

Aminoglycoside Dosing for Pediatrics

University Health System

Necessary patient information for dosing

Body weight

- Use ACTUAL body weight unless actual body weight is >130% of IBW. If actual body weight is >130% of ideal, use adjusted body weight.
 - IBW calculation for children 1-17 years old= (Height² x 1.65)/1000
 - *Height in cm, weight in kg*
 - Adjusted body weight: IBW + 0.4 (actual body weight- ideal body weight)

CrCl (ml/min/1.73m²)= [length (cm) x k] / SCr

- k = 0.45 for infants 1 to 52 weeks old
- k = 0.55 for children 1 to 13 years old
- k = 0.55 for adolescent **females** 13-16 years old
- k = 0.7 for adolescent **males** 13-16 years old

General rules

- Avoid aminoglycosides in children with impaired renal function or those on multiple concomitant nephrotoxins if possible
- Conventional dosing (q8 hours) is more commonly used in pediatrics patients (>30 days old) than extended interval (q 24 hour dosing)
- Extended interval (q 24 hours) aminoglycoside dosing is preferred in CF patients >3 years old
- Doses can be given over 30 minutes
- Peak serum concentrations are important for bacterial killing
- Trough serum concentration monitoring is recommended as a safety marker
 - Should be checked at least once weekly for pediatric patients on aminoglycoside therapy
 - 30 minutes prior to a dose

General dosing recommendations for gentamicin and tobramycin

Neonatal dosing- USE FOR ALL INFANTS <30 days old

CGA* (weeks)	Post natal age (days)	Dose (mg/kg)	Interval (hours)
≤29	0-7	5	48
	8-28	4	36
	≥29	4	24
30-34	0-7	4.5	36
	≥8	4	24
≥35	ALL	4	24

*Corrected gestational age

Conventional dosing (age >30 days old)

- Starting dose= 2.5 mg/kg/dose every 8 hours
 - Higher doses may be utilized in young infants/children
 - If aminoglycoside is necessary and CrCl <30 mL/min, may start on q 12 hour dosing
- OR**

Extended-interval dosing (non-CF patients)

- 3 months to <2 years: 9.5 mg/kg/dose every 24 hours
- 2 to <8 years: 8.5 mg/kg/dose every 24 hours
- ≥8 years: 7 mg/kg/dose every 24 hours

Indication specific dosing

Cystic fibrosis, pulmonary infection- TOBRAMYCIN PREFERRED

- Conventional dosing (for children <3 years old): 3.3 mg/kg/dose every 8 hours
- Extended-interval dosing: I.V.: 10-15 mg/kg/dose every 24 hours
- Alternative dosing: 7.5-10 mg/kg/dose every 12 hours
 - May be utilized in CF patients with ultra rapid renal clearance

Urinary tract infection

- Conventional dosing: Infants and Children 2-24 months: I.V.: 5 mg/kg/day divided every 8 hours
OR
- Extended-interval dosing:
 - 1 month to <5 years: 7.5 mg/kg/dose every 24 hours
 - 5-10 years: 6 mg/kg/dose every 24 hours
 - >10 years: 4.5 mg/kg/dose every 24 hours

Therapeutic Drug Monitoring

Aminoglycoside serum concentrations should NOT be drawn from same intravenous line through which drug is infusing. Drug may adhere to lumen of line even if line is flushed.

Conventional dosing (q 8 hours)

- Peaks: 6-10 mcg/mL
 - Should be drawn 30 minutes following the infusion of the 3rd dose
 - Peaks not necessary for treatment of urinary tract infections
- Troughs: <2 mcg/mL
 - Drawn before 4th dose

Extended interval dosing, NON-CF patients (q 24 hours)

- Peaks: 12-20 mcg/mL
 - Draw peak level ~1 hour following end of infusion
 - Peaks >20 mcg/mL may be required for more resistant Gram-negative organisms
 - Peaks can be drawn after 1st dose
- Troughs: <0.5 mcg/mL

Extended interval dosing, CF patients (q 24 hours- TOBRAMYCIN PREFERRED)

- Peaks: 20-40 mcg/mL
 - Draw peak level ~1 hour following end of infusion
 - Peaks can be drawn after 1st dose
- Random level (10 hours post dose): >1 mcg/mL
- Troughs: <0.5 mcg/mL

Alternative dosing, CF patients (q 12 hours)

- Peaks: >10 mcg/mL
- Troughs: <1 mcg/mL

References

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4. Prescott WA et al. Extended-interval once-daily dosing of aminoglycosides in adult and pediatric patients with cystic fibrosis. *Pharmacotherapy* 2010; 30: 95-108.

5. Smyth A et al. One versus three-times daily regimens of tobramycin treatment for pulmonary exacerbations of cystic fibrosis- the TOPIC study: a randomised controlled trial. *Lancet* 2005; 365: 573-8.
6. McDade EJ et al. Once-daily gentamicin dosing in pediatric patients without cystic fibrosis. *Pharmacootherapy* 2010; 30: 248-53.