

# ICU – Major Burn Management

Monitoring	General Management	Initial Goals
<ul style="list-style-type: none"> <li>Intravascular arterial blood pressure</li> <li>CVL (preferably supradiaphragmatic)</li> <li>ScvO<sub>2</sub> q3h X 24h then R/A</li> <li>Lactate q3h X 24-72h</li> <li>ABGs as necessary</li> <li>Bladder pressures q6h from 12-72h post burn</li> <li>Increase frequency if pressure ≥ 15mmHg</li> <li>For facial burns or inhalational injury:               <ul style="list-style-type: none"> <li>Consult Ophthalmology</li> <li>Consider Bronchoscopy (if suspicion of inhalational injury)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>HOB ≥ 30°</li> <li>Gastric prophylaxis</li> <li>DVT prophylaxis</li> <li>Burn dressings as per Plastic Surgery</li> <li>Elevate all burned body parts when possible</li> <li>Start uninterrupted enteric feeds as early as possible (as per Dietitian) unless legitimate concern of splanchnic hypoperfusion or abdominal compartment syndrome</li> <li>Fecal containment system for perineal burns as directed by ICU/Burn physician/Trauma Team Lead</li> </ul>	<ul style="list-style-type: none"> <li>Urine output minimum 30ml/h maximum 50ml/h (Consider higher urine output for electrical burns)</li> <li>Temperature ≥ 37°C</li> <li>MAP ≥ 65mmHg</li> <li>ScvO<sub>2</sub> ≥ 70%</li> <li>Lactate ≤ 4mmol/L</li> <li>Hgb ≥ 70g/L</li> <li>Plt ≥ 50 (Actively bleeding or imminently going to OR)</li> <li>INR ≤ 1.5 (Actively bleeding or imminently going to OR)</li> </ul>
Initial Fluid Resuscitation		Recommendations for Hypotension
<p><b>STEP 1</b> Calculate initial 24h resuscitation fluid requirements = (3ml of Ringers Lactate)(kg)(% TBSA from Plastics consult) / 24h. ½ of this IVF is administered in the first 8 hours (post burn) and the second ½ is delivered in the remaining 16 hours.</p> <p><b>STEP 2</b> Determined the administered pre-hospital IVF volume, subtract this from you above calculation, and adjust your treatment appropriately.</p> <p><b>STEP 3</b> Monitor urine output hourly and decrease or increase the RL infusion by 20% to maintain urine output between 30-50ml/hr. Avoid boluses if possible. <b>NOTE:</b> Hour to hour fluid resuscitation is critical, particularly during first 24 hours. <b>OVER-RESUSCITATION IS AS HARMFUL AS UNDER-RESUSCITATION.</b></p> <p><b>STEP 4</b> If urine output is ≤ 15ml/hr for two or more consecutive hours despite increasing fluid rate <b>OR</b> patient requires twice current calculated rate for more than two hours: <b>CALL ICU FELLOW OR ATTENDING</b>, flush urinary catheter, assess breath sounds and bladder pressure. Consider initiating albumin and titrate rate as above based on urine output.</p> <p><b>STEP 5</b> At 12 hours post-burn, calculate the <b>PROJECTED</b> 24 hour resuscitation if fluid rates are kept constant. If the projected 24 hour resuscitation requirement exceeds 6ml/kg/% TBSA burn or 350ml/kg total, the following steps are recommended:</p> <ol style="list-style-type: none"> <li><b>Initiate albumin infusion</b></li> <li><b>Watch for signs of Intra-Abdominal Hypertension</b> (bladder pressure ≥ 15mmHg, increased airway pressures, decreased urine output, hypotension) and extremity compartment syndromes (absent Doppler signal or pulses that are diminishing on serial exams q30-60 minutes should prompt consideration of escharotomy)</li> </ol>		<p><b>True hypotension MUST BE correlated with urine output.</b></p> <p>If MAP is consistently ≤ 65mmHg and there is evidence of poor end-organ perfusion (urine output ≤ 30ml/hr, lactate ≥ 4mmol/L, ScvO<sub>2</sub> ≤ 70%) the following steps are recommended:</p> <ol style="list-style-type: none"> <li><b>Volume Status:</b> If CVP ≤ 5mmHg or pulse pressure variation ≥ 15mmHg and patient is not breathing spontaneously, administer a fluid bolus of 0.5-1L RL in attempt to improve MAP (it is UNCOMMON to achieve CVP goals of 10-12mmHg in severe burn patients)</li> <li><b>Vasopressors:</b> If MAP is persistently ≤ 65mmHg initiate norepinephrine at 0-0.5 mcg/kg/min to maintain MAP ≥ 65mmHg (massive burn patients commonly require norepinephrine due to extensive vasodilatory shock secondary to the massive systemic inflammatory response associated with severe burns.)</li> <li><b>MAP Goal:</b> If persistently requiring norepinephrine (0-0.5 mcg/kg/min) consider a MAP goal of ≥ 65mmHg as long as urine output ≥ 30ml/hr, ScvO<sub>2</sub> ≥ 70% and lactate ≤ 4mmol/L.</li> </ol> <p>1. Azzopardi EA, McWilliams B, Iyer S, Whitaker IS. Fluid resuscitation in adults with severe burns at risk of secondary abdominal compartment syndrome—An evidence based systematic review. Burns. 2009 Nov 1;35(7):911-20.</p> <p>2. Ennis JL, Chung KK, Renz EM, Barillo DJ, Albrecht MC, Jones JA, et al. Joint Theater Trauma System implementation of burn resuscitation guidelines improves outcomes in severely burned military casualties. J Trauma. 2008 Feb 1;64(2 Suppl):S146-51; discussion S51-2.</p> <p>3. Latenser BA. Critical care of the burn patient: the first 48 hours. Critical Care Medicine. 2009 Oct 1;37(10):2819-26.</p> <p>4. Saffle JIL. The phenomenon of “fluid creep” in acute burn resuscitation. J Burn Care Res. 2007 Jan 1;28(3):382-95.</p> <p>5. Cartotto R, Zhou A. Fluid creep: the pendulum hasn't swung back yet! J Burn Care Res. 2010 Jan 1;31(4):551-8.</p>