ANTIBIOTIC PRESCRIBING POLICY FOR DIABETIC FOOT DISEASE IN SECONDARY CARE

Version	• 1.0
Date ratified	• June 2009
Review date	• June 2011
Ratified by	• Nottingham Antibiotic Guidelines Committee • Nottingham Acute Trusts Joint Drugs and Therapeutics Committee
Authors	• Dr Frances Games Consultant Endocrinologist • Prof William Jeffcoate Consultant Endocrinologist • Dr Vivienne Weston Consultant Microbiologist • Annette Clarkson Specialist pharmacist Antimicrobials and Infection Control
Consultation	• Nottingham Antibiotic Guidelines Committee members
Evidence base	• Local microbiological sensitivity surveillance • Recommended best practice based on clinical experience of guideline developers
Inclusion criteria	• Immuno-competent adult patients with diabetic foot infection
Distribution	• This guideline will be available on the Clinical Effectiveness Department Intranet page and the Trust antibiotics guidelines websites: **http://nuhnet/diagnostics_clinical_support/antibiotics** • This guideline will be included in the NUH Formulary update
Local contacts	• Dr Frances Game Consultant Endocrinologist

This guideline has been registered with the Trust.
Clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague. Caution is advised when using guidelines after a review date.

ANTIBIOTIC PRESCRIBING POLICY FOR DIABETIC

Disease of the diabetic foot is potentially limb- and life-threatening and must be referred within one working day to the diabetes specialist foot care team. Contact the team (both campuses) by HISS or NotIS (code DIAB), by bleeping the specialist registrar or by contacting the secretaries of Dr Game (ext 54161) or Prof Jeffcoate (ext 56201) at city campus or at QMC campus contact the secretaries for Dr Page or Dr Seevaratnam on ext 64464 or ext 63834.

Diagnosis of infection

- The diagnosis of infection is clinical, and therefore examination of the foot is an essential part of management.
- Microbiological sampling of the foot cannot be used to diagnose infection, but is used to identify infecting organisms.
- Clinical signs of inflammation may be less obvious in the ischaemic foot.
- Critical ischaemia may be misdiagnosed as infection because of redness, swelling and pain.
- The acute Charcot foot is also often first misdiagnosed as infection.

Infecting organisms

- The organisms responsible for newly occurring infection of soft tissue are usually Gram +ve cocci (staphylococci including MRSA and streptococci).
- If there is infection of bone, the most common infecting organism is *Staphylococcus aureus*, but other organisms, including anaerobic bacteria, may be involved.
- If a foot lesion
  (a) has already been treated with antibiotics or
  (b) is associated with ischaemia or extensive necrosis,
  the infecting organisms are frequently multiple and include Gram –ve organisms and anaerobic bacteria.

Antibiotic choice

The recommendations listed here are for emergency empirical management, ensure that all patients are referred to the diabetes team within one working day. Contact the diabetes

specialist footcare team (see above for contact details. The following advice should be followed to ensure the prudent use of antimicrobials:

1 Always write the indication and a review date for all antimicrobials on the drug chart at the point of prescribing, refer to the antibiotic Stop/Review Date and Indication Policy. The total duration of therapy will be determined via the specialist diabetes team.
2 Review all antibiotics daily
3 Review IV antibiotics on the post-take ward round and at 48 hours- refer to IV to oral switch guidelines
4 The emergency empirical treatment should be reviewed by the footcare team in the light of any positive culture results.

Prescribers should be aware of clinical factors which affect the empirical antibiotic treatment choice, see below. All doses given below are for those with normal renal function. For dosing advice in renal impairment see the antibiotics website http:nuhweb…..:

Newly occurring infection of soft tissue/cellulitus

Severe infection: Flucloxacillin IV 2g qds converting to Flucloxacillin po 1g qds when clinically improving (refer to the IV-PO switch guideline)
Non severe: Flucloxacillin PO 1g qds

If penicillin allergic: Clindamycin 300-450mg qds

Ulcers complicated by infection: Non-severe

IV Co-amoxiclav 1.2g tds (if IV therapy deemed clinically necessary) converting to Co-amoxiclav PO 625mg (Prescribed as co-amoxiclav 375mg plus amoxicillin 250mg) tds once clinically improving. See IV to PO guideline.

Penicllin allergy/ where a known sensitive pseudomonal infection is suspected:

Clindamycin po 300-450mg qds plus Ciprofloxacin po 500mg bd.

NB: *If patients are previous MRSA carriers ciprofloxacin is not recommended as can increase colonisation please seek advice from microbiology.*

Ulcers complicated by infection with systemic signs, in limb-threatening infection, or otherwise judged severe:

IV Amoxicllin 1g tds **plus** Metronidazole IV 500mg tds **plus** Gentamicin 5mg/kg od (max 500mg) unless renal impairment.

For gentamicin dosing advice in renal impairment and for advice on monitoring refer to the antibiotic website http://nuhnet/diagnostics_clinical_support/antibiotics or refer to page 5 of this guideline. For gentamicin dosing in the obese refer to the gentamicin dosing calculator on the antibiotic website.

Penicillin allergic: IV Clindamycin 600mg qds converting to oral Clindamycin 300mg-450mg qds once clinically improving **PLUS** Gentamicin IV 5mg/kg od (max 500mg) unless renal impairment. For gentamicin dosing advice in renal impairment and for advice on monitoring refer to the antibiotic website http://nuhnet/diagnostics_clinical_support/antibiotics or refer to page 5 of this guideline. For gentamicin dosing in the obese refer to the gentamicin dosing calculator on the antibiotic website.

ONCE DAILY GENTAMICIN DOSING AND MONITORING

Dosage:

- Use 5mg/kg/dose (up to a maximum of 500mg)
- Round the dose up or down to the nearest 40mg increment e.g. 320mg or 360mg
- Dose obese patients using the Gentamicin dosing calculator on the antibiotic website (http://nuhnet/diagnostics_clinical_support/antibiotics)
- Give as an **infusion** over 60 minutes (in 100ml NaCl 0.9% or Dex 5%).
- In patients with **established renal impairment** (ie CrCl <40ml/min) the dose must be reduced see below
- Many elderly patients have a CrCl below 50ml/min, which, because of reduced muscle mass, may not be indicated by a raised creatinine level. It is therefore prudent to assume at least **mild** renal impairment when prescribing for this patient group.

ONCE DAILY GENTAMICIN DOSING IN ESTABLISHED RENAL IMPAIRMENT

CrCl 10 –40ml/min	CrCl <10 (severe)
3mg/kg stat *(max 300mg)* Check levels 18–24 hours after first dose. Redose only when levels < 1 mg/L	**2 mg/kg stat *(max 200mg)*** Redose according to levels Close monitoring of blood levels recommended and dose adjustment as necessary

Calculation of Creatinine Clearance

The Cockcroft-Gault equation (below) should be used to calculate creatinine clearance and gives an estimate of kidney function for the purposes of drug dosing in renal impairment . **Cockcroft-Gault CrCl estimates should be used for drug dosing rather than the automated MDRD eGFR produced by the clinical chemistry laboratory available on NOTIS/HISS. There can be a significant difference between the results of the two calculations.**

The Cockcroft-Gault equation is used to calculate creatinine clearance as an **estimate** of GFR (ml/min):

$$\text{CrCl (ml/min)} = \frac{F \times (140 - \text{age}) \times \text{weight (kg)}}{\text{Serum creatinine (micromol/L)}}$$

where F

= 1.23 (male)
= 1.04 (female)

Where F = 1.23 (male), F = 1.04 (female)

- If patient is anuric, morbidly obese or in acute renal failure (ARF), this equation will NOT give a true reflection of creatinine clearance.
- Anuric and oliguric (<500ml/day) patients can be assumed to have a CrCl < 10ml/min (severe renal impairment)

A **Creatinine Clearance Calculator** is available on the Nottingham Hospitals antibiotic website: **http://nuhnet/diagnostics_cinical_support/antibiotics**

Monitoring of Gentamicin levels and renal function

- Take a **trough level 18-24 hours** (red-topped sample to microbiology) after the **first** dose, the ideal trough is less than 1.0mg/L
- Give time of last dose and time taken, details of dose and latest creatinine on the sample request form (without which the results cannot be interpreted).
- **For a result to be returned the same day, samples must be at path lab reception before 3.30pm on weekdays and before 10am on weekends**.
- In a patient **<65 years**, if the **serum creatinine is normal with good urine output give the second dose** without waiting for the result.
- In a patient **>65 years old** or with **abnormal renal function**, **await the result before giving a second dose** and obtain advice from the medical microbiologist if the pre dose is level is >1.0 mg/l
- When the first dose of gentamicin has been given in the evening/night, the level should be taken by 3.00pm the following day if this falls within the 18-24 hour window, and sent for analysis immediately. If this is not possible the doctor must decide whether the second dose of gentamicin is given before the level is known. As a general guide, for patients over 65 years or with impaired renal function, the level and dose may be delayed until the next morning.
- It is **not** necessary to do a post dose level
- Results will be available on results reporting system on the day that the sample is received.
- Renal function should be checked at least three times a week and levels should be checked twice weekly during a treatment course.
- If renal function deteriorates then renal function should be checked daily and gentamicin levels closely monitored. A dose reduction may be required.
- All patients prescribed more than one dose of gentamicin should have a fluid balance chart completed and urine output should be closely monitored.