Penicillin G Desensitization Protocol

DO NOT USE: U, u, IU, MS, MSO₄, 1.0 (trailing zero), .5, QD, QOD, MgSO₄
INSTEAD USE: Unit, Morphine, 1, 0.5 (leading zero), Daily, Every other day, Magnesium

1. Initiation of Protocol Requirements:
   - Admit patient to ICU: _________________________
   - Patient MUST be full code for the desensitization procedure and thru the next full dose is administered. If patient is DNR/DNI, the primary team should discuss with the patient or legal guardian whether they are willing to reverse the status to FULL CODE for the duration of the procedure.
   - Consult UM Allergist
   - If patient is taking a beta blocker, HOLD beta blocker for 24 hours before protocol is administered.

2. Monitoring Requirements:
   - Monitor and chart vital signs and oxygen saturation prior to the first dose and prior to each dose escalation (5min during dose and 10minutes after each dose = every 15 minutes).
   - Assess breath sounds prior to first dose, prior to each dose escalation, and upon complaints of respiratory symptoms including dyspnea or chest tightness.
   - Notify ICU fellow/attending or allergist at: ____________________ and hold subsequent doses until further orders if any of the following signs or symptoms occur:
     b. Skin: localized or generalized itching, flushing, hives, swelling (angioedema), morbilliform rash.
     c. GI: abdominal cramps or pain (colic), nausea, vomiting, diarrhea, loss of bowel control
     d. Respiratory: nasal congestion or sneezing, rhinorrhea, tightness in the throat, hoarseness, “barky” cough, difficulty swallowing, dyspnea, chest tightness, wheezing, stridor, drop in oxygen saturation, cyanosis, respiratory distress.
     e. Cardiovascular: tachycardia (increase >15 beats/min), dysrhythmia, mild hypotension, bradycardia, profound hypotension, cardiac arrest.
   - If allergic reaction occurs call physician at phone number listed above and administer the following agents in the listed sequence:
     a. Give 0.3mg (0.3mL) of 1:1000 epinephrine IM x1. May repeat Q5Min x2 as needed for allergic reaction.
     b. After epinephrine, Give 0.9% NaCl 1000mL IV bolus x 1 as needed for systemic reaction.
     c. After 0.9% NaCl, give Methylprednisolone 125mg IV x 1 dose PRN for systemic reaction.
     d. After Methylprednisolone, administer diphenhydramine 50mg IV X 1 PRN systemic reaction.
     e. After diphenhydramine, administer ranitidine 150mg IV x1 PRN systemic reaction.

3. Drug Desensitization Procedures:
   - Start with bag labeled solution #1.
   - Give each dose over 5 minutes. Then, allow a 10 minute monitoring period for signs/symptoms of allergic reaction before giving the next dose. If tolerating, modify infusion rate and volume to be infused (VTBI) on the pump in an escalating manner per protocol.
   - Document each dose as “given” on table on page #2
   - Monitor for 30 minutes after the final dose. If no reaction occurs, start the scheduled penicillin dose as follows 4 hours from the last desensitization dose as ordered by the treating physician:
     - Penicillin G: __________units IV Q__________H
   - If penicillin is held for more than 24 hours, notify allergist prior to re-administration of the drug.

4. Pharmacy Compounding Instructions:
   a. Use a 20,000,000 unit vial. Reconstitute with 75mL for a final approximate concentration of 250,000 units/mL.
   b. Compound Solution #4:
      i. Use a 50mL bag of D5W. Remove 20mL from bag. Discard 20mL.
      ii. Add 20mL from the reconstituted vial. Label as SOLUTION #4. Final approximate concentration is 100,000 units/mL.
   c. Compound Solution #3:
      i. Use a 50mL bag of D5W and remove 2mL from bag. Discard 2mL.
      ii. Add 2mL from the reconstituted vial. Label as SOLUTION #3. Final approximate concentration is 10,000 units/mL.
   d. Compound Solution #2:
      i. Use a 50mL bag of D5W. Remove 5mL from bag. Discard 5mL.
      ii. Remove 5mL from Solution #3 (not vial) and add to the bag of D5W.
      iii. Label as SOLUTION #2. Final approximate concentration is 1,000 units/mL.
   e. Compound Solution #1:
      i. Use a 50mL bag of D5W. Remove 5mL from bag. Discard 5mL.
      ii. Remove 5mL from Solution #2 (not vial) and add to the bag of D5W.
      iii. Label as SOLUTION #1. Final approximate concentration is 100 units/mL.

Physician Name and Signature: ___________________________ Date: ________________

Physician contact phone number: ___________________________
## Penicillin G Desensitization Protocol

### Start with Solution Bag #1 (approx. 100 units/mL - 5,000 units/50mL)

<table>
<thead>
<tr>
<th>Dose #</th>
<th>Protocol Time</th>
<th>Actual Time Given</th>
<th>Rate (mL/hr)</th>
<th>VTBI (mL)</th>
<th>Infusion time (min)</th>
<th>Dose (units)</th>
<th>Cumulative Dose (units)</th>
<th>Next Dose Due at (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0:00</td>
<td></td>
<td>6</td>
<td>0.1</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0:15</td>
<td></td>
<td>12</td>
<td>0.2</td>
<td>1</td>
<td>20</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0:30</td>
<td></td>
<td>24</td>
<td>0.4</td>
<td>1</td>
<td>40</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0:45</td>
<td></td>
<td>48</td>
<td>0.8</td>
<td>1</td>
<td>80</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1:00</td>
<td></td>
<td>12</td>
<td>1</td>
<td>5</td>
<td>100</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1:15</td>
<td></td>
<td>24</td>
<td>2</td>
<td>5</td>
<td>200</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1:30</td>
<td></td>
<td>48</td>
<td>4</td>
<td>5</td>
<td>400</td>
<td>850</td>
<td></td>
</tr>
</tbody>
</table>

**Total bag infused:** 8.5mL  
**Total bag to waste:** 41.5mL

### Change to Solution Bag #2 (approx. 1,000 units/mL - 45,000 units/45mL)

<table>
<thead>
<tr>
<th>Dose #</th>
<th>Protocol Time</th>
<th>Actual Time Given</th>
<th>Rate (mL/hr)</th>
<th>VTBI (mL)</th>
<th>Infusion time (min)</th>
<th>Dose (units)</th>
<th>Cumulative Dose (units)</th>
<th>Next Dose Due at (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1:45</td>
<td></td>
<td>12</td>
<td>1</td>
<td>5</td>
<td>1,000</td>
<td>1,850</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2:00</td>
<td></td>
<td>24</td>
<td>2</td>
<td>5</td>
<td>2,000</td>
<td>3,850</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2:15</td>
<td></td>
<td>48</td>
<td>4</td>
<td>5</td>
<td>4,000</td>
<td>7,850</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2:30</td>
<td></td>
<td>96</td>
<td>8</td>
<td>5</td>
<td>8,000</td>
<td>15,850</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>2:45</td>
<td></td>
<td>192</td>
<td>16</td>
<td>5</td>
<td>16,000</td>
<td>31,850</td>
<td></td>
</tr>
</tbody>
</table>

**Total bag infused:** 31mL  
**Total bag to waste:** 14mL

### Change to Solution Bag #3 (approx. 10,000 units/mL - 450,000 units/45mL)

<table>
<thead>
<tr>
<th>Dose #</th>
<th>Protocol Time</th>
<th>Actual Time Given</th>
<th>Rate (mL/hr)</th>
<th>VTBI (mL)</th>
<th>Infusion time (min)</th>
<th>Dose (units)</th>
<th>Cumulative Dose (units)</th>
<th>Next Dose Due at (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>3:00</td>
<td></td>
<td>36</td>
<td>3</td>
<td>5</td>
<td>30,000</td>
<td>61,850</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3:15</td>
<td></td>
<td>72</td>
<td>6</td>
<td>5</td>
<td>60,000</td>
<td>121,850</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3:30</td>
<td></td>
<td>144</td>
<td>12</td>
<td>5</td>
<td>120,000</td>
<td>241,850</td>
<td></td>
</tr>
</tbody>
</table>

**Total bag infused:** 21mL  
**Total bag to waste:** 24mL

### Change to Solution Bag #4 (approx. 100,000 units/mL - 5,000,000 units/50mL)

<table>
<thead>
<tr>
<th>Dose #</th>
<th>Protocol Time</th>
<th>Actual Time Given</th>
<th>Rate (mL/hr)</th>
<th>VTBI (mL)</th>
<th>Infusion time (min)</th>
<th>Dose (units)</th>
<th>Cumulative Dose (units)</th>
<th>Next Dose Due at (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>3:45</td>
<td></td>
<td>30</td>
<td>2.5</td>
<td>5</td>
<td>250,000</td>
<td>491,850</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>4:00</td>
<td></td>
<td>60</td>
<td>5</td>
<td>5</td>
<td>500,000</td>
<td>991,850</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>4:15</td>
<td></td>
<td>120</td>
<td>10</td>
<td>5</td>
<td>1,000,000</td>
<td>1,991,850</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>4:30</td>
<td></td>
<td>120</td>
<td>10</td>
<td>5</td>
<td>1,000,000</td>
<td>2,991,850</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>4:45</td>
<td></td>
<td>120</td>
<td>10</td>
<td>5</td>
<td>1,000,000</td>
<td>3,991,850</td>
<td></td>
</tr>
</tbody>
</table>

**Total bag infused:** 37.5mL  
**Total bag to waste:** 12.5mL

**Total Time to Desensitize:** 4 hours and 45 minutes  
**Total Cumulative Dose:** 4,000,000 units

### References: