Observations in Horses with Lameness Abolished by Palmar Digital Analgesia

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Scintigraphic examination plays an important role in the diagnosis of lameness abolished by palmar digital analgesia, particularly in horses with negative or equivocal radiographic changes. While navicular disease was a common diagnosis, third phalanx (P3) subchondral remodeling or trauma was an important finding, may lead to later fractures of P3, and was most common in the left front lateral and right front medial aspect of P3. Author’s address: Dept. of Clinical Studies, New Bolton Center, University of Pennsylvania, 382 W. Street Rd., Kennett Square, PA 19348-1692. © 1998 AAEP.

1. Introduction
Lameness abolished by palmar digital analgesia is a common and important problem for the equine practitioner, yet in many horses a specific diagnosis is not made. When radiographs confirm the expected problem or show obvious changes, the diagnosis is seemingly straightforward. However, when radiographs are negative or equivocal, a default diagnosis is often made of navicular disease in older non-racehorses, and of soft-tissue injury or pedal osteitis in racehorses. The classic description of structures desensitized by palmar digital analgesia, the palmar third of the foot and pastern, appears to underestimate the potential sources of lameness, since from the clinical perspective, lameness caused by painful conditions of the distal interphalangeal joint (DIP) such as osteoarthritis and fractures, by laminitis, and by fractures involving the proximal aspect of the first phalanx (P1) can sometimes be eliminated by this technique. Differential techniques in some horses, including DIP and navicular bursa analgesia, can be diagnostic, but the specificity of DIP analgesia has been questioned. Proposed communications of the synovial cavities; analgesia of nearby innervation of the navicular suspensory ligaments, navicular bone, or the DIP; and anesthetic diffusion into the navicular structures after DIP analgesia could explain the confusion with these techniques. An interpretation of diligent intrasynovial or regional analgesic techniques can be problematic, particularly in horses without obvious radiographic evidence of bony disease or in those in whom the response to treatment is poor.

A scintigraphic examination was useful in the diagnosis of foot lameness in horses with known or suspected navicular disease and third phalanx (P3) fractures, and such an examination is clinically most important when conventional radiographic signs are negative, equivocal, or do not support the presumptive diagnosis. Scintigraphy, a sensitive imaging modality that permits the assessment of soft tissues and bone, is particularly useful in the early diagnosis of musculoskeletal injury, and the presence of areas of increased radioisotope uptake...
(IRU) can lead to a more careful interpretation of existing radiographs or to the use of creative radiographic techniques.8

The purpose of the study reported here was to describe the scintigraphic findings in horses with lameness localized by using palmar digital analgesia, to correlate scintigraphic and clinical findings, and to use information to develop treatment recommendations.

2. Materials and Methods

Medical records of horses admitted for scintigraphic examination between September of 1993 and March of 1998 were reviewed. Scintigraphy was performed to investigate lameness when it was localized but when radiographs were negative or equivocal; when lameness could not be localized; as part of a comprehensive performance evaluation; or when requested by referring veterinarians. A subset of these horses was further investigated. The study group included only those horses in which the majority of the lameness was localized to the digit at the level of or below the base of the sesamoid as found by the use of palmar digital analgesia by the attending clinician or referring veterinarian. In some horses, dorsally directed subcutaneous infiltration (dorsal ring) at the midpastern level, or additional procedures, including proximal or distal interphalangeal joint or navicular bursa analgesia, were performed.

In all horses, delayed (bone phase, 2–3 h after injection) scintigraphic images, and in some horses, blood pool (soft tissue, 1–15 min after injection) images were obtained by administering 99mTc-HDP (0.4–0.5 mCi/kg) intravenously. In horses referred for a scintigraphic examination, images were obtained days to weeks after the use of diagnostic analgesia, but in horses evaluated in our hospital, images were obtained 24–48 h after analgesic procedures. Images were obtained by using a large field of view gamma camera with a low energy, high-resolution parallel-hole collimator, mounted on a custom-made central column overhead gantry. Standing lateral (100,000 counts) and dorsal (150,000 counts) or plantar (hindlimb) images were available for all horses. For most horses with suspected foot lameness, solar images (75,000 counts) or plantar (hindlimb) images were available. In horses referred for a scintigraphic examination, images were obtained days to weeks after the use of diagnostic analgesia, but in horses evaluated in our hospital, images were obtained 24–48 h after analgesic procedures.

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The radiographic examination included routine views of the digit and in some horses the metacarpophalangeal joint, and when indicated, it included palmaroproximal–palmarodistal oblique views of the navicular bone as well as dorsolateral 45° palmaromedial oblique and dorsomedial 45° palmarolateral oblique views of the foot, obtained with a horizontal radiographic beam.

3. Results

During the study period, of 1698 horses that underwent scintigraphic examination, 364 horses had scintigraphic abnormalities of the digit. Many horses were diagnosed to have foot lameness, particularly racehorses, but the lameness was not localized. The study group included 164 horses in which lameness was localized by palmar digital analgesia. With the use of a combination of clinical, scintigraphic, and radiographic findings, the diagnoses (number of horses) included the following: stress remodeling or stress fracture of PIII in racehorses (41; 35 forelimb and six hindlimb), navicular disease (39; five racehorses and 34 other horses), DIP subchondral trauma or remodeling in non-racehorses (20), a combination of navicular disease–subchondral trauma in non-racehorses (19), soft-tissue lameness of the foot (seven), severe DIP osteoarthritis (seven), proximal interphalangeal osteoarthritis (six), undiagnosed foot soreness (soft tissue, bone images, radiographs negative; six), laminitis (four), old PIII wing fractures (four), dorsal (laminar) PIII trauma (three), midsagittal PI fractures (two), collateral cartilage–proximal PIII IRU (two), and one horse each with proximal palmar PIII trauma, navicular bone fracture, PIII solar margin fracture, or PIII extensor process fracture.

In racehorses with stress remodeling-stress fracture of PIII, lameness was historically acute and often severe, but previous chronic foot lameness was common, and IRU most commonly involved the left front lateral and right front medial PIII. Radiographs were usually negative or equivocal, with the exception of mild narrowing of the DIP joint space on the affected side (attributed to a hoof imbalance). Expected marginal PIII radiographic or scintigraphic (geographic center of IRU in subchondral bone, not the margin of PIII) changes associated with pedal osteitis were uncommon, but a fracture was seen in horizontal oblique views in three horses and subsequently developed in two horses who continued to work. In non-racehorses diagnosed with subchondral trauma of PIII, radiographs showed subtle proliferative changes of the distal PII and proximal PIII, and subtle to obvious evidence of subchondral lucency of PIII. In three of these horses, the lameness was exacerbated with an elevation in the heel angle. Soft-tissue and bone-phase images were useful in the diagnosis of navicular disease, and the palmaroproximal–palmarodistal oblique (skyline) view was most helpful in detecting subtle radiographic changes of the navicular bone. In non-racehorses, IRU of the navicular bone most commonly involved the central portion, seen in the solar view, but lateral views were quite useful in establishing a scintigraphic diagnosis. In racehorses, solar images most often demonstrated uniform uptake across the width of the navicular bone. Thirteen horses with navicular disease or DIP subchondral trauma had prominent IRU of the prox-
mal, central aspect of the third metacarpal bone (McIII), often bilaterally. The lameness in horses with dorsal PIII trauma, solar margin or extensor process fracture, or severe DIP osteoarthritis was substantially improved by palmar digital anesthesia, but a dorsal subcutaneous ring was needed to abolish lameness completely.

4. Discussion

A scintigraphic examination was useful in establishing a diagnosis in a large group of horses in which lameness was localized by palmar digital analgesia, and while radiographic changes existed in some horses before scintigraphy was performed, the modality was particularly helpful in horses with negative or equivocal radiographic changes. Since soft-tissue images were not obtained in all horses, an assessment of the value of soft tissue as opposed to delayed images could not be made, but in most horses the IRU seen in pool phase images most often represented an early bone uptake, and primary soft-tissue problems were uncommon. The large number of diseases identified in this study suggest that the lameness desensitized by this blocking technique is complex and could be caused by conditions located proximally in the digit or dorsally in the foot. The results of this study confirm that while navicular disease was a common diagnosis in horses with subtle radiographic findings, the presence of a large number of horses with other diagnoses such as PIII subchondral remodeling, or a combination of the diseases, could explain the poor response to therapy in some horses. Scintigraphic changes prompted the acquisition and careful interpretation of horizontal oblique and navicular skyline views, which should be taken in horses with challenging lameness of foot.

A common finding in racehorses was IRU in left front lateral and right front medial PIII, and the subsequent identification of incomplete fractures or the development of complete PIII fractures suggests there may be a spectrum of stress-related bone remodeling or trauma that can lead to fracture, and that PIII fractures are not single-event injuries. Neither scintigraphic nor radiographic marginal PIII changes were common, suggesting that pedal osteitis may be overdiagnosed. Areas of IRU in PIII subchondral bone explained the lameness in horses with negative or equivocal radiographic findings, and they were often seen in horses with a narrowed DIP joint space on the affected side. An abnormal medial-to-lateral hoof balance may play an important role in the development of DIP subchondral trauma, and later in the development of osteoarthritis, subchondral lucency, and fracture. Subchondral pain would explain the inconsistent response to intra-articular medication in clinical patients with early osteoarthritis or trauma, similar to that reported in other joints.8 An IRU in PIII subchondral bone seen in solar images was sometimes in a semilunar pattern, but a diagnosis of enthesopathy or tendinitis of the deep digital flexor attachment could not be substantiated. Treatment recommendations varied depending on the degree of lameness, the type of sport horse, and the previous response to therapy, but they included lowering and floating the affected side (commonly lateral left front and medial right front), and applying a wide-web, concave inner surface, egg-bar shoe. In horses with navicular disease, recommendations were made to shorten the toe and raise the heel, whereas in horses with PIII subchondral uptake, no attempt was made to raise the heel. Scintigraphic abnormalities in proximal McIII in horses with foot lameness may indicate an abnormal loading of the suspensory ligament or subchondral bone of McIII and may explain clinical signs of pain on palpation of the proximal palmar metacarpal area, and mild residual lameness after palmar digital analgesia.

References