First choice antibacterials in children aged 1 month and over

- ***Oral*** *or* ***Intravenous*** *first line* :
  - EvGr Flucloxacillin p. 373.
  - Alternative in penicillin allergy or if flucloxacillin unsuitable: co-amoxiclav p. 370 (**not** in penicillin allergy), clarithromycin p. 353, or oral erythromycin p. 355 (in pregnancy). A
- ***Oral*** *or* ***Intravenous*** *first line if infection near the eyes or nose* :
  - EvGr Co-amoxiclav.
  - Alternative in penicillin allergy or co-amoxiclav unsuitable: clarithromycin. If anaerobes suspected, **add** metronidazole p. 358. A

Alternative choice antibacterials for severe infection in children aged 1 month and over

- ***Oral*** *or* ***Intravenous***:
  - EvGr Co-amoxiclav, clindamycin p. 351, or intravenous cefuroxime p. 341.
  - If meticillin-resistant *Staphylococcus aureus* confirmed or suspected, **add** intravenous vancomycin p. 349, intravenous teicoplanin p. 348, or linezolid p. 389 (specialist use only if vancomycin or teicoplanin cannot be used).
  - Other antibacterials may be appropriate based on microbiological results and specialist advice. A

Staphylococcal scalded skin syndrome

- Flucloxacillin
  - *Suggested duration of treatment* 7–10 days.
- *If penicillin-allergic*, clarithromycin (*or* azithromycin p. 352 *or* erythromycin)
  - *Suggested duration of treatment* 7–10 days.

Animal and human bites

Cleanse wound thoroughly. For tetanus-prone wound, give human tetanus immunoglobulin p. 826 (with a tetanus-containing vaccine if necessary, according to immunisation history and risk of infection). Consider rabies prophylaxis for bites from animals in endemic countries; assess risk of blood-borne viruses (including HIV, hepatitis B and C) and give appropriate prophylaxis to prevent viral spread.

- Co-amoxiclav
  - *If penicillin-allergic*, clindamycin

Surgical wound infection

- Flucloxacillin *or* co-amoxiclav

Paronychia or 'septic spots' in neonate

- Flucloxacillin
  - If systemically unwell, add an aminoglycoside.

Useful Resources

Cellulitis and erysipelas: antimicrobial prescribing. National Institute for Health and Care Excellence. NICE guideline 141. September 2019.
www.nice.org.uk/guidance/ng141

Impetigo: antimicrobial prescribing. National Institute for Health and Care Excellence. NICE guideline 153. February 2020.
www.nice.org.uk/guidance/ng153

ANTIBACTERIALS › AMINOGLYCOSIDES

Aminoglycosides

Overview

These include amikacin p. 332, gentamicin p. 333, neomycin sulfate p. 774, streptomycin p. 334, and tobramycin p. 334. All are bactericidal and active against some Gram-positive and many Gram-negative organisms. Amikacin, gentamicin, and tobramycin are also active against *Pseudomonas aeruginosa*; streptomycin is active against *Mycobacterium tuberculosis* and is now almost entirely reserved for tuberculosis.

The aminoglycosides are not absorbed from the gut (although there is a risk of absorption in inflammatory bowel disease and liver failure) and must therefore be given by injection for systemic infections.

Gentamicin is the aminoglycoside of choice in the UK and is used widely for the treatment of serious infections. It has a broad spectrum but is inactive against anaerobes and has poor activity against haemolytic streptococci and pneumococci. When used for the 'blind' therapy of undiagnosed serious infections it is usually given in conjunction with a penicillin or metronidazole p. 358 (or both). Gentamicin is used together with another antibiotic for the treatment of endocarditis. Streptomycin may be used as an alternative in gentamicin-resistant enterococcal endocarditis.

Loading and maintenance doses of gentamicin may be calculated on the basis of the patient's weight and renal function (e.g. using a nomogram); adjustments are then made according to serum-gentamicin concentrations. High doses are occasionally indicated for serious infections, especially in the neonate, in the patient with cystic fibrosis, or in the immunocompromised patient. Whenever possible treatment should not exceed 7 days.

Amikacin is more stable than gentamicin to enzyme inactivation. Amikacin is used in the treatment of serious infections caused by gentamicin-resistant Gram-negative bacilli.

Tobramycin has similar activity to gentamicin. It is slightly more active against *Ps. aeruginosa* but shows less activity against certain other Gram-negative bacteria.

Neomycin sulfate is too toxic for parenteral administration and can only be used for infections of the skin or mucous membranes or to reduce the bacterial population of the colon prior to bowel surgery or in hepatic failure. Oral administration may lead to malabsorption. Small amounts of neomycin sulfate may be absorbed from the gut in patients with hepatic failure and, as these patients may also be uraemic, cumulation may occur with resultant ototoxicity.

Cystic fibrosis

A higher dose of parenteral aminoglycoside is often required in children with cystic fibrosis because renal clearance of the aminoglycoside is increased. Aminoglycosides have a role in the treatment of pseudomonal lung infections in cystic fibrosis. Tobramycin can be administered by nebuliser or by inhalation of powder on a cyclical basis (28 days of tobramycin followed by a 28-day tobramycin-free interval) for the treatment of chronic pulmonary *Ps. aeruginosa* infection in cystic fibrosis; however, resistance may develop and some patients do not respond to treatment.

Once daily dosage

Once daily administration of aminoglycosides is more convenient, provides adequate serum concentrations, and has largely superseded *multiple-daily dose regimens* (given in 2–3 divided doses during the 24 hours). Local guidelines on dosage and serum concentrations should be consulted. A once-daily, high-dose regimen of an aminoglycoside should be avoided in children with endocarditis or burns of more than 20% of the total body surface area. There is insufficient evidence to recommend a once daily, high-dose regimen of an aminoglycoside in pregnancy.

Serum concentrations

Serum concentration monitoring avoids both excessive and subtherapeutic concentrations thus preventing toxicity and ensuring efficacy. Serum-aminoglycoside concentrations