

OPERATIONAL GUIDELINES Emergency Management, Triage, Treatment, and Transfer of Adult and Pediatric Burn Patients

OBJECTIVE: Describe the appropriate triage, treatment, and transfer for adult and pediatric burn patients.

GUIDELINES: To provide guidance on the triage, treatment, and transfer of burn patients. Provide steps to identify the severity of a burn, the necessity to transfer to a burn center. Provide information for the treatment of wounds depending on the severity and designation of patient. Provides the ABA's recommendations for fluid resuscitation for patients with a TBSA >20%.

REFERRAL CRITERIA: AMERICAN BURN ASSOCIATION BURN CENTER REFERRAL CRITERIA

- All third degree burns (full-thickness) of any size, in any age group
- Burns that involve the face, hands, feet, genitalia, perineum or major joints
- Second degree burns (partial-thickness) ≥ 10% of the body surface area
- Electrical burns, including lightning injuries
- Chemical burns
- Inhalation injury (with or without accompanying cutaneous burn injury)
- Burns accompanied by pre-existing medical conditions that can complicate management, prolong recovery or affect mortality
- Burns accompanied by trauma, where burn injury poses the greatest risk of morbidity and mortality
- Burns to children in hospitals without pediatric burn specialty services
- Patients with special social, emotional or rehabilitative needs

****If history of fire in an enclosed space, suspect smoke inhalation – Upgrade to Trauma Alert****

See initial Burn Management Algorithm Attachment E

- Patients that meet low risk criteria can be evaluated and treated in the Emergency Department and do not warrant definitive referral or consultation with the Burn Service.
- Patients that meet moderate risk criteria can be evaluated, treated and released by an Emergency Department Physician; however, communication with a Burn Service provider is required to determine management options and/or need for Burn Specialty evaluation and follow-up.
- Patients that meet High Risk Criteria should be referred for definitive burn specialty evaluation and management.

Definitions:

1. Minor Burn Injury
 - A. Burn Injury that includes ≤ 10% TBSA partial-thickness burns, in the absence of defined severity factors and in the presence of airway and hemodynamic stability. (A third degree burn of any size is considered significant and requires burn center referral.)
 - B. Location may influence the decision to refer a burn injury to the burn center. (ie. face, hands, feet, major joints, genitalia, and perineum.)
2. Severity Factors
 - A. Factors that significantly increase potential severity of injury, morbidity and mortality, regardless of burn size or depth:
 - i. Mechanism of injury:
 - ii. Electrical
 - iii. Chemical

3. Presence of/ suspicion of Inhalation Injury
 - A. Physiological Factors:
 - B. Age (extremes of age are more likely to present with deeper burns) Comorbidities/ disease history
4. Depth of Burn Injury
 - A. Defined by the level of anatomic destruction of the functioning layers of the skin
 - B. Burn depth alone can guide transfer & referral decisions
5. Extent of Burn Injury
 - A. Defined in Total Body Surface Area (TBSA) involvement
 - B. Specific methods for Pediatric and Adult estimation of TBSA (Attachment B)
 - i. Rule of Nine
 - ii. Palmar Method
 - iii. Lund & Browder Method

Triage:

The following Emergency Department Guidelines and the subsequent management and Triage Criteria (Attachment C) have been established for use by the emergency department of Suny Upstate Medical Hospital to guide the initial evaluation, management and referral of pediatric and adult patients with minor burn injuries.

1. Low Risk:

Patients that meet Low Risk criteria can be evaluated and treated in the Emergency Department and do not warrant definitive referral or consultation with the Burn Service. Superficial 2nd degree burns less than 1% that do not require ongoing burn wound re- evaluation or ongoing wound management and present minimal to no risk of complication or scarring. 1st degree burns that do not require pain control or intravenous re-hydration.

2. Moderate Risk:

Patients that meet Moderate Risk Criteria can be evaluated, treated and released by an Emergency Department Physician; however, communication with a Burn Service provider is recommended to determine management options and/or need for Burn Specialty evaluation and follow-up. If a patient meets Moderate Risk criteria and you would like to discuss with a burn provider, please see (Attachment A)for communication options.

Any patient with a 2nd degree burn that requires wound re-evaluation or ongoing management of burn wounds that do not meet High Risk criteria

superficial 2nd degree burns <5% TBSA that are not on the Face, Hands, Feet, Genitalia, Perineum or Involve Major Joints

Take caution in Deep 2nd degree and indeterminate depth burn wounds due to the risk for wound conversion to full-thickness and infection.

3. High Risk:

Patients that meet High Risk Criteria should be referred for definitive Burn specialty evaluation and management. If a patient meets High Risk criteria and you would like to discuss with a burn provider, please see appendix A for communication options.

- A. 3rd Degree burn of any size in any age

- B. $\geq 5\%$ TBSA 2nd degree burns in any age
- C. 2nd Degree Burns to Face, Hands, Feet, Genitalia, Perineum or crossing major joint(s)
- D. Circumferential or near circumferential burns of any extremity (regardless of depth)
- E. High risk Mechanisms of Burn Injury
 - a) Inhalation Injury
 - b) Caustic Chemical Agents
 - c) Electrical (Low voltage, High Voltage including Lightning Injury)

BURN MANAGEMENT GUIDELINES:

1. Cool the Burn

- a. Remove the source of burning or additional source(s) of burning (Jewelry or any metal objects that can retain heat).
- b. Decontaminate for suspected chemical exposure (Follow institutional Decon/ Haz Mat policy)
 - a) If powder chemical – Brush, then flush
 - b) If liquid, then flush with copious amounts of water
 - c) Flush for at least 15 min with luke-warm water
- c. Avoid the use of ice to cool any burn
 - a) Cooling of burns is only effective when performed within the initial 2 minutes of injury or if the burning agent is present. Use luke warm water to cool the affected area.
 - b) Avoid secondary injury and minimize potential for wound conversion
- d. Avoid use of cold saline or cold water soaked dressings on burns, however room temperature water is not contraindicated in cooling a minor burn (Venter, Karpelowsky, Rode, 2006)

2. Partial Thickness Burns (2nd degree)

- 1. Definition:
 - a) Destruction of epidermis and varying layers/ depth of the dermis
- 2. Characteristics
 - a) Described as blistered or moist if blisters are removed
Extremes of age may present with blistered wound that has deeper areas below the blister, therefore the presence of blister does not guarantee partial-thickness depth.
 - b) Wound Coloration/Appearance:
 - i. Wound bed coloration and appearance will vary according to the depth of dermis that is injured:
 - ii. Superficial partial-thickness burns typically present with varying stages of bullous blister. Once the blister is removed, the wound bed may be red or variations of pink
 - iii. Deep partial-thickness burns may be pale pink, white, yellow or deep red and may present with or without blister

- c) Vascularity:
 - i. Blanches with pressure
 - ii. May range from brisk to sluggish or absent depending on depth and coloration of the wound
- d) Pain:
 - i. Superficial partial-thickness are very painful when exposed to air as well as to palpation
 - ii. Deep partial-thickness may be painful but pain is typically dull to minimal
- e) Prognosis:
 - i. Blister removal is highly recommended to complete accurate wound assessment and to facilitate more rapid healing.
 - ii. Partial-thickness burn wounds that heal within 14 days typically have minimal risk for hypertrophic scarring, although mechanisms of injury such as grease have a higher probability for discoloration scarring.
 - iii. Deep partial-thickness burn wounds have a higher probability to result in scarring due to the depth of structural involvement and can result in contracture and hypertrophic scarring if healing is delayed or if the wound becomes infected.

3. Recommended Treatment:

- a) Gently cleanse wound with Chlorhexidine soap and rinse thoroughly with tap water. If the wound is on the face or ears use a mild soft soap as the chlorhexidine can cause Ototoxicity leading to hearing loss that can be permanent.
- b) Apply Bacitracin Ointment and cover with non-adherent Xeroform or adaptic.
- c) Antibiotic Ointment is preferred on hands, feet and areas that may have increased exposure to bacteria/ increased risk of infection (If the patient will be transferring to the burn center within a few hours do not apply creams or lotions).
- d) Wrap loosely with absorbent gauze dressing (Kerlix)
- e) Elevate extremities to decrease swelling
- f) The patient's tetanus immunization status should be evaluated and updated if appropriate. Should be within the past 5 years.
- g) Avoid use of Silver Sulfadiazine Cream 1% (Silvadene) in 2nd Degree burn wounds (Wasiak et al, 2010).
 - i. The high concentration of silver delays wound healing and is likely to be ineffective or harmful in the treatment of partial-thickness burns.
 - ii. Wounds treated with Silvadene also develop a thick layer of pseudo eschar that obscures future wound bed evaluation.
 - iii. Routine administration of prophylactic antibiotics does not protect against cellulitis and their use is not recommended (ABA chapter 2, 2001).

3. Full Thickness Burns (3rd degree)

1. Definition:

- a) Complete destruction of epidermis, dermis and may extend through subcutaneous tissue into fat and muscle.

- b) Full-thickness burn wounds may present with accompanying blister, specifically, in the extremes of age.

2. Characteristics:

- a) Wound Coloration/ Appearance:
- b) Charred, white to tan or black
- c) Dry, leathery or waxy texture/ feel

3. Vascularity:

- a) Since vascular bed is destroyed, Full-thickness burn wounds do not blanch due to complete destruction of cutaneous vascular supply.

4. Pain:

- a) Insensate, however may have deep pressure sensation
- b) Minimal to no pain, unless infection/ cellulitis is present

5. Prognosis:

- a) Full thickness burn wounds require surgical management with excision and skin grafting. Full-thickness burn wounds present multiple complications that result in the potential for extensive scarring, especially when located in areas of high tension and movement such as fingers, joints, axilla and neck.

6. Recommended Treatment:

- a. Referral to Burn Center for further evaluation and treatment
- b. The patient's tetanus immunization status should be evaluated and updated if appropriate
- c. Full-thickness/ 3rd degree burns require excision and skin grafting to heal
- d. Routine administration of prophylactic antibiotics does not protect against cellulitis and their use is not recommended
- e. For extremity injuries elevate to decrease swelling

Attachment A: Emergency Department communication options regarding burn patients

If a patient meets Moderate Risk criteria and you would like to discuss with a burn provider, options for communication are: Call the Upstate Burn Transfer Center (24-hr Burn Attending availability): 866 464-5449

Patients with burn injuries who are discharged need to follow up in the burn clinic.

Attachment B: Operating Hours Outpatient Burn Recovery Center

Outpatient Burn Recovery Center

750 East Adams Street

Syracuse, New York 13201

Phone: 315-464-1800

Fax: 315-464-2607

Hours:

Tues- 9-12

Wed 10-1130

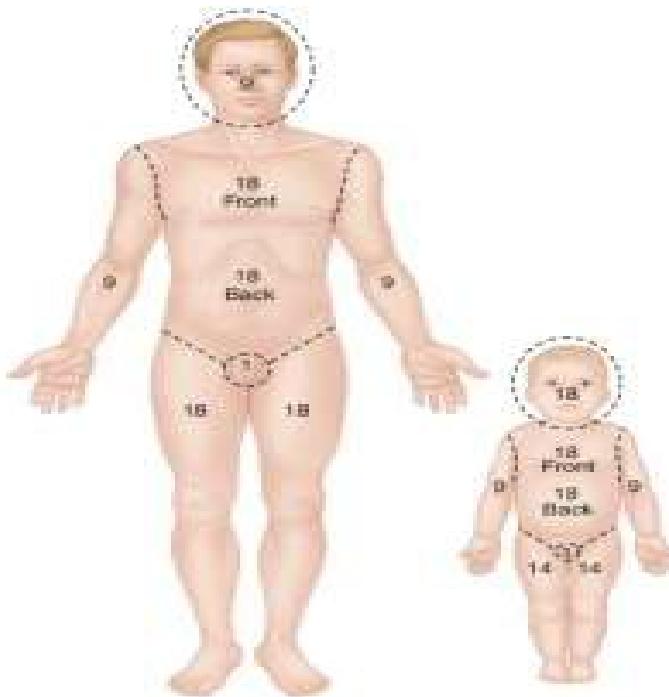
Fri 9-12

All Patients MUST Call for an Appointment

Helpful Information when calling the Outpatient Burn Center:

- Demographics: Name, Age, DOB, MR#
- HPI: Date of Injury, circumstances & mechanism of injury, burn size, location & depth
- Pt. Contact information (Home / Cell #)
- What was done to treat burn in ED

Attachment B: Evaluation of Extent of Burn Injury:
Rule of Nine: Adult/ Pediatric:



Palmar Method

- b. The palmar surface of a patient's hand, including fingers = 1% TBSA

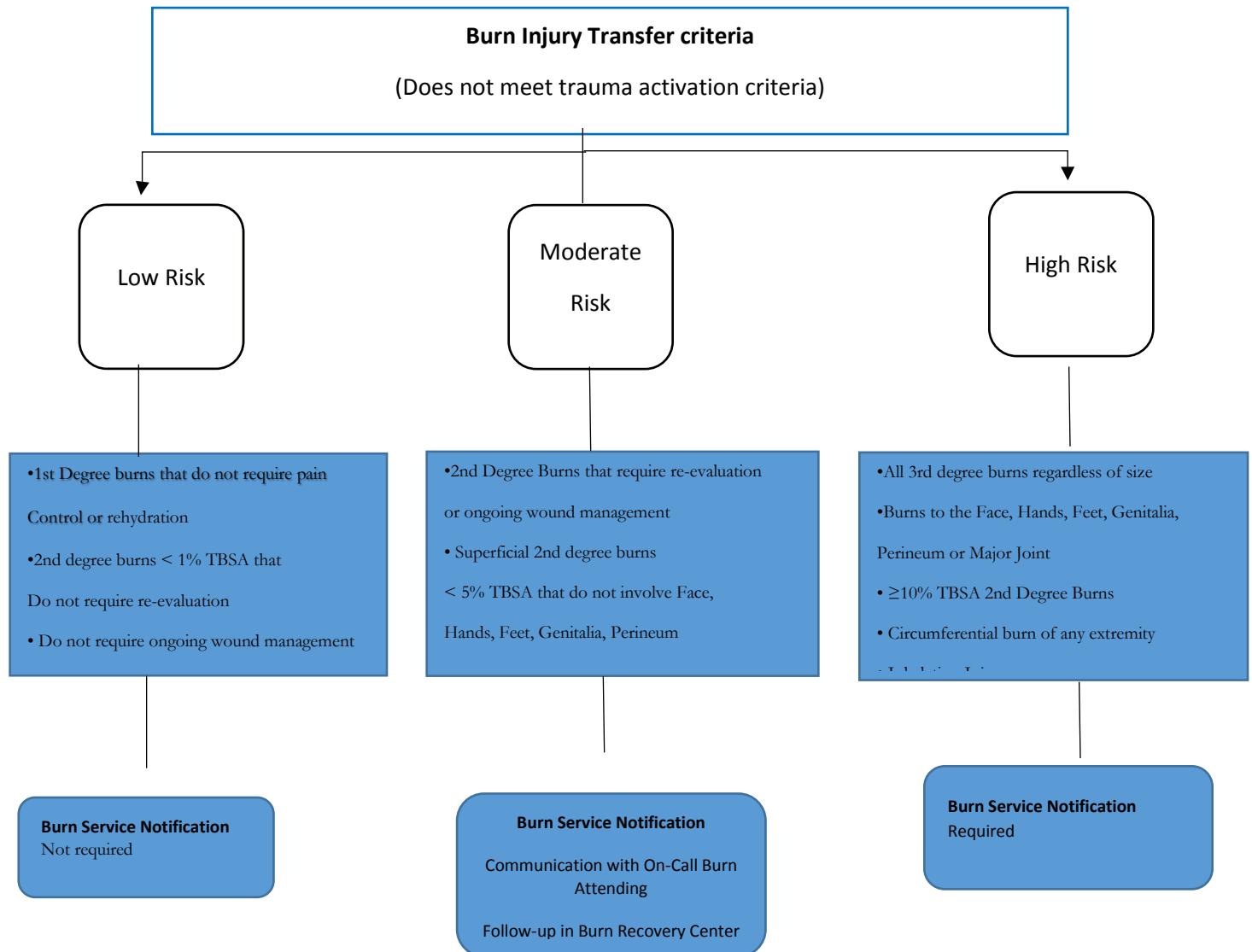
Lund and Browder Chart

Lund and Browder

Area	Age - Years				% 2°	% 3°	% Total
	0-1	1-4	5-9	10-15	Adult		
Head	19	17	13	10	7		
Neck	2	2	2	2	2		
Ant. Trunk	13	13	13	13	13		
Pos. Trunk	13	13	13	13	13		
Right Buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
Left Buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
Genitalia	1	1	1	1	1		
Right Upper Arm	4	4	4	4	4		
Left Upper Arm	4	4	4	4	4		
Right Lower Arm	3	3	3	3	3		
Left Lower Arm	3	3	3	3	3		
Right Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
Left Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
Right Thigh	5 1/2	6 1/2	8 1/2	8 1/2	9		
Left Thigh	5 1/2	6 1/2	8 1/2	8 1/2	9		
Right Leg	5	5	5 1/2	6	7		
Left Leg	5	5	5 1/2	6	7		
Right Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2		
Left Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2		
	TOTAL						

Attachment C: Regional Burn Center Criteria for Minor Burn Injuries

Regional Burn Center Criteria for Minor Burn Injuries



Attachment D: OPERATIONAL GUIDELINES: Fluid Resuscitation for Burn Patients in Emergency Department Adults/Pediatrics

OBJECTIVE: Provide guidelines describing the appropriate fluid resuscitation for the adult and pediatric burn patients in the Emergency Department.

GUIDELINES: All trauma cases – including patients with burn injuries – should be treated by initially following the guidelines for Advanced Trauma Life Support (ATLS) to ensure that life-threatening injuries are addressed immediately. ABCDs first! After addressing the ABCDs of life support, focus turns to burn injuries. Fluid replacement is crucial in the first 24 hours.

Patients who will need fluid resuscitation are those who have greater than 20% TBSA. First degree burns DO NOT count as part of the burn calculation.

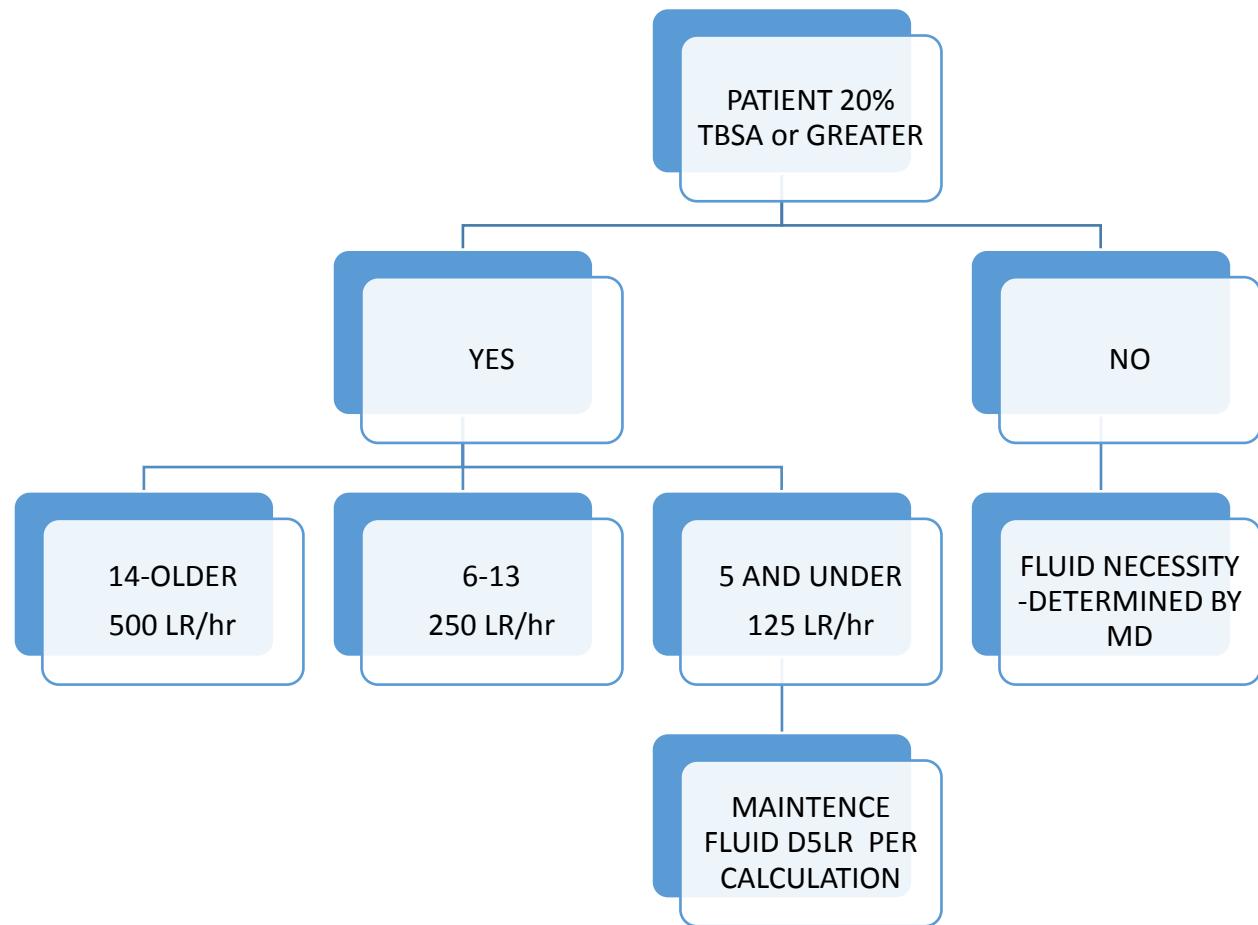
DO NOT bolus patient unless suspected trauma. Instead increase fluids by 1/3.

Do not administer Diprivan during resuscitation phase.

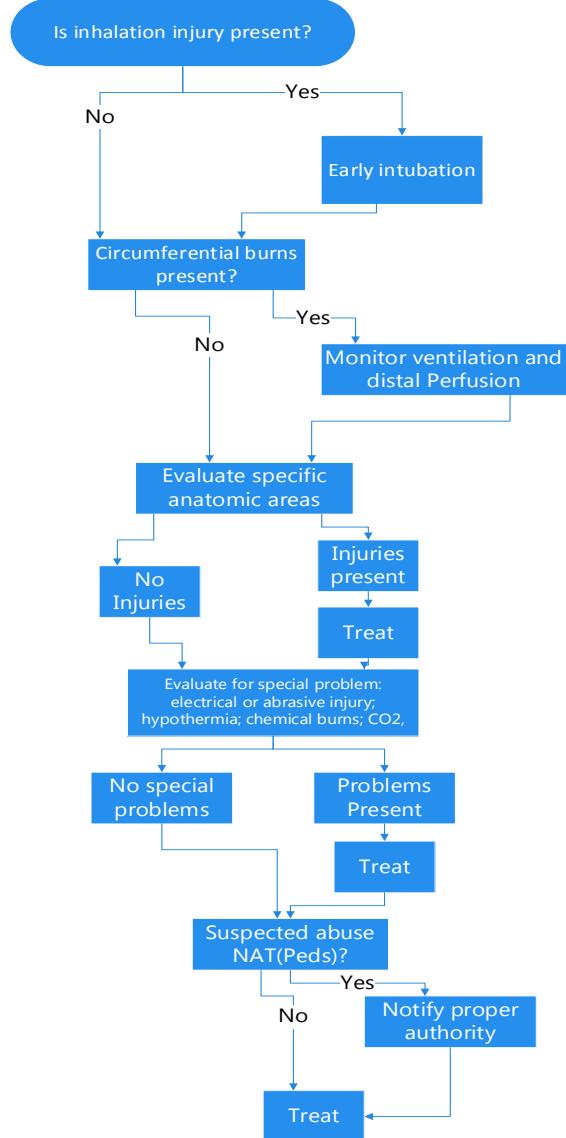
Procedure:

1. Patients who arrive to the ED will be assessed rapidly for an accurate TBSA.
2. Adult patients 14+older with 20% or greater TBSA will receive **500 LR/hr**
3. Children age 6-13 with 20% or greater will receive **250 LR/hr**
4. 5 years old and younger with 20% or greater will receive **125 LR/hr**
5. Children under the age of 5 will also receive D5LR maintenance fluid
 - a. **4ml/hour for each kg up to 10 kg**
 - b. **2ml/hour for each kg from 11-20 kg**
 - c. **1 ml/hour for each kg > 20kg**
6. Fluids should be adjusted to UOP.
 - a. Adults and older children (≥ 14 years old) 0.5 ml / kg / hour (30-50 ml / hour)
 - b. Children (<14 years old) 1 ml / kg / hour
 - c. Electrical injuries regardless of age 75-100 ml/hr

Patient with Greater Than 20% TBSA Fluid Resuscitation Algorithm for Emergency Department



Attachment E: Initial Burn Management



* ABCDE: Airway, Breathing, Circulation, Disability (neurologic evaluation), Exposure.
Refer to topics on the emergency care of moderate to severe burns.

Data from: Practice Guidelines for burn care. J Burn Care Rehabil 2001.

Graphic 51484 Version 3.0

REFERENCES:

ABLS Advisory Committee. Advanced Burn Life Support Providers Manual. Chicago, IL; American Burn Association; 2005:14-22, 42-5, 70-6.

American Burn Association Practice Guidelines Committee. Practice guidelines for burn care: Initial assessment of the burn patient. Journal of Burn Care & Rehabilitation Supplement, Chapter 2. April 2001. 5S-9S.

American Burn Association Practice Guidelines Committee. Practice guidelines for burn care: Outpatient management of burn patients. Journal of Burn Care & Rehabilitation Supplement, Chapter 3. April 2001. 10S-13S.

Committee on Trauma, American College of Surgeons (2006). Resources for Optimal Care of the Injured Patient, Chapter 14: Guidelines for the Operation of Burn Centers.

Duffy, B.J., McLaughlin, P.M., & Eichelberger, M.R. (2006). Assessment, triage, and early management of burns in children. Pediatric Emergency Medicine, Vol. 7, 82-93. Doi: 10:1016/j.cpem.2006.04.001

Grunwald, T.B., & Garner, W.L. (2008). Acute burns. Plastic and Reconstructive Surgery, 121(5), 311e-319e. Hartford, C.E., & Kealey, G.P. Care of outpatient burns. In: Herndon D.N., Jones, J.H., Total Burn Care. Philadelphia, PA: WB Saunders; 2007: 67-80.

Klein, G.L., & Herndon, D.N. (2004). Burns. Pediatrics in Review, Vol. 25, 411-417. Doi: 10.1542/pir. 25-12-411.

Moss, L.S. (2010). Treatment of the burn patient in primary care. Advances in Skin & Wound Care, 23(11), 517-524.

Sheridan, R. (2005). Outpatient burn care in the Emergency Department. Pediatric Emergency Care, 21(7), 449-456.

Wasiak, J. & Cleland, H. (2010). Clinical Evidence Handbook: Burn (Minor Thermal). American Family Physician 81(12), 1437-1438. Retrieved from www.aafp.org

Venter, T.H.J., Karpelowsky, J.S., Rode, H. (2006). Cooling of the burn wound: The ideal temperature of the coolant. Burns. Doi: 10.1016/j.burns.2006.10.408