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INDICATIONS FOR ENDOSCOPIC EXAMINATION IN THE STALLION

Stallions may develop ascending infections of the genitourinary tract and reproductive organs, including the urethra, accessory sex glands, bladder, testis and epididymides. Direct visualization of the tissues, such as the urethra and bladder, help to narrow the differential list in cases where hematuria/hematospermia or pyuria/pyospermia is present. Endoscopy may also be used to catheterize the common duct, along with palpation/ultrasound to direct the catheter into the affected vesicular or ampullary gland. Urethral trauma and hemospermia are common complaints. The nature and extent of urethral and accessory sex gland problems are best explored through a direct endoscopic approach. Unusual congenital abnormalities may also be assessed using this approach.

NORMAL ANATOMIC FEATURES

The portions of the stallion’s reproductive tract that may be visualized using endoscopy include the sheath, urethral opening, penile urethra, pelvic urethra, colliculus seminalis, and bladder (Fig. 1). The two common ducts of the ampulla and seminal vesicles open on the colliculus seminalis (Figg. 2, 3). The prominent bulbourethral gland openings, prostatic ducts, and urethral glands, are visible along the urethra (Fig. 2). The opening to the bladder is also visible (Fig. 3).
putial ring it joins the external lamina of the internal prepuce. The prepuce contains glandular tissue that secrete smegma, a waxy substance, which should be removed along with the exfoliated skin to visualize the surface.

If the goal is to fully assess the penis and internal and external preputial lamina, the stallion may be sexually aroused by teasing mares in estrus and/or sedated to allow the penis to relax and extend from the sheath. Geldings are usually sedated. Some tractable male horses allow the penis to be manually pulled down from the internal preputial cavity. Alpha agonists such as xylazine, and detomidine are useful for the purpose of sedation, and may be combined judiciously with acepromazine. Caution is advised when using acepromazine, because it has been reported to be associated with penile priapism (paralysis). Following arousal from sedation with acepromazine a reasonable precaution is to monitor the stallion to insure he retracts his penis, or encourage him to retract his penis by walking, application of cold water etc.

Sedation results in muscular relaxation, and allows the penis to protrude from the sheath. Indications for evaluating the interior of the sheath of a stallion/gelding include: history of never dropping the penis, excess discharge, foul smell, trauma, palpable mass, phimosis etc. Horse owners are sometimes concerned when young colts either urinate in their sheath, relax the external preputial lamina, but fail to fully extend their penis for urination. Errorously some horse owners think that they have a foal with a congenital abnormality. Occasionally insect bites to this region result in swelling of the preputial tissue and a failure to fully retract the prepuce. The attachments of the prepuce to the penis may take a while to remodel in young colts and this condition resolves on its own without treatment.

Space occupying masses on the penis or the prepuce may prevent penile protrusion. In these cases endoscopy of the prepuce may be used. Conditions of the prepuce include: infections, tumours such as squamous cell carcinoma, melanoma, lymphosarcoma, and sarcomas. Balanoposthitis (infection or inflammation of the penis and prepuce) may accompany coital exanthema, habronemiasis, insect hypersensitivity, trauma, squamous cell carcinoma or other bacterial infections.

Smegma and exfoliated skin debris is normal finding in the sheath of stallions. Loose skin debris accumulates at the preputial ring, prepuce and on the penile shaft. Discharge from the sheath may be noted in some stallions or geldings and be evident on the horse’s hind legs. Some discharge is attributed to normal preputial secretions, but excess secretion may accompany overzealous cleansing, bacterial overgrowth, balanitis, coital exanthema, fo-
reign bodies, habronemiasis, and squamous cell carcinoma. Pruritis and inflammation may be present in some cases. Bedding, particularly fine shavings, seems to be an irritant in some stallions and may be associated with bacterial infections. Microbiologic culture of the prepuce commonly yields a mixed bacterial growth. A heavy pure culture of bacteria may indicate an imbalance in the microflora of the prepuce/penis. Treatments for bacterial balantis include cleansing, antibiotics therapy, NSAIDs and in resistant cases immunomodulators and smegma transplants.

**PENIS**

The penis of a light horse stallion is approximately 50 cm long. The penis is approximately 6 cm in diameter. There is a large degree of variation in penile length and diameter. The examiner should note any abnormalities on the penis or prepuce such as lesions associated with coital exanthema, balanoposthitis, squamous cell carcinoma, melanomas, lymphosarcoma, etc.

**PENILE HYPOPLASIA**

A history of never having seen the penis dropped has been reported due to penile hypoplasia that accompanied Persistent Mullerian Duct Syndrome in a horse. The horse had no history of castration and had the phenotypic appearance of a gelding. The shaft of the penis was very short which mechanically would not allow the penis to protrude from the sheath.

**Foreign bodies** include stallion rings, misplaced rubber bands from malfunctioning artificial vaginas, and organic matter such as bedding.

**URETHRA**

The urethra in the stallion is long and it begins at the neck of the bladder, and ends on the ventral portion of the glans penis. Indica-

**Urethral Endoscopy**

Indications for urethral endoscopy include: hematuria, hemospermia, abnormal urination, pyospermia, fertility problems, and palpable accessory gland abnormalities. Urethral lacerations may occur when the tail hairs of the mare obstruct a stallion’s breeding attempts.

**Figure 4 - Normal healthy urethra with the preferred amount of insufflation.**
Insufflation may be used to determine the extent of the injury. Over-extension of the urethra is the most common error (Fig. 5A-C). Over-extension results in a blanching of the urethra, and blood may be observed to rush back and forth in response to changing insufflation pressures. The odd blanched appearance of the urethra may be confused with urethritis, and the streak like appearance of the blood misidentified as hemorrhage. Full dilation of the urethra with air to see the urethral lumen should be performed only after the defect has been identified. Dilation of the pelvic urethra may also assist in locating the colliculus seminalis, and opening to the bladder. A uterus masculinus may be visible in some stallions.

The extent of penile relaxation and the intrinsic length of the penis will determine the distance to the accessory sex gland openings and the bladder. The examiner passing the endoscope should record any lesions in relationship to the insertion depth of the equipment. Almost full insertion of the equipment is common. Allowing the penis to partially retract will increase the working length of the endoscope.

The region of the urethra near the junction between the penile and pelvic injury is particularly prone to injury and should be carefully examined. Once the full extent of the urethra has been examined, the insufflation pressure may be increased to allow viewing of the structures in the pelvic urethra. In the pelvic urethra the anatomic structures will come into view in sequence. The prominent openings for the bulbourethral glands are found on the midline, followed by the smaller and laterally located urethral glands. Small pin point openings of the prostate are visible near the colliculus seminalis. The common ducts of the ampullae and seminal vesicles can be seen opening on the colliculus seminalis. The caudal most structure is the opening to the bladder. The colliculus is located dorsally, which is important in deciding which gland opening to cannulate. Rectal massage of the accessory sex glands may move discharge out of the glands in cases of seminal vesiculitis. This material may be cultured.

**PATHOLOGIC CONDITIONS**

**Urethritis**

Urethritis is inflammation of the urethra. The caudal segment of the urethra near the penis is usually involved. Smegma may form small concretions (beans) in the urethral fossa which may mechanically impinge on the urethral opening causing irritation. Bacterial infection of the caudal urethra may also be present. Bacteria such as *Streptococcus equi*
subspecies *zooepidemicus*, *E.coli*, and *Actinobacillus* have been reported in pure or mixed cultures to cause urethritis.

**Summer Sores - Habronemiasis of the urethra**

*Habronemiasis* is caused by the hatched larva or Drashia spp and Habronema spp. The flies are attracted to moist tissue such as the prepuce and urethral opening. The lesions are pyogranulomatous and may be rapidly progressive. Scrapings of the affected tissue may contain larvae. Biopsies have characteristic features such as a dramatic eosinophilic infiltrate, and may be used to differentiate habronemiasis from squamous cell carcinoma. Caseous granules are present in the lesions. Complete blood counts may show systemic eosinophilia. Systemic and topical treatment with ivermectin, and non-steroidal anti-inflammatory agents are used for treatment. Corticosteroids are used to decrease the immune response to the larvae.

**Seminal Vesticulitis**

Seminal vesticulitis is an uncommon ascending bacterial infection of stallions that affects one or both seminal vesicles. The seminal vesticulitis may or may not be enlarged, or have an abnormal echotexture.

A proportion of the mares bred to a stallion with seminal vesticulitis may develop a sexually transmitted bacterial endometritis caused by the same organism infecting the stallion. Pyospermia, neutrophils in the semen, may be identified in the semen. Mares may have shortened interestrous intervals. Semen should be sent for quantitative bacterial culture and sensitivity, and typically shows mixed bacterial growth. Pathogens associated with seminal vesticulitis include Klebsiella and Pseudomonas, but only a few serotypes associated with venereal disease. These organisms are also found commensally and in the absence of clinical signs in a stallion, recovery of these bacteria from the semen is not a significant finding. Rarely have other organisms such as Actinobacillus, Strep and Staph been reported. Palpation of the infected seminal vesicle during endoscopy may result in expression of discharge coming from the common duct on the affected side (Figure 7).

The common duct of the seminal vesicle is catheterized by advancing a catheter through the biopsy port of the endoscope. Using direct visualization the catheter is guided into the common duct (Figure 8).

![Figure 6](image6.png)

*Figure 6 - Habronemiasis affecting the prepuce of a stallion.*

![Figure 7](image7.png)

*Figure 7 - Close-up view of brown purulent discharge coming from the common ducts in a stallion with seminal vesticulitis.*
Rectal palpation and ultrasound are used to confirm the location of the catheter in the seminal vesicle. The ampulla is positioned lateral to the seminal vesicle. Generally the seminal vesicle is easiest to catheterize as it is positioned along the midline. Simultaneous ultrasound of the seminal vesicle while flushing the catheter in the common duct to distend the gland is another means of confirmation. Poor penetration of antibiotics is achieved in the seminal vesicle through systemic administration, therefore local instillation of antibiotics is performed by injecting them through the catheter directly into the lumen of the seminal vesicle. In severe cases the seminal vesicle will be grossly enlarged (Figure 9). Semen extenders may also be prepared with antibiotics that have activity against the bacterial contaminants.

**Hemospermia**

Hemospermia in the stallion may vary from microhemospermia to frank blood. Hemospermia may be caused by trauma, idiopathic urethral rents, ulcers, urethritis and granulomatous lesions. Micro-hemospermia may be caused by pin point lesions on the glands that bleed during sexual arousal. Frank blood is often noted on the stallion’s penis at dismount or on collection. Frank blood in the ejaculate causes infertility. The rule outs for blood on the stallion’s penis include breeding injuries such as vaginal wall lacerations of the mare, and in lesser amounts, rupture of hymen. Blood may enter the ejaculate from the stallion from penile/preputial injuries, or urethral problems. There may be a history of trauma such as breeding through a fence or unsuccessfully jumping over a fence with a full erection. The most common cause of hemospermia is idiopathic. The urethra is very vascular. During sexual arousal blood flow to the penis and urethra increases and pressure rises. A urethral lesion will communicate with the underlying corpus spongiosum penis and the pressure from sexual arousal will result in urethral bleeding. Sexual activity or arousal will prevent the lesion from healing. Bacterial infections of the urethra cause a distal primary urethritis, or an ulcerated area may be secondarily infected. Raised granulomatous lesions are sometimes seen.

If the chief complaint is hemospermia the stallion should be sexually aroused to determine if blood drips from the penis in association with arousal. Semen collection should be performed if blood is not observed, as maximal penile and urethral pressures are achieved during the ejaculatory act (Figure 10, 11). Urethroscopy is used to determine the cause, location and extent of the urethral lesion. The most common location for urethral lesions associated with hemospermia is at the junction of the penile and pelvic portions of the urethra. This area is difficult to evaluate, hence methodical evaluation with low urethral insufflations pressure should be used. Over insufflation should be avoided, because the artefacts associated with over insufflation make the identification of urethral lesions very difficult. If a
lesion is identified moderate insufflations pressure may be used to determine the depth and extent of the urethral lesion. Treatment includes: absolute sexual rest 3 weeks, with antibiotics added based on culture and sensitivity of the bacteria recovered from the lesion or urethra. The stallion is to be maintained in a location where he will not become sexually aroused. After the 3 week rest period, a semen collection is performed and the lesion is re-evaluated using endoscopy. If the bleeding persists generally sexual rest is continued for another 3 months. The evaluation process is repeated in 3 months time. If urethral bleeding continues past 3 months then an endoscopically guided subischial perineal urethrostomy is performed and left to granulate in. This allows the penile urethral to be rested from urine flow which appears to prevent healing of the urethra in some stallions. Following perineal urethrostomy the stallion may develop urine scald that requires treatment.

**Retrograde ejaculation** is an uncommon condition where the ejaculated sperm enter the bladder rather than being emitted from the penis. No sperm are found in the ejaculate even though it appears the stallion has ejaculate. The problem arises in incomplete closure of the neck of the bladder, usually as a result of problems in the sympathetic nervous system. In these cases spermatozoa are recovered in the urine following ejaculation but are not emitted. There are no endoscopic abnormalities. Measurement of alkaline phosphatase in the seminal fluid and catheterization of the bladder will confirm the diagnosis.
Evaluation of the Bladder

If no lesions are observed in the urethra following sexual arousal or semen collection the endoscope is advanced into the bladder. The bladder wall, ureters, and bladder contents are evaluated.

The mucosa of the bladder should be smooth. Thickening or haemorrhages on the wall indicate cystitis. The contents of the bladder should include cloudy mucus and urine. The openings to the ureters can be viewed dorsally, and urine observed to enter the bladder. Removal of the urine by aspiration may reveal uroliths, or accumulation of sediment (sabbulous urolithiasis).

Hematuria may result from the kidney, ureteral, bladder, urethral problems, or trauma. Chief complaint is varied and may include: weight loss, colic, tenesmus, vocalization, hematuria, pollakiuria, stranguria, pyuria, incontinence, or obstruction. Transrectal palpation and ultrasound usually reveals the presence of cystic calculi.

Obstructive urolithiasis may cause complete or partial obstruction of the urethra. Uroliths are removed via lithotripsy, crushing, shock-wave therapy or via surgery. Spasms of the urethra may be palpated over the entrapped urolith. Endoscopy is used to assist in identifying the correct location of the urolith.

Cystic calculi may be identified in the bladder, they may be spiculated or smooth. These are often palpable during rectal examination of the bladder. Cystic calculi are visualized in the bladder using ultrasound. The dense nature of the calculi results in a large ultrasound attenuation artifact (similar to a shadow) below each calculus.

Sabbulous urolithiasis is an accumulation of crystalloid sludge from incomplete voiding of the bladder as a result of bladder paralysis. The bladder may be pulled downward into the abdomen by the weight of the sludge. Catheterization of the bladder and flushing will recover some of the sludged crystalline material.

Neurogenic Bladder

Recently neurotropic strains of equine herpes virus I have been associated with bladder paralysis, leading to voiding by overflow. Rectal examination shows a large bladder and a failure to regularly empty the bladder.

Tumours such as squamous cell carcinoma and transitional cell carcinoma may be visualized in the bladder.

CONGENITAL ANOMALIES

The majority of congenital anomalies in the reproductive tract of the intersex or stallion result in changes in appearance of the external genitalia. Phenotypic, gonadal and chromosomal sex are typically investigated to determine the underlying cause.

Figure 13 - Panel A shows normal bladder mucosa and urine, panel B shows bilaterally dilated ureteral openings.
# REFERENCES


