

# Initial Management of the Adult Burn Patient

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If immediate transfer to a regional Burn Center is not feasible: **Primary Assessment**

Assessment and Monitoring	Intervention/care
<p><b>Airway Maintenance with Cervical Spine Protection</b></p> <ul style="list-style-type: none"> <li>• For signs of airway injury, hypoxia, facial burns, carbonaceous sputum, stridor, nasal singe, history of a closed space fire, intubate early</li> <li>• Labs: <ul style="list-style-type: none"> <li>○ Arterial blood gas</li> <li>○ Carboxyhemoglobin (CO) level (if inhalation suspected)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Chin lift/jaw thrust with cervical spine protection as needed</li> <li>• Place an oral pharyngeal airway or endotracheal tube (ETT) in the unconscious patient</li> </ul>
<p><b>Breathing and Ventilation:</b></p> <ul style="list-style-type: none"> <li>• Assess for appropriate rate and depth of respirations with adequate air exchange</li> <li>• Monitor pulse oximetry while checking CO level (as needed)</li> </ul>	<ul style="list-style-type: none"> <li>• 100% (15L) FIO2 nonrebreather face mask or by ETT</li> <li>• Mechanical ventilation as needed</li> <li>• Head of bed (HOB) elevated</li> </ul>
<p><b>Circulation with Hemorrhage Control:</b></p> <ul style="list-style-type: none"> <li>• Vital Signs</li> <li>• Heart rate</li> <li>• Blood pressure</li> <li>• Capillary refill</li> <li>• Temperature</li> <li>• Skin color of unburned skin</li> <li>• Continuous cardiac monitoring</li> <li>• Perform brief assessment to determine burn size, utilizing the rule of nines (see page 2)</li> <li>• Labs on admission and every day as dictated by medical condition <ul style="list-style-type: none"> <li>○ Electrolyte panel</li> <li>○ CBC</li> <li>○ EKG for electrical injury or cardiac history</li> <li>○ Type and Screen</li> </ul> </li> <li>• CXR if intubated, inhalation injury suspected or underlying pulmonary condition</li> <li>• Monitor glucose at least every 2 hrs on pediatric burn patients x 24 hours</li> </ul>	<ul style="list-style-type: none"> <li>• Two large bore peripheral IV's in nonburned, upper extremities, secured well <ul style="list-style-type: none"> <li>○ IV's may be placed thru burned skin if needed, suture to secure in place</li> </ul> </li> <li>• Initiate burn resuscitation for a patient with a TBSA &gt;20 %:</li> <li>• 4 ml (LR) x body weight (kg.) x TBSA % burn = Lactated Ringers Solution (LR) fluid in first 24 hours post burn (calculate from time of burn)</li> <li>• Give half the fluid (LR) in the first 8 hours then the next half (LR) over the next 16 hours</li> </ul> <p><b>KEYPOINT: Titrate IV rate to maintain a urine output; 0.5ml/kg for adults (~30-50ml/hr),</b></p> <ul style="list-style-type: none"> <li>• Tetanus Prophylaxis unless given in last 5 years</li> </ul>
<ul style="list-style-type: none"> <li>• Disability</li> <li>• Neurologic checks every 4 hours and prn <ul style="list-style-type: none"> <li>○ Goal is an alert and oriented patient</li> </ul> </li> <li>• If altered neurological status consider; associated injury, CO poisoning, substance abuse, hypoxia or pre-existing medical condition</li> <li>• Determine level of consciousness</li> <li>• Consider using the "AVPU" method: <ul style="list-style-type: none"> <li>○ A - Alert</li> <li>○ V - Responds to verbal stimuli</li> <li>○ P - Responds to painful stimuli</li> <li>○ U - Unresponsive</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Exposure</li> </ul>	<ul style="list-style-type: none"> <li>• Remove all clothing and jewelry</li> <li>• Initially place a clean, dry sheet over the wounds until a thorough cleaning is done</li> <li>• Keep patient normo-thermic especially during wound care: <ul style="list-style-type: none"> <li>○ Keep patient covered</li> <li>○ Cover the patients head</li> <li>○ Warm the room</li> <li>○ Warm IV fluids</li> </ul> </li> </ul>

**Contact the Burn Center at Washington Hospital Center with questions.  
202-877-7241**

### Initial Estimate of Burn Size

The extent of burn injury is expressed as the percentage of total body surface area (TBSA) burned. In addition to determining the severity of injury, the estimation of TBSA guides fluid resuscitation.

The most commonly used guide for making an initial estimate of burn size is the "Rule of Nines". This method is based on the presumption that the body can be divided into anatomical regions that represent 9% or a multiple of 9% of the entire body surface. In the infant or child the "rule" deviates somewhat because the child's head and the smaller surface area of the lower extremities.

When a burn injury is small or irregularly shaped the palm of the patient's hand can be used to represent 1% of the body surface area.

### Parkland Formula

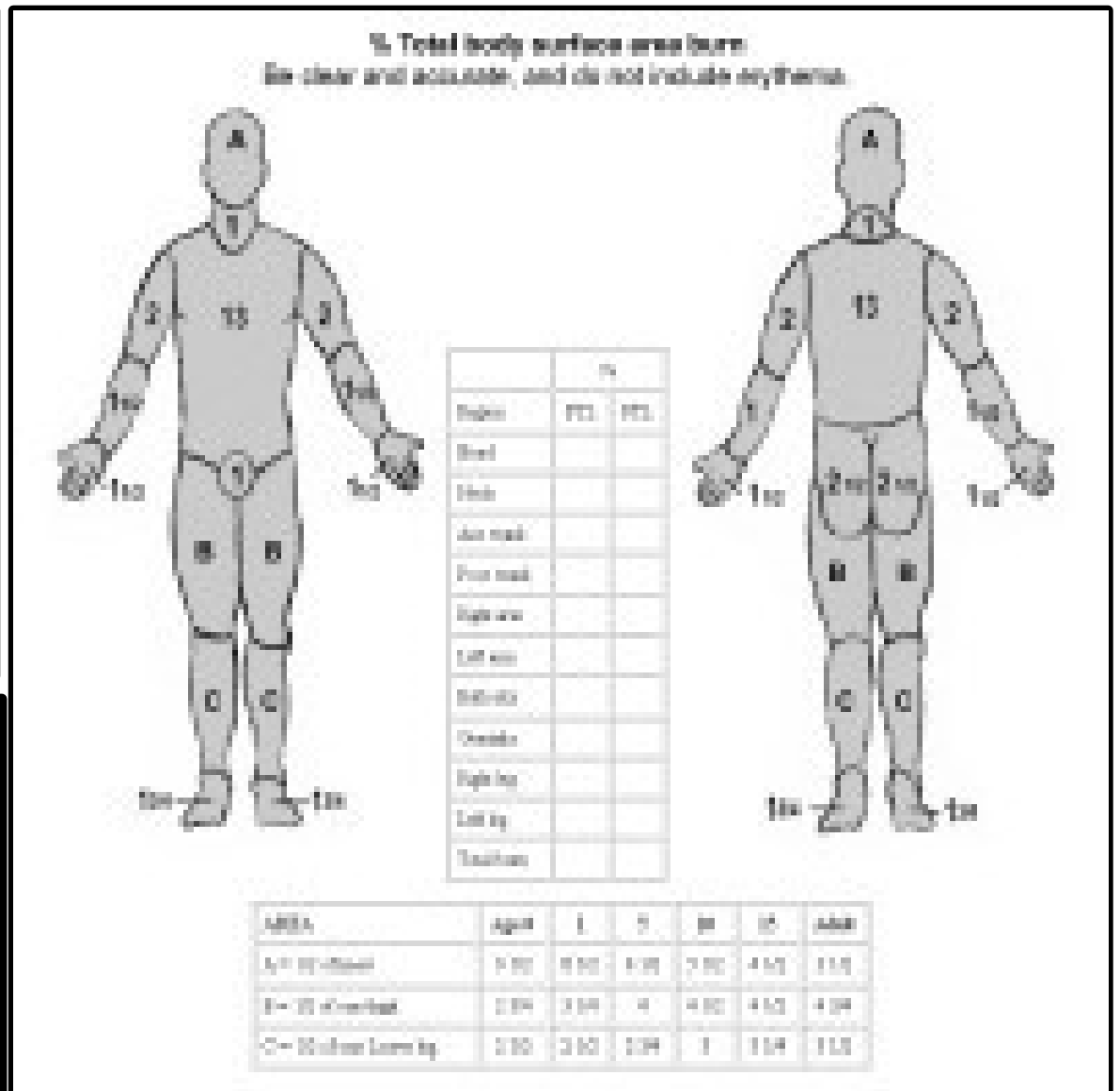
$$\text{Body weight (kg)} \times \% \text{TBSA burned} \times 4 \text{ml} = \text{Total volume of LR for 24 hrs}$$

Give half total over first 8 hours post-burn. Give remaining half over next 16 hours.

For Example: 75 kg X 20% X 4 ml's = 6000 ml;  
Give 3000 ml's LR 1st 8hrs. LR @ 375 ml/hr.

Give 3000 ml's LR next 16. LR @ 188 ml/hr.

**Titrate fluids to maintain urine output .5ml/kg (30-50 ml/hour)**



### Estimating Burn Depth

It is not always possible to know burn depth for several days as burn appearance may be deceiving or burn injury may deepen. Degree of Burn	Depth of injury	Wound Characteristics	Treatment Course
First-degree	Limited damage to epidermis, skin intact	<ul style="list-style-type: none"> <li>• Red</li> <li>• Painful</li> <li>• No blister formation</li> </ul>	Heals completely in 3-5 days, without scarring
Partial thickness (second-degree)	<p>Epidermis destroyed, minimal damage to superficial layers of dermis</p> <p>Epidermis, and dermis involved</p>	<ul style="list-style-type: none"> <li>• Pink or red</li> <li>• Moist</li> <li>• Weepy</li> <li>• Blanching</li> <li>• Blisters</li> <li>• Painful</li> </ul> <ul style="list-style-type: none"> <li>• May be red or pearly white</li> <li>• Drier in appearance than superficial injury</li> </ul>	<p>Heals completely within 5-21 days with little or no scarring. Grafting not required</p> <p>May take 3-8 weeks to heal, heavy scarring, may require skin graft</p>
Full thickness (third degree)	All epidermis and dermis destroyed	<ul style="list-style-type: none"> <li>• White, cherry red, brown or black in color</li> <li>• Hard and leathery</li> <li>• Insensitive to pinprick</li> </ul>	Prolonged healing, required skin graft to heal

**If immediate transfer to a regional Burn Center is not feasible:  
Care of the patient with > 20% TBSA burn for 72 hours: Secondary Survey**

Assessment and Monitoring	Intervention/care
<p><b>History:</b></p> <ul style="list-style-type: none"> <li>• Obtain circumstances of injury</li> <li>• Obtain medical history               <ul style="list-style-type: none"> <li>○ Consider the use of “AMPLE” to aid in obtaining information                   <ul style="list-style-type: none"> <li>A – Allergies</li> <li>M – Medications</li> <li>P – Previous illness, past medical history</li> <li>L – Last meal or fluid intake</li> <li>E – Events/environment related to the injury</li> </ul> </li> </ul> </li> </ul>	
<p><b>Complete Physical Examination:</b></p> <ul style="list-style-type: none"> <li>• Head to toe exam               <ul style="list-style-type: none"> <li>○ If eye involvement or facial burns consult an Ophthalmologist</li> </ul> </li> <li>• Determine the extent/size of the burn by calculating the TBSA burn:               <ul style="list-style-type: none"> <li>○ Rule of Nines or Rule of the Palm</li> <li>○ Lund-Browder chart – for pts</li> </ul> </li> <li>• Determine the depth of the burn (see above)</li> <li>• Monitor for the following signs and symptoms in full thickness, circumferential burn injuries which may indicate a circulation deficit:               <ul style="list-style-type: none"> <li>○ Pallor or cyanosis of distal unburned skin on a limb</li> <li>○ Capillary refill <math>\geq</math> 5 seconds</li> <li>○ Unrelenting deep tissue pain</li> <li>○ Progressive loss of sensation or motor function</li> <li>○ Progressive decrease or absence of pulses</li> <li>○ Inability to ventilate in patients with deep circumferential burns of the chest</li> </ul> </li> </ul>	<p><b>KEYPOINT: if signs of circulation deficit are present contact the Burn Center at Washington Hospital Center immediately</b></p> <p>If circulation is compromised, an escharotomy should be performed immediately.</p>
<p><b>Comfort:</b></p> <ul style="list-style-type: none"> <li>• Frequent pain/sedation assessment</li> <li>• Minimum every 4 hours</li> <li>• Before and after pain/sedation medication given</li> <li>• Use age appropriate pain scales for pediatric patients</li> </ul>	<ul style="list-style-type: none"> <li>• IV analgesia is the preferred route during the initial post injury period.</li> <li>• Large amounts of IV analgesic may be required to attain initial pain control</li> <li>• Administer opioids in frequent (every 5 minutes) small to moderate bolus doses (e.g. Morphine IV 4-5 mg or Dilaudid IV 0.5-1 mg) until pain is controlled.</li> </ul> <p>KEYPOINT: It may take large total opioid doses to achieve initial pain control (e.g. 40 to 60 mg of Morphine)</p>
<p><b>Wound Care:</b></p> <ul style="list-style-type: none"> <li>• Assess the wound and monitor for:               <ul style="list-style-type: none"> <li>○ Change in wound appearance</li> <li>○ Change in size of wound</li> <li>○ Signs or symptoms of infection</li> </ul> </li> </ul> <p>KEYPOINT: In a mass casualty disaster situation wound care for patient with a &gt;20% TBSA burn can be performed once per day</p>	<ul style="list-style-type: none"> <li>• Perform wound care every day if using silver sulfadiazine cream</li> <li>• Wound care involves washing the wounds with soap and warm tap water with a wash cloth, patting dry.</li> <li>• Burned scalps and faces should be shaved daily               <ul style="list-style-type: none"> <li>• Genitalia and perineal burns may require a foley to maintain patency</li> </ul> </li> <li>• Apply a double antibiotic ointment around the eyes and mouth to avoid cream from draining into them</li> <li>• Apply a thin layer of silver sulfadiazine cream, enough so that the wound can not be seen through the cream. The gauze can be impregnated then applied to the wound or applied directly to the burn. Then cover and wrap burn with clean dry gauze.               <ul style="list-style-type: none"> <li>○ The layer of silver sulfadiazine should be thick enough to prevent the wound from drying out prior to the next dressing change</li> <li>○ The purpose of a dressing is to keep the cream from rubbing off before the next dressing change</li> </ul> </li> <li>• Wrap fingers separately if burned</li> <li>• Place silver sulfadiazine coated gauze between the toes</li> <li>• Elevate burned extremities above the level of the heart</li> </ul>