Ann & Robert H. Lurie Children's Hospital of Chicago

Care of the Burn Patient

INCLUSION CRITERIA

Minor <5% TBSA burn

- Trauma consult for all patients being referred to burn clinic
- Consider Trauma consult for all other burn patients as indicated

Moderate 5-10% TBSA burn

- Obtain Trauma consult

Major >10% TBSA burn

- See ABA Burn Center Referral Criteria (below)
- Active Trauma A or B per ACS Guidelines
- Consider transfer to burn center

ABA Burn Center Referral Criteria

- Patients with full thickness burns, despite TBSA%
- Partial thickness burns totaling >10% TBSA
- Burns that involve the face, hands, feet, genitalia, perineum or major joints (even if <10%)
- Significant history of smoke inhalation, despite extent of burn
- Electrical burns, including lightening injury
- Chemical burns
- Circumferential burns of extremity, chest or abdomen
- Any burn patient with concomitant trauma in which burn injury poses greatest risk, the patient's condition may be stabilized before transfer to burn center

Transfer of Burn Patients

Transfer to or from another institution in consultation with Trauma Service

Prior to transfer, burns should be covered with clean dry sheet. Ensure sheets (or dressing if recommended by burn center) are not constrictive

Silvadene cream should not be applied unless recommended by burn center. Intravenous access should be established and fluid resuscitation should be initiated as per guidelines below or per burn center recommendations given at initiation of transfer. Maintain a warm environment, cover patient with blankets to prevent hypothermia

Burn Assessment and Management

wear PPE to decrease exposure to potentially infectious substances/chemicals, to protect patient from contamination and to decrease risk for infection

Primary Survey

Airway Maintenance with Cervical Spine Precaution

- Consider early intubation if signs of inhalation injury
- Assess for patent airway: cough, examine sputum for carbon particles, singed facial hair, stridor, hoarseness, wheezing, difficulty swallowing and oral burns
- Consider orogastric tube if intubated

Breathing and Ventilation

- Consider intubation early (with cuffed tube) if signs of distress including: neck/chest wall burn and injuries, compromising effective ventilations.
- Start high flow 100% oxygen using a non-rebreather mask if inhalation injury is suspected

Effects of Elevated (COHb) Saturation:

If carbon monoxide exposure: administer humidified O2 via 100% non-rebreather mask until COHb level returns to normal

Circulation

- Establish vascular access for adequate fluid administration with 2 large bore IVs
- Initiate fluid resuscitation as indicated:
  - ≤14 years of age or ≤30kg administer 3ml x kg x %TBSA of warmed LR (or normal saline)
  - >14 years of age or >30kg administer 2ml x kg x %TBSA of warmed LR (or normal saline)
    *total volume (ml) to be given over the first 24 hours.
    -One half of the total should be administered in the first 8 hours
    -Second half should be given over the subsequent 16 hours.
- Maintenance fluid of D5 LR for patients weighing up to 30kg for 24 hours post burn and it is not titrated to urine output.
- Obtain baseline labs (CBC, CMP, PT/PTT, VBG with co-oximetry, and HCG) including baseline Glucose level and ongoing monitoring of blood glucose levels.
- Any patient that is receiving fluid resuscitation or burns to genitalia should have a urinary catheter inserted.
  - Titrate fluids to maintain urinary output of 0.5ml/kg/hour in patients >30kg
  - Titrate fluids to maintain urinary output of 1ml/kg/hour in patients ≤30kg

Disability

Begin the assessment by determining the patient's level of consciousness using the **AVPU** method:
A- Alert
V- Responds to **v**erbal stimuli
P- Respond only to **p**ainful stimuli
U- Unresponsive

Exposure and Environmental Control

- Remove all clothing, diapers, jewelry and contact lenses
- Initiate warming procedures with warm blankets/ convective heating devices
- Frequent temperature monitoring
- Evaluate extent and depth of burns to determine total body surface area (TBSA)%

See Rule of Nines

Secondary Survey

Last update:04/05/2021 KB

Care of the Burn Patient

Ann & Robert H. Lurie Children's Hospital of Chicago

INCLUSION CRITERIA

Minor <5% TBSA burn

- Trauma consult for all patients being referred to burn clinic
- Consider Trauma consult for all other burn patients as indicated

Moderate 5-10% TBSA burn

- Obtain Trauma consult

Major >10% TBSA burn

- See ABA Burn Center Referral Criteria (below)
- Active Trauma A or B per ACS Guidelines
- Consider transfer to burn center

ABA Burn Center Referral Criteria

- Patients with full thickness burns, despite TBSA%
- Partial thickness burns totaling >10% TBSA
- Burns that involve the face, hands, feet, genitalia, perineum or major joints (even if <10%)
- Significant history of smoke inhalation, despite extent of burn
- Electrical burns, including lightening injury
- Chemical burns
- Circumferential burns of extremity, chest or abdomen
- Any burn patient with concomitant trauma in which burn injury poses greatest risk, the patient's condition may be stabilized before transfer to burn center

Transfer of Burn Patients

Transfer to or from another institution in consultation with Trauma Service

Prior to transfer, burns should be covered with clean dry sheet. Ensure sheets (or dressing if recommended by burn center) are not constrictive

Silvadene cream should not be applied unless recommended by burn center. Intravenous access should be established and fluid resuscitation should be initiated as per guidelines below or per burn center recommendations given at initiation of transfer. Maintain a warm environment, cover patient with blankets to prevent hypothermia

Secondary Survey
(following Primary Survey)

wear PPE to decrease exposure to potentially infectious substances/chemicals, to protect patient from contamination and to decrease risk for infection

- Complete head-to-toe evaluation of patient
- Psychosocial support
- Pain and anxiety management
  - oral/IV/IN pain medication as indicated

Wound Care

Mild/Moderate

- Gently clean with sterile soaked gauze.
  - Keep blisters intact
  - Consider debridement as indicated
- Topical antimicrobial agents
  - Face and head: Bacitracin
  - Periorbital: Bacitracin ophthalmic ointment
  - Perineum: Bacitracin
  - All other burns: Silver sulfadiazine (Silvadene cream) or Bacitracin as indicated or if risk of ingestion
- Sterile gauze dressing and wrap with gauze roll
  - Use flexible net as indicated

Major

- As directed by Trauma Service or Receiving Burn Center

Details on Chemical Burns

Discharge/Transfer/Admit

Details on Electrical Burns

OTHER CONSIDERATIONS

- Maintain patients Head of Bed 45 degrees to help minimize facial and airway edema and to decrease risk of aspiration
- Burned extremities should be elevated above the level of the heart to minimize edema
- Consider administering tetanus immunization if not given in the past 5 years
- Continuous monitoring of core body temperature
- Initially burns do not bleed, if there is bleeding, identify and treat the cause
- Assess peripheral perfusion (use Doppler if necessary)
- Be aware of possible non-accidental trauma and contact Social Work if necessary
- Consider related traumatic injuries as potential component of fire exposure

Burn Center Referral Information

Loyola Burn Center Referral:
Call (708) 216-3988 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to loy-burncenter@lumc.edu

Arrange Transfer or Clinic referral/follow up.

Loyola University Medical Center
2160 S 1st Ave
Maywood, IL 60153
Burn Clinic: (708) 216-4444 (open until 4pm)
Patient Placement (transport/admit): (708)-216-5361
Burn Unit: (708)216-3988

University of Chicago Burn Center Referral:
Call (773) 702-6736 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to Burn.center@uchospitals.edu

Arrange Transfer or Clinic referral/ follow up.

University of Chicago Medical Center
5841 S Maryland Ave
Chicago, IL 6063
Phone: 773-702-6302 Outpatient Clinic

John H. Stroger, Jr. Hospital of Cook County Burn Center Referral
Call (312) 864-1552 to speak to the Burn Unit fellow and discuss patient. Send pictures via a secure email as directed.

Arrange Transfer or Clinic referral/follow up.

John H. Stroger, Jr. Hospital of Cook County
1969 W. Ogden Avenue
Chicago, IL 60612
Phone: (312) 864-0200

Last update: 02-23-2022 KB

Ann & Robert H. Lurie Children's Hospital of Chicago

Care of the Burn Patient

INCLUSION CRITERIA

Minor <5% TBSA burn

- Trauma consult for all patients being referred to burn clinic
- Consider Trauma consult for all other burn patients as indicated

Moderate 5-10% TBSA burn

- Obtain Trauma consult

Major >10% TBSA burn

- See ABA Burn Center Referral Criteria (below)
- Active Trauma A or B per ACS Guidelines
- Consider transfer to burn center

ABA Burn Center Referral Criteria

- Patients with full thickness burns, despite TBSA%
- Partial thickness burns totaling >10% TBSA
- Burns that involve the face, hands, feet, genitalia, perineum or major joints (even if <10%)
- Significant history of smoke inhalation, despite extent of burn
- Electrical burns, including lightening injury
- Chemical burns
- Circumferential burns of extremity, chest or abdomen
- Any burn patient with concomitant trauma in which burn injury poses greatest risk, the patient's condition may be stabilized before transfer to burn center

Transfer of Burn Patients

Transfer to or from another institution in consultation with Trauma Service

Prior to transfer, burns should be covered with clean dry sheet. Ensure sheets (or dressing if recommended by burn center) are not constrictive

Silvadene cream should not be applied unless recommended by burn center. Intravenous access should be established and fluid resuscitation should be initiated as per guidelines below or per burn center recommendations given at initiation of transfer. Maintain a warm environment, cover patient with blankets to prevent hypothermia

See Primary Survey

See Secondary Survey

wear PPE to decrease exposure to potentially infectious substances/chemicals, to protect patient from contamination and to decrease risk for infection

Chemical Burn

Immediately brush any powdered chemical from the skin and begin continuous irrigation of the skin with copious amounts of warm water. Irrigation should be continued until the patient experiences a decrease in pain or burning of the wound

Eye Injuries

- Eye injuries can be irrigated with normal saline, while using caution to prevent additional injury to the eye, use Morgan lens as indicated
- Consider topical anagesics
- Goal pH 6.5-7.5
- Consider Ophthalmology consult

Contact poison control 1-800-222-1222 in the event of any chemical burn or exposure.

- Tar and asphalt burns should be thoroughly cooled with copious amount of cool water. Adherent tar can be covered in petroleum jelly or mayonnaise and dressed to promote emulsification of the tar
- Hydrofluoric acid burns can cause hypoglycemia, hypocalcemia, and cardiac dysrhythmias. Continuous cardiac monitoring and baseline labs needed.
  - May need IV Ca++ for low calcium level.
  - May use calcium gluconate added to petroleum jelly to be applied to hydrofluoric skin burn for pain relief.

Discharge/Transfer/Admit

Details on Secondary Survey

Details on Electrical Burns

Burn Center Referral Information

Loyola Burn Center Referral:
Call (708) 216-3988 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to loy-burncenter@lumc.edu

Arrange Transfer or Clinic referral/follow up.

Loyola University Medical Center
2160 S 1st Ave
Maywood, IL 60153
Burn Clinic: (708) 216-4444 (open until 4pm)
Patient Placement (transport/admit): (708)-216-5361
Burn Unit: (708)216-3988

University of Chicago Burn Center Referral:
Call (773) 702-6736 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to Burn.center@uchospitals.edu

Arrange Transfer or Clinic referral/ follow up.

University of Chicago Medical Center
5841 S Maryland Ave
Chicago, IL 6063
Phone: 773-702-6302 Outpatient Clinic

John H. Stroger, Jr. Hospital of Cook County Burn Center Referral
Call (312) 864-1552 to speak to the Burn Unit fellow and discuss patient. Send pictures via a secure email as directed.

Arrange Transfer or Clinic referral/follow up.

John H. Stroger, Jr. Hospital of Cook County
1969 W. Ogden Avenue
Chicago, IL 60612
Phone: (312) 864-0200

Last update: 02-22-2022 KB

Ann & Robert H. Lurie Children's Hospital of Chicago

Care of the Burn Patient

INCLUSION CRITERIA

Minor <5% TBSA burn

- Trauma consult for all patients being referred to burn clinic
- Consider Trauma consult for all other burn patients as indicated

Moderate 5-10% TBSA burn

- Obtain Trauma consult

Major >10% TBSA burn

- See ABA Burn Center Referral Criteria (below)
- Active Trauma A or B per ACS Guidelines
- Consider transfer to burn center

ABA Burn Center Referral Criteria

- Patients with full thickness burns, despite TBSA%
- Partial thickness burns totaling >10% TBSA
- Burns that involve the face, hands, feet, genitalia, perineum or major joints (even if <10%)
- Significant history of smoke inhalation, despite extent of burn
- Electrical burns, including lightening injury
- Chemical burns
- Circumferential burns of extremity, chest or abdomen
- Any burn patient with concomitant trauma in which burn injury poses greatest risk, the patient's condition may be stabilized before transfer to burn center

Transfer of Burn Patients

Transfer to or from another institution in consultation with Trauma Service

Prior to transfer, burns should be covered with clean dry sheet. Ensure sheets (or dressing if recommended by burn center) are not constrictive

Silvadene cream should not be applied unless recommended by burn center. Intravenous access should be established and fluid resuscitation should be initiated as per guidelines below or per burn center recommendations given at initiation of transfer. Maintain a warm environment, cover patient with blankets to prevent hypothermia

See Primary Survey

See Secondary Survey

wear PPE to decrease exposure to potentially infectious substances/chemicals, to protect patient from contamination and to decrease risk for infection

Electrical Burns

Consider Electrical Conduction Injury for the following:

- Loss of consciousness
- Paralysis of extremity
- Loss of peripheral Pulse
- Flexor surface contact injury
- Myoglobinuria
- Dislocation of major joints, fractures of vertebrae or long bones.
- If arc flash/blast injuries assess for pneumothorax and ruptured tympanic membranes

Small surface electrical wounds (contact points) can be deceiving and may be associated with devastating internal injuries including deep tissue necrosis

- Obtain 12 Lead EKG, continuous cardiac monitoring and baseline labs including CK-MB troponin, electrolytes, glucose, UA
- Check hands, feet and scalp for obscure wounds (possible points of entry/exit)
- Establish vascular access for fluid resuscitation of LR 4ml x kg x %TBSA (add D5LR at maintenance rate for infants and young children)
- Maintain urinary output of 75-100 ml/ hour >30kg
  Maintain urinary output of 2ml/kg/hour ≤30kg
  *if myoglobinuria present continue to monitor urinary output hourly until urine is grossly clear
- Monitor for compartment syndrome
- Determine source of electrical injury (low or high voltage)

Discharge/Transfer/Admit

Details on Secondary Survey

Details on Chemical Burns

Burn Center Referral Information

Loyola Burn Center Referral:
Call (708) 216-3988 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to loy-burncenter@lumc.edu

Arrange Transfer or Clinic referral/follow up.

Loyola University Medical Center
2160 S 1st Ave
Maywood, IL 60153
Burn Clinic: (708) 216-4444 (open until 4pm)
Patient Placement (transport/admit): (708)-216-5361
Burn Unit: (708)216-3988

University of Chicago Burn Center Referral:
Call (773) 702-6736 to speak to the Burn Unit nurse and discuss patient. Send pictures via a secure email to Burn.center@uchospitals.edu

Arrange Transfer or Clinic referral/ follow up.

University of Chicago Medical Center
5841 S Maryland Ave
Chicago, IL 6063
Phone: 773-702-6302 Outpatient Clinic

John H. Stroger, Jr. Hospital of Cook County Burn Center Referral
Call (312) 864-1552 to speak to the Burn Unit fellow and discuss patient. Send pictures via a secure email as directed.

Arrange Transfer or Clinic referral/follow up.

John H. Stroger, Jr. Hospital of Cook County
1969 W. Ogden Avenue
Chicago, IL 60612
Phone: (312) 864-0200

Last update: 02-22-2022 KB

Effects of Elevated Carboxyhemoglobin (COHb) Saturation:

Carboxyhemoglobin Saturation %	Estimated Ranges of Symptoms
0-10	None
10-20	Tension in forehead and dilation of skin vessels
20-30	Headaches and pulsating temples
30-40	Severe headache, blurred vision, nausea, vomiting and collapse
40-50	As above; plus syncope, increased respiratory and heart rates
50-60	As above; plus coma, seizures and Cheyne-Stokes respirations
>60	Coma, seizures, weak respirations and pulse, possible death

See Primary Survey

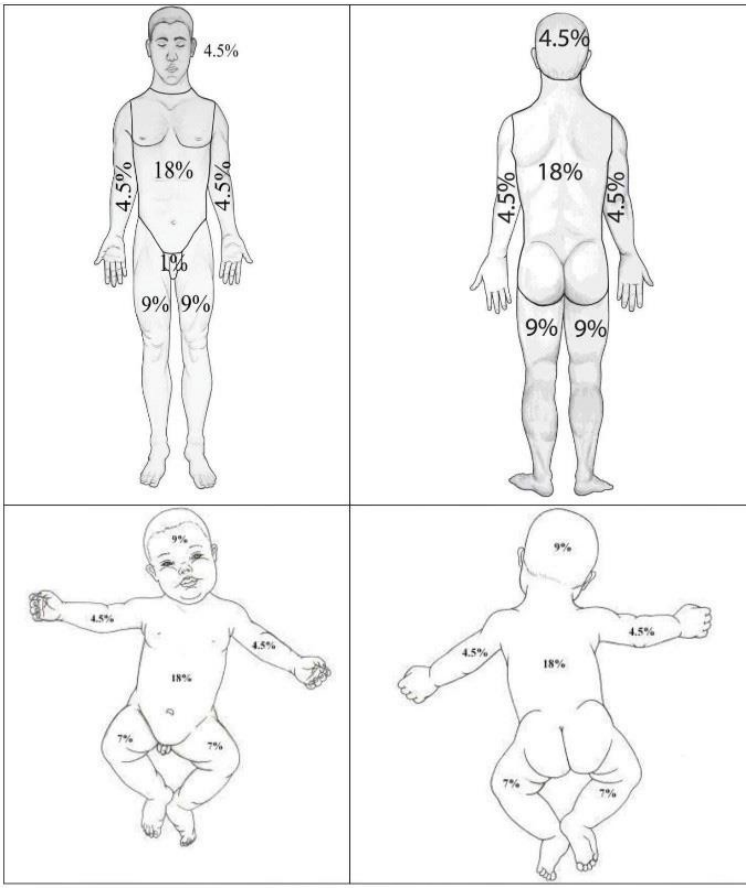
See Secondary Survey

Rule of Nines

The most commonly used guide to estimate second and deeper degrees of burn is the "Rule of Nines." In adults, distinct anatomic regions represent approximately 9% - or a multiple thereof – of the Total Body Surface Area (TBSA). In the infant or child, the "Rule" deviates because of the large surface area of the child's head and the smaller surface area of the lower extremities. (Burn diagrams take these factors into account.) Note that first degree (superficial burn without blister formation) areas are not included in the TBSA burn calculation.

If only part of the anatomical area is burned, calculate the percent TBSA burned based on the percentage of that site injured and not the value of the whole (i.e., if the arm is circumferentially burned from the hand to the elbow, only half the arm is burned for a total of approximately 4.5%).

This information is adapted from the American Burn Association's **2018 Advanced Burn Life Support (ABLS) Provider Manual**



See Primary Survey

See Secondary Survey