Clinical Guidelines for Use of Antibiotics in Adults

DIABETIC FOOT INFECTION

The main antibiotic policy can be found on the Trust intranet under Pharmacy/Antibiotics and will include general principles of good antibiotic prescribing.

It is Trust policy that ALL antibiotic prescriptions should state a duration or review date and an indication for treatment. All antibiotic prescriptions should be reviewed every 24 hours.
All doses are for adults with normal renal and liver function.

General

Antibiotic regimens should be guided by:

- Clinical presentation,
- Microbiological findings
- Response to antibiotics

If clinically infected treatment should be **started immediately** with therapy guided towards most likely pathogen. Infection from recently acquired superficial ulcer is likely to be due to *staph aureus* whereas long duration of ulceration with increased depth/severity and antibiotic treatment more likely to be polymicrobial including gram negatives anaerobes and resistant bacteria. (See table 1)

Table 1: Pathogens associated with various clinical foot-infection syndromes

Foot Infection Syndrome	Pathogens
Cellulitis without an open skin wound	b-Haemolytic streptococcus and *Staphylococcus aureus*
Infected ulcer and antibiotic naive	*S. aureus* and b-haemolytic streptococcus
Infected ulcer that is chronic or was previously treated with antibiotic therapy	*S. aureus,* b-haemolytic streptococcus, and Enterobacteriaceae
Ulcer that is macerated because of soaking	*Pseudomonas aeruginosa* (often in combination with other organisms)
Long duration non healing wounds with prolonged, broad spectrum antibiotic therapy	Aerobic gram-positive cocci (*S. aureus ,* coagulase-negative staphylococci, and enterococci), diphtheroids, Enterobacteriaceae, *Pseudomonas* species, non fermentative gram negative rods, and, possibly, fungi
Fetid foot: extensive necrosis or gangrene, malodorous	Mixed aerobic gram-positive cocci, including enterococci, Enterobacteriaceae, non fermentative gram-negative rods, and obligate anaerobes

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Specimens

Great care should be taken obtaining a sample and also interpreting result. Swabs should always be taken from the base of the ulcer after debridement of superficial slough and necrosis. Ideally biopsy of tissue from a debrided ulcer base (See table 2) should be obtained

A degree of subjectivity is required in interpreting results as not all organisms will be significant and require treatment.

Table 2: Collection of soft-tissue specimens from an infected diabetic foot for culture

When:

- Culturing clinically *uninfected* lesions is unnecessary, unless done as part of an infection-control surveillance protocol.
- Cultures of infected wounds are valuable for directing antibiotic choices, but may be unnecessary in cases of acute mild infection in an antibiotic-naive patient.
- Blood cultures should be performed for a patient with a severe infection, especially if the patient is systemically ill

How:

- Cleanse and debride the lesion before obtaining specimens for culture.
- In cases involving an open wound, obtain tissue specimens from the debrided base (whenever possible) by means of curettage (scraping with a sterile dermal curette or scalpel blade) or biopsy (bedside or operative)
- Avoid swabbing undebrided ulcers or wound drainage. If swabbing the debrided wound base is the only available culture option, use a swab designed for culturing aerobic and anaerobic organisms and rapidly transport it to the laboratory (B-I).
- Needle aspiration may be useful for obtaining purulent collections or, perhaps, a specimen from an area of cellulitis.
- Clearly identify samples (specimen type and anatomic location), and promptly send them to the laboratory in an appropriate sterile container or transport media for aerobic and anaerobic culture.
- Please indicate on the request slip if there are any clinical signs of infection

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Duration of Treatment (See table for more detail)

Continue antibiotic therapy until there is evidence that the infection has resolved but not necessarily until a wound has healed.

Suggestions for the duration of antibiotic therapy are as follows:

For **mild infections**, 1–2 weeks usually suffices, but some require an additional 1–2 weeks;

For **moderate and severe infections**, usually 2–4 weeks is sufficient, depending on the structures involved, the adequacy of debridement, the type of soft-tissue wound cover, and wound vascularity;

For **osteomyelitis**, generally at least 4–6 weeks is required, but a shorter duration is sufficient if the entire infected bone is removed, and probably a longer duration is needed if infected bone remains

Table 3: Suggested route, setting, and durations of antibiotic therapy, by clinical syndrome

Site, by severity or extent, of infection	Route of administration	Setting for therapy	Duration of therapy
Soft Tissue only:			
Mild	Oral	Outpatient	1–2 Weeks; may extend up to 4 weeks if slow to resolve
Moderate	Oral (or initial parenteral)	Outpatient/inpatient	2–4 Weeks
Severe	Initial parenteral, switch to oral when possible	Inpatient, then outpatient	2–4 Weeks
Bone or joint			
No residual infected tissue (e.g., post-amputation)	Parenteral or oral		2–5 Days
Residual infected soft tissue (but not bone)	Parenteral or oral		2–4 Weeks
Residual infected (but viable) bone	Initial parenteral, then consider oral switch		4–6 Weeks
No surgery, or residual dead bone post-operatively	Initial parenteral, then consider oral switch		>3 Months

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DIABETIC FOOT INFECTION TREATMENT PATHWAY

MILD	MODERATE	SEVERE
Cellulitis <2cm confined to skin. No evidence of systemic infection. Two or more of: Erythema, warmth, pain, tenderness, induration +/- drainage.	**Cellulitis >2cm** No evidence of systemic infection. Lymphatic streaking, deep tissue infection involving subcutaneous tissue, tendon, fascia, bone or abscess.	Moderate + systemic toxicity (fevers, chills, shock, vomiting, confusion, metabolic instability).
Initially for 7 days: **Flucloxacillin 500mg orally 6 hourly**. If anaerobes suspected: ADD **Metronidazole 400mg orally 8 hourly.** If no improvement in 7 days switch to: Co-amoxiclav 625mg orally 8 hourly.	**Co-amoxiclav 1.2g IV 8 hourly.** If radiological evidence of Osteomyelitis switch to: **Piperacillin/Tazobactam 4.5g IV 8 hourly.** ***(See section on oral switch)***	**Piperacillin/Tazobactam 4.5g IV 8 hourly.** ***(See section on oral switch)***
Penicillin allergy: **Doxycycline 200mg orally STAT, then 100mg once daily.** If anaerobes suspected: ADD **Metronidazole 400mg orally 8 hourly.** Duration 1 – 2 weeks	If history of/ suspected MRSA/MRSA colonised ADD to above: skin / soft tissue - **Teicoplanin 400mg (>85kg 600mg) IV every 12 hours for first 3 doses), then once daily.** Osteomyelitis - **Teicoplanin 800mg IV every 12 hours for 3 doses, then 12mg/kg or 800mg once daily whichever dose is lower.**	If history of/ suspected MRSA/MRSA colonised ADD to above: skin / soft tissue - **Teicoplanin 400mg (>85kg 600mg) IV every 12 hours for first 3 doses), then once daily.** Osteomyelitis - **Teicoplanin 800mg IV every 12 hours for 3 doses, then 12mg/kg or 800mg once daily whichever dose is lower.**
If no clinical improvement in 14 days on either regime – refer to Multi disciplinary Diabetic Foot team.	**Penicillin allergy:** skin / soft tissue - **Teicoplanin 400mg (>85kg 600mg) IV every 12 hours for first 3 doses), then once daily.** Osteomyelitis - **Teicoplanin 800mg IV every 12 hours for 3 doses, then 12mg/kg or 800mg once daily whichever dose is lower.** AND **Metronidazole 500mg IV 8 hourly** AND **Ciprofloxacin 500mg orally 12 hourly.**	**Penicillin allergy**: skin / soft tissue - **Teicoplanin 400mg (>85kg 600mg) IV every 12 hours for first 3 doses), then once daily.** Osteomyelitis - **Teicoplanin 800mg IV every 12 hours for 3 doses, then 12mg/kg or 800mg once daily whichever dose is lower.** AND **Metronidazole 500mg IV 8 hourly** AND **Ciprofloxacin 500mg orally 12 hourly.**

All IV antibiotics should be reviewed at least every 48 hours and de-escalated to oral when clinical signs are improving.

Switch to oral therapy as soon as appropriate. Review Microbiology report after surgical debridement for targeted antibiotic selection and duration.

Review by Multidisciplinary Diabetic Foot team twice a week

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Outpatient Parenteral Antibiotic Treatment at home (OPAT):

If patient has PICC line in situ and is clinically stable, if a district nurse service is available ONLY the following antibiotics are suitable for administration at home following advice from a consultant microbiologist/antibiotic pharmacist: Teicoplanin, Ceftriaxone, Ertapenem.

Oral Switch:

The timing of this will depend upon clinical response and infective markers improving appropriately. These guidelines are for empirical treatment where no patient isolates are available. Oral switch may be individual depending upon specific pathogens isolated. In more complex cases, advice should be sort from the Consultant Microbiologist or the Trust Antibiotic Specialist Pharmacists before switching to oral antimicrobial therapy.

For Empirical Oral Switches see below:

Existing Intravenous therapy	Common susceptible organisms	Suggested oral choice if no known organism.	Comments
Teicoplanin Or **Vancomycin**	Gram positive organisms only (including MRSA)	**Doxycycline** *(Flucloxacillin or amoxicillin or clindamycin if organism likely to be sensitive)	ORAL Vancomycin is NOT absorbed and should only be used for treatment of *C. difficile* associated infection.
Piperacillin with Tazobactam (Piptazo)	Broad spectrum antimicrobial covering Gram positive and Gram negative organisms and anaerobes. Not active against MRSA	**Co-amoxiclav** *Doxycycline *Co-amoxiclav and ciprofloxacin (for resistant gram negative infections)	Avoid use of ciprofloxacin in the elderly due to risk of *C.difficile* associated infection.

*Note lesser used alternatives in brackets.