Theriogenology Question of the Month

History

A 6-year-old Thoroughbred stallion was examined 3 weeks after it had been kicked in the scrotum while attempting to breed a mare. Treatment at the farm had included local hydrotherapy and systemic administration of anti-inflammatory drugs. The farm manager had repeatedly declined referral for further evaluation despite recommendations made by the attending veterinarian. The stallion was brought to our facility because it had become febrile and anorectic. At our facility, the stallion was extremely fractious, which required that it be heavily sedated to enable examinations to be conducted. Sedation was achieved by administration of detomidine hydrochloride (0.02 mg/kg [0.01 mg/lb], IV) and butorphanol tartrate (0.01 mg/kg [0.005 mg/lb], IV). Physical examination revealed an enlarged scrotal region with necrosis of the scrotal skin (Figure 1). The enlargement was approximately 18×20 cm (8×9 inches). Ultrasonographic examination of the scrotal region was performed by use of a 7.0-MHz curvilinear probe (Figure 2). Results of cytologic evaluation of red-tinged peritoneal fluid obtained by abdominocentesis were suggestive of abdominal hemorrhage. A tentative diagnosis was made of severe scrotal cellulitis and a hematocele.

Question

What is your interpretation of the ultrasonographic image? Please turn the page.

Figure 1—Photograph of the right side of the scrotum and inguinal region of a stallion obtained 3 weeks after it was kicked while attempting to breed a mare.

Figure 2—Ultrasonographic image of the left side of the scrotal area of the stallion in Figure 1. Marks on the right side of the ultrasonogram are at intervals of 0.5 cm.
**Answer**

Accumulation of anechoic fluid within the scrotum that is most likely blood or a serosanguineous fluid, echogenic areas consistent with fibrin or organized blood clots, and decreased echogenicity of the testis suggestive of major damage to the testis.

**Results**

Ultrasonographic evaluation of the scrotum revealed bilateral accumulations of substantial quantities of anechoic fluid (up to 3.5 cm [1.4 inches] in depth) and a thickened scrotal skin that was > 2.5-cm (1-inch) thick in some areas (Figure 3). Ultrasonographic measurements revealed that the left testis was 7.6 cm (3.0 inches) in length and 4.4 cm (1.7 inches) in height, whereas the right testis was 7.9 cm (3.1 inches) in length by 5.0 cm (2.0 inches) in height. Parenchyma of the left testis appeared less echogenic than normal.

Three distinct echogenic areas were visible around the testes. Two of the echogenic areas were clearly delineated (2.5 × 5.0 cm [1 × 2 inches] and 3.7 × 2.8 cm [1.5 × 1.1 inches]). These areas had an echogenic appearance consistent with that of testicular parenchyma; however, because the images were obtained 3 weeks after the original trauma, it was possible that the areas could also have represented blood clots. The third area consisted of multiple echogenic strands that floated freely in the fluid at the cranial aspect of the scrotum and also appeared to be attached to the cranial pole of the left testis. This was interpreted to be an organized blood clot.

We believed that the tunica albuginea may have been ruptured, so surgical exploration of the scrotum was performed. The stallion was anesthetized and positioned in dorsal recumbency. A 1.5-cm (0.6-inch) stab incision was made in the scrotum to facilitate drainage of hemorrhagic fluid and blood clots. Severe scrotal cellulitis was evident, and approximately two thirds of the scrotal skin was removed because of severe necrosis.

Exploration of contents within the damaged left vaginal tunic revealed a rupture of the tunica albuginea on the lateral aspect of the testis, severe necrosis of the testis parenchyma, and adhesions consisting predominantly of a large fibrin clot attached to the cranial aspect of the testis. Because of the chronic and severe nature of the injury, a poor prognosis was given for the ruptured testis and unilateral castration was performed; therefore, the left testis was emasculated and removed (Figure 4). Histologic evaluation revealed that the superficial testicular parenchyma (dark tissues) had the most substantial necrotic changes, whereas the deeper parenchyma (pale tissues) was less affected. The reason for the disparity was probably associated with the chronic nature of the injury and the location of directed forces of the kick (superficially on the testis), with considerable or complete loss of blood supply to the most severely affected area. The deeper testicular parenchyma had predominantly interstitial components (ie, interstitial [Leydig] cells), with only a few degenerating sustentacular (Sertoli) cells and no spermatozoa.

A small tear was detected in the right vaginal tunic. Exploration of the contents within that tunic revealed an accumulation of hemorrhagic fluid but no rupture of the testis. An adhesion was evident between the right testis and vaginal tunic. Because of the adhesions, chronic nature of the injury, and severe necrotizing cellulitis of the scrotum, a poor prognosis for future breeding with the remaining testis was given. The potential for ascending infection and possible peritonitis was...
substantial, and bilateral castration was recommended; however, the agent for the stallion refused this option. A swab specimen for bacteriologic culture was collected from deep within the vaginal tunica during surgery. Contents within the right vaginal tunica were lavaged thoroughly by enrofloxacin. A palpated collagen sponge was placed within the tunica, and the tunica was partially sutured with 2.0 synthetic monofilament glycomer in a simple interrupted pattern. The left scrotal area was packed with sterile cheese cloth and the right side with laparotomy sponges.

Following recovery from anesthesia, the stallion was administered cefiofur (2 mg/kg [0.9 mg/lb], IM, q 12 h for 7 days) and phenylbutazone (4 mg/kg [1.8 mg/lb], PO, q 24 h). Proteus vulgaris and Staphylococcus spp were isolated from the swab specimen, and an antibioticgram revealed that both organisms were susceptible to cefiofur. The stallion was discharged from the hospital on the day after surgery with instructions to have the packing (ie, cheese cloth and laparotomy sponges) removed 48 hours after surgery.

The owner was informed that the stallion had a poor prognosis for future return to breeding because of the chronic cellulitis and ascending infection of the remaining spermatic cord. The packing was removed by the referring veterinarian, and hydrotherapy and brisk hand walking of the stallion were performed twice daily. Five days later, the stallion had an increased amount of swelling in the scrotal area and was returned to our facility for evaluation and treatment.

Ultrasonographic examination of the scrotal region revealed fluid accumulation within both halves of the scrotum, especially around the right testis. The incision on the left side had sealed; it was reopened and enlarged to facilitate drainage. This area was packed with laparotomy sponges, which were to be removed 24 hours later. Removal of the right testis was again recommended because of the risk of infection, but the agent again declined. Cefiofur was prescribed for an additional week. The horse was discharged from the hospital, and the agent was instructed to monitor the horse closely for signs of fever, lethargy, or infection.

Five days later, the stallion was again evaluated at our facility because of fever and lethargy. Palpation of the scrotal region elicited signs of pain and revealed thickening of the left spermatic cord. Ultrasonographic examination revealed an abscess within the left half of the scrotum. The right testis appeared ultrasonographically normal; however, the spermatic cord appeared enlarged. A thick structure was palpable on the floor of the pelvic canal, and transrectal ultrasonography identified this structure as an enlarged urethra. Creamy discharge emerged from the tip of the penis during per rectal manipulations. Urethroscopy revealed diffuse moderate inflammation of the urethra, although the urinary bladder appeared to be normal.

Urinalysis revealed blood and bacteria in a urine sample obtained from the stallion. Staphylococcus aureus was isolated from the urine; the isolate was susceptible to enrofloxacin. Abdominal ultrasonography yielded unremarkable results, and cytologic analysis of peritoneal fluid obtained by abdominocentesis yielded results within expected limits. A CBC revealed moderate neutrophilia with evidence of mild toxic effects. On the basis of these findings, a diagnosis was made of an abscess in the left hemiscrotum, septic urethritis, and inflammation of the right vas deferens. Enrofloxacin was prescribed (3 mg/kg [2.3 mg/lb], PO, q 24 h for 10 days). The infection resolved uneventfully.

**Discussion**

Scrotal and penile injuries in stallions are common and can end the reproductive career of a stallion when the injuries are not quickly and properly managed. In humans, approximately half of the men with severe scrotal trauma also have rupture of the tunica albuginea. Compared with males of other species, stallions may be more prone to rupture of the tunica albuginea during trauma because of the massive directed forces of a kick from a mare. Early diagnosis of tunica rupture by ultrasonographic evaluation in men allows early surgical exploration and repair via suturing of the defect in the tunica albuginea. To our knowledge, surgical repair of a ruptured tunica albuginea in a stallion has not been reported. Ultrasonographic evidence of a large hematocoele and loss of the defined tunica albuginea on the surface of the testes are recommended hallmarks in humans that should alert physicians to the possibility of rupture of the tunica albuginea.

Surgical exploration is recommended in men following scrotal trauma to confirm and repair any ruptures of the tunica albuginea. Early intervention in men results in a decreased likelihood of unilateral castration following injury. Of 65 men with scrotal trauma in 1 study, 30 (46%) had rupture of the tunica albuginea. Ultrasonographic evaluation had a positive predictive value of 93.8% and a specificity of 85.7% for correctly identifying tunic rupture. In 2 men, a suspected tunic rupture was not confirmed during surgical exploration. No tunic ruptures identified during surgery were missed during ultrasonographic examination.

Follow-up reports on fertility after surgical repair of a ruptured tunica albuginea in men are sparse. Successful repair may lead to resumption of normal spermatogenesis in approximately half of the affected men. It has been reported that there is atrophy of the repaired testis in approximately half of the affected human males as a result of alterations in blood supply and necrosis.

The stallion described here depicts the emergency nature of breeding injuries in stallions and the impact such injuries can have on future fertility. In this stallion, severe trauma with considerable hemorrhage into the scrotum led to an ideal environment for bacterial growth, which resulted in scrotal cellulitis and ascending infection. Appropriate intensive treatment during the period immediately after injury generally includes hydrotherapy and administration of anti-inflammatories and antimicrobials. Because the stallion was not examined at our facility until 3 weeks after the original injury, the prognosis for retaining fertility was extremely poor. It is recommended that all stallions with trauma to the scrotum receive immediate veterinary attention and ultrasonographic evaluation. In stallions in which trauma is not severe, injury may be limited to scrotal swelling and a minimal hematocoele. These stallions can

be managed medically by the use of hydrotherapy, sling supports, and systemic administration of anti-inflammatory agents. Early surgical exploration may be recommended in horses with scrotal injury that have a large hematocele or in which ultrasonographic examination suggests possible rupture of the tunica albuginea. Ultrasonography is not likely to provide a definitive diagnosis; however, the index of suspicion may be raised sufficiently to warrant surgical exploration in horses with severe trauma.

Drainage of a hematocele, debridement of fibrin clots, and repair of the tunica albuginea (if ruptured) may allow retention of a traumatized testis and restoration of spermatogenic function. It is not known whether the left testis of the stallion described here could have been saved, even if early surgical exploration and repair of the ruptured tunica albuginea had been undertaken. However, appropriate early treatment probably could have saved the intact right testis, prevented complications of ascending infection, and salvaged the stallion’s breeding potential.

Outcome

A breeding soundness evaluation was performed on the stallion 3 months after resolution of the infection. Palpation of the scrotum revealed that it was nearly normal with only mild scarring. The right testis was palpably normal and appeared ultrasonographically to have a normal echotexture.

The stallion had poor libido and was extremely reluctant to mount a mare in estrus. After several unsuccessful attempts to collect semen by use of an artificial vagina, the stallion was allowed to naturally breed the mare in estrus and a dismount sample was collected after breeding and apparent ejaculation. The fluid recovered contained only a few dead, morphologically abnormal spermatozoa. The owner was given a poor prognosis for future fertility. Subsequent evaluation of the stallion’s fertility was recommended but, to our knowledge, has not been performed.

References


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