

CONVENTIONAL AMINOGLYCOSIDE DOSING AND MONITORING IN ADULTS

1. Determine patient's dosing weight (DW)

a. Non-Obese patients:

Use ideal body weight (IBW) unless total body weight (TBW) is less. Non-obese is defined as TBW < 30% over ideal body weight

IBW (males) = 50 kg + (2.3 x height in inches > 60 inches)

IBW (females) = 45 kg + (2.3 x height in inches > 60 inches)

b. Obese patients:

Use adjusted body weight (ABW) in obese patients
(TBW > 30% over IBW)

ABW (kg) = IBW + 0.4 (TBW – IBW)

2. Estimate patient's creatinine clearance (CrCL)

CrCL (male) ml/min = $\frac{(140 - \text{age}) \times \text{DW (kg)}}{72 \times \text{SCr}}$ (x 0.85 for females)

(Use minimum SCr of 1 mg/dL. Certain disease states or other factors may alter the relationship between SCr and CrCL resulting in over- or under- estimation of CrCL)

3. Select appropriate loading and maintenance doses based on the drug and estimated CrCL

(round dose to nearest 10 mg for gentamicin/tobramycin and to nearest 50 mg for amikacin)

Drug	Loading dose (mg/kg)*	Maintenance dose	Dosing interval based on estimated CrCL (ml/min)			
			50-80	30-50	10-30	<10
Gentamicin	2 to 3	1.5 to 2 mg/kg q8h				
synergy	None	1 mg/kg q8h	q12h	q24h	q48h	q48-72h
UTI	None	1 mg/kg q8h				
Tobramycin	2 to 3	1.5 to 2 mg/kg q8h	q12h	q24h	q48h	q48-72h
UTI	None	1 mg/kg q8h				
Amikacin	7.5 to 9	7.5 mg/kg q12h	q12h	q24h	q48h	q48-72h

* Loading dose needed only in life-threatening infections or in dialysis patients to achieve steady state levels more rapidly.

Drug	Dose and frequency in dialysis patients		
	Hemodialysis (dose POST dialysis)	Peritoneal dialysis (every 48h)	CRRT (every 24-48h)
Gentamicin	1.5 to 2 mg/kg	1.5 to 2 mg/kg	1.5 to 2 mg/kg
UTI	1 mg/kg	1mg/kg	1 mg/kg
synergy	1 mg/kg	1mg/kg	1 mg/kg
Tobramycin	1.5 to 2 mg/kg	1.5 to 2 mg/kg	1.5 to 2 mg/kg
UTI	1 mg/kg	1 mg/kg	1 mg/kg
Amikacin	7.5 mg/kg	7.5 mg/kg	7.5 mg/kg

* The rate and amount of drug removed are influenced by a variety of host and dialysis-related factors. Monitoring of aminoglycoside peaks and troughs is highly recommended.

4. Serum concentration monitoring

- **Serum peaks (for efficacy) AND troughs (for toxicity) must be monitored.**
- Obtain levels with the 4th dose after initiation of therapy or after dose adjustment. It is important to obtain serum concentrations earlier (with the 3rd dose) in patients with low CrCL (< 50 ml/min).
- Recheck only trough levels every 5 to 7 days to ensure levels remain low.
- A trough level should be obtained within 30 minutes of a dose and a peak level at least 30 minutes after the end of the infusion. DOCUMENTATION OF AMINOGLYCOSIDE ADMINISTRATION TIME AND THE TIMES SAMPLES WERE OBTAINED ARE ESSENTIAL IN INTERPRETING THE RESULTS. If samples are not obtained at the correct time, the results may be FALSELY elevated or underestimated.
- In patients with severe renal dysfunction, random levels, taken around the time the subsequent dose is due, should be obtained to determine appropriate dosing interval. In hemodialysis patients, check a level prior to the next scheduled dialysis. In both patient groups, redose when level ("troughs") falls to < 2 mg/L for gentamicin/ tobramycin and < 10 mg/L for amikacin.

Indication/ Site of infection	Desired concentrations (mg/L)			
	Gentamicin / Tobramycin		Amikacin	
	Peak	Trough	Peak	Trough
Uncomplicated lower UTI, synergy in gram (+) infections*	3-5 *	< 1	20-25	5-10
Gram (-) sepsis, other serious gram (-) infections	5-7	< 2	20-30	5-10
Gram (-) pneumonia	7-9	< 2	25-30	5-10

* Serum concentration monitoring is usually not necessary when used for synergy or UTIs, but periodic trough levels are suggested to ensure low levels in the elderly and those with renal dysfunction.