QualiCCare

Interprofessional care quality for people with chronic and multiple diseases

Version 2023

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 • Acute or chronic ulcer (non-healing wound within 4 weeks)? • Symptoms and signs of inflammation (local and/or systemic) • Assess extent and depth of infection, systemic reaction based on e.g. PEDIS/IDSA-Classification* (see Appendix PEDIS Infection Classification/IDSA) • Osteomyelitis: Clinical evaluation, probe to bone test
2. Blood Tests	• Generally not necessary for diagnosis of a diabetic foot infection • 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: → *deeper than skin and subcutaneous tissues = PEDIS 3 (osteomyelitis?)* → *chronic (osteomyelitis?)* → *traumatic (fracture?, Charcot?)*

Issue	Action
4. MRI	• Usually not indicated for initial assessment • Should be considered if: → *situation remains unclear (depth of infection? osteomyelitis? Charcot?)* → *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 • No superficial swab • Obtain tissue biopsy after debridement (or pus) • 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 • Criteria for hospitalisation: → Severe infection (IDSA 4) or moderate infection (IDSA 3) with complicating features (comorbidities, severe PAD*, no home support) → Complex surgical treatment required → Poor compliance, psychological and/or social factors
2. Supportive Measures	• Revascularisation if indicated → *see PAD dossier* • Off-Loading Pressure → *see Offloading dossier* • Wound care/Dressing → *antiseptic, no occlusion, no local anaesthetics* • Education • Treatment of diabetes and other cardiovascular risk factors
3. Surgical Treatment	• Local debridement if mild or moderate infection • Surgical treatment if deep abscesses, necrosing infection • Surgical treatment if Osteomyelitis, if indicated
4. Antibiotics 1	• Do not treat clinically uninfected wounds with antibiotics • No use of topical antibiotics • Empiric treatment only if clearly indicated and on basis of the severity of the infection • Some mild infections can be treated by offloading and adequate wound care alone • Which empiric antibiotic treatment? → For mild to moderate infections: therapy targeting aerobic gram positive cocci, if not recently received antibiotics and unfavourable course → For severe infections: broad-spectrum antibiotic

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

** Peripheral Arterial Disease (PAD)*

PEDIS Infection Classification/IDSA

1 – Uninfected	No systemic or local symptoms or signs of infection
2 – Mild infection	Infected: • At least 2 of the following items are present: → *Local swelling or induration* → *Erythema > 0.5 cm* around the wound* → *Local tenderness or pain* → *Local warmth* → *Purulent discharge* • Other causes of an inflammatory response of the skin should be excluded (e.g., trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis). • Infection involving only the skin or subcutaneous tissue (without involvement of deeper tissues and without systemic manifestations as described below). • Any erythema present extends < 2 cm* around the wound • 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. • 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: → *Temperature > 38 ° or < 36 ° Celsius* → *Heart rate > 90 beats/minute* → *Respiratory rate > 20 breaths/minute or $PaCO_2$ < 4.3 kPa (32 mmHg)* → *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 *Health care providers experienced in treatment of diabetic foot syndrome*	• Any clinical signs of infection (IDSA ≥ 2) • Severe infection (systemic reaction, IDSA 4) → *Level 3*
Level 1 B *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* • Moderate infection (rubor > 2cm, IDSA 3) → *Level 2 or 3* • Severe infection (systemic reaction, IDSA 4) → *Level 3*
Level 2 *Specialists in treatment of diabetic foot infections*	Severe infection (systemic reaction, IDSA 4)
Level 3 *Interprofessional Footcare-Team*	

Subgroup infectious diabetic foot syndrome
Bernard Chappuis, chair [8] – Emanuel Christ [8] Angela Cotti er [1] – Astrid Czock [4] – Ilker Uckay [9] – Veronique Urbaniak [11]

Working Group diabetic foot syndrome
Bettina Peter-Riesch, chair [8] – Ulf Benecke [6] Lucia Blal [6] – Thomas Böni [13] – Bernard Chappuis [8] – Angela Cottier [1] – Emanuel Christ [8] Astrid Czock [4] – Marc Egli [8] – Sandro Fraternali [14] – Christian Frei [12] – Isabelle Hagon-Traub [8] Axel Haine [7] – Mario Malgaroli [2] – Dieter Mayer [5] – Salah Qanadli [10] – Christina Ruob [3] – Katrin Schimke [8] – Claude Schoenenweid [8] – Ilker Uckay [9] – Véronique Urbaniak [11]

Organizations
[1] Swiss Family Doctors and Paediatricians
[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

All QualiCCare member organizations are listed under:
https://qualiccare.ch/mitgliedschaft/mitglieder

QualiCCare

QualiCCare association
Rütistr. 3a | 5400 Baden | www.qualiccare.ch

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.*