The Soldier Multi-Trauma Showcase Scenario simulates the injuries that a Combat Medic or other caregiver may encounter on the battlefield. This scenario highlights the ability of the Pulse physiology engine to simulate multiple insults occurring simultaneously. We have incorporated a tension pneumothorax with the blood loss from the hemorrhage to push and eventually exceed the limits of the homeostatic control mechanisms.

**Scenario Narrative**

**Segment 0**

Engine initialization period.

**Segment 1**

A team of soldiers is conducting a presence patrol through a small village in a troubled country. As they pass a mud wall, an improvised explosive device detonates injuring one of the soldiers. The squad medic was with the other team in another part of the village, and she reaches the casualty one minute after the onset of injury.

**Segment 2**

The medic goes to work immediately, attempting to stop the hemorrhage with direct pressure while she assesses the casualty for other injuries. After one minute of assessment, the medic suspects a tension pneumothorax. She instructs a combat life saver to continue direct pressure on the hemorrhage while she prepares to treat the tension pneumothorax.

**Segment 3**

The medic treats the tension pneumothorax by performing a needle decompression. The three inch needle is inserted immediately, and the medic spends the next four minutes finishing and assessing the effectiveness of the procedure.

**Segment 4**

The medic notices that the combat life saver is unable to effectively control the bleeding with direct pressure. She applies a tourniquet stop the hemorrhage. The medic spends 30 seconds inspecting the tourniquet application and preparing an intravenous infusion.

**Segment 5**

The medic initiates a bolus intravenous infusion of isotonic saline.

**Segment 6**

The medic also administers five milligrams of morphine intravenously to control the casualty’s pain. She advises the ranking military person on the scene to call a CASEVAC and continues supportive care.

**References**

Publications:


**Key**

- Good Agreement with data/trends
- Agreement with most trends, some deviations from validation data/trends
- Some major disagreements with validation data/trends
<table>
<thead>
<tr>
<th>Event</th>
<th>Segment</th>
<th>Number</th>
<th>Event</th>
<th>Time</th>
<th>Duration (s)</th>
<th>Hypotension</th>
<th>Tachycardia</th>
<th>Blood Pressure</th>
<th>Complications</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin Massive Hemorrhage</td>
<td>6</td>
<td>5</td>
<td>Bleeding has stopped.</td>
<td>792</td>
<td>5000</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td></td>
</tr>
<tr>
<td>Tension Pneumothorax has progressed untreated</td>
<td>5</td>
<td>4</td>
<td>Slight decrease because of partial correction of hypovolemia.</td>
<td>789</td>
<td>5000</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td></td>
</tr>
<tr>
<td>Saline is administered over 5 minutes at a rate of 100 mL/min</td>
<td>4</td>
<td>3</td>
<td>Slight decrease because of partial correction of hypovolemia.</td>
<td>789</td>
<td>5000</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td></td>
</tr>
<tr>
<td>Begin Tension Pneumothorax</td>
<td>3</td>
<td>2</td>
<td>Slight decrease because of partial correction of hypovolemia.</td>
<td>789</td>
<td>5000</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td></td>
</tr>
<tr>
<td>A pressure dressing or manual pressure is applied</td>
<td>2</td>
<td>1</td>
<td>Slight decrease because of partial correction of hypovolemia.</td>
<td>789</td>
<td>5000</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td>NC or decrease</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Blood Volume is a direct calculation from blood loss and assumed engine. For the systemic effects of tourniquet application please see @cite kam2001arterial. 950 mL of blood loss at the end of this segment (BPM).

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