Frog puncture wound with navicular bursa envolvement in a horse – a Case report*

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ABSTRACT. Santos Júnior J.C.B., Türner S.P., Weiss L.M., Pontvianne F.F., Ramos M.G.S.N., Caruso A.C.P. & Lessa D.A.B. **Frog puncture wound with navicular bursa envolvement in a horse - a Case report.** [Ferida perfurante em ranilha com envolvimento da bursa do navicular em equino - Relato de caso.] *Revista Brasileira de Medicina Veterinária, 38(1):65-68, 2016*. Faculdade de Veterinária, Universidade Federal Fluminense, Rua Vital Brazil Filho, 64, Vital Brazil, Niterói, RJ 24230-34, Brasil. E-mail: annacaruso@globo.com

A 5 years old show jumping mare presented a deep puncture wound of the frog, involving the navicular bursa. The diagnosis was confirmed by positive--contrast fistulography and deep digital flexor tendon ultrasonography. The treatment included systemic non-steroidal anti-inflammatory drugs, broad--spectrum antibiotics, cryotherapy, and regional intravenous perfusion (RIP) of gentamicin. The horse achieved full recovery and returned to high level of performance 8 months after the injury.

KEY WORDS. Equine, frog, puncture wound, cryotherapy.

RESUMO. Este relato de caso refere-se a uma ferida penetrante profunda da ranilha com envolvimento da bursa do navicular em uma égua de 5 anos de idade utilizada para salto. Foi realizado fistulograma com contraste positivo e ultrassonografia do tendão flexor digital profundo. A terapia médica instituída incluiu o uso sistêmico de droga anti-inflamatória não esteroidal e antibióticos de amplo espectro, além de crioterapia do casco e perfusão regional com antibiótico, ocorrendo total recuperação do paciente em oito meses após a ocorrência da ferida.

PALAVRAS-CHAVE. Equino, ranilha, ferida perfurante, crioterapia.

INTRODUCTION

Horses are frequently subjected to hoof injuries caused by sharp objects during exercise. The frog and white line are the most commonly affected structures of the hoof. These areas are composed of less resistant tissues, which can be easily punctured by sharp objects.

The internal soft tissues of the hoof are often affected by bacterial infection subsequent to puncture wounds of the hoof. The diagnosis and treatment of these infections poses a challenge to veterinarians (Redding 2007).

Puncture wounds in the frog area should be considered emergencies, and early therapy must be

*Received on June 17, 2015.
Accepted for publication on December 24, 2015

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instituted to increase the chance of success. Diagnostic imaging is essential to determine the extent of the lesion (Richardson et al. 1986). Antibiotic and anti-inflammatory therapies are a mainstay of treatment, and lead to good results when treating superficial wounds. However, surgical debridement is often necessary to treat deep puncture wounds.

The prognosis for recovery of puncture wounds with central or collateral sulci involvement depends on whether or not synovial structures affected. The prognosis is more favorable when frog wounds do not involve synovial structures. Treatment immediately after trauma is also essential to improve prognosis (Kilcoyne et al. 2011).

The present study reports a case of a puncture wound in the through the central sulcus of the frog. The horse was treated with regional intravenous perfusion (RIP), and achieved total athletic performance recover.

HISTORICAL FINDINGS

This case report describes a 5 year old, high level show jumping, mare (510kg bwt). During training, the mare had a nail puncture the middle portion of the central sulcus of her left hind limb frog.

According to Stashak (1994) lameness classification, it was observed a grade 4/4 lameness on the left hind limb. Physical examination revealed a puncture wound caused by a nail entering through the central sulcus of the frog on the left hind limb. The sole and frog were sensitive to hoof testers. Left hind digital pulses and hoof temperature were increased, and the mare was non-weight bearing on the left hind limb during rest.

It was performed a 1 cm circular incision at the site of the puncture wound. An injection of 5 ml of 10% iodine was performed at this site once daily for 7 days. It was done intramuscular injections of procaine penicillin G (1500000 IU), penicillin G potassium (1500000 IU), benzathine penicillin G (3000000 IU), dihydrostreptomycin sulfate (1250 mg) and streptomycin sulfate (1250 mg) q. 24h for seven days. In addition, the horse received phenylbutazone (4.4 mg/kg bwt i.v. q. 24h) for 7 days. An intramuscular dose of 5000 IU of tetanus serum was administered. The horse's shoes were pulled off, and the left hind foot was wrapped with cotton and bandage.

The initial treatment produced no positive results. The mare continued to exhibit non-weight bearing lameness, marked sensitivity on the sole and frog with hoof testers, increased hoof wall temperature, bounding digital pulses, and purulent exudate draining from the wound. These clinical signs were consistent with septic pododermatitis.

A positive-contrast fistulography was performed with organic iodate (25% sodium diatrizoate). Lateromedial and dorsoplantar radiographs were obtained of the left hind foot. Radiographs showed extension of the wound tract into the navicular bursa, in addition to a radiolucent area above the navicular bone (Figure 1).

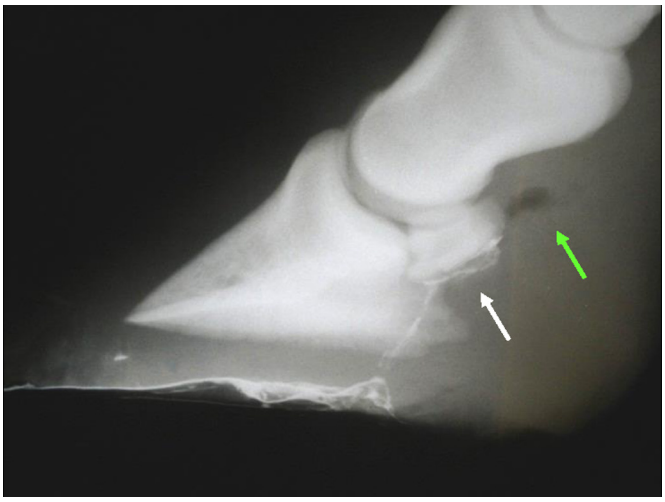

Figure 1. Lateromedial positive-contrast fistulography projection of the left hind foot. The contrast medium was injected into the wound tract and entered navicular bursa (white arrow). A radiolucent area was observed proximal to the navicular bone (green arrow).

Based on the radiographic findings, an ultrasound was performed. No abnormalities were observed in the digital flexor tendons with the ultrasound. Diagnostic imaging results supported a diagnosis of septic pododermatitis and navicular bursitis.

A new treatment protocol was initiated, including cryotherapy of the hoof for 30 minutes q. 8h., meloxicam (0.6 mg/kg bwt p.o.) q. 24h for 10 days, and a protective bandage with a topical mixture of penicillin and streptomycin (aforementioned in the first therapy protocol). Immediately after the first session of cryotherapy, the patient's comfort level was obviously improved, and 2 hours of full weight bearing on the left hind was observed. The temperature of the hoof wall and the digital pulses were also decreased.

The new treatment protocol yielded clinical improvement, with decreased sensitivity to hoof testers, improved hoof temperature and decreased digital pulses. However, the mare only would not fully bear weight on left hind foot. The mare's lameness persisted at 3/4, only toe touching. As a result, the parenteral antibiotic therapy was suspended and a new protocol was introduced: a single dose of regional intravenous perfusion (RIP) using gentamicin (1 g/kg bwt. i.v.). The mare continued to undergo cryotherapy, oral meloxicam, and wearing the protective bandage.

RIP was performed after placing a crepe bandage and a Smarch bandage at the proximal third of the left metatarsal bone in order to tourniquet the distal limb. A 21 gauge needle was used to perform venipuncuture of the lateral metatarsal vein. The blood was allowed to flow from the needle until the flow rate slowed naturally, then the gentamicin was injected (Figure 2). The tourniquet was maintained tightly for 20 minutes after the gentamicin injection, and then it was gradually loosened.

Physical exam was performed 24 hours after RIP. A grade 3/4 lameness was detected, with partial weight


Figure 2. Regional intravenous perfusion with gentamicin.

bearing of the left hind during rest. By day 10 post RIP, the lameness improved to grade 2/4.

Twenthy days after RIP, the frog puncture wound was completely healed. Mild sensitivity to hoof testers was detected only when placed directly on the frog. At this time, the protective bandage was removed, therapeutic shoes were applied, and the horse was kept on stall rest for 30 days. After 30 days, physical examination revealed a decrease in lameness to grade 1/4, with no sensitivity to hoof testers. Strict stall rest was continued for another 30 days, in addition to 10 minutes of hand walking twice daily on a hard surface.

After this time, another physical exam reported no sensitivity to hoof testers and an intermittent grade 1/4 lameness grade. The mare was thus allowed 15 minutes of turnout twice daily on a plain pasture for 30 days. At the end of this period, the lameness was no longer observed.

A 90 days exercise program was then formulated to return the mare back to normal performance activities. The patient was examined and found to be fully recovered in 8 months after the puncture wound.

DISCUSSION AND CONCLUSION

After diagnosing the puncture wound, the initial treatment protocol using injectable penicillin and streptomycin was intented to prevent ascending infection and septic pododermatitis. affecting navicular bursa and flexor tendons. However, this conservative treatment was not effective in case of this deep puncture wound (Richardson et al. 1986).

The use of injectable penicillin and streptomycin was not efficient promoting clinical improvement. This finding could be related to local microbial resistance, or possibly to low bioavailability of injectable chemotherapeutics to the infected area.

Frog puncture wounds involving the central sulcus have a high risk of damaging important anatomical structures, including the distal interphalangeal joint, the digital tendon sheath and the navicular bursa (Redding 2007). Extension of the infection into these areas explains the rapid onset and the maintenance of clinical symptoms during the first treatment protocol in this case.

The positive-contrast fistulography allowed the determination of the depth of wound tract, showed changes in the navicular bursa, and also showed a radioluscent area proximal to the navicular bone. This displays the importance of positive-contrast fistulography in the diagnosis of septic pododermatitis with navicular bursitis (Redding 2007, Kilcoyne et al. 2011).

Severe, non-weight bearing lameness following puncture wounds to the frog or sole is consistent with involvement of the navicular bursa or the digital flexor tendon due to an inflammatory and infectious process (Dobareiner et al. 2003). In this case, the findings of positive-contrast fistulography confirmed the involvement of navicular bursa. However, the ultrasound exam revealed no changes in the deep flexor tendon.

RIP with gentamicin was crucial to control the infection, as was evidenced by remarkable clinical improvement beginning 24 hours after the treatment. The clinical response can be explained by achieving antibiotic minimum inhibitory concentration (MIC) at the affected area (Werner et al. 2003). It is possible that the use of gentamicin RIP in early in the treatment of this puncture wound could have shortened the mare's recovery time.

When the navicular bursa becomes infected, endoscopic flushing of the bursa in addition to debridement of infected tissues, is often a preferred method of treatment (Redding 2007). However, those procedures require general anesthesia, and appropriate medical and surgery equipment and facilities. This case demonstrates that RIP may a less invasive techniques for the treatment of frog puncture wounds. Furthermore, RIP is significantly cheaper when compared to surgical debridment and bursoscopy.

Cryotherapy has proven benefits in the developmental stage of laminitis, by reducing the metabolic activity of the foot laminae. In addition,

cryotherapy decreases the perfusion of circulating inflammatory factors to the soft tissues of the hoof (Pollitt et al. 2003). In this case, cryotherapy produced significant pain relief, decreased hoof temperature, decreased digital pulses, and improvement in left hind weight bearing.

The significant pain relief that was observed after cryotherapy indicated that the therapy helped to reduce the inflammation. It is also noteworthy that cryotherapy was readily accepted by the patient, likely due to the comfort produced during this procedure.

The puncture wound complications seen in positive-contrast fistulography has confirmed the guarded prognosis for frog puncture wounds (Richardson et al. 1986, Kilcoyne et al. 2011) and may justify the long recovery period (8 months).

The long recovery period and the improvement of lameness grade during the recovery period are indicative of adhesions around the navicular bursa. It is likely that these adhesions were broken down during the recovery period due controlled physical activity.

Treatment with RIP was critical to the positive outcome of this case. RIP can be used early in the treatment of cases of deep puncture wounds in equine hoof. Furthermore, RIP could be used in conjunction with surgical debriment, bursoscopy, and parenteral antibiotics.

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