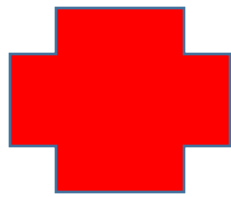


TRAUMA ALERT



***Welcome to the Trauma Alert Education Newsletter brought to you by
Beacon Trauma Services.***

Edition 3- Burns and Burn Care

According to the American Burn Association there are roughly 450,000 patients that receive hospital and emergency room treatment for burns each year. Of these burn injuries, roughly 3,400 burn injury deaths occur each year. Burns and fires are the third leading cause of death in the home. A fire related death occurs every 169 minutes and a fire injury every 30 minutes.

Burn Cause Statistics:

- 44% of all admissions to burn centers result from fire or flame burns.
- 33% of all burn center admissions result from scalding injuries caused by wet or moist heat.
- Electrical burns account for four percent of burn center admissions.
- Chemical burns account for three percent of all burn center admissions.

Pediatric Burn Statistics:

- Scalding is the most common burn injury in children under four years old, accounting for 200,000 injuries per year.
- An estimated fifty percent of scalds are from spilled food and drinks, while the remainder are from hot tap water and hot other objects such as irons, stoves, and heaters.
- About 1,100 children die per year from fires and burn injuries.

Burn Death Statistics:

- The 3,400 deaths each year are related to the following mechanisms:
 - 2,550 are a result of residential fires.
 - 300 are from vehicle crash fires.
 - The remaining 550 are from other causes, such as flames, smoke inhalation, scalding and electricity.

American Burn Association Burn Center Referral Criteria

- Partial thickness burns greater than ten percent of total body surface area (TBSA).
- Burns that involve the face, hands, feet, genitalia, perineum or major joints.
- Third-degree burns in any age group.
- Electrical burns, including lightning injuries.
- Chemical burns.
- Inhalation injuries.
- Burn injuries with pre-existing medical disorders that could complicate management, prolong recovery or affect mortality.
- Any patient with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greatest immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn center.
- Burned children in hospitals without qualified personnel or equipment for the care of children.
- Burn injury patients who will require special social, emotional or rehabilitative intervention.

ATLS Protocol for Initial Care of Burn Patient

- R/O life threatening injuries other than burns.
- Consider child or adult protective services as needed.

Remove any sources of heat

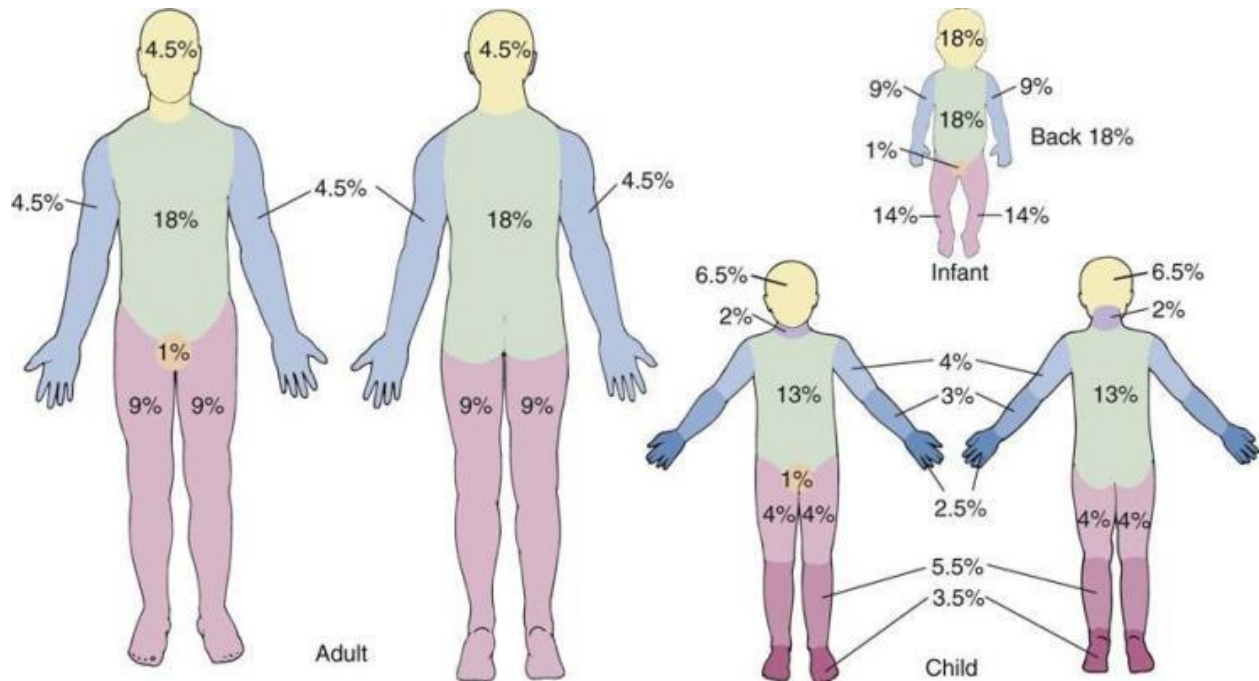
- Cool any burns that are warm to touch with tepid water and then dry patient.
- Cover the patient with a clean, dry sheet or blanket to prevent hypothermia.
- Do NOT apply any ointments or moist dressings unless advised to do so by the burn center.

Assess airway/breathing

- Carbon monoxide may present as restlessness, headache, nausea, poor coordination, memory impairment, disorientation, or coma. Administer highest level of oxygen possible via non-rebreathing face mask.
- Useful labs: Blood gases, carboxyhemoglobin level.
- Intubation is generally only necessary for unconscious patients, hypoxic patients with severe smoke inhalation, or patients with flame or flash burns involving the face and neck. Indications include pharyngeal burns, air hunger, and carbonaceous sputum with hoarseness.

Estimate the percent of the total body surface area (TBSA) burned

- Use the Rule of Nines initially.
- Remove as much soot as possible for a more accurate assessment.
- First degree burns are not included in the estimation

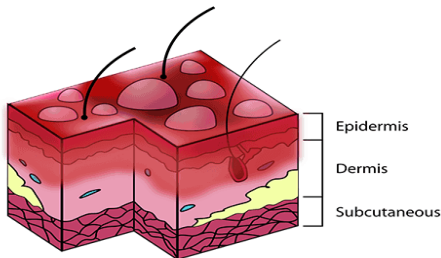
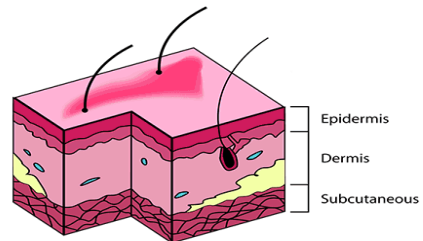


Source: <https://tinyurl.com/yck926rk>

Depth Classifications of Burn Injury

Superficial partial-thickness (Similar to First Degree)

The epidermis is destroyed or injured and a portion of the dermis may be injured.

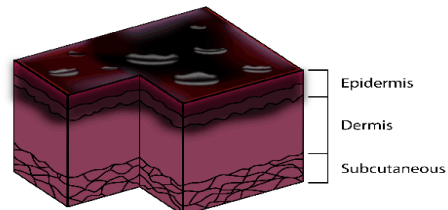


Deep partial thickness (Similar to Second Degree)

A deep partial thickness burn involves the destruction of the epidermis and upper layers of the dermis and injury to the deeper portions of the dermis.

Full thickness (Similar to Third Degree)

A full thickness burn involves total destruction of the epidermis and dermis and, in some cases, the destruction of the underlying tissue, muscle, and bone.



Source: <https://tinyurl.com/y89qd8ww>

Obtain IV access

- For burns of 15-40 percent TBSA, secure two large bore IV lines.
- Reminder: IVs may be placed through a burn if necessary (suture to secure). Avoid saphenous vein if at all possible. Avoid cut downs through unburned skin if possible.

Initiate fluid resuscitation

- In contrast to resuscitation for other types of trauma in which fluid deficit is typically secondary to hemorrhagic losses, burn fluid resuscitation is required to replace the ongoing losses from capillary leak due to inflammation.
- **Adults**: $2 \text{ ml ringers lactate} \times (\text{kg of body weight}) \times (\% \text{ TBSA burn}) = \text{ml in first 24 hours}$, with half of this total given in the first eight hours post-injury.
- **Children younger than age 14**: $3 \text{ ml ringers lactate} \times (\text{kg of body weight}) \times (\% \text{ TBSA burn}) = \text{ml in first 24 hours}$, with half of this total given in the first eight hours post-injury.
- **Example** – Patient weighing 70 kg with a burn of 50 percent TBSA: $2 \text{ ml} \times 70 \text{ kg} \times 50\% = 7,000 \text{ ml}$ needed in the first 24 hours, with 3,500 ml needed in the first eight hours.
- Children < 30 kg should also receive maintenance fluids of D5LR in addition to the burn resuscitation fluid.

Assess urine output

- Lasix and other diuretics are never given to improve urine output. Fluid rates should be adjusted to increase urine output.
- Observe urine for burgundy color, which is often seen with massive injuries or electrical burns. There is a high incidence of renal failure associated with these injuries, requiring prompt and aggressive intervention. Increase IV fluids to ensure an increased urine output of 1ml/kg/hr for children or 0.5 ml/kg/hr for adults.

Insert nasogastric tube

- Insert nasogastric tube on intubated patients, burns > 20% TBSA and unresponsive patients.
- Initiate antacid therapy if patient will not be transported within 12 hours.

Administer medication.

- Give tetanus immunization.
- In an adult patient, give small frequent doses of morphine repeated in 5- to 10-minute intervals until pain appears to be under control.
- Even small degrees of hypovolemia may grossly exaggerate effects of all medications.

Give wound care.

- If transfer of patient will be completed within 12 hours, debridement and application of topical antimicrobials is unnecessary. Transport patient wrapped in a dry sheet and blanket.
- If it will be longer than 12 hours before transfer is completed, debride all loose tissue and gently cleanse the wounds of all debris with mild soap and water.

Chemical Burns

- Brush powdered chemicals off wound if necessary. Then, flush chemical burns for a minimum of 20 - 30 minutes with running water.
- Never neutralize an acid with a base or vice versa.
- Irrigate burned eyes with a gentle stream of saline, flushing both the injured eye and the conjunctiva. Follow with an ophthalmology consult if transport is not imminent.
- Always irrigate eyes with the inside canthus out to avoid washing chemicals down the tear ducts.

Electrical Burns

- Attach cardiac monitor. Treat life-threatening dysrhythmias as needed.
- Assess for associated trauma. Assess central and peripheral neurologic function.
- Administer ringers lactate. $4 \text{ ml ringers lactate} \times (\text{kg of body weight}) \times (\% \text{ TBSA burn}) = \text{ml in first 24 hours, with half of this total given in the first eight hours post-injury.}$
- Useful lab: ABG with acid/base balance.
- Observe urine for burgundy color, which is often seen with electrical burns. There is a high incidence of renal failure associated with these injuries, requiring prompt and aggressive intervention. Increase IV fluids to ensure an increased urine output of 1ml/kg/hr for children or 0.5 ml/kg/hr for adults.

Friction Burn (Road Rash)

- Occurs when the skin is scraped off by contact with a hard object such as the road, floor, etc.
- Most friction burns are second degree burns and if untreated can commonly lead to infection, scarring and contracture of the scar due to pigmented particle (mainly stones) imbedded into the skin.
- The management of a friction burn is the same as for a thermal burn.
- Friction burns typically take 2 weeks to heal.
- Care should include:
 - Remove old dressings, cleanse area with soap and water and dry.
 - Apply antibiotic ointment and a clean dressing.



Source: <https://tinyurl.com/yaq4y9gk>

1. Which of the following is true regarding the care of burns > 10% TBSA?
 - a. Apply bacitracin ointment and saline saturated gauze
 - b. Infuse normal saline IV's as fast as possible
 - c. Use the burn fluid calculation to determine how much warmed lactated ringers to infuse
 - d. Apply dry dressings, keep patient warm and monitor urine output
 - e. Both C and D

2. Which of the following could be indications to intubate a burn patient?
 - a. Singed eyebrow/nasal hair and/or facial/scalp hair
 - b. Burns to face, neck, chest with potential to swell
 - c. Evidence of soot, hoarseness, enclosed space blast mechanism
 - d. Elevated carbon monoxide level
 - e. All the above

3. A 39 year old male presents with burns after throwing gasoline on a fire. He has 2nd degree burns to his bilateral anterior arms, his chest/abdomen, bilateral anterior legs. Using the Rule of Nines to estimate what is his total body surface area (TBSA) burned.
 - a. 25%
 - b. 70%
 - c. 45%
 - d. 60%

4. For the same patient calculate the amount of Lactated Ringers IV fluid he should receive in the first eight hours following the time of the burn. He weighs 90 kg.
 - a. 200 ml
 - b. 8100 ml
 - c. 4,050 ml
 - d. 16,200 ml

Answers at the end

Recognition/Thank You

- National fireworks safety month
- National Ice cream month
- Independence Day- July 4th



Source: <https://tinyurl.com/y9qy28c6>

Test your knowledge Answers-

1= E 2= E 3= C (both arms= 9%, both legs= 18%, chest/abdomen= 18%= 45%)

4= C (90 kg x 2 ml x 45%= 8100 ml in 24 hours. Half=4,050 ml in 8 hours)

References

Burn Injury fact sheet. (2020, June 7). Retrieved from https://ameriburn.org/wp-content/uploads/2017/12/nbaw-factsheet_121417-1.pdf

American College of Surgeons. 2018. Thermal Injuries, In *ATLS Student Manual* (10th ed.). 170-179

Burn center referral criteria. (2020, June 7). Retrieved from <http://ameriburn.org/public-resources/burn-center-referral-criteria/>

Resources

Richard A. Fairbanks burn center at Eskenazi Health Indianapolis call 1.800.4.TRAUMA

Lutheran Regional Burn Center- Ft. Wayne call 1-800-900-STAT

MHSB Trauma Guideline: Burn Center Referral

For questions or future submission requests contact Stacie Bobeck MSN, RN, CEN, CPEN, TCRN, SANE-A Beacon Trauma Educator and Outreach/Injury Prevention Coordinator at sbobeck@beaconhealthsystem.org