Aminoglycoside Reference

Aminoglycosides are concentration-dependent and have a post-antibiotic effect.

1) **Mainly active against *Gram* – organisms**
    a. Tobramycin has greater susceptibility to Pseudomonas than Gentamicin
    b. Amikacin has broadest activity
2) **Synergy in treating *Gram* + organisms – i.e. Staphylococcus/Enterococcus endocarditis**
3) **Included in order set at Memorial for Pneumonia with MDRO infection risk, including:**
    a. Antibiotic therapy in preceding 90 days
    b. Current hospitalization of 5 or more days
    c. Presence of risk factors for HCAP – hospitalized > 2 days in past 90 days, nursing home resident, home infusion tx, wound care in past 30 days, chronic HD in past 30 days, family member with hx of MDRO
    d. Immunosuppressed

-Empiric tx for MDRO Pneumonia includes: Anti-pseudomonal β lactam + anti-pseudomonal FQ **OR** Aminoglycoside + macrolide **plus/minus** Vancomycin/linezolid

Dosing of Aminoglycosides:

1) **Extended Interval Dosing:** draw random level within 6-16 hours post dose and determine frequency based on corresponding nomogram (on back of page).
    ***Less nephrotoxic and more cost-effective than traditional dosing**

*For extended interval dosing, **use adjusted body weight unless actual body weight is ≤ IBW**
-AdjBW (kg) = IBW + [0.4 (TBW-IBW)]

-Gentamicin/Tobramycin:

-may use 3 mg/kg for UTI **(no sepsis)**

-may use 5 mg/kg for most infections **AND/OR renal dysfunction (CrCl < 60mL/min)**

-may use 7 mg/kg for sepsis **AND normal renal function (CrCl ≥ 60mL/min)**

-Tobramycin more sensitive to Pseudomonas

-Amikacin: 15-20 mg/kg

-reserved as last line for resistant organisms
-levels must be sent out of hospital

2) **Traditional Dosing:** for patients with impaired renal function, dialysis, pregnancy, cystic fibrosis, ascites, history of hearing loss, most gram positive infections (used for synergy), or mycobacterial infections.

*For traditional dosing, **use IBW unless actual body weight is ≥ 20% IBW, in which case adjusted body weight should be used (AdjBW)**.

Dose	**CrCl >60**	**40-60**	**20-40**	**<20**
Gent/tobra: 1-2 mg/kg/dose **Amikacin:** 5-7.5 mg/kg/dose	Q8H	Q12H	Q24H	Give loading dose, monitor levels

Traditional Dosing Drug Concentrations

Drug	**Peak (mcg/ml)**	**Trough (mcg/ml)**
Gentamicin/Tobramycin	**6-8**	**<2**
Amikacin	**20-30**	**<5**

- **Draw trough level right before next dose, take peak level 30 minutes after end of infusion**

Dosing in hemodialysis patients:

Use IBW unless actual body weight is >/= 20% IBW, in which case adjusted body weight should be used (AdjBW).

Gentamicin/Tobramycin: To be given after HD

Loading Dose = 2-3 mg/kg then
Maintenance Dose:
Mild UTI or synergy = 1 mg/kg after HD
Moderate to severe UTI = 1- 1.5 mg/kg after HD
Systemic GNR infection = 1.5 – 2 mg/kg after HD

*If HD is started shortly after the initial loading dose the lower end of the range for the second dose should be considered after HD. If HD is delayed for more than a day after the initial loading dose the predialysis serum concentration may have declined to a greater extent and the higher end of the range for the second dose may be considered.

Doses will need to be redosed based on the following pre-HD levels:

Mild UTI or synergy if level < 1 mg/L
Moderate to severe UTI if level < 1.5 – 2 mg/L
Systemic GNR infection if level < 3 - 5 mg/L

*Because accumulation can occur over the duration of therapy, periodic serum concentrations (e.g, every 3-5 days) should be considered.

3) **Synergy Dosing:** Lower concentrations of aminoglycosides are targeted when used in combination with other agents to treat serious gram-positive infections. Example would be suspected endocarditis.

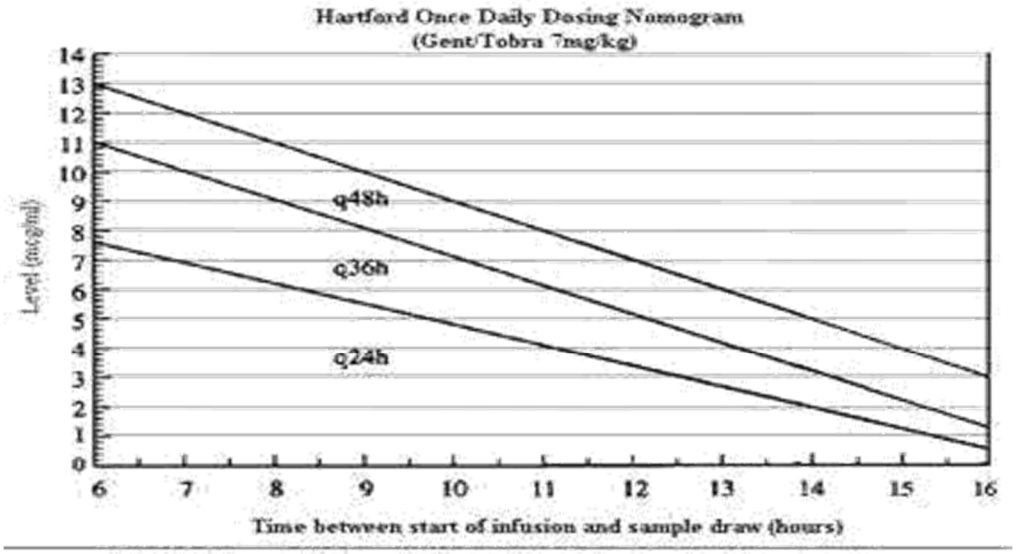
*For synergy dosing, **use IBW unless actual body weight is ≥ 20% IBW, in which case adjusted body weight should be used (AdjBW)**.

Synergy Dose	**CrCl >60**	**40-60**	**20-40**	**<20**
Gent/tobra: 1 mg/kg/dose	Q8H	Q12H	Q24H	Give loading dose, monitor levels

****Recommended peak 3-4 and trough < 1****

Alternate synergy dosing for some streptococcal endocarditis: 3mg/kg IV q24h (unless renal dysfunction)

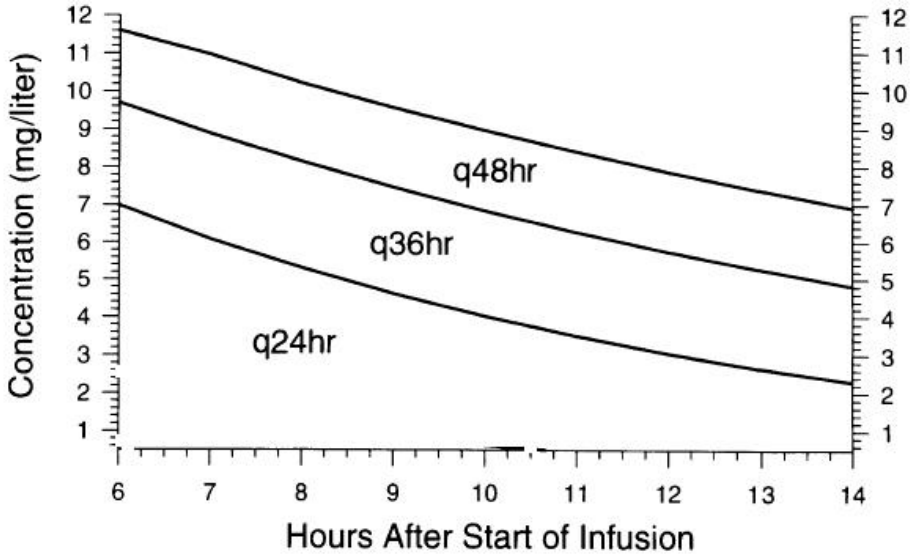
**Recommended trough <1



Nicolau DP, Freeman CD, Belliveau PP, Nightingale CH, Ross JW, Quintiliani R. Experience with a once-daily aminoglycoside program administered to 2,184 adult patients. Antimicrob Agents Chemo 1995;39:650-655.

Gent/Tobra 5mg/kg

Dosage Interval Based on Serum Level < 1 mg/liter



Amikacin Extended Interval Dosing Nomogram (15mg/kg)