

Antibiotic Therapy of Soft Tissue and Bone in Diabetics

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Microbiology

- ▣ 1. Fungi are the initiator of infections :
 - ▣ a. Yeasts
 - ▣ b. Dermatophytes
 - ▣ c. Molds
- ▣ 2. Superficial ulcers/cellulitis – staphylococci, streptococci equals non limb- threatening conditions
- ▣ 3. Infections with deeper ulcers (into subcutaneous tissues) equal limb- threatening conditions

Microbiology

- ▣ a. Polymicrobial infections greater than 80%;
- ▣ 3- 5 isolated/ulcers
- ▣ b. Mixed gram-positive/ negative organism, aerobes/ anaerobes
- ▣ c. Patients on prior broad spectrum therapy – resistant gram-negative
- ▣ d. Role of enterococcus
- ▣ 4. Role of diphtheroids, Viridian streptococci, and coagulase-negative staphylococci in mixed infections

- ▣ B. Reliable (aspirate, surgical) vs. unreliable (ulcer) cultures
- ▣ 1. Isolated identical only 25%, “unreliable” cultures yield false-positive and false-negative results 50%
- ▣ a. Curettage improves yield, reduces colonizers
- ▣ b. Aspiration – may miss pathogen (15-40%)

Clinical Features

- A. Toxicity is rare, including significant fever
 - 1. Toxicity associated with extensive soft tissue infection (fasciitis), bacteremia, remote site of infection
- B. Gangrene/necrosis, severe vascular insufficiency: increase rate of amputation
- C. Clinical features of limited utility in predicting microbiology beyond non-limb threatening conditions vs. limb-threatening conditions

TREATMENT

- ▣ A. Outpatient Treatment
- ▣ 1. Uninfected ulcers – a mechanical problem, neuropathy plus/ or minus ischemia: if fails after one month non- weight bearing, reassess ischemia/ mechanics
 - ▣ a. role antibiotics
- ▣ 2. Superficial infection – ulcer not through skin

- ▣ 2. Superficial infection – ulcer not through skin
- ▣ a. No toxicity, gangrene, limited area
- ▣ b. Metabolism stable
- ▣ c. Reliable with good home care
- ▣ d. Antibiotics by mouth (cover *S. aureus*, streptococci, occasional gram – negative rods) for 7-14 days
 - ▣ i. Omnicef, dicloxacillin, clindamycin, amoxicillin clavulanate
 - ▣ ii. Use fluoroquinolones with caution; many *S aureus* and streptococci are resistant
 - ▣ iii. Oral Antifungal vs. Topical Antifungal (i.e. Loprox, Dermasyn)
- ▣ e. Role of antibiotics until ulcer heals questionable – failure to heal requires reevaluation of mechanics, vascular supply, bone infection

Inpatient Treatment

- ▣ 1. Significant areas of cellulitis with shallow ulcer or no ulcer: oxacillin, cefazolin, vancomycin (MRSA or allergy)
- ▣ 2. Infection in patients with significant circulatory insufficiency
- ▣ 3. Deep ulcers with/without osteomyelitis
 - ▣ a. Beware of remote infection complicating bacteremia (*S.aureus*)
 - ▣ b. Empiric broad spectrum treatment; avoid amino glycosides

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- ▣ i. Less than ideal: cefazolin, cefamandole, cefuroxime, cefoxitin
- ▣ ii. Adequate initial treatment: limb-threatening infection
 - ▣ 1. Third generation cephalosporin's plus clindamycin
 - ▣ 2. Timentin (ticarcillin plus clavulanate)
 - ▣ 3. Unasyn (ampicillin – sulbactam)
 - ▣ 4. Quinolone plus clindamycin)
 - ▣ 5. Zosyn (piperacillin- taxobactam)
 - ▣ 6. Oral antifungal versus Topical Antifungal (Loprox)

- ▣ iii. Cover for life threatening infection:
- ▣ 1. Primaxin (impenem)
- ▣ 2. Aztreonam- vacomycin-metroniadazole
- ▣ 3. Tobramycin- clindamycin-ampicillin

C. Debridement and drainage of necrotic tissue/pus is essential

- ▣ 1. Retrospective study shows decreased amputation and reduced cost with early surgical intervention (<3days vs. greater than 3 days)
- ▣ 2. Revise antibiotic therapy based on response to treatment and culture data
 - ▣ i. Expand, if improvement is inadequate
 - ▣ ii. Simplify, if microbiology allows and improvement noted

Diagnosis and Management of Osteomyelitis

- ▣ 1. Osteomyelitis results of direct extension to bone
- ▣ A. Definition problems – implication of bone exposure and destruction vs. defining osteomyelitis by aspiration culture alone – not resolved
- ▣ B. Osteopathy secondary to trauma/ Charcot often confused with osteomyelitis
- ▣ C. Diagnostic tests
 - ▣ 1. X-ray limited sensitivity and specificity; negative early, difficult to distinguish osteopathy

Diagnosis

- ▣ 2. Triple phase bone scan sensitivity but nonspecific , false negative if severe ischemia
- ▣ 3. Indium labeled WBC scans – poor localization bone vs. soft tissue; may improve if combined with TPBS
- ▣ 4. Exposed bone – sterile probe to bone or joint positive test predicts osteomyelitis

II. Treatment

A. Antibiotics alone

- ▣ B. Antibiotics plus primary foot sparing surgery

- ▣ 1.Experienced with aggressive surgery

- ▣ C. Role of bypass grafting in foot salvage

- ▣ 1.Bypass grafting plays a major role in foot salvage, allowing for more extensive and aggressive surgical debridement

III. Can Osteomyelitis be treated without Surgery

- ▣ A. Requires comparative trial
- ▣ B. Major role for non-weight bearing treatment plus surgery in non healing ulcer
 - ▣ 1. Revise pressure distribution
 - ▣ 2. Improve vascular supply