QualiCCare

*Interprofessional care quality for people with chronic and multiple diseases*

*Version 2020*

# Diabetic foot infection

## Key issues and actions in initial management of acute diabetic foot syndrome and foot ulcer (DFS/DFU)

# Diagnosis

| Issue | Action |
|---|---|
| **1. Clinical Evaluation** | • Patient and ulcer history<br>• Acute or chronic ulcer (non-healing wound within 4 weeks)?<br>• Symptoms and signs of inflammation (local and/or systemic)<br>• Assess extent and depth of infection, systemic reaction based on e.g. PEDIS/IDSA-Classification* (see Appendix PEDIS Infection Classification/IDSA)<br>• Osteomyelitis: Clinical evaluation, probe to bone test |
| **2. Blood Tests** | • Generally not necessary for diagnosis of a diabetic foot infection<br>• Measure inflammation markers if systemic reaction |
| **3. Plain X-Ray** | Recommended in all patients with a diabetic foot infection in the first evaluation, mainly if the ulcer is:<br>→ *deeper than skin and subcutaneous tissues = PEDIS 3 (osteomyelitis?)*<br>→ *chronic (osteomyelitis?)*<br>→ *traumatic (fracture?, Charcot?)* |

| Issue | Action |
|---|---|
| **4. MRI** | • Usually not indicated for initial assessment<br>• Should be considered if:<br>→ *situation remains unclear (depth of infection? osteomyelitis? Charcot?)*<br>→ *prior to a surgical intervention upon indication by the treating surgeon* |
| **5. Microbiological culture** | • Obtain culture in order to guide treatment in all cases if possible, particularly when deep or chronic wounds and/or recent antibiotic therapy<br>• No superficial swab<br>• Obtain tissue biopsy after debridement (or pus)<br>• Bone biopsy (culture and histology if possible) if high suspicion of osteomyelitis and no surgery is planned in order to guide antibiotic treatment |

** Infectious Diseases Society of America (IDSA)*

# Treatment

| Issue | Action |
|---|---|
| **1. Triage** | • Decide if inpatient or outpatient management<br>• Criteria for hospitalisation:<br>→ Severe infection (IDSA 4) or moderate infection (IDSA 3) with complicating features (comorbidities, severe PAD*, no home support)<br>→ Complex surgical treatment required<br>→ Bad compliance, psychological and/or social factors |
| **2. Supportive Measures** | • Revascularisation if indicated → ***see PAVK dossier***<br>• Off-Loading Pressure → ***see Offloading dossier***<br>• Wound care/Dressing → ***antiseptic, no occlusion, no local anaesthetics***<br>• Education<br>• Treatment of diabetes and other cardiovascular risk factors |
| **3. Surgical Treatment** | • Local debridement if mild or moderate infection<br>• Surgical treatment if deep abscesses, necrosing infection<br>• Surgical treatment if Osteomyelitis, if indicated |
| **4. Antibiotics 1** | • Don't treat clinically uninfected wounds with antibiotics<br>• No use of topical antibiotics<br>• Empiric treatment only if clearly indicated and on basis of the severity of the infection<br>• Some mild infections can be treated by offloading and adequate wound care alone<br>• Which empiric antibiotic treatment?<br>→ For mild to moderate infections: therapy targeting aerobic gram positive cocci, if not recently received antibiotics and unfavourable course<br>→ For severe infections: broad-spectrum antibiotic |

| Issue | Action |
|---|---|
| **4. Antibiotics 1** *(continuation)* | • Oral or parenteral antibiotics?<br>→ Start parenteral if severe (or moderate) infection, then change to oral<br>→ Oral in most mild or moderate infections<br>→ Decision irrespective of vascular status<br>• Acute infected ulcer (with soft tissue involvement):<br>→ Initial empiric therapy based on most likely pathogen and clinical severity, then adjusted based on culture results<br>• Chronic infected ulcer:<br>→ Treatment based on culture results<br>• Osteomyelitis:<br>→ Treatment based on culture results should be preferred |
| **4. Antibiotics 2** | Duration of treatment<br>A. Soft tissue infection<br>→ Mild: 5–7 days or dependent on clinical course<br>→ Moderate: 7–14 days or dependent on clinical course<br>→ Severe: 12–20 days or dependent on clinical course<br>B. Osteomyelitis<br>→ 4–6 weeks if no resection of infected bone<br>→ 2–6 weeks if residual infected (but viable) bone after resection<br>→ 0–1 week if no residual infected tissue after resection (e.g. post amputation) |

** Periferal Arterial Disease (PAD)*

# PEDIS Infection Classification/IDSA

| | |
|---|---|
| **1 – Uninfected** | No systemic or local symptoms or signs of infection |
| **2 – Mild infection** | Infected:<br>• At least 2 of the following items are present:<br>→ *Local swelling or induration*<br>→ *Erythema > 0.5 cm* around the wound*<br>→ *Local tenderness or pain*<br>→ *Local warmth*<br>→ *Purulent discharge*<br>• Other causes of an inflammatory response of the skin should be excluded (e.g., trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis).<br>• Infection involving only the skin or subcutaneous tissue (without involvement of deeper tissues and without systemic manifestations as described below).<br>• Any erythema present extends < 2 cm* around the wound<br>• No systemic signs or symptoms of infection (see below) |
| **3 – Moderate infection** | • Infection involving structures deeper than skin and subcutaneous tissues (e.g., bone, joint, tendon, muscle) or erythema extending > 2 cm* from the wound margin.<br>• No systemic signs or symptoms of infection (see below) |
| **4 – Severe infection** | Any foot infection with the systemic inflammatory response syndrome (SIRS), as manifested by ≥ 2 of following:<br>→ *Temperature > 38 ° or < 36 ° Celsius*<br>→ *Heart rate > 90 beats/minute*<br>→ *Respiratory rate > 20 breaths/minute or $PaCO_2$ < 4.3 kPa (32 mmHg)*<br>→ *White blood cell count > 12,000 or < 4,000/$mm^3$ or > 10 % immature (band) forms* |

* *In any direction, from the rim of the wound; The presence of clinically significant foot ischemia makes both diagnosis and treatment of infection considerably more difficult.* [2, 3]

# Organization

| Level | Referal to higher level if: |
|---|---|
| **Level 1 A**<br>*Health care providers experienced in treatment of diabetic foot syndrome* | • Any clinical signs of infection (IDSA ≥ 2)<br>• Severe infection (systemic reaction, IDSA 4)<br>→ *Level 3* |
| **Level 1 B**<br>*General practitioner experienced in treating diabetic foot infections* | • Mild infection (IDSA 2) and no signs of wound healing within 14 days despite adequate wound care and antibiotic treatment → *Level 2 or 3*<br>• Moderate infection (rubor > 2cm, IDSA 3)<br>→ *Level 2 or 3*<br>• Severe infection (systemic reaction, IDSA 4)<br>→ *Level 3* |
| **Level 2**<br>*Specialists in treatment of diabetic foot infections* | Severe infection (systemic reaction, IDSA 4) |
| **Level 3**<br>*Interprofessional Footcare-Team* | |

***Subgroup infectious diabetic foot syndrome***
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***Organizations***
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*[2] Swiss Organisation of Podiatry*
*[3] pharmaSuisse*
*[4] QualiCCare*
*[5] Swiss Society of Vascular Surgery*
*[6] Swiss Association for Woundcare*
*[7] Swiss Society of Angiology*
*[8] Swiss Society of Endocrinology and Diabetology*
*[9] Swiss Society of Infectiology*
*[10] Swiss Society of Vascular and Interventional Radiology*
*[11] Swiss Interest Group of Diabetes Nurses*
*[12] Swica Insurances*
*[13] Swiss orthopaedics*
*[14] Foot and Shoe Association*

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## *References*

**1** *Guidance 2015, International Working Group on the Diabetic Foot (www.d-foot.org)*

**2** *Schaper NC. Diabetic foot ulcer classification system for research purposes: a progress report on criteria for including patients in research studies. Diabetes Metab Res Rev 2004*

**3** *Lipsky BA et al. Infectious Diseases Society of America Clinical Practice Guideline for the Diagnosis and Treatment of Diabetic Foot Infections. Clin Infect Dis 2012*

**4** *Wraight PR et al. Creation of a multidisciplinary guideline for diabetes foot complications. Diabetic Medicine 2004*

**5** *SGINF DFI Leitlinien Expertenkommittee, Guidelines Infektionen des diabetischen Fuss 2018*

**6** *Uckay I et al. Principles and practice of antibiotic stewardship in the management of diabetic foot infections Curr Opin Infect Dis. 2019 Apr; 32(2):95-101.*