

## PRACTICE GUIDELINE

Effective Date: 9-27-04

Manual Reference: Deaconess Trauma Services

### TITLE: MANAGEMENT AND TRIAGE OF SEVERELY BURNED PATIENTS

**PURPOSE:** To provide triage parameters and guidelines for the management of the severely burned patient. To provide guidelines to stabilize thermally-injured persons until they may be transferred to a burn center. To provide information to ensure smooth transfer of the patient to the burn center.

**DEFINITIONS:** The definitions are derived from the classification of burns and guidelines proposed by the American Burn Association (ABA) as well as the American College of Surgeons (ACS).

**SEVERLY BURNED PATIENT:** A patient with a severe burn injury who should be transferred for specialized care to a burn center.

### ABA BURN CENTER REFERRAL CRITERIA:

Burn injuries that should be referred to a burn center include:

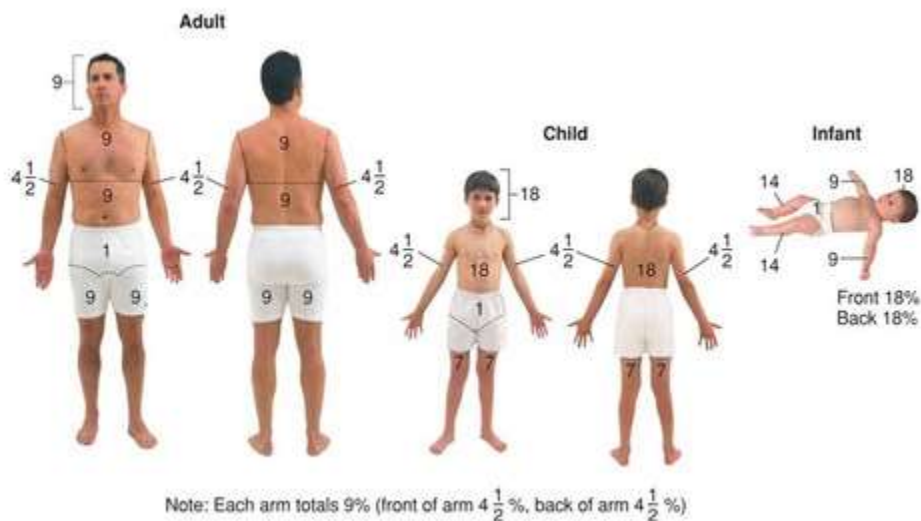
- Partial thickness burns greater than 10% total body surface area (TBSA)
- Burns involving the face, hands, feet, genitalia, perineum, or major joints
- Third Degree burns in any age group
- Electrical burns, including lightning injury
- Chemical burns
- Inhalation injury
- Burns injury in patients with pre-existing medical disorders that could complicate management, prolong recovery, or affect mortality
- Burns and concomitant trauma (such as fractures) when the burn injury poses the greatest risk of morbidity or mortality.
  - If the trauma poses the greater immediate risk, the patient's condition may be stabilized initially in a trauma center before transfer to a burn center
  - Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols
- Burns in children
  - Children with burns should be transferred to a burn center verified to treat children.
- Burn injury in patients who will require special social, emotional, or rehabilitative intervention.

### SEVERITY DETERMINATION:

- First Degree (Partial Thickness) – superficial, red, sometimes painful
- Second Degree (Partial Thickness) – skin may be red, blistered, swollen. Very painful.

- Third Degree (Full Thickness) – Whitish, charred or translucent, no pin prick sensation in burned are.

### PERCENTAGE TOTAL BODY SURFACE AREA (TBSA) (“Rule of Nines”)



### GUIDELINES:

1. Any burn patient admitted to Deaconess Hospital, regardless of mechanism of injury, should be admitted to a trauma surgeon or have a consult to a trauma surgeon.
  - a. When deemed necessary by trauma surgeon, plastics will be consulted
2. Treatment Protocol:
  - a. Remove any sources of heat.
    - i. Cool any burns that are warm to the touch with tepid water and then dry the patient.
    - ii. Cover patient with a clean, dry sheet or blanket to prevent hypothermia.
  - b. ATLS Protocol: Assess the ABCs. Do not allow your attention to be diverted by the cutaneous burn. Look for life-threatening injuries first.
  - c. Airway
    - i. Assess for upper airway injury caused by the inhalation of hot air or gases. This will potentially result in rapid upper airway occlusion.
      1. Stridor
      2. Inability to handle secretions
      3. Inability to speak; hoarse
      4. Burns about face and mouth
      5. Erythema in the pharynx
      6. If there is any question about airway occlusion, intubate the patient using the oral route under direct visualization
    - ii. Assess for smoke inhalation. This will result in lower airway occlusion or non-cardiogenic pulmonary edema
      1. All of the above signs, plus
        - a. a history of being burned in an enclosed environment
        - b. Carbonaceous sputum

- c. Soot in the airway and around the nose and mouth
- d. Uncontrollable coughing
  - i. Obtain chest x-ray. REMEMBER: the initial chest x-ray may be normal with severe smoke inhalation
  - ii. Consider bronchoscopy, looking for erythema of the airway and soot deposition in the trachea and bronchi
  - iii. If there is any question about smoke inhalation, intubate the patient and place them on positive pressure ventilation
- iii. Carbon monoxide poisoning signs and symptoms include restlessness, headache, nausea, poor coordination, memory impairment, disorientation or coma
  - 1. Consider carbon monoxide poisoning with any of the above findings, and
  - 2. Carboxyhemoglobin level >10%
    - a. All burns get oxygen
    - b. Burns with carbon monoxide exposure should have high flow oxygen via a non-rebreathing mask
    - c. Consider endotracheal intubation for respiratory failure
    - d. Consider the use of a hyperbaric chamber
- d. Breathing
  - i. Remember that the patient could have sustained a chest injury in association with the burn injury
    - 1. Assess breath sounds and obtain a chest x-ray
    - 2. Treat according to chest injury guidelines
- e. Circulation
  - i. Assess for shock and treat accordingly
  - ii. Insert two large bore IVs.
    - 1. These may be placed peripherally or centrally
      - a. It is okay to place the IVs through eschar if it is the only access site
  - iii. Administer two liters of normal saline solution
- f. Disability
  - i. Assess neurologic status
  - ii. If brain injury is suspected, obtain CT scan
- g. Expose
  - i. Remove all clothing and constricting bands or jewelry
  - ii. Place patient on clean sheet
    - 1. Sterile sheets are not required
  - iii. Do not immerse burn into water or ice
- h. Obtain blood sample for laboratory
  - i. CBC, renal panel, UA, clotting studies, blood alcohol (if necessary)
  - ii. Obtain chest x-ray if not already done
  - iii. Obtain EKG in patients who are having arrhythmias
  - iv. Obtain arterial blood gas with carboxyhemoglobin level

- i. Insert Foley catheter with >90% TBSA burn
- j. Consider Nasogastric/orogastric tube if >20% TBSA burn
- k. Examine the burn when the patient is otherwise stable
  - i. Rule of nines for partial thickness (second degree) and full thickness (third degree) burn only
  - ii. The palm of the patient's hand (without fingers) is equal to 1% TBSA
  - iii. Assess depth of burn
    - 1. Superficial (first degree): erythematous, dry, painful, blanches (e.g., sunburn)
    - 2. Partial thickness (second degree): blisters, wet, erythematous, painful, blanches (e.g., blister burn)
    - 3. Full thickness (third degree): dry, leathery, gray or brown, painless, does not blanch (e.g., surface of football)
    - 4. Only partial thickness (second degree) and full thickness (third degree) are considered when assessing the size of the burn
- l. Calculate the fluid requirements
  - i. The calculated fluid volume is initiated in the following manner
    - 1.  $\frac{1}{2}$  of the total fluid is provided in the first 8 hours after the burn injury
      - a. Example: 100 kg man with 80% TBSA burns requires  $2 \times 80 \times 100 = 16,000$  ml/24 hours. 8,000 ml should be given in the first 8 hours
  - ii. The formulas provide a target rate. The amount of fluid replacement should be adjusted according to the urine output target of 0.5 ml/kg/hr for adults and 1 ml/kg/hr for children weighing < 30 kgs.
  - iii. In adults, urine output should be maintained between 30 and 50 ml/hr to minimize potential for over-resuscitation

Burn resuscitation fluid rate and target urine output by burn type and age			
Category of burn	Age and weight	Adjusted fluid rate	Urine output
Flame or scald	Adults and older children ( $\geq 14$ years old)	2mL LR x kg x %TBSA	0.5 mL/kg/hr  30-50mL/hr
	Children (<14 years old)	3ml LR x kg x %TBSA	1mL/kg/hr
	Infants and young children ( $\leq 30$ kg)	3ml LR x kg x %TBSA  Plus a sugar containing solution at maintenance rate	1mL/kg/hr
Electrical injury	All ages	4mL LR x kg x %TBSA until urine clears	1-1.5mL/kg/hr until urine clears

- m. Access for constricting eschar
    - i. Usually on extremity but may be on chest or neck
    - ii. Release eschar medially and laterally as follows
      - 1. Prep with betadine
      - 2. Use #11 blade
      - 3. Hold between your thumb and forefinger with the blade protruding ¼ inch
      - 4. Run the blade on the medial and lateral aspect of the involved limb
        - a. For chest injuries, release the eschar on the lateral aspect of the chest at the anterior axillary line
      - 5. There should be no pain and minimal bleeding
      - 6. Expand the escharotomy with a clamp
      - 7. Cover the site with a dry, sterile dressing
  - n. Do not administer antibiotics unless there is concomitant injury
  - o. Administer intermittent boluses of morphine intravenously as needed for pain
    - i. If the patient is intubated and stable, you can be moderately liberal with the pain medicine
3. Wound Care
- a. Gently cover with a clean sheet. This decreases the pain from air currents passing over the skin
  - b. If transferring the patient to a tertiary center within 12 hours, debridement and application of topical antimicrobials is unnecessary. Transport patient wrapped in a dry sheet and blanket
  - c. If it will be longer than 12 hours before the transfer is completed, debride all loose tissues and gently cleanse the wounds of all debris with mild soap and water. This should be done with opiate analgesia but not general anesthesia. Consult burn center for topical therapy

**REFERENCES:**

- American Burn Association, ADVANCED BURN LIFE SUPPORT COURSE GUIDELINES.
- Resources for the Optimal Care of the Injured Patient
- Deaconess Hospital Policy and Procedure Manual 30-03, PATIENT ROOM PREPARATION AND BED ASSIGNMENT.
- Deaconess Hospital Policy and Procedure Manual 40-06, EMERGENCY MEDICAL TRANSFER AND ACTIVE LABOR (EMTALA) GUIDELINES.

<b>REVIEWED DATE</b>	<b>REVISED DATE</b>
Additional dates removed for brevity	MAR 2011
JAN 2019	AUG 2016
AUG 2020	JAN 2020
JUNE 2021	JAN 2022