



Adult Aminoglycoside Dosing Guidelines

Definitions

- Total body weight (TBW)
 - Patient's actual weight
- Ideal body weight (IBW)
 - IBW (male) = 50 kg + (2.3 x height in inches > 60 inches)
 - IBW (female) = 45 kg + (2.3 x height in inches > 60 inches)
- Adjusted body weight (AdjBW)
 - AdjBW (kg) = IBW + 0.4 (TBW – IBW)

Dosing

1. Obtain baseline serum creatinine (SCr), patient height, and patient weight
2. Estimate patient's creatinine clearance (CrCL)

$$\text{CrCL (mL/min)} = \frac{(140 - \text{age}) \times \text{IBW} (\times 0.85 \text{ for females})}{\text{SCr} \times 72}$$

- Use **adjusted body weight (AdjBW)** in **obese patients** (TBW > 30% over IBW) instead of ideal body weight (IBW)
 - Use **actual body weight** if **less than ideal body weight**
 - If elderly and SCr is less than 0.8 mg/dL consider rounding to 0.8 mg/dL
3. Determine dosing weight
 - Use IBW in most patients
 - If patient is obese (TBW > 30% over IBW) use adjusted body weight (AdjBW)
 - Use TBW if less than IBW
 4. Determine dosing strategy (conventional or extended interval)
 - Extended interval dosing optimizes the pharmacokinetic/pharmacodynamic properties of aminoglycosides
 - Exclusion criteria for extended interval dosing:
 - Renal dysfunction (CrCl < 30 mL/min) or unstable renal function
 - Morbid obesity
 - Synergy dosing for gram-positive infections (i.e. infective endocarditis)
 - Pediatrics
 - Meningitis
 - Burns >20% of body surface area
 - Pregnancy
 - End stage liver disease/ascites
 - Anasarca
 - Cystic fibrosis
 5. Calculate dose based on tables below
 - Conventional dosing on page 2
 - Extended-interval dosing on page 3

Conventional Dosing

Dose

	Gentamicin/Tobramycin (Round dose to nearest 10 mg)	Amikacin (Round dose to nearest 50 mg)
Uncomplicated UTI, gram positive synergy	1 mg/kg/dose	5 mg/kg/dose
Systemic infections, bacteremia	1.7 mg/kg/dose	7.5 mg/kg/dose
Life-threatening infections, pneumonia	2 mg/kg/dose	7.5 mg/kg/dose

Dosing frequency

Creatinine Clearance	Dosing frequency
> 60 mL/min	Q8h
40-60 mL/min	Q12h
20-40 mL/min	Q24h
< 20 mL/min	Dose by level
Intermittent hemodialysis	Dose post hemodialysis

Monitoring

Indication	Gentamicin/Tobramycin		Amikacin	
	Peak (mcg/mL)	Trough (mcg/mL)	Peak (mcg/mL)	Trough (mcg/mL)
Uncomplicated UTI, gram positive synergy	3-5	<1	15-20	<5
Systemic infections, bacteremia	6-8	<1	20-25	<8
Life-threatening infections, pneumonia	8-10	<2	25-40	<8

- Draw peak 30 minutes after 3rd dose infusion completed
- Draw trough approximately 30 minutes prior to 4th dose

Dose Adjustment

Peak	Trough	Adjustment
Low	Therapeutic	Increase dose, same frequency
High	Therapeutic	Decrease dose, same frequency
Therapeutic	Low	Continue current dose
Therapeutic	High	Same dose, decrease frequency
High	High	Decrease dose and consider decreasing frequency
Low	High	Increase dose, decrease frequency

Hemodialysis

Indication	Gentamicin/Tobramycin		Amikacin	
	Peak (mcg/mL)	Pre-dialysis (mcg/mL)	Peak (mcg/mL)	Pre-dialysis (mcg/mL)
Uncomplicated UTI, gram positive synergy	3-5	<2	15-20	<6
Systemic infections, bacteremia	6-8	<4	20-25	<10
Life-threatening infections, pneumonia	8-10	<4	25-40	<12

- For hemodialysis patients: draw pre-HD levels after 2 doses have been administered

Extended-interval dosing (Hartford nomogram)

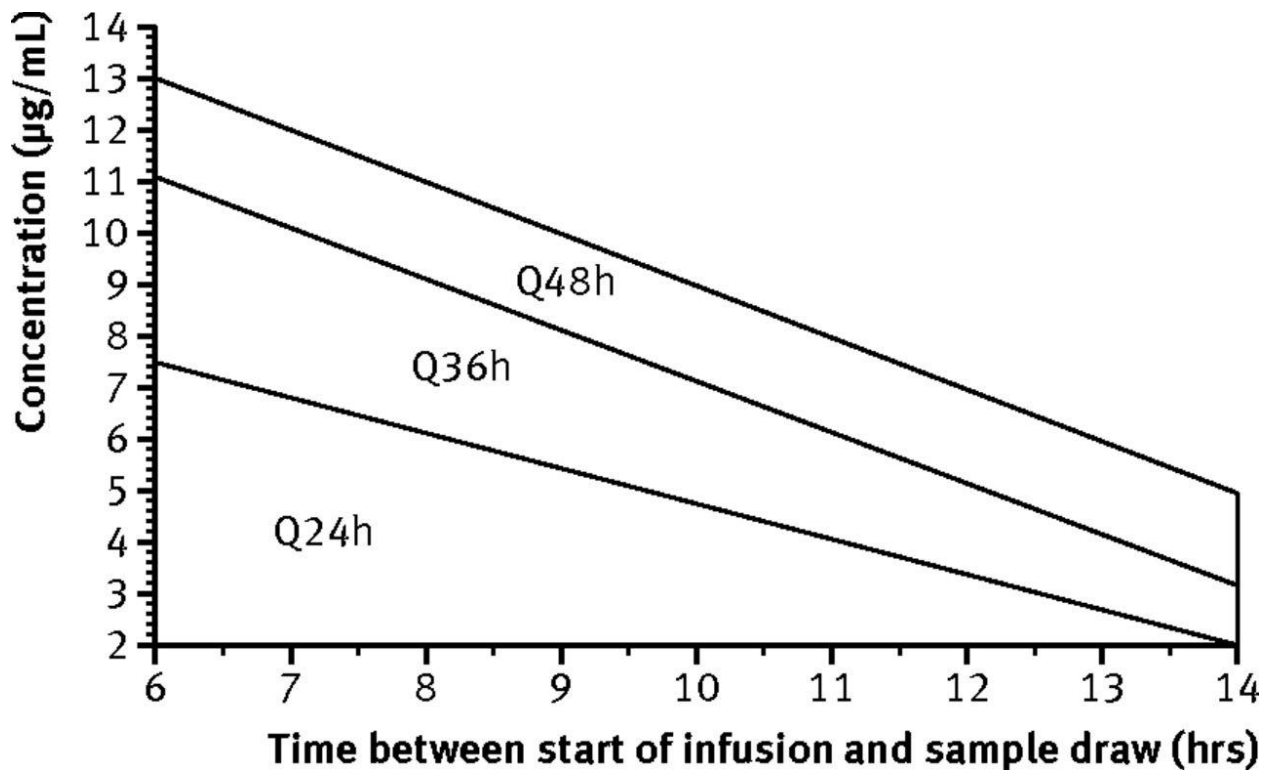
Dose

Gentamicin/Tobramycin	Amikacin
7 mg/kg IV (Round dose to nearest 10 mg)	15 mg/kg IV (Round dose to nearest 50 mg)

Determining dosing interval

- Obtain a single level 6-14 hours after start of first infusion
- Apply level and time drawn to Hartford nomogram
 - Divide amikacin level by 2 before plotting

Hartford Nomogram



- If level falls on the line, select the longer dosing interval
- If level falls above Q48h line, convert to conventional dosing

Monitoring

- Peaks and troughs do not routinely have to be measured if utilizing Hartford nomogram
- Once dosing interval has been established, monitor drug levels 6-14 hours after start of infusion once weekly
- If renal function becomes unstable, switch to conventional dosing

References

-Janson B, Thursky K. Dosing of antibiotics in obesity. *Curr Opin Infect Dis.* 2012 Dec;25(6):634-49.
-Nicolau DP, Freeman CD, Belliveau PP, et al. Experience with a once-daily aminoglycoside program administered to 2,184 adult patients. *Antimicrob Agents Chemother.* Mar 1995;39(3):650-655.