

AABP FACT SHEET



DEEP DIGITAL SEPSIS

Authored by the AABP Lameness Committee

DESCRIPTION

Deep digital sepsis is diagnosed when septic processes have extended into the phalanges, navicular bone, synovial structures or tendons of the foot. Affected cattle typically have a lameness score of 5/5 with significant asymmetrical swelling above the coronary band. (Figure 1) Most presenting cases are chronic in nature. The most common initial causes are sole ulcer, white line disease, or foot rot, while a minority occur as a result of other processes. In the majority of



Figure 1. Cow affected with deep digital sepsis in the lateral digit of the left hind foot.

the cases, the veterinarian will be able to determine the original insult. The lateral hind digit is the most commonly affected (82%) and the medial front digit is a distant second (11%).

DIAGNOSIS

Diagnosis of deep digital sepsis is made by examination of the swollen digit. Localized, asymmetrical swelling usually begins at the coronary band and includes the heel bulb of the affected digit (Figure 2). In dairy cattle, a hoof block has often been previously applied to the unaffected digit without resulting improvement in the gait of the cow. In beef cattle,



Figure 2. Deep digital sepsis primarily caused by a complicated sole ulcer. Note the swelling around the heel bulb and prolapse of tissue through the ulcer site.

treatment for foot rot has often been attempted without response.

During examination of the foot, tracts extending from the initial insult can be followed with a teat cannula to demonstrate the extent of sepsis. Radiography is not considered necessary for diagnosing this condition, but can be useful in providing a prognosis.

In deep sepsis secondary to foot rot there is usually a fistulous tract extending from the interdigital space into the adjacent distal interphalangeal (DIP) joint. In those secondary to complicated sole ulcer, there is often a tract from the ulcerated sole into the DIP joint. The deep flexor tendon is often avulsed from the third phalanx or ruptured (Figure 3) if the affected digit can be overextended beyond the posture of the unaffected digit.

There may also be fistulae into the DIP joint in the heel bulb or above the coronary band with sepsis secondary to white line disease. Septic pro-

cesses beginning in the region of the DIP joint may extend proximally along the deep flexor tendon. Tendonitis extending proximally more than 7.5 cm or 3 inches above the dewclaws may involve the branch of the deep flexor tendon supporting the unaffected digit resulting in a poor prognosis if surgery is performed.



Figure 3. Longitudinal section of a bovine digit with chronic septic arthritis, showing the widening of the distal interphalangeal joint, ruptured deep flexor tendon and sole ulcer.

TREATMENT

Conservative therapy with systemic antimicrobials and analgesic drugs seldom results in a cure or even significant improvement. Successful treatment of deep digital sepsis and preservation of animal welfare involves surgical approaches including claw amputation, facilitated ankylosis of the DIP joint, and tendon/tendon sheath resection. Timely euthanasia or slaughter should be considered in cases where surgical management is not feasible. Current drug withdrawals should be considered in the decision-making process. The AABP Fact Sheet "Welfare Guidelines for Veterinarians Presented with a Severely Lame Cow With Deep Digital Sepsis" (www.aabp.org/Members/resources/AABP%20Welfare%20Guidelines.pdf)

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Continued

should be followed when managing each case.

Two categories of techniques for surgery are commonly used. Intravenous regional analgesia with 20cc 2% lidocaine injected distal to a tourniquet placed at mid-metatarsus or mid-metacarpus is essential prior to surgery.

■ DIGIT AMPUTATION

Amputation of the digit has been the most common standard treatment in the field, and the median survival time after amputation is reported to be between 6 and 15 months.

Amputation may be done with obstetrical wire by cutting through the distal end of P1, the proximal interphalangeal (pastern) joint, or P2. Alternatively, the pastern joint may be disarticulated with a scalpel. Whatever technique is chosen, the amputation should be performed proximal enough so that the cut surface is free of signs of infection; loose fat should be removed and smooth cartilage removed to promote granulation and second intention healing. Control of hemorrhage is usually through the application of a non-adherent dressing and bandaging, changed at 48-hour intervals. Healing is complete over several months.

This procedure is associated with rapid reduction in lameness score and rapid recovery.

■ DIGIT SALVAGE

Digit salvage procedures offer the potential to extend the productive life of cattle with deep digital sepsis. The general principal of all digit salvage surgical techniques is to remove the necrotic tissues (corium, distal part of

the deep flexor tendon, and navicular bone), provide adequate drainage of the joint, and promote ankylosis of the resected joint.

Therefore, the veterinarian should evaluate the surgical candidate not only by examination of the lesion itself, but by judging how likely the patient will be to remain ambulatory during the post-operative period. Cows with extreme difficulty walking are poor candidates for joint resection as pain worsens shortly after surgery. No surgical attempt should be made for those animals that are no longer ambulatory. The prognosis is less favorable for cows affected with lameness in multiple limbs.

Three approaches are reported based on the location of the original lesion: palmar/plantar, dorsal and abaxial.

A technique that may be readily used in the field involves opening the palmar/plantar aspect of the DIP joint, either through a vertical incision incorporating a sole lesion (such as a complicated sole ulcer), or a horizontal heel incision just above the coronary band (Figure 4). Using either approach, a scalpel is used to dissect down on to the navicular bone, removing any remnants of the deep flexor tendon. Removal of the navicular bone allows direct access to the condyles of the DIP joint, where a drill can accurately be placed across the joint. Removal of the navicular bone is facilitated by splitting the bone in half with a drill bit and use of a dental rongeur to elevate the edges so that collateral ligaments may be incised. A 0.50-inch diameter drill bit is directed to emerge either just below or just above the coronary band and after flushing and placement of a



Figure 4. Resection of the DIP joint (heel approach). Close up view of the DIP joint after removal of deep flexor tendon and navicular bone.

drain, a block is applied to the unaffected claw and the foot bandaged.

The abaxial approach is performed in cases without pathology on the sole, such as a penetrating foreign body in the interdigital space. Similar to the procedure above, a drill is used to accomplish drainage of the DIP joint. Drill placement is at a point one-third of the way down the hoof wall distal to the coronary band and halfway between the dorsal hoof wall and heel. The joint is drilled through, destroying the cartilage and the joint lavaged and maintained under a bandage.

AFTER CARE

Digit amputation requires bandage changes at weekly intervals after the initial bandage change 24-48 hours after surgery. Once the bone end is covered by granulation tissue, the limb can remain unbandaged to continue healing.

Digit Salvage procedures require more extensive care post-operatively, including systemic antimicrobials, analgesic drugs and frequent local lavage and rebandaging.

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