Burn Management & Assessment

- Shenandoah Co. Fire and Rescue
EMS Training – Nov. 2006
Bill Streett – Training Section Chief
Objectives

• Review different type of burn injuries
• Describe physical examination of burn patient
• Describe the management of burn injury
• Discuss management of patient with inhalation injury
Objectives

• Describe complications and management of chemical injuries.
• Describe management and assessment of electrical injury.
Skin Anatomy

Epidermis
Outermost skin layer

Dermis
Directly beneath the epidermis helps contain the body and support the functions on the epidermis

Subcutaneous Tissue
Body layer beneath the dermis
Soft Tissue

- Skin
- Fat
- Muscle
- Fibrous tissue
- Blood vessels
- Membranes
- Glands
- Bone (hard tissue)
- Nerves
- Organ
Soft Tissue Injuries

Injuries

Burns
Superficial Burn

☑ Involves only the epidermis
☑ Reddened skin
☑ Pain at the site
Partial Thickness Burn

- Involves both the dermis and epidermis
- Intense pain; Blisters
- White-to-red skin that is moist and mottled
Full Thickness Burn

- Burn involves all dermal layers and may include muscle, bone, or organs
- Dry and leathery skin; Charred
- Little or no sensation; hard to the touch; pain at periphery
Rule of Nines

• Compare burn area to the patients palm.
• Palm = 1% Body Surface Area.
• Can be used to estimate burn area of any age patient.
RULE OF NINES (%)

- Head & neck: 9
- Posterior trunk: 18
- Anterior trunk: 18
- Each upper extremity: 9
- External genitalia: 1
- Each lower extremity: 18
- Posterior trunk: 18

Each region is represented as a percentage of the total body surface area.
Severity

- Depth or Degree
- Body Surface Area - BSA (%)
- Location of the Burn
- Pre-existing medical conditions
- Age of the Patient
Determine Severity

Critical Burns

- Full thickness burns involving the hands, feet, face, or genitalia
- Burns associated with respiratory injury
- Full thickness burns over 10% BSA
- Partial thickness burns over 30% BSA
Determine Severity

Critical Burns

- Burns complicated by painful, swollen, deformed extremity
- Moderate burns in young children or elderly patients
- Burns encompassing any body part e.g. arm, leg, or chest
Determine Severity

Moderate Burns

- Full thickness burns 2 – 10% BSA excluding hands, feet, & face
- Partial thickness burns 15 – 30% BSA
- Superficial burns of greater than 50% BSA
Determine Severity

Minor Burns

- Full thickness burns less than 2% BSA
- Partial thickness burns less than 15% BSA
Stop the burning process, initially with water or saline
Emergency Medical Care

(Continued)

✓ BSI
✓ Constantly monitor airway

Remove smoldering clothing and jewelry
Emergency Medical Care

✔ Prevent further contamination

Cover the burned area with a dry, sterile dressing
Emergency Medical Care

• Do not break blisters.

• Do not use any type of ointment, lotion or antiseptic.

• Know local protocols for transport to appropriate local facility.
Infant/Child Considerations

• Consider the possibility of child abuse!
Chemical Burns

• Take the necessary scene safety precautions to protect yourself from exposure to hazardous materials.

• Wear gloves and eye protection
Work Place Burn Statistics

<table>
<thead>
<tr>
<th>Type of Burn</th>
<th>% of Total</th>
<th>% Permanently Disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scald</td>
<td>38</td>
<td>6.5</td>
</tr>
<tr>
<td>Flame</td>
<td>30</td>
<td>10.0</td>
</tr>
<tr>
<td>Tar</td>
<td>16</td>
<td>14.3</td>
</tr>
<tr>
<td>Electrical</td>
<td>8</td>
<td>85.7</td>
</tr>
<tr>
<td>Contact</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>Chemical</td>
<td>4</td>
<td>50.0</td>
</tr>
</tbody>
</table>
✓ Brush off dry chemicals prior to flushing

Flush with large amounts of water. Continue enroute to receiving facility.
Electrical Burn Injuries

- Account for 4% to 6.5% of admissions to burn centers.
- Responsible for 500 deaths each year.
Electrical Shock

• High tension causes more serious injuries (>1000 volts)
• Fatal electrocutions may also occur with household current.
• Alternating current (AC) at 60 cycles per second is more dangerous than direct current (DC) at same magnitude.
Electrical Shock

• Trans-thoracic more likely to be fatal than vertical path of travel.
• V-fib more common from electrocutions from A/C current.
• Asystole more common from electrocutions from D/C current.
Electrical Burns

• Do not attempt to remove the patient from the electrical source unless trained to do so.

• If the patient is still in contact with the electrical source or if you are unsure, do not touch the patient.
Emergency Medical Care (Continued)

- Administer oxygen if indicated.
- Monitor patient closely for respiratory and cardiac arrest.
- Often injuries are more severe than external indications.
Emergency Medical Care

Look for both entrance and exit wounds
2006-2007 Lord Fairfax EMS Protocol

• **Adult – Trauma: Burns**
  
  • *Chemical burns* represent a hazard to both the patient and the rescuer, and extreme care should be taken to avoid exposure to offending agents. The eyes are particularly vulnerable to chemical burns and, in general, acids tend not to burn as deeply as alkalis which penetrate very deeply as the tissue is de-fatted. Therefore, eye irrigation should be started early and continued for at least 15 minutes. The care of *electrical burns* should be guided by safety. The heart is most susceptible to voltage below 400 volts. Above this level internal burns are a major complication. Remember that most injuries in electrical burns are internal. Fatal arrhythmias are usually a very early problem but other arrhythmias may occur at any time if the heart has been electrically injured. Care of the patient with *thermal burns* should be guided by scene safety, cooling the burn (if appropriate), maintaining normal body temperature, and protecting the airway. Shock in the very early stages of a burn is generally not associated with the burn, thus one should rule out other life-threatening injuries.

• **EMT-B**
  
  • Scene safety (turn off power or contact fire department, extinguish flames, wear PPE).
  
  • Apply *dry* sterile dressings.
  
  • Spinal immobilization, if indicated.
  
  • Irrigate chemical burn site with water if appropriate to chemical (if powdered chemical, brush off).
  
  • Splint fractures (after applying dressing).
EMT-Enhanced
1. Manage airway appropriately. Have a high index of suspicion in cases of facial burns, sooty sputum, singed facial hair, etc.
2. Establish IV access.
3. Fluid bolus of 500 mL NS, may be repeated if necessary after reassessment, up to 1 liter NS if indicated for hypotension, to maintain a SBP> 90 mmHg.
   a. Avoid establishing IV distal to an extremity burn site. Maintain a SBP > 90 mmHg.
   b. Administer 500 mL/hr for electric burns if no risk of CHF.

EMT-Intermediate / Paramedic
1. Initiate cardiac and oximetry monitoring.
2. If pain persists, consider morphine sulfate 2 mg slow IV/IM, maintaining a SBP > 90 mmHg.
3. May be repeated every 5-10 minutes to a total of 6 mg.

Contact Medical Command
Consider additional analgesia.

Key Points / Considerations
- In electrical burns, search for additional traumatic injury.
- In thermal burns, assess the patient for evidence of potential carbon monoxide exposure.
- Remove jewelry and nonadherent clothing.
- Estimate extent of burns (area of patient’s palm = 1% TBSA)
- **Note:** Continuous EKG, pulse oximetry and blood pressure monitoring (every 5 minutes) are mandatory, during, and after administration morphine sulfate.
Burn Management Summary

• Think Safety first!!!!!!!!!!
• Always remember ABC’s.
• Stop the burning process and dress with dry sterile dressings.
Burn Mgt. Summary Cont.

- Flush chemical burn with large amounts of water.
- Electrical burns may be much more serious than they appear.
- Always look for entrance and exit wound for electrical burns.
Any Questions?????????????

Quiz Time........
Burn Management Scenarios

• Scenario#1- Wash Bay
  -Dispatched for 40 YOM at a local hardware store with chemical burns to the arms.

Scenario #2 – Tower 1 Bay
  -Dispatched for a 22 YOM with facial burns from a gas grill explosion.

Scenario#3 – Co. 1 Bay
  -Dispatched for an HEC worker electrocuted.