Extended Interval Aminoglycoside Monitoring and Dosing Guideline

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 needed, according to Hartford Nomogram.

ii) ADULT PATIENTS – determine renal function

Option 1A 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]**

- Females: (140 – Age) x IBW**  
- Males: (140 – Age) x1.2
- Serum Creatinine (μmol/L)

**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 1B  Creatinine Clearance determined quantitatively from urine collections.
(Laboratory values for creatinine clearance will be reported in SI units of mL/s. See Dosing Chart below)

**DETERMINE Gentamicin or Tobramycin DOSING INTERVAL BASED ON RENAL FUNCTION**

<table>
<thead>
<tr>
<th>Calculated Creatinine Clearance (mL/min)</th>
<th>Measured Creatinine Clearance (mL/s)</th>
<th>Dosing Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥60</td>
<td>≥1.00</td>
<td>q24h</td>
</tr>
<tr>
<td>40 – 59</td>
<td>0.66 – 0.99</td>
<td>q36h</td>
</tr>
<tr>
<td>20 – 39</td>
<td>0.33 – 0.65</td>
<td>q48h</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>&lt; 0.33</td>
<td>Obtain pharmacist consult</td>
</tr>
</tbody>
</table>

**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 5mg 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 actual body weight (ABW) < IBW, use ABW.
- Obese: If patient is obese (ABW > 30% above IBW), use dosing weight:
  \[ DW = 0.4 \times (ABW - IBW) + IBW \]

**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. (Definition: 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, i.e. 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 (7mg/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 dosage 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 (i.e. <2.0 mg/L), aminoglycoside dosing/therapy should be reassessed if patient not improving. A pharmacist consult is suggested.