Diabetic Foot Infections

EMPIRIC TREATMENT

Is this a diabetic foot infection (DFI)?	Diabetic patient with <u>foot ulcer</u> **+**	<u>Two or more of</u>: • Redness • Warmth • Swelling or induration • Tenderness or pain • Purulent discharge
Initial Management	• Baseline bloodwork • Deep wound culture after cleaning and debriding wound • Foot X-Ray • ABI and toe pressures if not done within past 12 months and no easily palpable dorsalis pedis/posterior tibialis pulses • Good glycemic control • Pressure off-loading	

Classification		Duration (days)
Ulcer without infection	No antibiotics. Wound care only.	-
Infection <u>without ulcer</u> in a diabetic patient	This is <u>cellulitis</u>, not a diabetic foot infection. Refer to "Skin and Soft Tissue Infections" chapter for guidance.	-
Mild DFI *≤2cm surrounding redness* *No deep tissue involvement* *No systemic toxicity*	cephalexin 500-1000 mg PO QID *If MRSA suspected:* **ADD** TMP/SMX DS 1-2 tab PO BID **OR** doxycycline 100 mg PO BID *If severe beta-lactam allergy:* clindamycin 450 mg PO TID	**7-14**
Moderate DFI *>2cm surrounding redness* ***OR*** *Deep tissue involvement:* *Abscess* *Osteomyelitis (OM)* *Septic arthritis* *No systemic toxicity*	amoxicillin-clavulanate 875-125 mg one tab PO BID[1] **OR** ceftriaxone 2 g IV q24h **+/-** metronidazole 500 mg PO/IV q12h *If MRSA suspected:* **ADD** TMP/SMX DS 1-2 tab PO BID **OR** doxycycline 100 mg PO BID **OR** vancomycin[2] *If severe beta-lactam allergy:* moxifloxacin 400 mg PO q24h **OR** clindamycin 450 mg PO TID **AND** ciprofloxacin 500 mg PO BID	**≥14**
Severe DFI *Systemic toxicity:* *HR > 90/min* *RR > 20/min* *T >38°C or <36°C* *WBC>12 or <4x10^9/L or >10% bands*	ceftriaxone 2 g IV q24h **AND** metronidazole 500 mg PO/IV q12h **OR** piperacillin-tazobactam 3.375 g IV q6h *If ESBL colonized or infected:* meropenem 500 mg IV q6h *If MRSA suspected:* **ADD** vancomycin[2] *If severe beta-lactam allergy:* moxifloxacin 400 mg PO/IV q24h	**≥14**
MRSA coverage can be discontinued after 48 hours if cultures don't show MRSA.		

Doses may require adjustment in renal insufficiency.

[1] Only if no osteomyelitis or septic arthritis present.

[2] For vancomycin dosing, refer to "Vancomycin Dosing and Therapeutic Monitoring"

Microbiology

- *S. aureus* and beta-hemolytic streptococci are the most common pathogens in DFI.
- Deep tissue involvement increases risk of gram negative bacilli.
- *Pseudomonas* and *Enterococcus* are common colonizers in diabetic foot ulcers, especially when identified on sub-optimally collected specimens. Expanding antimicrobial coverage to include *Pseudomonas* or *Enterococcus* when found on culture is only necessary if patient is failing initial empiric regimen.
- Necrotic, gangrenous, or foul-smelling wounds may involve mixed anaerobes.

Diagnosis

- Obtain deep wound culture after cleaning and debriding wound. Superficial culture results correlate poorly with true pathogen.
- If probing the ulcer base goes directly to bone, this is highly suggestive of osteomyelitis. Obtain a plain X-ray. Further imaging is usually unnecessary except when required for surgical planning.
- Imaging:
    - Plain X-ray of the involved area should be done as baseline.
    - MRI is the most sensitive and specific imaging modality to diagnose soft-tissue complications or osteomyelitis.
    - Bone scan is helpful to rule out osteomyelitis if negative, but a positive result is not specific. False negatives may be seen in severe peripheral arterial disease. It can be combined with SPECT/CT to provide better three-dimensional localization.
    - White blood cell-labelled radionuclide scan has good performance to detect osteomyelitis. It can be combined with SPECT/CT to provide better three-dimensional localization.
- Assessment for peripheral arterial disease should be done for every diabetic with a foot ulcer. If dorsalis pedis or posterior tibialis pulses are not easily palpated, ankle-brachial index (ABI) and toe pressures should be done (if not done in past 12 months).
    - ABI <0.9 is abnormal. Consider vascular imaging and referral to vascular surgeon.
    - Toe pressure <30 mmHg is highly correlated to failure of medical management alone. Consider urgent vascular imaging and referral to vascular surgeon.

Oral Step-Down

- Oral step-down can occur when patient is clinically improving and without systemic toxicity.
- If osteomyelitis is diagnosed, oral step-down can be considered using agents with good oral bioavailability: fluoroquinolones (ciprofloxacin, moxifloxacin, levofloxacin), clindamycin, doxycycline, or trimethoprim-sulfamethoxazole. If oral step-down is not possible because of severity, intolerance, or resistance, then intravenous therapy should be continued; consider transition to outpatient parenteral antimicrobial therapy.

Duration

- For mild DFI, 1-2 weeks of antibiotics is usually sufficient. Moderate-severe DFI should receive 2-3 weeks.
    - If osteomyelitis is diagnosed, treat for 6 weeks.
- Treatment can be discontinued when signs and symptoms of infection have resolved. Antibiotics need not be continued until the wound has fully healed.
- If patient undergoes surgical debridement, post-operative antibiotic duration is as follows:
    - Radical resection/amputation with no residual infection: 2-5 days post-operatively
    - Resection with residual infection: 4-6 weeks post-operatively