University Hospitals of Derby and Burton NHS Foundation Trust

Intravenous Tobramycin in adults - Drug Monograph and dosing guide

Reference number: CG-ANTI/2023/071

Indication	Tobramycin is an aminoglycoside which is significantly more potent against *Pseudomonas aeruginosa* than gentamicin. Aminoglycosides are indicated for the management of severe or complicated infections caused by gram negative organisms. They can be given in combination with a beta-lactam antibiotic or, in the case of severe penicillin allergy, a quinolone, in case resistance is present to these agents. **This should only be used as per microbiology advice or if referenced in a specific antimicrobial guideline.**
Exclusions	Tobramycin should not be used in the following patients: - Creatinine clearance **< 20 ml/min** - Multiple myeloma (increased risk of nephrotoxicity) - History of allergy to an aminoglycoside - Myasthenia gravis (aminoglycosides may impair neuromuscular transmission).
Dose = 6mg/kg based on adjusted dosing weight If patient is underweight (i.e. if they are < IBW) use actual body weight for CrCl and dose calculation.	**Step 1 – Calculate ideal body weight (IBW)** **Ideal body weight (IBW) (kg)** = 50 + 0.91 (height (cm) - 152.4) men = 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)** = (140 – age) x ADW x 1.23* / serum creatinine * in women 1.04 **Step 4: Calculate dose** **If CrCl is < 20 ml/min do not give tobramycin** Calculate the dose based on **6mg/kg** ADW or actual body weight if this is less than IBW. Round the dose to the nearest 4 mg. Maximum dose 500 mg. Please note that the dosing recommended in this guideline is unlicensed, and not as per the British National Formulary (BNF) but is supported by evidence from the literature. **For Meditech only:** choose Tobramycin 6mg/kg dosing string
Preparations	Intravenous tobramycin should be ordered as an urgent item by bleeping a pharmacist in hours. Certain areas keep tobramycin as stock. The dose should be diluted in 100ml sodium chloride 0.9%.

Administration	Infuse over 30 - 60 minutes
Compatibility issues	Regarding administration, tobramycin is physically incompatible with penicillins and cephalosporins. Give through a separate line or flush thoroughly between drugs. Please consult the product literature for further incompatibility information.
Additional information	Tobramycin has a low pH and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large bore peripheral cannula, monitoring the insertion site. Resite the cannula at first signs of inflammation.
Monitoring	Daily U+Es and urine output. If the patient is going to have further doses, a tobramycin level should be measured 18 hours after the first dose. See below for more information. With prolonged courses, monitor for ototoxicity and vestibular toxicity.

Further doses

A single/STAT dose is often required.

Further doses of tobramycin should only be given following discussion with the parent consultant and/or a consultant microbiologist. If treatment is continued, U+Es should be measured daily, and the patient monitored for nephrotoxicity and ototoxicity.

If further doses are indicated, a serum tobramycin level should be measured 18 hours after the stat dose.

Level < 1 mg/l	-	Give the same dose, 24 hours after the first dose
Level 1 – 2 mg/l	-	Discuss further dosing with a pharmacist. Extension of the dosing interval or a reduced dose are possible options
Level > 2 mg/l	-	Repeat the level 12 hours after the first level and then discuss further dosing with a pharmacist

References:

Joint Formulary Committee (2023) *British National Formulary* (online) London: BMJ Group and Pharmaceutical Press http://www.medicinescomplete.com [Accessed on 25/04/2023]

Flynn Pharma Ltd (2022) *SPC for Tobramycin 40mg/ml Injection*. Tobramycin 40mg/ml Injection - Summary of Product Characteristics (SmPC) - (emc) (medicines.org.uk) [Accessed 25/04/2023]

Medusa Injectable Medicines Guide (2022) *Tobramycin monograph*. https://medusa.wales.nhs.uk [Accessed 25/04/2023]

EUCAST (2020*) Guidance Document on Implementation and Use of the Revised Aminoglycoside Breakpoints*. https://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Guidance_documents/Aminoglycoside_guidance_document_20200121.pdf [Accessed 25/04/2023]

EUCAST (2020) *Tobramycin - Rationale for the EUCAST clinical breakpoints, version 2.0.* https://eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Rationale_documents/Tobramycin_rationale_1.2_0906.pdf [Accessed 25/04/2023]

Nicolau DP, Wu AHB, Finocchiaro S, et al: *Once-daily aminoglycoside dosing: impact on requests and costs for therapeutic drug monitoring*. Ther Drug Monit 1996; 18:263-266.

Nicolau DP, Freeman CD, Belliveau PP, et al: *Experience with a once-daily aminoglycoside program administered to 2,184 adult patients*. Antimicrob Agents Chemother 1995; 39(3):650-655.

Documentation control

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