Louth: Antimicrobial Guidelines - Louth Hospitals: Antimicrobial Guidelines: Paediatric Gentamicin Once Daily Guideline

Children's Health Ireland Paediatric Gentamicin Dosing and Monitoring Guideline 2020

EXCEPTIONS to this guide

- This guideline does not apply to those with known mitochondrial m.1555A>G mutation.
- This guideline excludes patients on renal replacement therapy; consult local protocols and nephrology department for advice in these cases.

PAEDIATRIC GENTAMICIN DOSING GENERAL GUIDANCE

- Use extended interval or once daily dosing except where recommended by ID/Micro.
- Dose using ideal weight for height in obesity (dose should not exceed maximum adult daily dose of 480mg or as per local policy). However, individual hospitals may have specific protocols for particular patient groups which recommend different maximum daily doses.
- Dose based on kidney function (i.e. review urea and creatinine, urine output, consider any known kidney abnormality or dialysis. However, this should not delay the first dose of gentamicin in patients with suspected sepsis).
- If possible, dehydration should be corrected before starting gentamicin.
- Assess need to continue other ototoxic or nephrotoxic drugs. Where concomitant use is unavoidable, administration should be separated by as long a period as practicable (e.g. gentamicin and an ototoxic diuretic such as furosemide).
- Regular review and documentation of ongoing need for gentamicin is essential.
- The time of blood sampling and the time the last dose was administered must be recorded in order to accurately interpret gentamicin level results.
- This guideline excludes patients on renal replacement therapy; consult local protocols and nephrology department for advice in these cases.

PAEDIATRIC GENTAMICIN INITIAL DOSING REGIMEN

NOTE: Dosing guidelines in individual centres should be agreed locally with input from microbiology/ infectious disease experts, nephrologists and pharmacy.

Age	Renal Function	Initial Dose
Child > 1 month	Normal	7mg/kg 24 hourly IV infusion over 30 min
Updated Renal Dosing from Crumlin/Temple St Hospitals 2019:		
Child > 1 month	Mild renal impairment (GFR 30 – 70ml/min/1.73 m^2)	5mg/kg, prescribe single dose only
Child > 1 month	Moderate renal impairment (GFR 10 – 30 ml/min/1.73 m^2)	3mg/kg, prescribe single dose only
Child > 1 month	Severe renal impairment (HD/GFR < 10 ml/min/1.73 m^2)	2mg/kg, prescribe single dose only

PAEDIATRIC GENTAMICIN MONITORING

Why are levels taken?

- **Pre dose (trough)** levels are taken to ensure that the previous dose of gentamicin has been sufficiently cleared by the kidneys before the next dose is given. Failing to clear doses due to kidney impairment can result in toxic levels and kidney damage.
- **Post dose (peak)** levels are not routinely performed with extended interval or once daily dosing. They may occasionally be required, but should only be done under expert guidance.

When should first level be taken?

- The prescriber must decide on initial timing of therapeutic drug monitoring (TDM) and order first serum pre-dose level in advance of prescribing 1st dose if more than one dose is planned.
- The first pre dose level can be taken either before the 2nd or the 3rd dose depending on the clinical situation.
- For the majority of patients with normal kidney function, taking a pre-dose level before the 3rd dose is appropriate. This prevents unnecessary levels from being taken in patients that are likely to stop gentamicin within the first 36-48 hours of therapy. For example:
  - Patients who are likely to be switched to oral antibiotics after 48 hours of IV therapy e.g. treatment of uncomplicated UTI.
  - Patients being treated for febrile neutropenia who are well, with no clinical focus of infection and where gentamicin will be stopped after 48 hour negative cultures.

- If there are any concerns about a patient's kidney function a level should be taken before the 2nd dose of gentamicin. For example:
  - Patients with acute kidney impairment due to sepsis/or with profound circulatory compromise and/or on inotropes especially in intensive care settings.
  - Any patient with chronic kidney impairment or with a known kidney abnormality.

Timing of levels

- Ideally the blood sample should be taken immediately before the next dose is due.
- However in order to facilitate phlebotomy and laboratory times, levels can be taken in the following time windows:
  - Up to 8 hours before dose is due if on 24 hourly dosing (i.e. 16-24 hours post dose)
  - Up to 8 hours before dose is due if on 36 hourly dosing (i.e. 28-36 hours post dose)
- The time of blood sampling and the time previous dose was administered must be recorded in order to accurately interpret the results.

Subsequent doses

- Give 2nd or 3rd dose as appropriate without waiting for result, unless there is evidence of kidney dysfunction (e.g. elevated serum creatinine or urea concentrations, decreased urine output).
- In patients with kidney dysfunction, wait for result before giving any further doses.
- In acutely septic patients, dose may be given if clinically appropriate under direction of a senior clinician.

Interpreting results

Aim for pre-dose levels < 1mg/L for paediatric patients. If levels are above recommended range:

- Double check that the level was taken in the correct time window (i.e.16-24 hours or 28-36 hours post dose as appropriate).
- If the levels are high in acutely septic patients, contact ID team/Microbiology Consultant for advice.
- In patients with a level >1mg/L who are not acutely septic, hold the next dose and repeat level 12 hours later.
- Recommence dosing if levels are ≤1mg/L and amend the dosage interval to reflect the time required to clear the previous dose (e.g. from every 24 hours to every 36 hours).

Frequency of monitoring

- Check U&E/creatinine each time you check gentamicin level
- In patients with normal kidney function: Repeat level every 3 doses.
- In patients with kidney impairment: Before every dose until discussed with Consultant Nephrologist/Microbiologist or ID.
- More frequent monitoring may be required if the patient is on concomitant nephrotoxic drugs (e.g. ibuprofen, ciclosporin, tacrolimus, furosemide, ACE inhibitors), if the dose has changed or kidney function deteriorates.