What Is Your Diagnosis?

In cooperation with

Figure 1—Lateromedial (A), dorsoplantar (B), dorsolateral-plantaromedial oblique (C), and dorsomedial-plantarolateral oblique (D) radiographic views of the tarsal and metatarsal regions of a 9-year-old Thoroughbred mare evaluated because of a 1-month history of severe left hind limb lameness and pyrexia.

History

A 9-year-old Thoroughbred mare was referred for evaluation because of a 1-month history of severe non–weight-bearing left hind limb lameness and pyrexia with rectal temperatures up to 41°C (105.8°F). The metatarsal area of the left hind limb had been swollen for 1 month, and a wound became evident just below the torus carpeus (chestnut) after the first 2 weeks of clinical signs. Findings on radiographs of the tarsus obtained 1 week after the onset of lameness were inconclusive. The referring veterinarian suspected lymphangitis and therefore administered penicillin followed by ceftiofur as well as phenylbutazone and flunixin meglumine without clinical improvement. Two days before referral, the horse was able to bear weight on its left hind limb.

At the time of referral, the horse appeared to walk comfortably but was tachycardic (heart rate, 64 beats/min) and pyrectic (rectal temperature, 38.9°C [102°F]). The left hind limb had firm, warm edema from the area of the metatarsophalangeal joint to the tarsus, with fluctuating areas around a large (6 × 5-cm) wound just below the chestnut. Pus was exteriorized by manual pressure and sent for bacteriologic culture. Serum biochemical analysis and CBC revealed that the horse had moderate leukocytosis (13.11×10^9 cells/L; reference range, 6×10^9 cells/L to 12×10^9 cells/L), hyperproteinemia (94 g/L; reference range, 55 to 75 g/L), and hyperfibrinogenemia (8 g/L; reference range, 2 to 4 g/L). Radiographs of the left tarsus and metatarsal region were obtained (**Figure 1**).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

This report was submitted by Mickaël P. Robert, DMV; Julien Olive, DMV, MSc; and Monika C. Gangl, Med Vet; from the Equine Department, VetAgro Sup, Veterinary Campus of Lyon, 1 Ave Bourgelat, 69280 Marcy L'Etoile, France.
Address correspondence to Dr. Robert (mickrob17@hotmail.com).

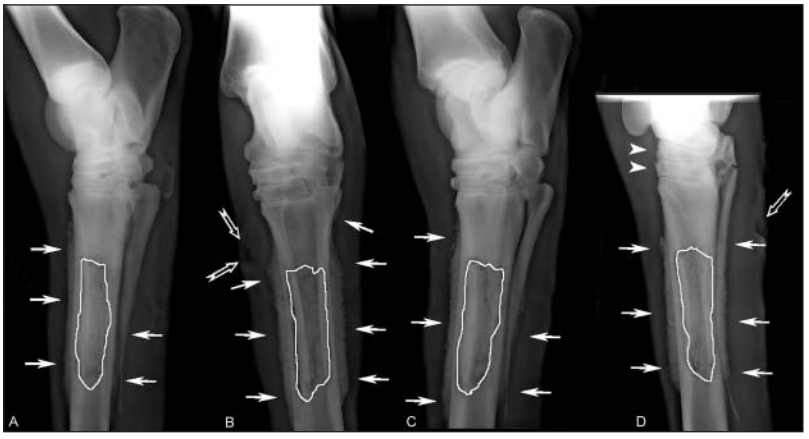

Figure 2—Same radiographic images as in Figure 1. A 12-cm-long bone fragment is sequestrated within the third metatarsal bone (white line). A palisading periosteal reaction is visible (white arrows) as well as a focal gas opacity representing the cutaneous wound (open white arrows) on the proximomedial aspect of the metatarsal region. Notice the periosteal reaction present on the dorsolateral aspect of the central and third tarsal bones (white arrowheads).

Radiographic Findings and Interpretation

A 12-cm-long, grossly cylindrical fragment of heterogeneous mineral opacity is evident between the proximal and middle third of the medullary cavity of the third metatarsal bone (**Figure 2**). The fragment comprises the internal half of the cortical bone and the full width of the trabecular bone. It is clearly isolated from the parent bone by an irregular, broad radiolucent line. Next to the fragment, the periosteum of the third metatarsal bone has circumferential, homogeneous, and moderately aggressive 8-mm-thick palisading new bone formation. The dorsolateral aspect of the central and third tarsal bone has a similar periosteal reaction. The medullary cavity, including the fragment, has an increased mineral opacity, compatible with bone sclerosis or superimposition due to periosteal bone production. The surrounding soft tissues are thickened, with focal gas opacity at the proximomedial aspect of the metatarsal region, representing the wound. These findings are consistent with osteomyelitis of the third metatarsal bone with internal sequestration.

Comments

Given the size and location of the mixed cortical and intramedullary sequestrum, surgical debridement was deemed unfeasible. A cannulated intramedullary screw was positioned in the dorsolateral aspect of the distal portion of the third metatarsal bone.[1] Intraosseous perfusion of gentamicin was performed every other day for 10 days with the horse standing. Surgical debridement of the wound was performed, and the horse was given flunixin meglumine and cefquinome (1 mg/kg [0.45 mg/lb], IV, q 12 h). Bacteriologic culture yielded a methicillin-resistant *Staphylococcus aureus* (MRSA) organism that was resistant to cefquinome. Antimicrobial susceptibility testing results revealed that the MRSA organism was susceptible to tetracyclines and trimethoprim-sulfonamides; therefore, antimicrobial treatment was changed from cefquinome to trimethoprim-sulfamethoxazole (30 mg/kg [13.6 mg/lb], PO, q 12 h). Susceptibility to gentamicin was intermediate, but intraosseous infusion was continued because this administration protocol can achieve high intramedullary concentrations.[1] An episode of pyrexia was observed 1 week after admission; 10 days after admission, the horse was still fully weight bearing at rest. The cannulated screw was removed, the hole was curetted, and the removed bone was sent for histologic examination. The horse was discharged from the hospital. Unfortunately, the horse's comfort level deteriorated, pyrexia became uncontrollable, and the owner had the horse euthanatized at home, making further examination impossible. Histologic evaluation of bone submitted prior to hospital discharge revealed necrotizing osteomyelitis with intralesional bacteria.

Findings in the horse of this report underscore the low diagnostic sensitivity of radiography to detect bony changes early in the disease process of osteomyelitis,[2] as the radiographs made 1 week after the onset of lameness were inconclusive. Because there was a lack of known bone trauma and because of the absence of full-thickness cortical discontinuity, it is hypothesized that osteomyelitis in this horse was hematogenous in origin.[3] The observed wound may have represented a primary source of infection, a secondary draining tract, or because of its location proximal to the sequestrum, a second site of hematogenous spread of infection. The diffuse periosteal new bone formation that surrounded the diaphysis made up the involucrum, which forms around a sequestrum.[4] The involucrum elevates the periosteum, which subsequently deprives the underlying cortex of its external blood supply. The massive diaphyseal sequestrum observed in this horse is likely the result of compromised medullary blood supply.[4]

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3. van den Boom R, Rijkenhuizen AB. Hematogenous (suspected-) septic inflammation of the synovial fossa in the adult horse: rare but deceptive (3 case reports). *Tijdschr Diergeneeskd* 2002;127:382–385.
4. Bargai U, Pharr JW, Morgan JP. Radiological diagnosis of the metacarpus and metatarsus. In: Bargai U, Pharr JW, Morgan JP, eds. *Bovine radiology*. Ames, Iowa: Wiley-Blackwell, 1989;72–76.