Alberta Health Services
Laboratory Services

Extended Interval Aminoglycoside Monitoring and Dosing Guideline

This document is applicable at site(s):
All Sites

Step 1. DETERMINE IF PATIENT IS EXCLUDED FROM EXTENDED INTERVAL AMINOGLYCOSIDE DOSING

Exclusion criteria:	• Neonatal patients (postconceptional age <44 weeks) • Pediatric patients with significant renal dysfunction (use conventional dosing) • Patients requiring hemodialysis, hemoperfusion, or peritoneal dialysis • Patients with rapid clearance of drug (e.g. burns >20% body surface area) • Patients with gram positive infections where aminoglycoside is used for synergy (e.g. *Staphylococcus aureus*, viridans group Strep, *Enterococcus spp*.) • Patients with endocarditis • Patients with allergy/sensitivity to aminoglycosides • Surgical prophylaxis
Precautions:	• Patients with chronic ascites or serious liver disease • Patients with known auditory/vestibular disease • Pregnancy/post partum (altered volume of distribution)

Step 2. DETERMINE Gentamicin or Tobramycin DOSING INTERVAL

i. **PEDIATRIC PATIENTS:** give q24h. If **interval** serum level is necessary (see Step 4- Gentamicin/ Tobramycin serum levels), adjust interval of subsequent doses, if need be, according to Hartford Nomogram.

ii. **ADULT PATIENTS:** determine renal function:

Option A) Creatinine Clearance estimated using body weight and serum creatinine:

- **Determine Ideal Body Weight** (IBW) (kg):
  IBW (females) = 45.5 kg + [2.3 x (inches > 5 feet)]*
  IBW (males) = 50 kg + [2.3 x (inches > 5 feet)]*
  * Or [0.92 x (cm > 150 cm)]

- **Calculate Creatinine Clearance** (CRCL) (mL/min):

$$\frac{\text{Females: (140-Age) x IBW**}}{\text{Serum Creatinine (µmol/L)}} \qquad \frac{\text{Males: (140-Age) x IBW**}}{\text{Serum Creatinine (µmol/L)}} \times \mathbf{1.2}$$

****NOTE:** If actual body weight (ABW) < IBW, use ABW in creatinine clearance calculation. If obese (ABW > 30% above IBW), use dosing weight (DW) [DW = 0.4 (ABW - IBW) + IBW].

Option B) Creatinine Clearance determined quantitatively from urine collections.
Laboratory values for creatinine clearance will be reported in SI units of mL/s. See Dosing Chart on next page.

DETERMINE Gentamicin or Tobramycin DOSING INTERVAL BASED ON RENAL FUNCTION:

Calculated Creatinine Clearance (mL/min)	Measured Creatinine Clearance (mL/s)	Dosing Interval
≥60	≥1.00	q24h
40-59	0.66-0.99	q36h
20-39	0.33-0.65	q48h
<20	<0.33	Obtain pharmacist consult

Step 3. ORDER DOSE

i. **PEDIATRIC PATIENTS:** order 7 mg/kg dose (based on actual body weight [ABW]. If obese, use ideal body weight [IBW]). Round dose to nearest 5 mg and dilute in D5W or normal saline. Infuse over 60 minutes.

ii. **ADULT PATIENTS:** order 7 mg/kg dose (based on IBW EXCEPT in malnourished and obese patients)
- Malnourished: If ABW < IBW, use ABW
- Obese: If ABW >30% above IBW, use dosing weight: DW = 0.4 (ABW - IBW) + IBW

Step 4. ORDER LABORATORY TESTS

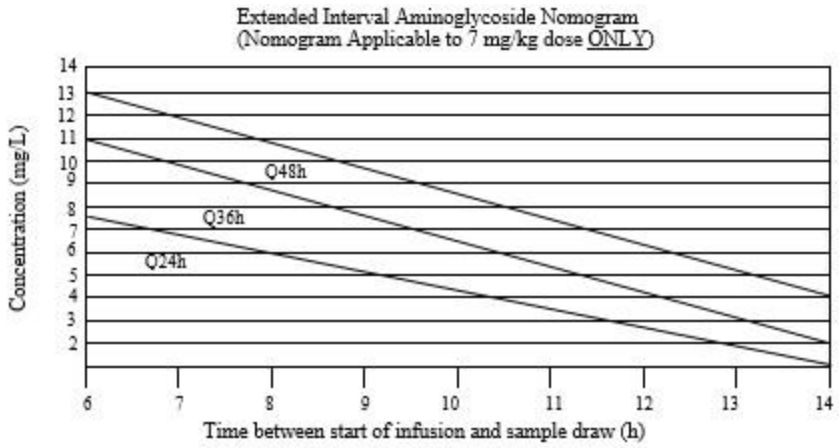
Creatinine serum levels:
- Baseline determination and every 3 days thereafter

Gentamicin / Tobramycin serum levels:
- DO NOT draw specimens for standard serum peak and trough levels
- In the following selected patients it may be desirable to monitor INTERVAL levels (a sample collected outside of traditional peak and trough sampling times):
  - Receiving more than 5 days of therapy.
  - Renal dysfunction and/or significant changes in renal function.
  - Large volumes of distribution (third spacing, ascites).
  - >65 years of age.

If a level is required:
- Collect serum specimen 8h after the START of infusion. This will guarantee a reasonable turnaround of results.
- **Frequency of Collection:** After first dose, then once/week (may need more frequently if patient has renal dysfunction, e.g. requires q36h or q48h dosing, if renal function changes, or patient on concurrent nephrotoxic drugs).
- Complete a **ROUTINE** requisition. DO NOT use a STAT requisition.
  - On the Gentamicin or Tobramycin line, mark off "**INTERVAL – 8h after dose start**" box under Extended Interval Dose (7 mg/kg) heading. Specimens collected at times other than 8h MUST be ordered as "OTHER" levels.
  - Complete requisition FULLY including dose regimen, time last dose started, time last dose completed, time of next dose, and how long on this dose regimen.

Step 5. **INTERPRET AMINOGLYCOSIDE CONCENTRATIONS**

Plot serum concentrations on **Hartford Nomogram** [Antimicrobial Agents and Chemotherapy, 1995; 39(3):650-5]



IF THE DOSE IS NOT 7 mg/kg, DO NOT USE NOMOGRAM. A pharmacist consult is suggested.

- This nomogram assumes Vd of 0.3 L/kg. If patient's Vd is different, consult pharmacist.
- If interval level falls in areas marked as q24h, q36h, q48h, dosing interval should be every 24, 36, or 48 hours respectively.
- If the interval level is on one of the sloping lines, choose the longer interval.
- If the interval level is above the q48h dosing interval area, STOP extended interval dosing and switch to conventional dosing. A pharmacist consult is suggested.
- If the interval level is below the nomogram (e.g. <2.0 mg/L), aminoglycoside dosing/therapy should be reassessed if patient not improving. A pharmacist consult is suggested.

References:

http://bugsanddrugs.albertahealthservices.ca, accessed 8 November 2018.