

# AABP/SFT Joint Sessions

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## Male Reproductive Surgery

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### Introduction

Although male reproductive surgery can be very rewarding, it is overall a bad area to do surgery. To have a successful outcome there must be complete freedom of movement. The area is prone to post operative swelling and the area is contaminated, which increases the risk of post operative infection. Post operative infection leads to abscesses which lead to secondary adhesions as they heal. With these factors in mind a guarded prognosis is in order and these surgeries should only be considered on valuable animals.

Urogenital surgery requires a lot of time, not only from a surgical standpoint, but also extended time out of service post-operatively. Depending on the surgical procedure at least 30 days of sexual rest is recommended. In most cases this removes a bull from the program for an entire breeding season.

Tranquilizers should be avoided when performing urogenital surgery as many of them cause the penis and prepuce to prolapse. Prolapse increases edema to the injured part and may lead to secondary trauma. Therefore, if tranquilization is necessary it should be done lightly and with caution.

### Differential Diagnosis

Two of the problems most often encountered in male reproductive surgery are penile hematomas (broken penis, rupture of the tunica albuginea) and preputial laceration complex. As these two differ greatly in treatment and prognosis an accurate diagnosis must be made before treatment or referral. There are basically three problems which cause swelling in the sheath area: 1) penile hematoma, 2) preputial laceration complex, and 3) ruptured urethra.

The ruptured urethra causes a very diffuse swelling that tends to extend from the fold of the flank on

one side to the fold of the flank on the other side, and from the end of the sheath to the scrotum. This is a pitting edema type of swelling and may, in advanced cases, be accompanied by necrosis of either the skin or preputial mucous membrane.

Penile hematomas almost always occur at the distal sigmoid flexure. In the resting (sexually) bull the distal sigmoid flexure is located very close to the base of the scrotum. Therefore, the majority of the swelling in a penile hematoma is located in the posterior half of the sheath. Often there is some secondary edema in the anterior half of the sheath, but this is less pronounced than the swelling in the posterior half. The incidence of penile hematomas is higher in the horned English breeds, although they are not uncommon in Zebu type cattle. They are, however, extremely rare in Angus cattle.

The preputial reflection and its attachment to the penis is located in the anterior half of the sheath. Therefore, after a preputial laceration the majority of the swelling is located in the anterior half of the sheath. The preputial laceration complex is seen almost exclusively in the polled breeds of cattle (see etiology) and in Zebu breeds (excessive amounts of prepuce). Based on the breed and location of the swelling one can make a presumptive diagnosis. If one feels it is necessary to tap the swelling to make a diagnosis, a clip and surgical prep is necessary. Without a clip and thorough prep it is easy to create an abscess from a penile hematoma. As some penile hematomas may become infected via the hematogenous route, it is also advisable to culture fluid which is obtained when tapping a swelling in the area of the sheath.

### Etiology

Penile hematomas are caused by the sudden bending of the erect penis. In most cases this occurs because the bull misses the vulva and jams the penis up against

the escutcheon while attempting to breed a cow. This high pressure blow out can cause a lot of damage to the surrounding tissue including the nerve supply to the glans penis and the dorsal artery of the penis. The size of a penile hematoma is directly related to how many breeding attempts the bull makes after the rupture of the tunica albuginea.

Preputial lacerations are a direct result of trauma from an external source (usually bushes and brush in a pasture). Indirectly they are the result of having the prepuce out where it can get traumatized. About 1/3 of all polled bulls lack the retractor muscles of the prepuce. Although these bulls can retract their prepuce, this takes conscious effort and at rest the prepuce is often prolapsed. The Zebu breeds typically have a preputial prolapse just due to the sheer volume of the prepuce. Thus, the naturally polled breeds and the Zebu breeds are most prone to the preputial laceration complex. This is referred to as a complex as it starts out as a laceration in a contaminated area which soon becomes cellulitis, which leads to abscess formation which later heals with scar tissue. When we, as veterinarians, are called determines where in this continuum we see this complex.

### Treatment

Bulls with penile hematomas can be treated conservatively or with surgery. Conservative therapy has only been advocated for use in small (less than 10 cm diameter) penile hematomas. The hallmarks of conservative therapy are: 1) sexual rest, 2) systemic antibiotics and 3) hydrotherapy. Success for conservative therapy is about 50%. Surgical intervention will give about a 75% success rate. In the past it has been recommended that surgery not be initiated sooner than 7 days after the injury. There is probably no basis for this recommendation and ideally one would do surgery as soon as possible after the diagnosis is made. After about 10-14 days the hematoma starts to organize and this fibrosis definitely decreases the chances of success.

This is a surgery that is ideally performed under general anesthesia, but which can be performed with a large dose (50-100cc) epidural or tranquilization and a line block. The bull should be cast into lateral recumbency and the upper hind leg should be tied up and back to expose the prescrotal area. A diagonal incision from the vestigial teats anterior and ventral for about 10-15 cm is made through the skin and subcutaneous tissue. Once through the subcutaneous tissue the hematoma is entered and as much blood clot as can be easily removed, is removed. It is important not to be too vigorous and create new hemorrhage. Once the clot is removed the rent in the tunica albuginea is located (usually on the dorsal surface of the distal sigmoid flexure) and sutured with interrupted sutures of absorbable su-

ture material. The rent in the tunica albuginea is usually spiral in nature and 3-7 cm in length. The elastic tunics are closed, if possible, with OO or OOO absorbable suture is a simple continuous pattern. It is very important to close the elastic tunics if possible as closing them will help prevent adhesions postoperatively.

The hematoma cavity is flushed with 2 million units of aqueous penicillin before closing the subcutaneous tissue and the skin. The bull should be maintained on penicillin for 5-7 days after surgery and should have 30 days of sexual rest. During the 30 days of sexual rest it is ideal for the bull to be housed near, but not with cycling females. It is not unusual for these bulls to have quite a bit of swelling for the first 7-10 days after surgery, but if there has been no contamination this swelling will decrease with no therapy.

The leading causes of failure are: 1) rupture of the dorsal artery of the penis with subsequent erection failure, 2) nerve damage to the glans with failure of ejaculation and 3) adhesions which prevent extension. It should also be noted that even after a successful surgery the bull can again have a penile hematoma at a later date. This has nothing to do with surgical technique but rather the fact that if a bull is clumsy enough to get a hematoma once, he is more prone than average to again be clumsy during a mount.

Unlike the penile hematoma, the prognosis on a preputial laceration must be determined on each individual case and is seldom better than 50%. Unless a preputial laceration is very fresh, such as the young bull with an avulsion at the glans, suturing is contraindicated. As the preputial laceration is contaminated, initially it must be treated conservatively. This will include: 1) systemic antibiotics for 7-10 days, 2) hydrotherapy, 3) corticosteroids to reduce inflammation include and 4) topical therapy. In the case of phimosis, topical therapy should include daily flushes with a 50:50 mixture of hydrogen peroxide and betadyne. With paraphimosis this should consist of daily application of a lanolin based ointment. An attempt should be made daily to replace the penis and once the penis can be replaced, a purse string suture should be placed in the end of the sheath to retain the penis.

Once healing is complete the bull should have at least 30 days of sexual rest before being used. Once healing has taken place the scar tissue can be dissected and remodeled if necessary or the bull can be circumcised.

Circumcision is a surgery that is ideally performed under general anesthesia, but which can be performed with a large dose (50-100cc) epidural or tranquilization and a ring block. The bull should be cast into lateral recumbency and the upper hind leg should be tied up and back to expose the preputial area. The penis is extended and held by an assistant. A tourniquet is ap-

plied at the mucocutaneous junction.

A circumferential incision is made around the prepuce both proximal and distal to the area to be removed (usually the area of the scar). In making these circumferential incisions, care should be taken to leave enough prepuce to cover the erect penis. A general rule of thumb requires that the prepuce be 2.5 times the length of the glans penis. A longitudinal incision is used to connect the two circumferential incisions. All three of these incisions should be no deeper than necessary to remove the damaged prepuce. The deeper the incisions are, the more likely one is to encounter major hemorrhage or damage the elastic tunics. The isolated portion of preputial mucous membrane is now removed and the proximal and distal prepuce are sutured together. In suturing the proximal and distal mucous membrane together, O absorbable suture should be used in an interrupted pattern. Any type of continuous pattern will have a tendency to constrict the prepuce and may cause a stricture which will prevent future erections. In suturing the prepuce, care should be taken to match dorsal-to-dorsal and ventral-to-ventral. At the conclusion of surgery a Penrose drain should be sutured over the end of the penis with 2 interrupted absorbable sutures. This will convey the urine out of the sheath and not allow it to run over the newly sutured incision line.

Several other techniques have been described for circumcision. Most are faster than the reefing procedure described above, but are not as successful.

### **Penile Fibropapilloma**

Penile fibropapillomas are usually seen in young bulls (12-18 months of age). This is the age when young bulls are first sexually active and this sexual activity is involved in the etiology and spread of the virus which causes penile fibropapillomas. Fibropapillomas may be single or multiple and may range from the very small to masses 5-6 cm in diameter. Although penile fibropapillomas are warts they do not usually respond to wart vaccine and surgery is the treatment of choice.

Surgery for penile fibropapillomas is usually performed under local anesthesia. The warts, which usually have a very small base (stalk), are carefully dissected so as to avoid the urethra. All wart tissue must be removed and electrocautery seems to be helpful in preventing recurrence (probably through some immune reaction). After surgery the animal should not be used for breeding for 3-4 weeks. If the warts do reoccur, a second surgery is indicated and is usually successful.

### **Penile Deviation**

Although the corkscrew (spiral) deviation is the most common in the bovine penis, ventral (rainbow) and

S deviations are also possible. Penile deviations must be carefully evaluated before even considering surgery. There is some evidence that spiral deviations may have an inherited component and therefore, it may not be advisable to correct them in a purebred herd. Also deviations may be caused by the stimulation of an electroejaculator, therefore essential to evaluate a penile deviation during natural service.

The etiology of penile deviation is the dorsal ligament slipping around to the left side of the penis. As such, all of the surgical techniques which have been described attempt to anchor the dorsal ligament to the tunica albuginea.

This is a surgery that is ideally performed under general anesthesia, but which can be performed with a large dose (50-100cc) epidural or tranquilization and a ring block. The bull should be cast into lateral recumbency and the upper hind leg should be tied up and back to expose the preputial area.

Many methods have been described to correct this problem. The method described here has given consistently good results and may be easier to accomplish than some of the other techniques. This method employs the fixation of strips of the dorsal ligament into the tunica albuginea.

With the bull in lateral recumbency and blocked the penis is prepped and extended. An incision is made through the epithelium on the dorsum of the penis from a point one inch from the distal extremity to 4-5 inches from the mucocutaneous junction. The dorsal ligament is exposed by carefully incising the elastic tunics. Incise the dorsal ligament on its midline and elevate each side for 1/2-1 cm. Cut a 1/2 cm, inch width, strip from each edge of the dorsal ligament, leaving them attached at their proximal ends. Close the incision in the dorsal ligament with a continuous suture of O or OO absorbable suture. Using a large needle, implant the two strips of dorsal ligament in a criss-cross (shoelace) pattern taking bites well into the tunica albuginea and terminating as near the distal end of the penis as possible. Transfix the distal ends of the strips of the ligament to each other and to the dorsal ligament. Suture the elastic tunics with a continuous layer of OO or OOO absorbable suture. Close the epithelium with O absorbable suture and suture a Penrose drain over the tip of the penis with two interrupted sutures before returning the penis to the prepuce.

Surgical correction of ventral or rainbow deviations is far less successful and requires the implantation of strips of biceps fascia or artificial implants to strengthen the dorsal ligament.

### **Seminal Vesiculectomy**

As medical therapy for seminal vesiculitis is often unsuccessful, surgical removal is probably the prefer-

able treatment in bulls used for artificial insemination. Seminal vesiculectomy has been far more successful in young bulls (1-2 years of age) than it has been in older bulls. Because of the poor success rate, surgical removal of seminal vesicles in older bulls cannot be recommended at this time. The preferred approach for seminal vesiculectomy is through the floor of the rectum using the technique described by Hull et al. Penile vasculature, innervation and the musculature responsible for achieving and maintaining an erection lie adjacent to the rectum and may be damaged using the surgical approach through the ischio-rectal fossa.

Antibiotics should be administered for 1-2 days before seminal vesiculectomy. Ideally the antibiotic of choice would be determined by culture and sensitivity of seminal fluid obtained in a sterile manner. Antibiotics should be continued for 4-5 days after surgery as postoperative abscesses often lead to disastrous results.

Local anesthesia is achieved with the use of epidural anesthesia. Tranquilization is also probably indicated as well depending on the temperament of the animal. In this regard xylazine is probably not the drug of choice as it may lead to the animal lying down during surgery.

The rectum is manually evacuated as far forward as possible and packed off with a large cotton tampon. Tampons can be made by placing roll cotton in 6-inch stockingette. Placing the cotton within the stockingette facilitates later removal. Once the rectum has been evacuated and packed the entire perineal area is clipped and prepped for surgery. As part of the preparation for surgery, the rectum is thoroughly cleaned with povidone-iodine.

A vertical incision transecting the anal sphincter is made at the 6 o'clock position. This incision extends ventrally to the penis as it crosses the ischial arch and

is carried anteriorly for a distance of 8-10 cm. This incision extends to the depth of the urethralis muscle. Holding the incision open with towel forceps or stay sutures facilitates visualization during the remainder of the surgery. Blunt dissection is used to continue the incision forward along the penis. Sharp dissection should be minimized, as hemorrhage is difficult to control and may lead to unacceptable results. Once the seminal vesicles are identified they are freed by blunt dissection from the surrounding tissue. The vesicles will be freed from anterior as they attach to the penis at their posterior pole. If care is used during the blunt dissection the peritoneum should not be penetrated. Once both vesicles have been freed they can be removed with a chain ecrasure. They should be removed individually as close to the penis as possible to minimize any residual "stump" which may still contain purulent exudate. The muscularis and submucosa of the rectum are closed with a continuous Lembert pattern of absorbable suture. Extreme care should be exercised in placing this suture so as not to penetrate the rectal mucosa. As the rectum is closed it should be tacked to the surrounding tissue to minimize dead space. The anal sphincter can be reconstructed with horizontal mattress sutures. The skin can be closed with non-absorbable suture in a pattern of the surgeon's choice. Once the surgery is completed the tampon is pulled posterior to the surgical area and is left there for an hour before total removal. The pressure of the tampon helps minimize post-surgical hemorrhage.

### Conclusion

Although reproductive surgery is time consuming and often difficult, it can be very rewarding as the potential value of the animal is so great.