EPR Downtime: Gentamicin Treatment Dose

ONLY TO BE USED BY ADULT CRITICAL CARE AREAS (OCC, CICU AND CTCCU) OR IN THE CASE OF EPR DOWNTIME.

Formulary antimicrobial. Use in accordance with trust guidelines.

AWaRe antibiotic classification: 'Access'. Use as per guidelines.

- Gentamicin is given intravenously. Where this route is unavailable, it can be given by intramuscular injection. Please see injectable monographs for further information.
- For Infective Endocarditis Treatment see Gentamicin - infective endocarditis monitoring
- **Review need for gentamicin daily. Gentamicin should not be administered for more than three days without discussion with Micro/ID.**

For all information regarding contra-indications, interactions, contraception, pregnancy and breastfeeding and additional information, see BNF and Summary of Product Characteristics (SPC).

Monitoring

- Baseline renal function should be measured, and creatinine clearance calculated.
- Monitor renal function daily. If there is a greater than 15% change in serum creatinine re-calculate creatinine clearance and adjust dose.
- Take a baseline weight and then monitor weekly. Adjust dose if weight changes.
- Take daily U+Es.
- Monitor serum gentamicin levels (see below).
- Auditory function may be affected. Please refer to Audiometry and intravenous aminoglycosides.

Gentamicin IV – Calculating initial dose

STEP 1. Calculate the dosing weight (DW)

Calculate the dosing weight (DW) ie weight that is used to calculate the gentamicin dose – this may differ from actual body weight as below.

a) Obtain actual body weight in kg (**ABW**)

b) Estimate ideal body weight (**IBW**). **IBW** (kg) **=** [males 50kg, females 45.5kg] + 2.3kg per inch over 5ft.

c) Establish **DW**

If **ABW** within 20% of **IBW** then **DW** = **ABW**

If **overweight by more than 20% above IBW** then calculate **DW** using the formula:

DW = **IBW** + 0.4 x (**ABW** – **IBW**)

STEP 2. Determine Creatinine Clearance (CrCl)

Determine **Creatinine Clearance** using the Cockcroft-Gault equation (below).

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

where F=1.04 (females) or F=1.23 (males)

CAUTIONS

- Use **Ideal Body Weight (IBW)** if **Actual Body Weight (ABW)** is over 20% above **IBW**.

STEP 3. Calculate initial gentamicin dose

Usual Treatment Dose (CrCl 31 ml/min and over)	5mg/kg IV (maximum dose of 480mg)
Renal impairment treatment dose (CrCl 30ml/min or less) If patient is on dialysis, consult with renal team before administering gentamicin.	3 mg/kg IV (maximum dose of 240mg)

- Depending on the CrCl, calculate the initial dose using the dosing weight calculated above.
- Round down to the nearest 20mg where applicable.

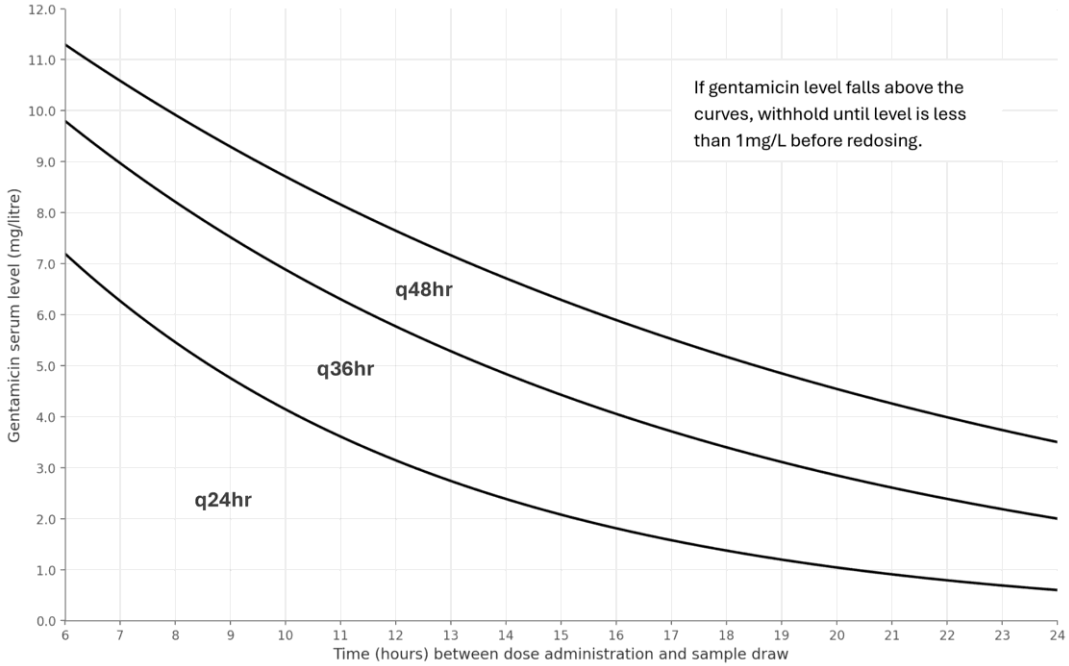
Gentamicin level and dose adjustment for 5mg/kg dose

STEP 4. Responding to gentamicin levels if creatinine clearance 31ml/min or greater

- Take serum gentamicin level (yellow blood tube) 6-14 hours after administration of first dose of gentamicin.
- **Once level available**, plot on nomogram below and adjust time interval as required.
- **If gentamicin level is not available at 24 hours post first dose**: check table below for when to give the next dose (time interval)*.

- For gentamicin 3 day courses: After calculating dosing interval from nomogram below:
    - If interval is 24 hours - give 2 further doses at the appropriate time.
    - If interval is 36 or 48 hours - give 1 further dose at the appropriate time.
- For prolonged courses if renal function is stable, repeat gentamicin levels should be taken twice a week.
- Take daily U+E. If renal function is deteriorating review use of gentamicin as this is a nephrotoxic medicine

Gentamicin 5mg/kg nomogram



*** If gentamicin level is not available at 24 hours, suggested time intervals for 5mg/kg dose are:**

Calculated Creatinine Clearance	Time interval	Where the gentamicin course is for 3 days
60 ml/min or greater	24 hours	Give 2 further doses at the appropriate time.
40 to 59 ml/min	36 hours	Give 1 further dose at the appropriate time
30 to 39 ml/min	48 hours	Give 1 further dose at the appropriate time
Less than 30 ml/min	Take a gentamicin level at 24 hours after dose and do not re-dose until serum level (TDM) is less than 1mg/L.	

Gentamicin level and dose adjustment for 3mg/kg dose

STEP 4. Responding to gentamicin levels if creatinine clearance 30ml/min or less

- Take gentamicin level 24 hours after dosing. Continue taking levels every 12 hours until level is less than 1mg/L. Only re-dose once level is less than 1mg/L.
- For patients on a 3 day course the patient may only be given 1 dose if level remains above 1mg/L.
- Take daily U+E.

MHRA Drug Safety Update

- **MHRA Drug Safety Update (January 2021)** Aminoglycosides (gentamicin, amikacin, tobramycin, and neomycin): increased risk of deafness in patients with mitochondrial mutations
- For information on Audiometry assessment see Audiometry and intravenous aminoglycosides

References

Nomogram was adapted from the Lancashire NHS Foundation Trust gentamicin guideline