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Management of Burns in the Community

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Objectives

This presentation will include the following:

- Types of burn injuries
- Prevention strategies
- Assessment and evaluation of burns
- When to refer to burn centre

Definition

Burns are often referred to as thermal injuries. A thermal injury is defined as a loss of functional skin barriers and can extend to underlying structures of the muscle, fascia and bone.

Length of exposure, location, individual's age, type of thermal injury, depth and extent of the burn impact the injury impact.

Type of Burns

1. Thermal Burns
2. Electrical Burns
3. Chemical Burns
4. Radiation Burns

Thermal Burns

- Caused by exposure or contact with flame, hot liquids, steam, tar or hot objects
- Examples include:
  - Residential fires
  - Scald injuries
  - Explosive motor vehicle accidents
  - Work related accidents
  - Inhalation injuries

Electrical Burns

- Caused by the heat generated by an electrical energy passing through the body.
- Examples include:
  - High voltage power lines
  - Electrical wires
  - Lightning
- Severity or tissue injury is dependent on:
  - Type and voltage of the source
  - Amperage of current passing through the tissue
  - Resistance of skin thickness
  - Wet skin versus dry skin
  - Pathway through the body
  - Duration of contact

Chemical Burns

- Caused by acids, alkalis or organic compounds
- Examples include:
  - Household substances, such as drain cleaners
  - Chemicals used in industry, such as liquid concrete
  - Chemicals used in agricultural products, such as fertilizers
- Extent and depth of damage is dependent on:
  - Type of agent
  - Concentration and quantity
  - Duration of contact
  - Activity and penetration ability of agent
  - Resistance of involved tissues
  - Local versus systemic injury

Radiation Burns

- Caused by exposure to a radioactive source.
- Examples include:
  - Equipment contact such as radiation treatment for cancer
  - Sunburn from prolonged exposure
  - Nuclear radiation accident

Prevention Strategies

- Keep all matches away from children
- Never leave a child unattended near a heat source
- Keep all chemicals and flammable liquids out of a child's reach
- Keep appliance cords out a child's reach
- Use flame-resistant sleepwear for infants and children
- Do not overload electrical outlets
- Implement safety precautions with the elderly and those who smoke while consuming alcohol
- Do not smoke while oxygen is in use
- Do not smoke in bed
- Do not use flammable liquids to start fires
- Use caution when cooking and removing heated foods from ovens

Prevention Strategies (cont'd)

- Keep all pot handles turned inward and use the back stove burners
- Never store or use flammable liquids near a fire source, such as a pilot light
- Set the hot water tank temperature no higher than 49 degrees Celsius (120 degrees Fahrenheit)
- Develop and practice a home exit drill with all household members
- Fire retardant clothing and protective gear
- Keep a working fire extinguisher in the home
- Install and maintain smoke detectors in the home (Check batteries monthly, change detectors every 10 years)

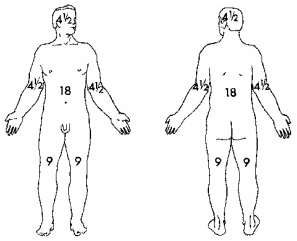
Priorities for Management

- As with any trauma victim, it is important to assess the individual's airway, breathing, and circulation.
- Need to do a head to toe examination of the extent and depth of thermal injury wounds as well as any coexisting injuries.
- A major concern is the maintenance of vital organ functioning
- A thermal injury causes a fluid shift from the intravascular to the interstitial spaces which results in swelling
- In order to increase perfusion to all organs and prevent irreversible damage, fluid replacement needs to be implemented. The first step in determining the required fluid replacement is to assess the percentage of TBSA of the burn
- Monitor blood sugar in infants because they have limited glycogen stores and are very prone to hypoglycemia

Evaluation of Burn Area Size

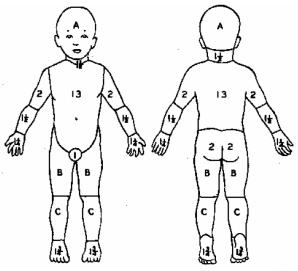
- Two methods:
  - Rule of Nines Method
  - Lund Bower Method

Rule of Nines Method



- Quick easy method
- Body is divided into 9 percent sections
- Can be modified for infants and small children
- Scattered small burn areas can be calculated using the principle that the palmar surface of the victim's hand represents 1 %

Lund Bower Method



- Most accurate and accepted method
- Uses surface area measurements assigned to each body part in terms of age of individual
- Highly recommended for children under 10

Lund Bower Method

			Age (Years)			
Body Part	0	1	5	10	15	Adult
A=1/2 head	9 ½	8 ½	6 ½	5 ½	4 ½	3 ½
B=1/2 of 1 thigh	2 ¾	3 ¼	4	4 ¼	4 ½	4 ¼
C=1/2 of 1 lower leg	2 ½	2 ½	2 ¾	3	3 ¼	3 1/2

Emergent Care

Thermal Burns:

- Cool area with liberal amounts of tepid water or normal saline. Do not use ice. Ensure individual is kept warm.
- Remove any clothing and jewelry from burn areas
- Assess neurovascular status of limbs:
  - Color, capillary refill, blanching
  - Warmth
  - Sensation
  - Movement
  - To reduce swelling, elevate extremities if possible
  - Cover the area with dry sterile sheet or dry dressings
  - Refer to Burn Centre per referral criteria

Emergent Care (cont'd)

Asphalt and Tar Burns:

- Cool with liberal amounts of tepid water or normal saline. Do not attempt to remove tar until individual is evaluated. Ensure individual is kept warm.
- Petrolatum based ointments or solvents, for example vaseline or mineral oil may be applied to facilitate tar removal. Cover with dry dressing. After 4 – 12 hours, remove the dressing and cleanse the area and repeat the process if indicated.

Emergent Care (cont'd)

Electrical Burns:

- Assess cardiac status as soon as possible
- Assess neurological status
- Assess all wounds
- Assess neurovascular status of affected extremity:
  - Color, capillary refill, blanching
  - Warmth
  - Sensation
  - Movement
- Obtain information of the voltage of power source
- To reduce swelling, elevate extremities if possible
- Apply dry dressings
- Refer to Burn Centre per referral criteria

Emergent Care (cont'd)

Chemical Burns:

- Remove any clothing and jewelry from the area immediately
- Irrigate with copious amounts of tepid water or normal saline for at least one hour. Dry chemicals should be gently brushed off skin before irrigation is started.
- Identify the chemical agent.
- Assess neurovascular status of affected extremity:
  - Color, capillary refill, blanching
  - Warmth
  - Sensation
  - Movement
- To reduce swelling, elevate extremities
- Continuous assessment of wound to ensure adequate dilution to stop burning. Apply dry dressings
- Refer to Burn Center per referral criteria

Referral to Burn Centre Criteria

- **Extensive Burns:**
  - Greater than 10% TBSA in adults.
  - Greater than 5% TBSA in children
  - Isolation is vital when the burn is greater than 10 percent TBSA to protect from infection
- **Full thickness Burns:**
  - Greater than 5% TBSA any age
- **Inhalation Injury:**
  - Regardless of burn size
- **Extremes of age:**
  - Children less than 2 years and the elderly (greater than 50 years)

Referral to Burn Centre Criteria (cont'd)

- **Special Types of Burns:**
  - Electrical
  - Chemical
- **Critical Areas:**
  - Face, neck, hands, feet, perineum, genitalia, major joints, circumferential burns of limb or trunk
- **Associated Problems:**
  - Medical conditions such as epilepsy, diabetes
  - Accompanying trauma
  - pregnancy

Referral to Burn Centre Criteria (cont'd)

- **Psychiatric Illness:**
  - Suicide attempt
- **Other:**
  - No response to treatment
  - Wound complications
  - Scar management and revision
  - Significant infection or sepsis
  - Child or vulnerable adult abuse

Assessment and Diagnostic Testing

- TPR
- Comprehensive history
- Time and details of injury
- Physical examination
- Weight and height
- BMI
- Diet history
- Tetanus status
- Wound Culture

Assessment & Diagnostic Testing (cont'd)

- Baseline blood work to consider:
  - CBC, differential
  - INR/PT
  - PTT
  - Serum glucose
  - Electrolytes
  - Urea
  - Creatinine
  - Nitrogen balance (calculated balance)
  - Albumin and pre-albumin
  - Folic Acid

Wound Care

Cleansing:

- Individuals with small open burns (less than 10 percent) may shower using mild soap and running water
- Whether an individual is allowed to shower or bathe depends on the clinical situation which is based on an individualized assessment of the person and the presence of acceptable facilities

Wound Care (cont'd)

Wound Infection:

- Systemic antimicrobials are based on culture results
- Topical antimicrobials:
  - routinely used in burn care to prevent infection and to support wound closure
  - Milder agents such as Polysporin are used for the treatment of small or superficial wounds
  - Antimicrobial dressing products are used to reduce bioburden
  - Potent antimicrobials are used in burn centres

Wound Care (cont'd)

Debridement:

- Healthcare professionals must have approved education/skills and site must have policy to perform procedures
- In the acute phase management begins with cleansing of the wound to remove loose non-viable tissue and foreign matter
- Controversy exists over management of blisters:
  - Blisters larger than 1-2 cm should be debrided 1-2 days post burn if they interfere with range of motion or blister fluid becomes cloudy
  - Blisters caused by chemical injuries need to be removed because they obstruct dilution of the chemical

Selection of Wound Care Products

- Consider the wound size, depth, location, amount and type of drainage
- Dressing change frequency is dependent on the amount of drainage and type of wound care product used
- Typically, a non-adherent dressing and a topical antimicrobial product is used for small open areas
- For larger, deep wounds a topical antimicrobial dressing product may be used
- Once a burn wound has closed, a non-perfumed lotion or cream is applied to moisturize the skin, prevent dryness and relieve itchiness

Other Care Issues

- Nutrition
- Pain Management
- Psychological Support

Nutrition

- Consult with dietitian re: nutritional needs to meet increased metabolic demand and assist with wound healing

Pain Management

- Pain is more severe in partial thickness wounds due to exposed nerve endings
- Manage by controlling or eliminating source of pain:
  - Covering wounds
  - Adjusting support surfaces
- Provide analgesia as required:
  - For small partial thickness wounds oral medications such as tylenol, tylenol with codeine, hydromorphone, or non-steroidal anti-inflammatory agents such as Ibuprofen, ASA or Ketoralac
  - HS sedation to enhance sleep if required
  - Administer 30 minutes to one hour prior to dressing change
  - Non-pharmacologic interventions such as distraction, relaxation, deep-breathing exercises, guided imagery

Psychological Support

- Individuals with severe injuries along with their families may require support in managing stress, dealing with changes to their body image and functional limitations:
  - Grief counselling may be required
  - Psychotherapy and pharmacotherapy may be required

Case Studies

Case Study #1

•4 year old girl with a burn on her left cheek

•Knocked over a cup of hot coffee

The most appropriate treatment for this wound is which of the following?

a) Mepitel
b) Acticoat
c) Polysporin
d) Aquacel Ag

Case Study #2

- 44 year old male injured in house fire
- Awakened by smell of smoke, shirt caught fire while escaping
- TBSA 35%:
  - 20.5% partial thickness burns on upper anterior trunk, head, neck, upper Lt. arm, part of Rt. arm and dorsal Rt. hand
  - 14.5% full-thickness burns on anterior trunk, dorsal Lt. arm, dorsum of Lt. hand

Following assessment and emergent treatment, which of the following would be indicated?

a) Bacitracin ointment and a contact layer dressing
b) Flamazine ointment and a gauze dressing
c) Saline soaked gauze dressings held in place with burn net
d) Immediate transfer to a burn centre

Case #2 (cont'd)

- The partial thickness wounds healed well
- On day 15 the full-thickness wounds were excised and grafted
- On day 2 post graft, initial dressings were removed. Grafts were adherent with no signs of hematoma or seroma formation
- Wounds were dressed with bacitracin ointment, covered with a contact layer and gauze dressing held in place with burn net
- He was discharged home with a referral to Home Care

The most appropriate treatment for this wound is which of the following:

a) Saline soaked gauze dressings
b) Mepilex foam dressing
c) Bacitracin/contact layer/gauze
d) Aquacel Ag foam adhesive

Case #2 (cont'd)

- By day 8 on the Home Care program the graft sites and donor sites were healed.
- The client was provided information about on-going self care and was discharged from the program.

Which of the following should be included in the education prior to discharge from the Home Care program?

a) Apply their usual moisturizing lotion as needed
b) Apply a non-perfumed lotion to burned areas
c) Continue with bacitracin ointment to moisturize skin
d) Continue with contact layer dressing to prevent dryness

Case Study #3

- 26 year old female who was cooking a pot of pasta which was knocked off the stove
- The liquid splashed down her legs and pooled on her feet.
- She immediately removed her clothing and ran cool water over the area
- She had no significant past medical history
- The scald burn was calculated to be TBSA 10%:
  - 4.0 % partial thickness wounds
  - 6.0 % full-thickness wounds

Following assessment and emergent treatment, which of the following would be indicated?

a) Debride all blisters and remove necrotic skin
b) Debride large blisters and remove necrotic skin
c) Saline soaked gauze dressings held in place with burn net
d) Immediate transfer to a burn centre

Case #3 (cont'd)

Following debridement of the large blisters and removal of the necrotic skin, which of the following would be indicated?

a) Saline soaked gauze dressings held in place with burn net
b) Bacitracin/contact layer/gauze
c) Aquacel Ag foam adhesive
d) Aquacel Ag to open areas only with no cover dressing

Case Study # 4

- Two year old male
- Placed palm on a hot burner last evening
- Mother immediately placed his hand under cool running water
- This morning she brought him to the health center for treatment
- TBSA approximately 1%
- Intact blisters over much of the palmar surface with small blisters on the finger tips
- Full range of motion is present

Following assessment, which of the following would be indicated?

a) Debride all blisters and remove necrotic skin
b) Debride large blisters and remove necrotic skin
c) Saline soaked gauze dressings held in place with burn net
d) Immediate transfer to a burn centre

Case #4 (cont'd)

Following debridement of the large blisters and removal of the necrotic skin, which of the following would be indicated?

a) Saline soaked gauze dressings held in place with burn net
b) Bacitracin/contact layer/gauze
c) Aquacel Ag foam adhesive
d) Aquacel Ag to open areas only with no cover dressing

References

Alberta Health Services. (2009). Wound Care Guidelines. Edmonton: Author.

Ward, R. S. (2012). Management of Burn Injuries. In C. Sussman & B. Bates-Jensen (eds.) Wound Care: A Collaborative Practice Manual for Health Professionals. (4th ed.). Pp. 401-417. Philadelphia: Lippincott Williams & Wilkins.