Diabetic foot infection: antimicrobial prescribing

NICE National Institute for Health and Care Excellence

Background

In diabetes, all foot wounds are likely to be colonised with bacteria

Diabetic foot infection has at least 2 of:

- **local swelling or induration**
- **erythema**
- **local tenderness or pain**
- **local warmth**
- **purulent discharge**

Severity is classified as:

- **Mild - local infection with 0.5 cm to less than 2 cm erythema**
- **Moderate - local infection with more than 2 cm erythema or involving deeper structures (such as abscess, osteomyelitis, septic arthritis or fasciitis)**
- **Severe - local infection with signs of a systemic inflammatory response**

Prescribing considerations

When choosing an antibiotic, take account of:

- **the severity of infection (mild, moderate or severe)**
- **the risk of complications**
- **previous microbiological results**
- **previous antibiotic use**
- **patient preference**

Give oral antibiotics first line if possible

Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible

Review need for continued antibiotics regularly

Diabetic foot infection

H

Refer to hospital immediately and inform multidisciplinary foot care service if there are limb- or life-threatening problems such as:

- ulceration with fever or any signs of sepsis, or
- ulceration with limb ischaemia, or
- suspected deep-seated soft tissue or bone infection, or
- gangrene

For all other active diabetic foot problems, refer to foot service within 1 working day

- Start antibiotic treatment as soon as possible
- Take samples for microbiological testing before, or as close as possible to, the start of antibiotic treatment
- When choosing an antibiotic, take account of prescribing considerations

Give advice about:

- **possible adverse effects of the antibiotics**
- **seeking medical help if symptoms worsen rapidly or significantly at any time, or do not start to improve within 1 to 2 days**

When microbiological results are available:

- review the choice of antibiotic, and
- change the antibiotic according to results, using a narrow spectrum antibiotic, if appropriate

- **Do not offer antibiotics to prevent diabetic foot infection**
- **Advise seeking medical help if symptoms of diabetic foot infection develop**

Reassess if symptoms worsen rapidly or significantly at any time, do not start to improve within 1 to 2 days, or the person becomes systemically very unwell or has severe pain out of proportion to the infection. Take account of:

- **other possible diagnoses, such as pressure sores, gout or non-infected ulcers**
- **symptoms or signs suggesting something more serious such as limb ischaemia, osteomyelitis, necrotising fasciitis or sepsis**
- **previous antibiotic use**

Refer to hospital if needed (see above)

This is a summary of the recommendations on antimicrobial prescribing for diabetic foot infection from NICE's guideline on diabetic foot problems: prevention and management. For more general recommendations on diabetic foot problems, see the NICE guideline at www.nice.org.uk/guidance/ng19

Diabetic foot infection: antimicrobial prescribing

NICE National Institute for Health and Care Excellence

Mild infection: choice of antibiotic for adults aged 18 years and over

Antibiotic[1]	Dosage and course length
First choice oral antibiotic	
Flucloxacillin	500 mg to 1 g four times a day for 7 days[2,3]
Alternative oral antibiotics for penicillin allergy or if flucloxacillin is unsuitable (for people who are not pregnant; guided by microbiological results when available)	
Clarithromycin	500 mg twice a day for 7 days[2]
Doxycycline	200 mg on first day, then 100 mg once a day (can be increased to 200 mg daily) for 7 days[2]
Alternative oral antibiotic for penicillin allergy in pregnancy	
Erythromycin	500 mg four times a day for 7 days[2] Erythromycin is preferred if a macrolide is needed in pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. See the Medicines and Healthcare products Regulatory Agency (MHRA) Public Assessment Report on the safety of macrolide antibiotics in pregnancy.

[1]See BNF for appropriate use and dosing in specific populations, for example, people with hepatic impairment or renal impairment, or who are pregnant or breast-feeding.

[2]A longer course (up to a further 7 days) may be needed based on clinical assessment. However, skin does take some time to return to normal, and full resolution of symptoms at 7 days is not expected.

[3]The upper dose of 1 g four times a day would be off-label. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Good practice in prescribing and managing medicines and devices for further information.

When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

 ISBN: 978-1-4731-4991-5

Diabetic foot infection: antimicrobial prescribing

Moderate or severe infection: choice of antibiotic for adults aged 18 years and over

Antibiotic[1]	Dosage	
First choice antibiotics (guided by microbiological results when available)[2,3,4,] In severe infection give IV for at least 48 hours (until stabilised). Course length is based on clinical assessment: minimum 7 days and up to 6 weeks for osteomyelitis (use oral antibiotics for prolonged treatment)[5]		
Flucloxacillin ***with or without***	1 g four times a day orally[6]	**or** 1 to 2 g four times a day IV
Gentamicin[7,8] ***and/or***	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration	
Metronidazole	400 mg three times a day orally	**or** 500 mg three times a day IV
Co-amoxiclav ***with or without***	500/125 mg three times a day orally	**or** 1.2 g three times a day IV
Gentamicin[7,8]	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration	
Co-trimoxazole (in penicillin allergy)[8,9] ***with or without***	960 mg twice a day orally	**or** 960 mg twice a day IV (can be increased to 1.44 g twice a day)
Gentamicin[7,8] ***and/or***	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration	
Metronidazole	400 mg three times a day orally	**or** 500 mg three times a day IV
Ceftriaxone ***with***	2 g once a day IV	
Metronidazole	400 mg three times a day orally	**or** 500 mg three times a day IV
Additional antibiotic choices if *Pseudomonas aeruginosa* suspected or confirmed (guided by microbiological results when available)[2,3,4,10]		
Piperacillin with tazobactam	4.5 g three times a day IV (can be increased to 4.5 g four times a day)	
Clindamycin ***with***	150 to 300 mg four times a day orally (can be increased to 450 mg four times a day)	**or** 600 mg to 2.7 g daily IV in two to four divided doses, increased if necessary in life-threatening infection to 4.8 g daily (max per dose 1.2 g)
Ciprofloxacin (consider safety issues[11]) ***and/or***	500 mg twice a day orally	**or** 400 mg two or three times a day IV
Gentamicin[7,8]	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration	
Antibiotics to be added if MRSA infection suspected or confirmed (combination therapy with an antibiotic listed above)[3,4]		
Vancomycin[7,8]	15 to 20 mg/kg two or three times a day IV (maximum 2 g per dose), adjusted according to serum vancomycin concentration	
Teicoplanin[7,8]	Initially 6 mg/kg every 12 hours for three doses, then 6 mg/kg once a day IV	
Linezolid (if vancomycin or teicoplanin cannot be used; specialist use only)[8]	600 mg twice a day orally	**or** 600 mg twice a day IV

[1]See BNF for use and dosing in specific populations, for example, people with hepatic impairment or renal impairment, or who are pregnant or breast-feeding, and administering IV (or, where appropriate, intramuscular) antibiotics.
[2]Give oral antibiotics first-line if the person can take oral medicines, and the severity of their condition does not require intravenous antibiotics.
[3]Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible.
[4]Other antibiotics may be appropriate based on microbiological results and specialist advice.
[5]Skin takes some time to return to normal, and full resolution of symptoms after a course of antibiotics is not expected. Review the need for continued antibiotics regularly.
[6]The dose of 1 g four times a day would be off-label. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Good practice in prescribing and managing medicines and devices for further information.
[7]See BNF for information on therapeutic drug monitoring.
[8]See BNF for information on monitoring of patient parameters.
[9]Not licensed for diabetic foot infection, so use would be off label (see above).
[10]These antibiotics may also be appropriate in other situations based on microbiological results and specialist advice.
[11]See MHRA advice for restrictions and precautions for using fluroquinolone antibiotics due to very rare reports of disabling and potentially long-lasting or irreversible side effects (March 2019).