

CAUTION: You must refer to the intranet for the most recent version of this policy.

Clinical guidelines for the in-patient management of diabetic foot infections

Sharepoint Location	Clinical Policies and Guidelines
Sharepoint Index Directory	General Policies and Guidelines
Sub Area	Not applicable
Key words <i>(for search purposes)</i>	Diabetes
Central Index No	195
Endorsing Body	Medical CMT 29/08/07 CMB 16/06/07
Endorsement Date	August 2007
Review Date	August 2009
Lead author and designation	Dr S O Oyibo, Consultant Physician Mr. P Taylor, Consultant Vascular Surgeon Karen Halliday, Chief Diabetes Podiatrist Dr D Mlangeni, Consultant Microbiologist Nikki Philimore, Senior Pharmacist
Review led by	Appendix 2 updated May 2008 – Nikki Phillimore

CAUTION: *You must refer to the intranet for the most recent version of this policy.*

Clinical guidelines for the in-patient management of diabetic foot infections

Background

Diabetic foot infections (infected foot ulcers, gangrene and osteomyelitis) are a major cause for admission for patients with diabetes mellitus. If not promptly treated, severe foot infections can lead to septicaemia and death. A multidisciplinary team approach (by podiatrists, physicians, vascular and orthopaedic surgeons, nursing staff and diabetes nurse specialists) is required to reduce morbidity and mortality for affected patients.

Purpose of this clinical guideline

This guideline has been produced to promote consistent care of patients with diabetic foot infections. It outlines the actions necessary for managing these conditions and thereby reduces the risk to patients as much as possible. Whilst based on scientific evidence or professional consensus these guidelines are not intended to replace clinical judgement.

Scope of the guideline

The guideline should be used Trust wide by medical, surgical, podiatric and nursing staff for the management of patients with diabetic foot infections.

Classification of infected foot ulcers

Mild: presence of markers of inflammation, erythema less than 3cm around ulcer, infection limited to skin or subcutaneous tissues, no systemic toxicity.

Moderate: erythema more than 3cm around ulcer, lymphangitis, spread beneath superficial fascia, deep abscess, gangrene or involvement of muscles, tendon or bone, but no systemic toxicity.

Severe: infection as above with systemic toxicity (fever, tachycardia, tachypnoea, leukocytosis, raised CRP).

CAUTION: You must refer to the intranet for the most recent version of this policy.

Guideline recommendation

1. Diabetic foot infections

- 1.1. Patients with moderate to severe diabetic foot infections as described above require urgent admission to hospital to prevent rapid deterioration (see appendix 1 & 2).
- 1.2. The foot ulcer/affected foot should be exposed and examined. The other unaffected foot should also be inspected.
- 1.3. Assessment of circulation may be difficult. Pedal pulses may be hard to feel in swollen feet. Diabetic neuropathy may lead to paradoxical erythema even where ischaemia is present. Doppler examination can be difficult to interpret due to arterial calcification. Duplex examination in the Vascular lab is often necessary. If pedal pulses are not palpable, please refer for urgent vascular surgical assessment (see 2.5).
- 1.4. A wound swab (best obtained from the debrided base of the infected ulcer) should be sent off ideally before antibiotics are commenced. Purulent collections should be aspirated or swabbed and sent to laboratory promptly.
- 1.5. Routine blood investigations should include FBC, U&E, LFT, CRP, GLU, and Blood Cultures.
- 1.6. An x-ray of the affected area or foot (forefoot, mid-foot, hind-foot) should be performed to assess for osteomyelitis, fractures, Charcot foot, etc.
- 1.7. All patients must be on prophylactic subcutaneous heparin.
- 1.8. Patients may require insulin therapy/infusion to improve their diabetes control.
- 1.9. A member of the diabetic foot team should be informed of any patient admitted with a diabetic foot problem (please send a fax to Ext - 5159).

2. Infected diabetic foot ulcers

- 2.1. The presence of infection and ischaemia greatly increase the probability of a foot ulcer not healing and thereby deteriorating, leading to gangrene and septicaemia.
- 2.2. After obtaining appropriate specimens (as in section 1.4), intravenous antibiotics should be commenced in these patients.
- 2.3. You may need to cover gram-negative and anaerobic organism when there is a deep ulcer and/or significant ischaemia, or previous antibiotic usage.
- 2.4. If pedal pulses are not palpable and ischaemia is suspected (see 1.3), the On Call surgical team / vascular surgeon (see 2.5) should be informed as soon as possible, as early vascular intervention can improve healing of foot ulcers, prevent deterioration, and also limit the extent of necessary amputation.
- 2.5. The presence of osteomyelitis, deep abscess, large areas of slough/necrosis, pre-gangrene and gangrene warrant urgent assessment by the vascular surgeons. **Please bleep** the on-call surgical SpR, who will contact the vascular surgeons or orthopaedic surgeons as necessary.
- 2.6. Antibiotics with good bone penetration should be used for patients with osteomyelitis.
- 2.7. The presence of MRSA should prompt the swabbing of other relevant areas, informing the Infection Control Nurse and discussion with the microbiologist.

CAUTION: *You must refer to the intranet for the most recent version of this policy.*

- 2.8. Debridement of neuropathic and neuro-ischaemic foot ulcers will be carried out as necessary by the podiatric team in close collaboration with the vascular surgeons.
- 2.9. See appendix 2 for antibiotics usage for diabetic foot infections, and remember that the microbiologist is there for urgent advice.

3. Wound dressing and diabetic foot ulcers

- 3.1. Patients should be kept off their feet for as much as possible to aid healing of their ulcers.
- 3.2. The foot team should inspect their shoes for foreign bodies, as shoes are the commonest culprits in the pathogenesis of foot ulceration.
- 3.3. Sterile, non-adhesive dressings should be used to cover ulcers to protect them from trauma, absorb exudates, reduce infection and promote healing.
- 3.4. Please liaise with podiatrist and the tissue viability nurse.

4. Osteomyelitis (and the acute Charcot foot)

Osteomyelitis is suspected if there is a red, swollen, sometimes painful joint or toe (sausage toe) in the presence of a nearby infected ulcer. The underlying bone is usually exposed. An x-ray may be normal in the early stages, but later may reveal cortical destruction, periosteal reaction, reduced bone density or sclerosis.

Charcot foot is suspected if there is a red, swollen, sometimes painful joint (commonest in the mid-foot) in the absence of infection in patients with severe diabetic neuropathy. However, this could co-exist with infection. An x-ray could be normal initially, but later reveal destructive bony changes and the typical disorganised joint.

All patients with suspected osteomyelitis should have:

- 4.1. A specimen from the ulcer or discharge (best done after cleaning/debridement) should be sent for culture and sensitivity.
- 4.2. Antibiotics as for moderate/severe foot infection to target most likely pathogens (see appendix 2).
- 4.3. An x-ray of the affected site. Patients may require a magnetic resonance imaging test (MRI) to differentiate osteomyelitis from the acute Charcot foot.
- 4.4. Review by the vascular surgeons as soon as possible, especially if there is associated ischaemia, pre-gangrene, gangrene or deep abscess. The vascular surgeons will liaise with the orthopaedic surgeons as appropriate.
- 4.5. The acute Charcot foot is usually treated by casting, stabilisation and non-weight bearing (this could be done on an out-patient basis). Please inform the diabetic foot team.

5. Discharge from hospital and out-patient follow-up

- 5.1. No patient should be discharge with either moderate or severe infection. Patients with mild infection can be discharged on oral antibiotics (1-2 weeks course for mild foot infections; 8-12 weeks for unresolved osteomyelitis).

CAUTION: You must refer to the intranet for the most recent version of this policy.

- 5.2. Foot ulcers do not necessary need to be healed before patients can be discharged from hospital.
- 5.3. All foot lesions must be inspected on the day of discharge.
- 5.4. All patients on discharge must be referred to the diabetic foot clinic for out-patient follow-up, using appropriate referral forms (patients need to be seen within two weeks of discharge).

Suggested areas for audit

1. Foot ulcers swabs/sample sent for microbiological examination before antibiotics commenced. (100%)
2. Vascular assessment done for all patients. (100%)
3. Patients referred to the diabetic foot clinic on discharge. (100%)

References

Edmonds ME, Foster AVM (2000) Managing stage 4: The cellulitic foot. In *Managing the diabetic foot*. Blackwell Science: Oxford, pp 77-98.

Edmonds ME, Foster AVM (2000) Managing stage 5: The necrotic foot. In *Managing the diabetic foot*. Blackwell Science: Oxford, pp 99-112.

International Working Group on the Diabetic Foot (2003) International consensus on the diabetic foot [CD-ROM]. Brussels: International Diabetes Foundation.

King's College Hospital (2003) Guidelines for the microbiological management of diabetic foot infections.

Lipsky BA, Berendt AR, Deery HG, Embil JM, Joseph WS, Karchmer AW, LeFrock JL, Lew DP, Mader JT, Norden C, Tan JS, Infectious Disease Society of America (2004) Diagnosis and treatment of diabetic foot infections. *Clin Infect Dis* 39: 885-910.

National Institute for Clinical Excellence (2004) Type 2 diabetes: prevention and management of foot problems. NICE Technology Appraisal Guidance No. 10. London: National Institute for Clinical Excellence. Available at: www.nice.org.uk. Accessed Nov 17, 2006.

North West Podiatry Services Diabetes Clinical Effectiveness Group (2005) Guidelines for the prevention and management of foot problems for people with diabetes.

Oyibo SO (2004) Studies on the management of diabetic foot problems. *A thesis accepted by the University of Manchester*.

Appendix 1

Flow chart showing guidelines for in-patient management of diabetic foot infections

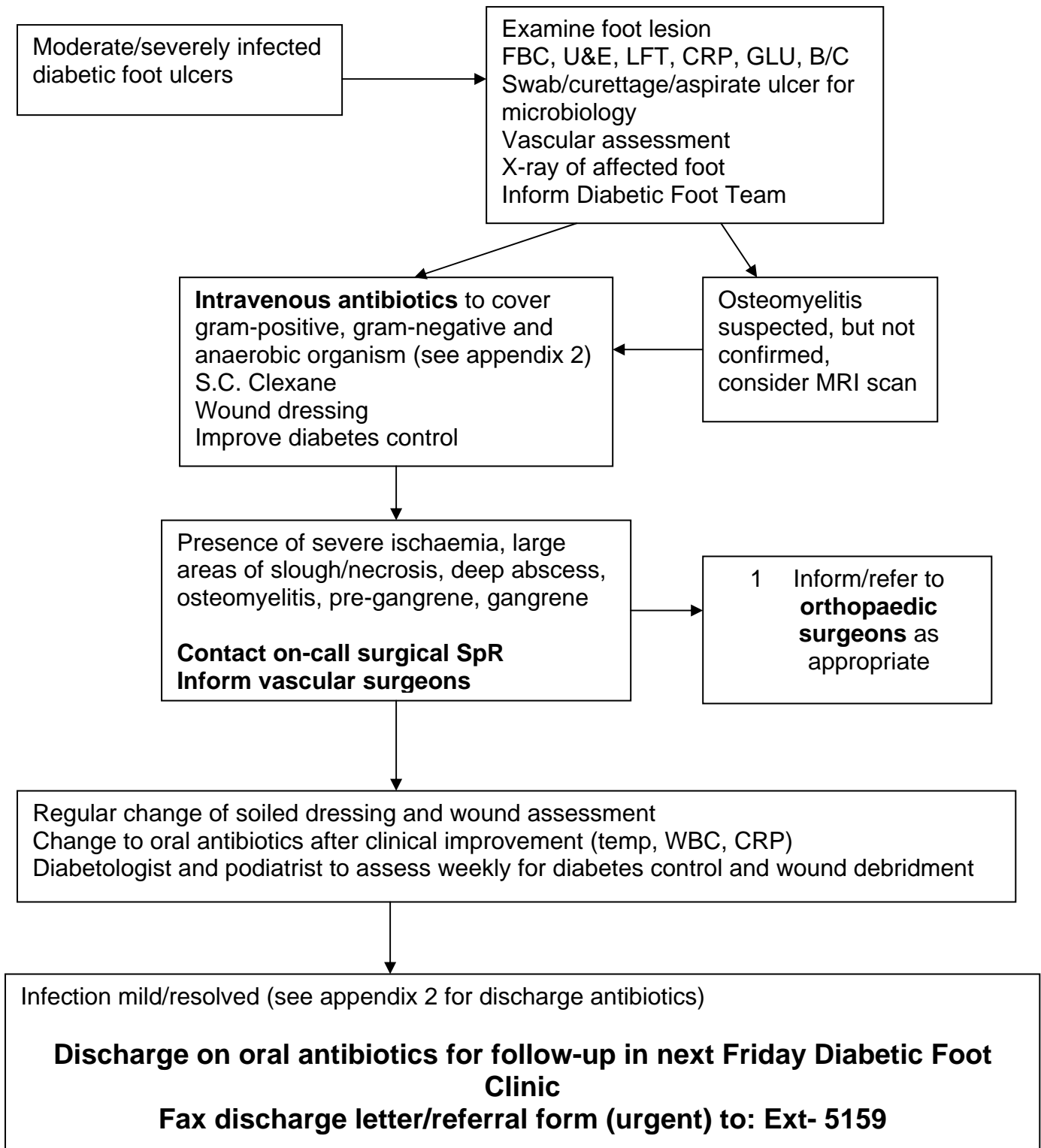
Appendix 2

Flow chart showing guidelines for use of antibiotics for diabetic foot infections

CAUTION: You must refer to the intranet for the most recent version of this policy.

Appendix 1

Guidelines for in-patient management of diabetic foot infections



CAUTION: You must refer to the intranet for the most recent version of this policy.

Appendix 2

