Aminoglycoside Dosing and Monitoring Per Practice Protocol
(Formerly Aminoglycoside Dosing and Monitoring Protocol #6.02 AND Extended Interval Gentamycin and Tobramycin Dosing #6.05)
Aminoglycoside Dosing and Monitoring (Adults) Allen Hospital

Aminoglycoside Dosing and Monitoring (Adults)

High-Dose, Extended-Interval Dosing (“Once-Daily”)

1. Exclusion criteria: these guidelines are NOT to be used in:
   - Dialysis patients (Contact Nephrologist if we receive an order to dose)
   - Patients using aminoglycosides for synergistic activity against Gram-positives
   - Pediatrics
   - Patients with deteriorating renal function
   - CrCl < 30ml/min or if 10hr random level indicates serial dosing
   - Pre-op surgical procedures
   - Pregnant patients

2. Dosing:

   **Gentamicin, Tobramycin**

<table>
<thead>
<tr>
<th>CrCl</th>
<th>Dose and Interval (round to nearest 10mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60ml/min</td>
<td>7mg/kg every 24 hr</td>
</tr>
<tr>
<td>40-59ml/min</td>
<td>7mg/kg every 36 hr</td>
</tr>
<tr>
<td>30-39ml/min</td>
<td>7mg/kg every 48 hr</td>
</tr>
<tr>
<td>&lt; 29ml/min</td>
<td>use traditional dosing</td>
</tr>
</tbody>
</table>

   **Amikacin**

<table>
<thead>
<tr>
<th>CrCl</th>
<th>Dose and Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;60ml/min</td>
<td>15mg/kg every 24 hr</td>
</tr>
<tr>
<td>&lt;60ml/min</td>
<td>use traditional dosing</td>
</tr>
</tbody>
</table>

   Dosing will be based on actual body weight unless the patient is morbidly obese (i.e., 20% over ideal body weight [IBW]).
   Dosing weight = 0.4(actual body weight – IBW) + IBW.

3. Monitoring:
   - **Obtain** a single random serum level after the first dose between 6-14 hours after the start of the infusion. Evaluate on the nomogram. If the level falls in the area designated Q24h, Q36h, or Q48h, the interval should be every 24, 36, or 48 hours respectively; however, if the point is on the line, one should choose the longer interval. If the random level is off the nomogram at the given time, the scheduled therapy should be stopped and serial levels followed until the level has dropped to <0.5mcg/ml). At that time, traditional aminoglycoside dosing should be started.
- Draw troughs every 2-3 days. Schedule 1 hour before the dose.
- Draw trough levels only.
- Doses are to be held pending the report of the level
- Target Trough Gentamicin/Tobramycin <0.5mcg/ml
- Target Trough Amikacin <4mcg/ml
- Obtain 1st trough before the 2nd dose if frequency is q36hr or q48hr. Draw 1st trough before the 3rd dose with q24hr interval.
- Repeat levels every 2-3 days. Schedule 1 hour before the dose. Draw before each dose if renal function is changing.
- Check serum creatinine (SCr) three times weekly as per standing monitoring orders.

Multiple-Daily Dosing ("Traditional")
- This approach be used for the treatment of Gram-negative infections when "once daily" dosing is not appropriate.

1. Inclusion criteria:
   - Patients with suspected or documented Gram-negative infections not eligible for "once-daily" dosing.

Exclusion criteria:
- Patients using aminoglycosides for synergistic activity against Gram-positives.

2. Dosing:
   - **Gentamicin/Tobramycin**
     - **CrCl** | **Dose and Interval (round to nearest 10mg)**
     - >60ml/min    | 2mg/kg loading dose then 1.5mg/kg/dose IV q8hr
     - 40-60ml/min  | 2mg/kg loading dose then 1.5mg/kg/dose IV q12hr
     - 20-39ml/min  | 2mg/kg loading dose then 1.5mg/kg/dose IV q24hr
<20ml/min 2mg/kg loading dose then 1.5mg/kg dose IV serially
Dialysis Nephrologist will dose

Amikacin

Dose and Interval
7.5mg/kg loading dose then CrCl(0.01)x loading dose) IV q12hr
Dialysis Nephrologist will dose

Dosing will be based on actual body weight unless the patient is morbidly obese (i.e., 20% over ideal body weight [IBW]).
Dosing weight = 0.4(actual body weight – IBW) + IBW

3. Monitoring:
   - Patients who are anticipated to receive aminoglycoside for > 3 days should have levels monitored.
   - For patients who require monitoring, draw a peak and trough level around the dose. Peak levels should be drawn 1 hour after the end of the infusion (90 minutes after IM injections). Trough levels should be drawn 1 hour before the dose. Initial levels should be drawn around the 3rd dose. Levels should be drawn at least every 3 days and sooner if a change in renal function is observed.
   - Use the “GlobalRPh” program (located in clinical folder) to adjust dose and frequency to achieve desired levels.

<table>
<thead>
<tr>
<th>Infection Site</th>
<th>Gentamicin/Tobramycin</th>
<th>Amikacin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak</td>
<td>Trough</td>
</tr>
<tr>
<td>Abdominal</td>
<td>6-7</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Cystitis</td>
<td>4-5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>4-12</td>
<td>&lt;1.5</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>6-7</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>8-10</td>
<td>&lt;1.5</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>6-7</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Sepsis</td>
<td>7-8</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Soft tissue</td>
<td>6-7</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Synergy</td>
<td>5-6</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Wound Infections</td>
<td>6-7</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

   - Check serum creatinine (Scr) three times weekly as per standing monitoring orders.

Gram-Positive Combination Dosing (“Synergy”)
   - Patients with serious Gram-positive infections may receive aminoglycosides in combination to achieve synergistic killing.

1. Inclusion criteria:
   - Patients with serious Gram-positive infections (e.g. endocarditis) being treated with a β-lactam or vancomycin.

Exclusion criteria:
   - Patients with documented serious Gram-negative infections (e.g. Pseudomonas) receiving aminoglycosides in combination with a β-lactam agent.

2. Dosing:
   - Gentamicin/Tobramycin
     
     \[
     \text{CrCl} \quad \text{Dose and Interval (round to nearest 10mg)}
     \]
     
     \[
     >60\text{ml/min} \quad 1\text{mg/kg/dose IV q8hr}
     \]
40-60ml/min  1mg/kg/dose IV q12hr
20-39ml/min  1mg/kg/dose IV q24hr
<20ml/min  1mg/kg/dose IV dose IV serially

Dosing will be based on actual body weight unless the patient is morbidly obese (i.e., 20% over ideal body weight [IBW]).
Dosing weight = 0.4(actual body weight – IBW) + IBW

3. Monitoring:
   - Patients who are anticipated to receive aminoglycoside for > 3 days should have levels monitored.
   - For patients who require monitoring, draw a peak and trough level around the dose. Initial levels should be drawn around the 3rd dose. Peak levels should be drawn 60 minutes after the end of the infusion. Trough levels should be drawn 60 minutes before the dose. Initial levels should be drawn around the 3rd dose. Levels should be drawn at least every 7 days or sooner if a change in renal function is observed.
   - Use Global RPh aminoglycoside program to adjust dose and frequency to achieve desired levels.

   **Peak**
   **Trough** ≤ 1
   - Check serum creatinine (SCr) three times weekly as per standing monitoring orders

Additional Information:
1. CMS Survey Procedure
   a. Standard: Delivery of Service. In order to provide patient safety, drugs and biologicals must be controlled and distributed in accordance with applicable standards of practice, consistent with Federal and State law. (CMS A-0500 482.25(b))
      i. Does the hospital pharmacy have a system of monitoring the effects of medication therapies for cases specified per hospital policy

Closing Banner:
Originated by: Pharmacy Department
Effective date: 4/95
Authorized by: P&T Cmte/ Date: 7/26/16
Authorized by: _____________________________________
Jessica Rosenhamer, Pharmacy Director
Revision date: 9/98, 10/10, 07/16, 9/16
Review date: 8/00, 4/04, 1/12, 7/17

References:
Iowa Pharmacy Law
CMS