

UHDB NHS FOUNDATION TRUST

DRUG MONOGRAPH AND DOSING GUIDE FOR GENTAMICIN IN INFECTIVE ENDOCARDITIS AND CARDIAC IMPLANTABLE ELECTRONIC DEVICE (CIED) INFECTIONS IN ADULTS

In the treatment of infective endocarditis (IE), once daily LOW dose gentamicin is used for its synergistic effects alongside a cell-wall active antimicrobial (e.g. benzylpenicillin, vancomycin). Previously a twice daily regime was used for IE, however the European Society of Cardiology guidelines now support the use of once daily 3mg/kg dosing. High dose, once daily gentamicin does not apply in IE as lower doses are required. Very occasionally e.g. if treating Gram negative endocarditis, high dose once daily dosing may be recommended by the consultant microbiologist, in which case this should be prescribed separately on EPMA.

Gentamicin is contraindicated in and should **not** be used in patients with **myasthenia gravis**.

DOSE: Initially 3mg/kg OD – adjusted following levels, see below. Dose should be calculated using the steps below. Dose is based on adjusted weight and renal function and should be rounded to the nearest **40mg** increment. **Maximum dose 240mg.**

ADMINISTRATION: Doses ≤120mg can be bolused over at least 3 minutes. Doses >120mg must be given as an infusion over 30 minutes. This can be made using 80mg/2ml vials; measure the dose using a 10ml syringe and dilute with 100ml NaCl 0.9% or glucose 5%

THERAPEUTIC DRUG LEVEL MONITORING (TDM): Take dose level **18-24 hours** after the first dose, **AWAIT** result and if **<1 mg/L**, give further doses. Minimum twice weekly thereafter. See level interpretation chart.

A Doctor or non-medical prescriber must prescribe the initial dose regime on **Lorenzo** or **Meditech** and enter instructions for levels to be taken in the 'review request comments' box on Lorenzo and the 'dose instructions' box on Meditech. After that, either a doctor, non-medical prescriber or pharmacist can adjust the regime to achieve the required levels. If the medical team **do not** wish the pharmacist to do this, clearly document in 'additional comments' box on Lorenzo or 'dose instructions' box on Meditech. Please document the latest plan in the patient's medical notes.

DOSE CALCULATION:

Prescribe doses on the electronic prescribing system as 'gentamicin' on Lorenzo and 'gentamicin adult IV —endocarditis'.

Step 1 – Calculate ideal body weight (IBW)

Ideal body weight = 50 + 0.91 (height (cm) - 152.4) men

(IBW) (kg)

= 45.5 + 0.91 (height (cm) - 152.4) women

Step 2 – Calculate adjusted dosing weight (ADW)

ADW = Ideal body weight + 0.4(Actual body weight - ideal body weight)

Step 3 – Calculate creatinine clearance (use CrCl not eGFR)

CrCl (ml/min) = $\frac{(140 - \text{age}) \times \text{ADW} \times 1.23^*}{\text{serum creatinine}}$ * in women 1.04

Step 4: Calculate dose

Calculate the dose based on **3mg/kg** ADW or actual body weight if this is less than IBW.

Round the dose to the nearest 40mg increment. Maximum dose 240mg.

Please note that the dosing recommended in this dosing guide is unlicensed, and not as per the British National Formulary (BNF) but is supported by evidence from the literature.

RENAL DOSE REDUCTION:

- Anuric and oliguric (<500ml/day) patients can be assumed to have a CrCl <10ml/min

CrCl >40ml/min	CrCl 10-40ml/min	CrCl <10ml/min OR AKI stage 1-3 OR anuric OR oliguric
3mg/kg OD (max 240mg)	2mg/kg OD (max 200mg)	Single dose of 2mg/kg OD (max 200mg). ONLY re dose once pre-dose level <1mg/L

UHDB NHS FOUNDATION TRUST

DRUG MONOGRAPH AND DOSING GUIDE FOR GENTAMICIN IN INFECTIVE ENDOCARDITIS AND CARDIAC IMPLANTABLE ELECTRONIC DEVICE (CIED) INFECTIONS IN ADULTS

TDM LEVEL INTERPRETATION:

- The target dose level is <1mg/L
- Do NOT administer if level exceeds 1mg/L

The following is a guide only. Pharmacy should be consulted for advice on dose adjustment if necessary.

Blood Level	Potential actions - discuss with pharmacist
<1mg/L	Continue the same dose. Repeat levels after 3 to 4 more doses providing renal function stable.
1-2mg/L	If renal function stable, review ongoing need for gentamicin. If use is still required, reduce as per dose reduction table below and give dose.
>2mg/L	Review ongoing need for gentamicin. Check CrCl and urine output. If still required, re-check level in 18-24hrs and only give further dose once level <1mg/L, dosed as per dose reduction table below.

- Monitor serum creatinine closely in all patients. If patient develops AKI, seek advice

Patients being treated with gentamicin should be monitored for any signs and symptoms of ototoxicity and vestibular toxicity including hearing impairment, dizziness and impaired balance.

DOSE REDUCTION:

- Following the dose reduction, repeat a pre-dose level and WAIT before giving a second dose at the reduced dosing regime.

Current once daily dosing regime	New once daily dosing regime
3mg/kg OD	2mg/kg OD
2mg/kg OD	Omit dose and repeat level the following day.

Reference:

Victoria Delgado, Nina Ajmone Marsan, Suzanne de Waha, Nikolaos Bonaros, Margarita Brida, Haran Burri, Stefano Caselli, Torsten Doenst, Stephane Ederhy, Paola Anna Erba, Dan Foldager, Emil L Fosbøl, Jan Kovac, Carlos A Mestres, Owen I Miller, Jose M Miro, Michal Pazdernik, Maria Nazarena Pizzi, Eduard Quintana, Trine Bernholdt Rasmussen, Arsen D Ristić, Josep Rodés-Cabau, Alessandro Sionis, Liesl Joanna Zühlke, Michael A Borger, ESC Scientific Document Group, 2023 ESC Guidelines for the management of endocarditis: Developed by the task force on the management of endocarditis of the European Society of Cardiology (ESC) Endorsed by the European Association for Cardio-Thoracic Surgery (EACTS) and the European Association of Nuclear Medicine (EANM), European Heart Journal, Volume 44, Issue 39, 14 October 2023, Pages 3948–4042, <https://doi.org/10.1093/eurheartj/ehad193>

**UHDB NHS FOUNDATION TRUST
DRUG MONOGRAPH AND DOSING GUIDE FOR GENTAMICIN
IN INFECTIVE ENDOCARDITIS AND CARDIAC IMPLANTABLE
ELECTRONIC DEVICE (CIED) INFECTIONS IN ADULTS**

Development of Guidelines:	Hester Smail—Advanced Pharmacist Cardiology Ellie Birnie—Lead Antimicrobial Pharmacist
Consultation With:	Consultant Microbiologists, AMMSG, Consultant Cardiologists
Version	1
Approved By:	AMMSG 10.09.24 D&TC 17.09.24 Medicine 26.09.24 CDCS 01.10.24
Review Date:	October 2027
Key Contact:	Hester Smail—Divisional Lead Pharmacist for Spe- cialist Medicine (hester.smail1@nhs.net) Ellie Birnie—Lead Antimicrobial Pharmacist (ellie.birnie1@nhs.net)
Changes from previous guide- line:	Dosing amended from 1mg/kg BD to 3mg/kg OD as per ESC recommendations Update of monitoring requirements as per ESC recommendations Update to administration instructions in view of amended dosing Transition to electronic prescribing from paper charts at Derby sites Re-formatting of full guideline

