Digital Sepsis: Etiology and Control

A. David Weaver, *F.R.C.V.S.*
College of Veterinary Medicine
University of Missouri-Columbia

Digital sepsis involves several structures within the claw. These tissues include the distal phalanx, deep flexor tendon and associated sheath, navicular bone and bursa, and the distal interphalangeal joint. Anatomical relationships determine the first deep structure to become affected, as well as the subsequent direction of spread.

Sepsis in the *distal interphalangeal joint* arises following deep foreign body penetration (e.g. nail) of the more dorsal part of the interdigital space or by simple extension of a deep interdigital necrobacillosis infection. From another direction the distal joint is liable to infection from a deep vertical septic sandcrack close to the coronary band adjacent to the extensor process of the distal phalanx.

Sepsis of the *distal phalanx* without early involvement of the joint space characteristically arises most frequently following septic laminitis at the sole-heel junction following a badly neglected sole ulcer. The ensuing route of infection is usually to the insertion of the deep flexor tendon, to the navicular bursa and navicular bone. Other cases of distal phalangeal sepsis (osteomyelitis) develop from foreign body penetration (nail) and inadequate early drainage from septic solar laminae. It usually takes several weeks before the osteomyelitis then spreads into the joint at which time much of the distal phalanx has been destroyed.

Sepsis of the *navicular bone and bursa* may be considered together. The bursa lies between the deep flexor tendon, close to its insertion, and the navicular bone. Osteomyelitis of the distal phalanx causing rupture and separation of the deep flexor tendon is very liable to spread sepsis to the bursa and slowly to the navicular bone. Bursal sepsis, due to the proximal bursal pouch, soon results in extension of sepsis to the middle and proximal thirds of the middle phalanx and to the deep flexor tendon sheath, which can then act as a conduit to pass purulent synovial fluid proximally past the fetlock joint. Another route for navicular sepsis is from spread of a retro-bulbar abscess which, occasionally, occurs from direct penetration of the heel.

Diagnosis of the extent of deep sepsis often depends eventually on surgical exploration. Inspection for signs of a discharging sinus, exploration by a grooved director, careful use of hoof testers and radiography, if the cow can be brought to a clinic for further investigation and treatment, are the preliminary steps. Radiographs should be taken in two planes, and use of a non-screen interdigital film will give excellent details of the distal phalanx and some of the distal joint surface.

Digital sepsis may be grouped into three classes.

1. *limited damage* to deeper structures, e.g. localized osteomyelitis, which justifies local surgical intervention with retention of the digit (e.g. drainage of abscess beneath the sole and curettage of a localized area of phalangeal osteomyelitis);
2. *extensive destruction* and sepsis not involving structures more proximal than the distal third of the proximal phalanx and therefore suitable for digital amputation;
3. *more proximal sepsis* with osteomyelitis very close to or in the fetlock joint, or with severe septic tenosynovitis proximal to the fetlock, in which amputation is contra-indicated and in which early culling is indicated on both economic and humane grounds.

Corynebacterium pyogenes can be recovered from over 80% of cases of deep digital sepsis. The antibiotics of choice are broad spectrum and include ampicillin and penicillin G. Adequate therapeutic blood levels should be maintained for 7-10 days. More important than systemic antibiotics in control of deep sepsis is the need for surgical decompression, drainage and copious lavage of the septic focus, unless, of course, effective drainage has already been established by natural means. Curettage with an angled sharp spoon, such as Frick's sharp curette, is helpful. The close relationship of the main structures involved in deep digital sepsis presents many problems.

To reduce the pain, often the cause of a drastic reduction of feed intake and weight loss, phenylbutazone may be given at a rate of 8 mg/kg bodyweight every second day. This regime has no effect on the disease process itself.

Both on economic and humane grounds, investigation and treatment should be initiated early. While this is required in problems of deep sepsis, it is also applicable to herd lameness problems, which require good records, keen and careful observation, and a willing spirit of cooperation on the part of farmer, dairyman, veterinarian and related professionals.

Paper presented at the Dairy Herd Health Programming Conference, University of Minnesota, June 1-2, 1988, Dr. James O. Hanson, Coordinator.