

26. Burns Resuscitation Pathway (Assessment)

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

SAMPLE HISTORY

Signs and Symptoms

Allergies

Medication

Past Medical History/Pregnancy

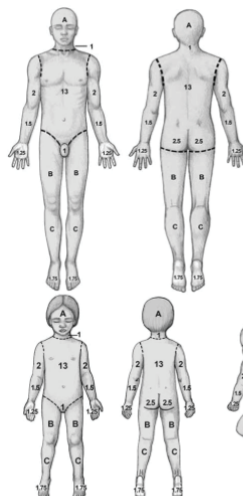
Last meal

Events preceding presentation

ACTIVATE THE TRAUMA TEAM (see **Trauma Team Activation Criteria**)

Primary Survey (C-ABCDE)

- C-Spine – If suspected trauma, Cleared Clinically (see)? Perform **Manual In-Line Stabilization (MILS)** then apply **Head Blocks** or **Blanket Rolls** taped to the patient's head and trolley. **DO NOT APPLY A C-COLLAR**
- Airway – Open? Maintainable? Intubate? Indications for intubation include presence of pharyngeal burns, air hunger, stridor, carbonaceous sputum and hoarseness, unconscious patients, hypoxic patients with severe smoke inhalation, or patients with flame or flash burns involving the face and neck.
- Breathing – Rate? SPO₂? Air entry bilaterally?
- Circulation – Active Bleeding Control? Pulse? CPR? BP? Signs of Shock? ECG for electrical burns?
- Disability – GCS? Pupils? **RBS?**
- Expose patient

1st Degree Burns	<ul style="list-style-type: none">• Epidermis only• Commonly caused by UV light or very short flash or flame exposure• Skin is red, dry & hypersensitive• No treatment except analgesia• Leaves no scarring on healing	<p>Total Body Surface Area (TBSA) Burns Estimation Lund and Browder Charts for area of body burnt</p>  <table border="1"><thead><tr><th>Burnt area</th><th>%</th></tr></thead><tbody><tr><td>Head</td><td></td></tr><tr><td>Neck</td><td></td></tr><tr><td>Trunk (front)</td><td></td></tr><tr><td>Trunk (back)</td><td></td></tr><tr><td>Arm (right)</td><td></td></tr><tr><td>Arm (left)</td><td></td></tr><tr><td>Hand (right)</td><td></td></tr><tr><td>Hand (left)</td><td></td></tr><tr><td>Buttock (right)</td><td></td></tr><tr><td>Buttock (left)</td><td></td></tr><tr><td>Genitals</td><td></td></tr><tr><td>Leg (right)</td><td></td></tr><tr><td>Leg (left)</td><td></td></tr><tr><td>Feet (right)</td><td></td></tr><tr><td>Feet (left)</td><td></td></tr><tr><td>Total burn area</td><td></td></tr></tbody></table>	Burnt area	%	Head		Neck		Trunk (front)		Trunk (back)		Arm (right)		Arm (left)		Hand (right)		Hand (left)		Buttock (right)		Buttock (left)		Genitals		Leg (right)		Leg (left)		Feet (right)		Feet (left)		Total burn area	
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2nd Degree Burns	<p>Superficial;</p> <ul style="list-style-type: none">• Epidermis + Upper ½ of Dermis• Commonly caused by scald (spill or splash)• Red, moist, weeping, cob blisters that blanche with pressure• Painful - due to nerve exposure, & heals from 7-14days• Leaves no scarring on healing but there is potential pigmentary changes																																			
	<p>Deep;</p> <ul style="list-style-type: none">• Epidermis + Upper ¾ of Dermis• Commonly caused by scald, flame, chemicals, oil & grease• Cheesy white, wet or waxy dry; Do not blanche with pressure• Healing takes > 21days• Severe scarring & risk of contractures																																			
3rd Degree Burns (Full Thickness Burns)	<ul style="list-style-type: none">• Full Epidermis + Dermis are destroyed leaving no cells to heal• Commonly caused by scald, steam, flame, chemicals, oil, grease & high voltage electricity• Grey to charred & black, insensate, contracted, pale, leathery tissue• Severe scarring & high risk of contractures																																			
4th Degree Burns	<ul style="list-style-type: none">• Muscle involvement																																			
5th Degree Burns	<ul style="list-style-type: none">• Bone involvement - Especially in epileptics who convulse during burning																																			

Do not include first degree burns in the calculation of % TBSA. The surface area of a patient's palm (including fingers) is roughly **1% of TBSA**. Palmar surface can be used to estimate relatively small burns (< 15% of total surface area) or very large burns (> 85%, when unburnt skin is counted). For **medium-sized burns**, it is **inaccurate**.

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Burns Resuscitation Pathway (Resuscitation)

Resuscitation (C-ABCDE)

CONSULT A SURGEON IMMEDIATELY AS YOU BEGIN RESUSCITATION OF ANY BURNS PATIENT WITH 3RD OR 4TH DEGREE BURNS AND CIRCUMFERENTIAL BURNS (also see [Trauma Team Activation Criteria](#))

- C** – If suspected C-Spine trauma and **NOT** cleared clinically, **Head Blocks** or **Blanket Rolls** strapped to the patient's head and trolley?
- A**
- Rapid Sequence Intubation? **Avoid succinylcholine in patients with burns > 24hrs** due to risk of hyperkalaemia. Indications for intubation include presence of pharyngeal burns, air hunger, stridor, carbonaceous sputum and hoarseness, unconscious patients, hypoxic patients with severe smoke inhalation, or patients with flame or flash burns involving the face and neck.
- B**
- Supplementary Oxygenation? If suspected **carbon monoxide poisoning** (restlessness, headache, nausea, poor co-ordination, memory impairment, disorientation, or coma), give **100% oxygen via a Non-Rebreather mask at 15L/min for 24 hrs**
- C**
- Control Active Bleeding
 - **Do not include first degree burns in the calculation of % TBSA**
 - Patients with < **10% TBSA** burns can be resuscitated orally (unless the patient has an electrical injury or associated trauma). This needs on-going evaluation and the patient may still require an IV line.
 - Patients with burns involving **≥ 20% of TBSA** will require intravenous fluid resuscitation. Insert 2 large bore IV/IO lines and give appropriate fluid resuscitation (RL/NS/whole blood). **Parkland Formula (available in MDCalc) – Total fluids over 24hrs = 4ml/kg/%TBSA**. Give ½ of this volume within the first **8hrs** of the burns then the next ½ over the next **16hrs** + maintenance fluid for children < 30 kg. Aim for a urine output of **1 mL/kg/hour in children younger than 2 years** (or who weigh < 30 kg) and **0.5 mL/kg/hour in adults and older children**. If urine output is not adequate, increase fluids for the **next hour to 150%** of calculated volume until urine output is adequate.
- High-voltage electrical injury** causes significant muscle injury, so formulas for fluid resuscitation based on percentage of body surface area burned are not applicable. Aggressive fluid resuscitation to maintain adequate **urine output (1.0-1.5 mL/kg per hour)** should be initiated **until the urine is clear of myoglobin** (urinary dipstick positive for blood with no red cells in the sediment). Acute myoglobinuric renal failure with life-threatening consequences can occur if fluid resuscitation is delayed.
- GXM and request adequate supplementary blood and blood products if necessary
- D**
- Correct Hypoglycaemia – 50mls 50% Dextrose IV
 - **Give appropriate analgesia e.g. Fentanyl 1µg/kg IV (see Analgesia Chart)**; Consider procedural sedation with Ketamine for wound dressing (see 44. Procedural Sedation and Analgesia (PSA))
- E**
- Check temperature and provide warmth to the patient
 - Cool any burns < 3 hours old with **cold tap water for at least 30 minutes** and then dry the patient. In patients undergoing external cooling who have burns covering **≥ 10% of TBSA**, monitor body temperature for hypothermia.
 - Remove all clothes, jewellery, necrotic tissue & debris
 - Wash wound with mild soap and tap water
 - **DO NOT BURST BLISTERS**. Blisters left intact heal faster and become infected less often.

Secondary Survey (Head-to-Toe Survey) and Other Considerations

- In neck burns, a pillow is placed under the patient's head to hyperextend the neck at the shoulders to prevent contractures
- Chest wall burns - Do a checker-box release - **consult a Surgeon**
- Upper limb burns should be nursed elevated at 45°
- Evaluate 3rd & 4th Degree Burns and circumferential burns for possible escharotomy, **consult a Surgeon**
- Give **Tetanus Toxoid**.
- **Topical antimicrobial agents** or bioengineered substitutes should be applied to **all clean, debrided wounds except superficial burns**. Prophylaxis with **systemic antibiotics** is currently **NOT RECOMMENDED** for patients with severe burns other than perioperatively.

Disposition

Minimum criteria for transfer to a burns centre (Modified from the Australian and New Zealand Burn Association (ANZBA) protocol)

Burn injury patients who should be referred to a burn unit include the following:

- All burn patients less than 1 year of age
- All burn patients from 1-2 years of age with burns > 5% total body surface area (TBSA)
- Patients in any age group with third-degree burns of any size
- Patients older than 2 years with partial thickness burns greater than 10% TBSA
- Patients with burns of special areas – face, hands, feet, genitalia, perineum or major joints
- Patients with electrical burns, including lightning burns. Admit patients with history of loss of consciousness, documented arrhythmias either before or after arrival to the ED (including cardiac arrest), ECG evidence of ischemia, or high-voltage electrical injury
- Chemical burn patients
- Patients with inhalation injury resulting from fire or scald burns
- Patients with circumferential burns of the limbs or chest
- Burn injury patients with pre-existing medical disorders that could complicate management, prolong recovery or affect mortality
- Any patient with burns and concomitant trauma
- Paediatric burn cases where child abuse is suspected
- Burn patients with treatment requirements exceeding the capabilities of the referring centre
- Septic burn wound cases