

Burns and their Immediate Care

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Introduction

On the following pages you will find valuable information in caring for burn injuries. I have not made copies of the slides for your handout, as many of them have pictures of patients. Although these patients have given consent for our educators to show them, we do not want to give them out in an effort to protect their privacy. There is always a chance that you might recognize someone in this presentation. If you do, please remember that we are professionals and that HIPAA standards apply. What we say here about these patients stays here.

Burn Unit Referral Criteria

Burn Injuries that should be referred to a burn unit include the following:

1. Second degree burns greater than 10% total body surface area (TBSA)
2. Burns involving the face, hands, feet, genitalia, perineum, and major joints.
3. Electrical burns including lightning injury.
4. Third degree burns in any age group.
5. Chemical injury.
6. Inhalation injury.
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery or affect mortality.
8. Any patient with burns and concomitant trauma (such as fracture) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be treated initially in a trauma center until stable before being transferred to a burn unit. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols.
9. Hospitals without qualified personnel or equipment for the care of children should transfer children with burns to a burn unit with these capabilities. Burn injury in patients who will be requiring special social/emotional and/or long-term rehabilitative support, such as cases involving suspected child abuse, substance abuse, etc.

Treatment Protocol

For the best outcome of your patient, Assessments and Care should follow this basic process. Special Considerations may be needed for patients of Chemical and Electrical Injury and will be discussed with those sections.

Stop the Burning Process! Remove any sources of **Heat**, including clothing, diapers, and jewelry. Any burn that is still hot may be cooled with tepid tap water, but for no longer than 5 – 10 minutes, then dry patient and keep them covered with sheet and blankets to maintain body heat. Ask the patient if they are wearing contacts and have them remove them immediately. The reason that we cool for only a short period of time is to maintain body temperature, especially in patients with large body surface area burns and 10 minutes is the maximum time in which the depth of burn may be decreased with the flushing process. This process is different for chemicals and will be discussed with that section.

1. Assess airway and breathing

Carbon monoxide intoxication may present as restlessness, headache, nausea, poor coordination, memory impairment, disorientation or coma.

Treatment: Initially 100% O₂ via non-rebreather face mask

Intubation is necessary for unconscious patients, hypoxic patients with severe smoke inhalation or patients with flame or flash burns to face where breathing is compromised from swelling.

2. Estimate Percent Body Surface Burned

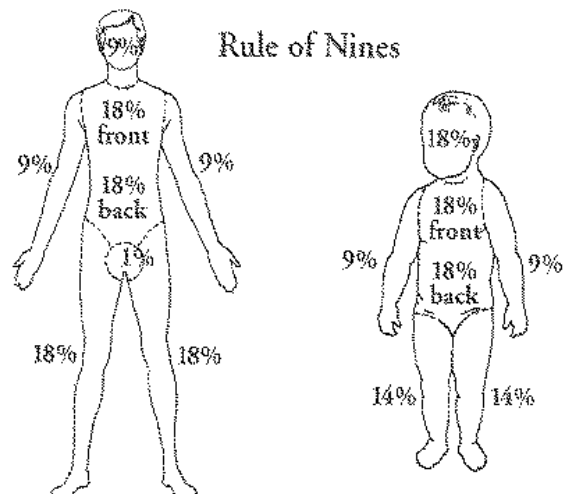
Remove as much soot as possible and remember that first degree burns (red without blistering) should not be included in the estimate. Use Rule of Nines or Lund and Browder, Berkow chart for more accurate estimate.

You can also use the rule of palm which says that the palm of the patient's hand is approximately 1 % of the patient's total body surface area.

This information is important early on because it can help in deciding how significant this injury is and if capabilities of air support at the scene would be reasonable.

3. Circulation

Place patient on cardiac monitoring as soon as possible for patients with a significant burn. Assess adequate circulation in extremities. Circumferential burns around any extremity can impede blood flow. Elevate extremities. Rarely would escharotomies be



required before transfer to the burn center. Consult burn center with this information. *If there is thick eschar to trunk, especially if circumferential, respiratory effort may be impaired.* This may require a release as soon as the patient arrives to the burn center. Give the burn center a heads up with this situation. Elevating extremities may help in return circulation prior to transport.

4. IV access (if this is available)

Initially those burns under 15% TBSA may not need IV access and can be resuscitated orally unless the etiology of the burn injury was electrical in nature or if the patient has other extenuating circumstances where IV access would be essential. IV access may be necessary for pain medications.

For Burns 15-40%, secure on large bore IV line in an upper extremity; add a second line if transport will be longer than 45 minutes.

Burns > 40% require two large bore IV lines in upper extremities
IVs may be placed in burned skin but will be more difficult to secure and require frequent observation for patency.

Resuscitation Formula:

$(2-4 \text{ ml Ringers lactate}) \times (\text{body wt. in kg}) \times (\% \text{burn}) = \text{mls in first 24 hours (post time of burn)}$
half is given in the first 8 hours post burn injury.

Make sure that no one is starting an IV and running it wide open just because it is a burn without further assessments. Over resuscitation can cause more edema which in turn could cause burns to convert from partial thickness to full thickness. For this reason accuracy in determining % TBSA burned is very important. The burn center can help in determining the amount of fluid required for the patient.

5. D-disability (Mental Status)

Generally our patients may be alert and oriented at the scene. They would be able to give details about the occurrence of the injury. If they appear disoriented or unable to answer your questions you should further investigate their condition. Hypoxia if the patient was pulled from a burning building or from an electrical injury may be the problem. Also alcohol intoxication or from drugs may be the culprit. The more complete picture you can paint for the burn center crew the better, as all of these conditions will help determine the care we give and the success overall for the patient.

6. Expose and Examine

All clothing should be removed unless it is imbedded in the skin or in the case of electrical injuries, if removal could cause more significant damage to an appendage. Addition of water to burn injuries in an area where electricity may still pose a risk to responders should be prohibited. Generally with electrical injuries addition of water will not decrease the depth of burn. If a large amount of skin is involved when an electrical

exposure is indicated, a thermal injury was probably sustained in addition to the electrical injury. For chemical injuries the clothing should be removed prior to or simultaneously with the hydrotherapy to dilute the chemical.

All of these primary assessments are completed in the first few minutes after a patient is discovered. A secondary assessment including a history (AMPLE) should follow.

7. History - AMPLE

Although this comes after the primary assessment it can be extremely important for determining additional assessments. Look at the patient's other medical conditions. For example, if someone is a smoker and was in a house fire they may already have a compromised respiratory system which puts them at a higher risk for inhalation injury. **In addition it is important to ascertain this information early in case intubation is required before transport.** If you are unable to give pain medications, getting the patient to talk with you can help distract them from some of the pain they are experiencing.

8. Wound Care

If patient is to be transferred to the burn center, it is not necessary to put dressings on the burn. Clean dry sheets are acceptable. The main goal is to maintain the patient's body temperature in route to the burn center. Medications are most effective in control of pain, and keeping air currents from hitting open blisters where nerve endings are irritated. If it will be a number of hours before transport, explain situation to the burn center for further instructions. Coverings over the injured areas will help reduce pain from air currents temporarily.

Special Considerations

Chemical injury

Early determination to involve Hazmat should be made in situations where an exposure of chemicals has occurred. All responders should wear protective equipment appropriate for the chemical exposure.

The extent and severity of chemical injury is largely dependent on the amount of time that a chemical is in contact with the skin. Immediate hydrotherapy is important in diluting the agent until its impact to the skin is decreased. In some cases this can be identified verbally by the patient stating that the burning sensation has lessened or stopped. If the chemical is in powder form, brush it from the skin, then irrigate with water for at least 20-30 minutes. This should happen as quickly after the occurrence of the burn as possible, especially before transport by EMS to a facility. Determine if possible what the chemical is and the concentration. This determination should not supersede the flushing process and delay should not be made in lieu of any other substance that could be used as a dilution agent. Water is still the best and most

available resource for chemical irrigation. Never try to neutralize a chemical with use of another chemical.

Eye exposures should be irrigated continuously with Normal Saline from the inside canthus out until requested to stop by the physician. All eye burns should have follow up care by the burn center or ophthalmologist.

Electrical Injuries

Scene safety should include making sure that any electrical source is removed from the victim before assessments are made.

Victims should be placed in a C-collar and on backboard until the spine can be cleared of fractures. This is important to accomplish because when electricity enters the body it causes your voluntary muscles to contract. This can cause fracture of smaller bone structures when the opposing muscles contract at once. Serious damage to muscle tissue is also of a frequent consequence. Then the assessment should process as previously described. Assess for associated trauma and central and peripheral neurological function. Keep involved extremities elevated. Electrical burns differ from thermal injuries because they frequently enter through the skin and follow paths of least resistance in the body. These paths frequently follow nerves and blood vessels. Usually entrance and exit sites can be identified.

Transport of victims to the nearest facility should be accomplished as soon as possible. In some cases, especially if the burn size is large or the patient has a severe respiratory problem immediate evacuation by helicopter to the Burn Center may be prudent.

Additional Information

Burn Pathophysiology

Local destruction of capillaries and their cell walls which allows for the leakage of fluid from the cardiovascular system to the interstitial tissues causing edema and swelling. If the burn is greater than approximately 30% TBSA, the fluid shift becomes systemic with all capillaries leaking fluid into interstitial tissues. With this fluid shift a hypovolemia situation set up. This is why early fluid resuscitation is so important, however it becomes a double edged sword when too much fluid is given because the fluid continues to shift out of the cardiovascular system as long as the capillaries are leaking. The body starts to repair the capillaries at about 8 hours post burn and continue this process until about 48 hours post burn injury. Other conditions occurring at the time of the burn also affect how much fluid is required. Someone who has had a significant alcohol intake prior to injury is already dehydrated and will need more fluid volumes. Also someone with significant inhalation injury may need more fluids also. This is a very simplistic explanation of what happens, however it gives you an understanding of how this fluid shift occurs.

Urine Output

Insert foley catheter in patients with burns > 25% TBSA. Adequate urine output is 1-1.5 ml/kg in a child weighing less than 30kg; in patients over 30kg about 30ml/hour is adequate. Never give diuretics immediately post burn. The patients are hypovolemic and require more fluids at this time.

Special considerations: in electrical injury or in large burns where muscle mass has been destroyed the urine may exhibit shades of pink to red colors. When this occurs more fluid will be required to flush the chromogens from the urine. Consult with the burn center for directions.

Medications:

Give tetanus immunization: Guideline is 5 years since last immunization

After IV access is obtained, pain medication and sedation may be administered to keep the patient comfortable. Morphine is still the gold standard. Dose according to response. Younger individuals may tolerate large total doses of Morphine whereas older individuals may do well with smaller dosing. Sedation may also play a part in helping the patient tolerate the pain. In the burn center we use Versed in small doses. Valium or Ativan may also be helpful depending of staff comfort level. Remember if you have had to paralyze a patient due to intubation, you will need to give sedation as well as pain medication. All medications should be given IV (except tetanus) unless cleared by the burn center.

It is our hope that this outline will give you the basic knowledge required to care for a patient with burn injury in the pre-hospital setting, extending into the small critical access hospitals. Additional presentations are available upon request of the Burn Education Program Coordinator.

† CATHOLIC HEALTH
INITIATIVES

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