

Treating Equine Paraphimosis

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Paraphimosis—the inability to retract the penis fully into the preputial cavity—in stallions is an emergency demanding immediate, aggressive medical treatment. Failure to treat paraphimosis can have catastrophic consequences for a breeding stallion.

FIGURE 1 shows the normal penile and preputial anatomy. Paraphimosis commonly begins as penile prolapse followed by development of excessive preputial edema that prevents retraction of the penis into the preputial cavity. If this condition is untreated, a vicious cycle ensues, compounding the severity of the condition. The longer the penis remains prolapsed, the more lymphatic and venous drainage are compromised, resulting in edema of the internal preputial lamina (**FIGURE 2**). This edema can become severe enough that the preputial ring constricts, exacerbating distal penile swelling. The exposed penile and preputial tissues are fragile and, if unprotected, can easily be damaged by pressure necrosis and exposure to environmental elements. Excoriation, infection, and/or sloughing of the associated tissue may follow (**FIGURE 3**). In cases of prolonged penile and preputial prolapse, fibrosis and damage to the internal pudendal nerves may result in permanent penile prolapse or paralysis if treatment is not successful.¹⁻³

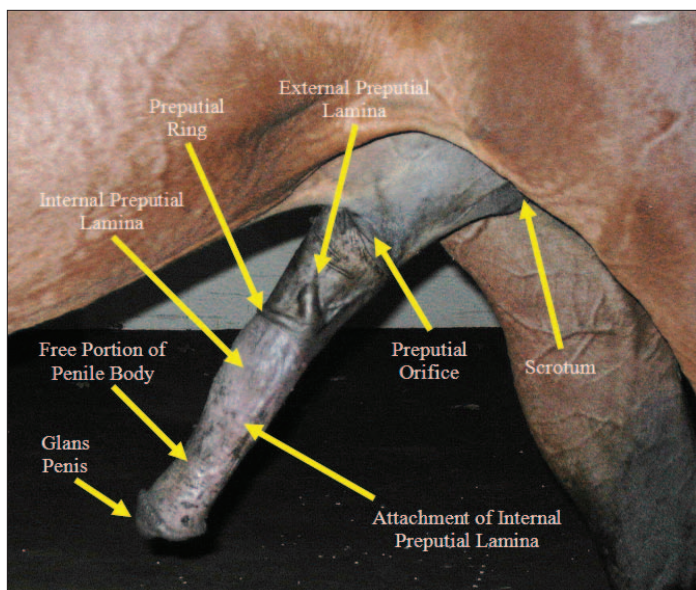


Figure 1. Lateral view of the normal prepuce and penis.

Etiology

The most common etiology precipitating paraphimosis is traumatic injury to the prepuce and/or penis during breeding activities. These injuries can result in or be associated with lacerations and/or hematoma formation. Other potential etiologies include the use of phenothiazine tranquilizers, severe debilitation, neurologic conditions such as those associated with equine herpesvirus-1 infection, and systemic diseases such as purpura hemorrhagica and dourine. Paraphimosis can also be a sequela of priapism (persistent erection) or penile paralysis.¹⁻³

Physical Examination

A thorough general physical examination should first be performed to investigate potential causes of paraphimosis, especially if breeding trauma or use of phenothiazine tranquilizers are not part of the recent history, and to evaluate the horse's ability to urinate. When this examination is completed, the prepuce and penis should be thoroughly evaluated. The affected areas should be thoroughly cleaned and palpated. Evaluating the temperature of these tissues can help determine whether blood circulation is adequate. Neural function, specifically the presence or absence of pain, is also important to evaluate. Additionally, ultrasonography of the penis and prepuce over the areas of swelling can help to determine the echogenicity of the tissue to identify



Figure 2. Penile prolapse with swelling of the internal preputial lamina.



Figure 3. Chronic paraphimosis with severe necrosis and sloughing of the preputial and penile tissue.



Figure 4. Ultrasonogram of preputial edema due to paraphimosis.

whether the swelling is due to edema only or to fluid-filled structures such as hematomas, abscesses, or seromas^{2,4} (FIGURE 4). Differentiating between these types of swelling is important for determining the course of treatment.

Treatment

Initial reduction of edema in the penile and preputial tissues should be attempted using an elastic, compressive bandage, such as an Esmarch bandage. Sedatives with strong analgesic properties (e.g., detomidine [0.01 to

0.04 mg/kg IV or IM])⁵ can be used alone or, preferably, in combination with butorphanol (0.01 to 0.02 mg/kg IV)⁵ to facilitate application of this bandage. The compressive bandage is applied to the distal tip of the penis initially and continued proximally, forcing the fluid within the tissues to move distally to proximally (FIGURE 5; FIGURE 6). This bandage is removed after 10 to 15 minutes, and manual reduction of the penis into the preputial cavity is attempted. If the penis cannot be replaced, the compressive bandage may be reapplied.² If a compressive bandage is not available, hydrotherapy, manual massage, administration of topical osmotic agents (e.g., sugar), or a combination of these therapies can be used for initial reduction of penile and preputial edema.⁶ If the penis cannot be replaced into the preputial cavity because the preputial ring is tight and stricture-like, the ring can be incised longitudinally enough to allow penile replacement. The preputiotomy site is allowed to heal by second intention.^{1,3}

Another option for reducing the size of the penis and prepuce when hematomas, abscesses, or seromas are present is to drain the fluid. Drainage should be attempted only if bleeding has ceased and the penis and prepuce cannot be replaced into the preputial cavity after the use of an elastic, compressive bandage. The most dependent area of the fluid-filled structures should be prepared aseptically and a large (14- to 16-gauge) needle inserted into this area to facilitate drainage (FIGURE 7). If the fluid is too thick to pass through the needle or if fibrin or blood clots are present, an incision with a scalpel blade can be made to facilitate their removal (FIGURE 8). Drainage can be encouraged by massage.² The drainage site should be cleaned daily and allowed to heal by second intention.

The penis and prepuce should be protected from drying, cracking, and urine scalding by applying an antimicrobial emollient cream.^{1-4,7} The cream should be lanolin or petrolatum based (TABLE 1). The presence of a steroid in the emollient cream is not necessary but may have beneficial antiinflammatory effects. If an antimicrobial cream is not available, a nonantimicrobial lanolin- or



Figure 5. Placement of an Esmarch bandage on the prepuce and penis.

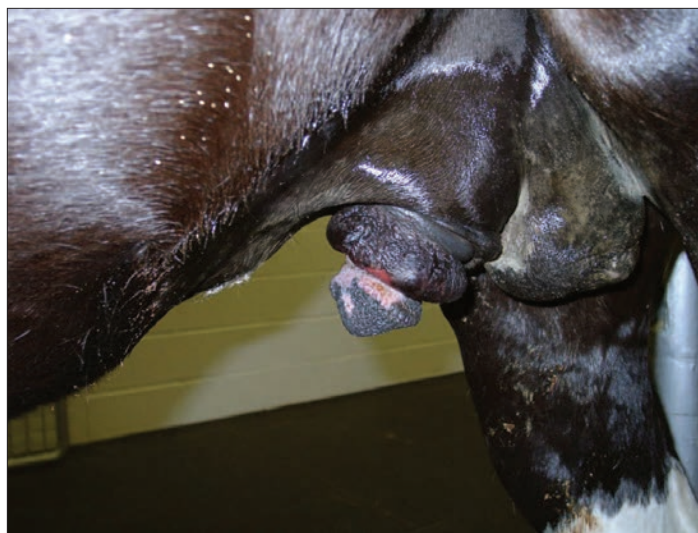


Figure 6. The same stallion as in Figure 5 immediately after removal of the Esmarch bandage.

petrolatum-based emollient cream can be used (TABLE 2). A non-antimicrobial emollient cream can be used alone or in combination with an antimicrobial ointment with or without a steroid. Another substitute for an antimicrobial emollient cream is nitrofurazone ointment (0.2%),^{4,6} but it is less desirable because it has a water-soluble base. Topical ointments and salves with any potential for irritating the tissue should not be used.⁴

After application of an emollient cream, the penis and internal and external preputial laminae are either manually or pharmaceutically replaced within the preputial cavity. Injection of phenylephrine HCl, an α_1 agonist, into the corpus cavernosum penis causes immediate but temporary retraction of the penis into a position that is more proximal in the preputial cavity than can be obtained with manual reduction. For this injection, a 7- to 9-cm² area is aseptically prepared on the right and left sides of the dorsal



Figure 7. Drainage of a preputial hematoma with a 14-gauge needle.



Figure 8. Removal of a blood clot from a preputial hematoma after incision with a scalpel blade.

aspect of the penis, just distal to the preputial ring.³ Phenylephrine (1 to 5 mg¹ diluted to 5 mL with 0.9% sodium chloride) is quickly injected into the corpus cavernosum penis at each prepared site.³ Thus, a total of 2 to 10 mg of phenylephrine diluted to a final volume of 10 mL is used per horse.

Replacement of the penis into the preputial cavity must be followed by a method of physically retaining the penis in this position to prevent recurrence of paraphimosis. A purse-string suture with a heavy suture material or towel clamps placed across the preputial orifice or preputial ring can be used for a few days (FIGURE 9). When one of these methods is used, an opening large enough to allow free voiding of urine must be provided. The penis can also be retained in the preputial cavity using a sling made of mesh or nylon hosiery (FIGURE 10) or a narrow-necked plastic bottle supported with bandage material or rubber tubing (FIGURE 11).¹⁻³ The bottom portion of the bottle is cut off, and the edges

³Varner DV. Personal communication. 2011.

Table 1. Examples of Lanolin- or Petrolatum-based Topical Antimicrobial Emollient Creams.

Emollient	Source(s)
Dexamethasone (80 mg) and oxytetracycline (3.88 g) per 1 lb of lanolin ^{1,2}	Compounded product
Petrolatum-based triple antibiotic cream (neomycin, polymyxin b sulfates, bacitracin zinc ointment) ³	Multiple generics
Silver sulfadiazine cream (1%) ^{1,2}	Multiple generics

¹Blanchard TL. Personal communication. 2008.

Table 2. Examples of Lanolin- or Petrolatum-based Topical Nonantimicrobial Emollient Creams

Emollient	Source(s)
Zinc oxide diaper rash cream	Desitin (Johnson & Johnson, New Brunswick, NJ); multiple generics
Vitamin A and D ointment	Multiple generics
Petroleum jelly ⁴	Multiple generics
Udder balm/cream ⁴	Bag Balm (Dairy Association Co., Inc., Lyndonville, VT); Dr. Naylor Udder Balm (H.W. Naylor Co., Inc., Morris, NY); multiple brand names and generics
Corona Multi-Purpose Ointment	Summit Industries, Inc. (MannaPro, Inc.), Marietta, GA

are cushioned with tape. The penis is inserted into the bottle so that the opening is adjacent to the urethral orifice. One set of tubing is placed dorsally over the lumbar region; another set is passed caudally through the hind legs on either side of the scrotum. The tubing is tied over the tail head. Bandages or retaining devices should be removed, cleaned, and re-applied twice daily.²

Another option for retaining the penis in the preputial cavity is a probang penile repulsion device (FIGURE 12; FIGURE 13).⁶ This device has several advantages over the other retention methods. The probang maintains the penis in the most proximal location possible, more effectively limiting edema formation and damage to the internal pudendal nerves. In addition, the probang can be left in place without removal for longer periods of time. A stallion examined at Texas A&M University Veterinary



Figure 9. A purse-string suture placed near the preputial ring.



Figure 10. A mesh sling retains the penis within the preputial cavity.



Figure 11. Retaining the penis within the preputial cavity using a 500-mL plastic bottle.

Medical Teaching Hospital successfully maintained a probang for 1 week without evidence of trauma or urine scalding to the penis or prepuce; application of additional elastic tape (Elastikon; Johnson and Johnson, New Brunswick, NJ) to the belly bandage was the only additional management required. It is important to note that this stallion's penis and prepuce as well as the padded end of the probang were smothered with emollient cream containing dexamethasone, oxytetracycline, and lanolin before application of the probang (TABLE 1).

If the penis cannot be replaced into the preputial cavity, the penis and prepuce should be bandaged against the ventral body wall^{1-4,7} (FIGURE 14). The purpose of the support bandage is to reduce the effect of gravity, which exacerbates penile and preputial edema.

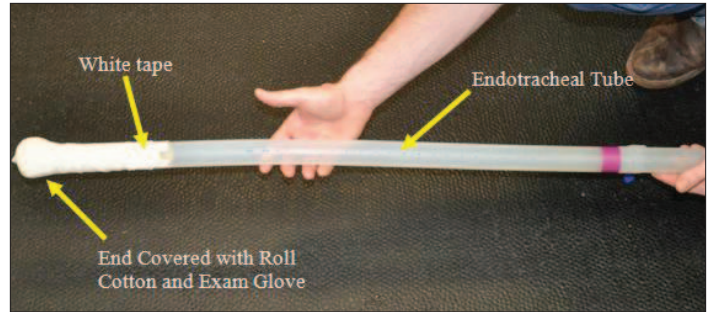


Figure 12. A probang penile repulsion device consisting of an endotracheal tube with a diameter of ~1.5 inches. The padded end is covered with roll cotton that is held in place with white tape. This end is inserted into an inside-out examination glove that is secured with white tape.



Figure 13. A horse urinates while a probang is properly secured with an Elastikon belly bandage.



Figure 14. A support bandage holds the penis against the ventral body wall.

Additional essential therapies include complete sexual rest, daily exercise, and administration of NSAIDs (flunixin meglumine [1.1 mg/kg PO or IV q12h] or phenylbutazone [2.2 to 4.4 mg/kg PO or IV q12-24h]), all of which help reduce edema and directly

or indirectly (via reduction of edema) provide analgesia.^{1-4,7} Tetanus prophylaxis should also be performed if deemed necessary based on vaccination history and risk of tetanus infection.

Adjunct therapies to help reduce edema include hydrotherapy (10 to 15 minutes once or twice daily) and systemic dimethyl sulfoxide (0.1 to 1.0 g/kg PO or IV once or twice per day for 3 days).⁴ Short-term use of corticosteroids such as dexamethasone (0.02 to 0.1 mg/kg IV, IM, or PO q12-24h) or prednisolone (0.25 to 1.0 mg/kg PO q12-24h)⁵ as well as the use of diuretics such as furosemide (0.5 to 2.0 mg/kg IV or IM q12-24h)⁵ can also be helpful for reducing edema.^{1-4,7} Administration of systemic antibiotics is indicated for infection or when an abscess, hematoma, or seroma is drained.² Placement of a urinary catheter may be necessary to permit urination.

The duration of treatment varies, but 7 to 10 days of intensive therapy is often required before the penis can be retained in the preputial cavity without support. Some cases may require several weeks of treatment,² and treatment may not be successful in some patients. For unresolved cases involving geldings, surgical intervention (i.e., penile amputation [phallectomy] or permanent retraction of the penis into the preputial cavity) can be performed, allowing the gelding to return to its intended use.^{1,3,4,7} If the affected horse is a valuable breeding stallion, the primary goal is to maintain breeding capability. If the breed registry of the stallion allows artificial insemination, the stallion can sometimes be trained to ejaculate when its nonerect penis is manually inserted into an artificial vagina.^{1,3,8} Pharmacologically induced ejaculation using imipramine (1.76 to 2.2 mg/kg PO) and xylazine (0.44 to 0.66 mg/kg IV 2 h following imipramine administration) is another potentially successful semen collection method.⁹ Love and co-workers⁸ reported that an 8-year-old Thoroughbred stallion with chronic erectile dysfunction was trained to ejaculate within a plastic examination mitt placed into the vagina of a mare. This mitt extended from the vulva to the internal os of the cervix. The stallion's nonerect penis was manually inserted into the mitt, and circumferential pressure with a hot compress (113°F [45°C]) was

applied to the base of the penis. The stallion ejaculated within the vestibular portion of the mitt. Semen within the mitt was manually directed into the uterus. The reflux of semen was used for reinforcement breeding.⁸ For stallions refractory to these methods, castration followed by the surgical intervention techniques for geldings is performed.^{1,3,4,7}

Conclusion

The keys to successful treatment of paraphimosis are to expediently minimize the dependent edema within the penile and preputial tissues and to prevent recurrence of edema. Failure to implement these crucial components in a timely manner is the most common cause of treatment failure.

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