum. This diverticulum is present on the dorsal surface of the urethra just cranial to the brim of the pelvis in all of our domestic

ruminants. Neophytes often forget this diverticulum and in trying to pass the catheter after surgery mistake this diverticulum as an additional calculus.

The skin is incised on the midline for a distance of 4-6 inches. Once through the skin the tough subcuticular fascia also needs to be incised. Blunt dissection is carried through the septum between the animal's legs until the penis is found. Generally the penis is deeper than one would anticipate. While dissecting between the legs one first encounters the retractor penis muscles. These should not be confused with the penis. They are paired, less firm, smaller in diameter and more superficial than the penis itself. Once the penis is identified, it is freed by blunt dissection and exteriorized by pulling on the distal end. Care should be taken not to twist the penis while exteriorizing it and thereby lose the relationship of the penis and the retractor penis muscles. The penis should be cut as long as possible at the ventral end of the skin incision. A mistake which is often made is cutting the penis too short. This will either cause a severe kink in the penis or cause the penile stump to end up in a subcutaneous position at the conclusion of the surgery, both of which are very undesirable. Once the stump of the penis is sutured to the skin there should be about 1 inch of penile stump protruding from the skin. If the portion protruding from the skin is in excess of 1 inch it can always be cut a second time to achieve the 1 inch length. Care should be taken to prevent kinking of the penis as it is anchored to the skin as this kinking may result in an iatrogenic obstruction.

There are several techniques available for suturing the penis to the skin. The urethra lies on the posterior surface of the penis and this becomes dorsal in location as the penis is exteriorized. This is important to note as we do not want to occlude the urethra with our suture placement. The simplest way to suture the penis is with a modified horizontal mattress suture. The skin is grasped on one side of the incision and then the stump of the penis is transfixated before the suture is brought through the skin on the opposite side of the incision. The suture can then be tied below (thus avoiding the urethra) the stump of the penis or the suture can be placed back through the skin and again transfix the penis in a more ventral location before tying off the suture. A modification of this is to split the urethra and suture the edge of the urethra to the skin with fine absorbable suture material. Advocates of splitting the urethra claim less stricture formation postoperatively, however this has never been proven. Once the penis is su-

tured to the skin the remainder of the skin incision is closed with interrupted sutures of non-absorbable suture material.

As has been noted above, a catheter can rarely be passed into the bladder and it is therefore unnecessarily traumatic to try to catheterize the animal after surgery. As the bladder has been greatly distended or even ruptured urine will not flow immediately after surgery. It is, however, important to observe the animal for urine flow postoperatively and to remove any blood clots which might obstruct urine flow. Postoperative antibiotics (preferably those with a short market withdrawal) are indicated for several days after surgery.

Cystotomy

Some people would recommend a cystotomy to remove additional calculi or suturing the rent in the bladder if the bladder has ruptured. Bladders which have ruptured are very edematous, friable and difficult to suture in any type of urine tight seal. It is also questioned as to whether this can be considered a very economical procedure in a castrated male animal. As most bladders rupture dorsally, 40-60 % will heal spontaneously once a patent egress has been established for urine flow.

In a breeding animal a cystotomy should certainly be considered as part of the surgical therapy as animals seldom have a single calculus. Removal of additional calculi via a cystotomy helps prevent reoccurrence. If a cystotomy is to be performed the animal needs to be restrained in dorsal recumbency, preferably with the rear quarters elevated slightly. The incision can be on the midline or paramedian depending on the surgeon's preference. Regardless, the incision will start at the brim of the pelvis and extend about 8 inches anteriorly. Once the abdomen has been entered the fundus of the bladder can be grasped and gently elevated through the incision. Extreme care is necessary if the bladder has previously ruptured as it is extremely friable. If the bladder has already ruptured the edges need to be trimmed back to viable tissue before suturing. The bladder should be sutured with 0 absorbable suture. Most people try to use an infolding pattern and this is advisable unless the bladder is too friable to infold. If the bladder is too friable, it is apposed with simple interrupted or continuous sutures.

If the bladder has not previously ruptured, it should be opened in the fundic area and remaining calculi removed. The bladder should be rinsed with sterile saline to remove any sand which may be too fine to manually remove. It is advisable to attempt to pass a catheter from the bladder into the urethra, however, mucosal folds near the urethral orifice often prevent this.

If the abdomen is opened to suture the bladder or to perform a cystotomy, a catheter should be sutured into the bladder to provide a means of draining urine from the

bladder for several days while the urethra is healing. It is well known that urine is very detrimental to healing. Usually this catheter is a Foley catheter placed from a paramedian position, but any type catheter or even latex tubing can be used. The catheter should not exit the body wall through the primary skin incision as it will retard healing. Rather it should exit the body wall through a separate stab incision. After the catheter is placed and the bladder is closed (in the case of a cystotomy with 2 layers of inverting sutures), the body wall is closed in a routine manner.

The catheter should be left in place for 3-5 days and urine allowed to flow freely from it, to keep the bladder drained without further irritation to the urethra. After 3-5 days the catheter is clamped or tied off and the animal is kept in an unbedded stall to observe for evidence of normal urination before pulling the catheter. If the animal cannot urinate, the catheter can again be clamped or tied off for several more days or if necessary can be left in place until the animal is salvaged. Once the animal has been observed to urinate normally, the bulb of the catheter is deflated and the catheter can be pulled. The small hole left in the bladder after pulling the catheter will heal on its own with no suturing.

Urethrotomy

In a breeding animal the occluding calculus must be removed if the animal is to return to breeding. There have been several non-surgical methods of calculus retrieval described, but for the most part these have not been highly successful. Before calculus removal the penis should be extended and a catheter or sound passed up the urethra until the calculus is located. This can usually be accomplished without tranquilization, but tranquilization may be employed if necessary. Once the calculus has been located it can usually be palpated through the skin by deep palpation. As the calculus usually lodges in the distal sigmoid flexure, it is usually located just anterior to the scrotum once the penis has been extended. Once the calculus has been located the animal can be placed in lateral or dorsal recumbency and the area can be clipped and prepped in a routine manner.

While an assistant holds the penis extended, a 4-6 inch skin incision is made through the skin in the area where the calculus can be palpated. Once through the skin the incision is continued through the subcutaneous tissue and the elastic tunics surrounding the penis. The elastic tunics should be handled gently as they are very important in preventing postoperative adhesions. Once the stone has been located it can sometimes be crushed by pinching it through the urethra with a towel clamp and then flushing it from the urethra. Repeated attempts at this procedure are not advisable as severe damage to the urethra may result. It is recommended to surgically remove the stone. An incision is made through the ventral tunica albuginea and

urethra just anterior to the location of the calculus and the calculus is moved forward and popped through the incision. Opening directly over the stone or just posterior to the calculus is not advisable as these areas are devitalized due to pressure necrosis and suture holding power and healing are both decreased in these areas. The urethra is closed with a single layer of either simple interrupted or simple continuous sutures. These sutures should be very fine (000 or 0000), absorbable and placed close together as this needs to be a urine tight seal. Closing of the urethra is facilitated by placing a catheter in the urethra and suturing over the catheter. After suturing is complete, the catheter is removed. After closing the urethra, it is important to close the elastic tunics. These should be closed carefully as they are the main deterrent to adhesion formation around the penis. The subcutaneous tissue and the skin can be closed in a routine manner.

Although some would recommend the removal of the calculus through an incision just behind the scrotum (with the penis not extended), I feel there is a greater risk of adhesion formation with this approach and do not recommend it. Urethrotomy is a procedure which is only performed on breeding animals and anything that can be done to insure the animal's breeding potential is essential.

One should remember that the prognosis for life decreases as we try to salvage the animal as a functional breeding animal. Therefore economics may dictate that even though an animal with urinary calculi is an intact male, it may best be handled with a urethrostomy and salvaged at a later date.

Postoperative Care

As already indicated, post operative antibiotics (preferably those with short market withdrawal) are indicated after any surgery for urinary calculi. Additionally in the case of a breeding animal, the cause of the calculi should be determined if possible and corrected. In the breeding animal, increasing the salt in the diet or adding ammonium chloride to the diet should be considered to help prevent reoccurrence.

The animal should be monitored closely, and if laboratory facilities are available creatinine or BUN should be monitored for several days postoperatively as if hydro-nephrosis and hydroureter are a problem they will manifest themselves by the animal not responding to the surgery. This lack of response is especially evident in the area of urinary enzymes.



CYSTORELIN®

Gonadorelin

Standard equipment for the high-performance dairy.

Your producers look to you for help in getting the most out of their dairy operation. They want maximum milk production. To get it, make sure they're using the best equipment available for maximum reproduction. Cystorelin® (Gonadorelin).

For nearly 13 years, Cystorelin has been the trusted, safe and effective GnRH product for treating cystic ovaries to improve reproduction efficiency.

You know it's extremely safe, with no adverse effects on pregnant animals. And you know it's extremely cost-efficient, because of Cystorelin's high response rate in treating cystic cows to enhance reproductive efficiency.

Use Cystorelin to control ovarian cysts and get a boost in reproductive efficiency. Tell your dairy clients that on every high performance dairy, Cystorelin is standard equipment.

Cystorelin® (Gonadorelin, Abbott)

Description: Cystorelin is a sterile solution containing 50 micrograms of gonadorelin (GnRH) diacetate tetrahydrate per milliliter suitable for intramuscular or intravenous administration. CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian. How Supplied: Cystorelin is available in a concentration of 50 mcg/ml, pH adjusted with potassium phosphate (monobasic and dibasic). Cystorelin is supplied in single vials containing 2 ml of sterile solution. Refer to package insert for full label directions.



© 1990 Sanofi Animal Health, Inc.,
a subsidiary of SANOFI, Inc.,
7101 College Boulevard, Overland Park, KS 66210.
Toll free, 1-800-538-2382.

Cystorelin is a Reg. TM of Abbott Laboratories. 9-4393/12

Quality products and service.

