Management of the Burn Patient

Sidney Miller, MD, FACS
Professor of Surgery
Director of Research and Development
Ohio State University Burn Center

American Burn Association Transfer Criteria

- Burn > 10% TBSA
- Burns > 5% full thickness
- Burns complicated by inhalation injury,
  significant associated injury or co-morbidity
- Burns of hands, face, feet, perineum,
  major joints
- Electrical/chemical injuries

ABA Advance Burn Life Support (ABLS) course

Learning Objectives

- Describe ambulatory management of burn patients
- Use the “rule of nines” to estimate total body surface area of the burn
- Describe partial and full thickness burn wounds
- List ABA criteria for patient transfer to a specialty burn center
- Discuss the management of SJS/TEM
Annual Burn Injuries 1,000,000/yr

Deaths 3500

ED visits 450,000

Outpatient care 505,000

ABA Criteria for Referral to a Burn Center

Yes 25,000 admissions

No 20,000 admissions

Severity Total Body Surface Area

Rule of Nines

Patient’s whole hand approx. 1.5% BSA
**Severity**

**Total Body Surface Area**

- Patient’s whole hand approx. 1.5% BSA
- Palm of patient’s hand to their body-approx. 1% BSA

**Partial thickness: First Degree**

- Epidermis only
- Pink or red
- Painful
- Heals in few days, injured epithelial cells peel

---

**Severity-Depth**

**Depth - 2nd Degree Burn**

- appearance
  - reddened
  - blisters
  - open tissue
- sensation
  - painful
  - diminished discrimination between sharp & dull stimulus

Demling et al, Burnsurgery.org
Think child Abuse

Severity Depth - 3rd Degree Burn

- Entire epidermis and dermis
- White, gray
- Dry, leathery
- No hair
- Absent capillary refill
- Less pain
- Small area heals by epithelial ingrowth
- Large areas require surgical skin grafts

Outpatient care

Wound care
- Topical only
- Moisturizing cream
- SSD
- Long wear Ag

Pain management
- Elevation
- Well applied dressing

Antibiotics
- Topical only

Follow-up
- 7-10 days
- Remove long wear
- Moisturizing cream

Facial Burns
Facial Burns

Facial Burns

Facial Burns

Facial Burns
Facial Burns

Facial Burns

Facial Burns

Facial Burns
Facial Burns

Example
Long wear Ag+ Products

Most Commonly Used
Acticoat
AquacelAG
MepilexAg
Chemical Injury

Treatment

Get chemical off of the tissue
if dry chemical brush off 1st
Flush with copious amounts of water 20-30 minutes
P.P.E.’s to ensure safety of healthcare provides
Patient with Chemical Burn

Full thickness injury from chemicals in the home

Hydrofluoric Acid

Tissue damage & great pain
Hydrofluoric Acid binds with Calcium
Treatment
- Topical mixture of calcium gluconate & K-Y
- Sub-dermal inject calcium gluconate (ER)
- Intra-arterial infusion of calcium gluconate (Burn Center)

Wound Care

FOR PATIENTS BEING TRANSFERRED:

- Cover the wound with dry clean sheets / towels / blankets - need not be sterile
- KEEP THE PATIENT WARM

Steven Johnson Syndrome (SJS) / Toxic Epidermal Necrolysis (TEN) Continuum

STANDARD OF CARE IS MANAGEMENT IN A BURN CENTER

McGee, 1998, Palmieri 2002,
Methods

- Retrospective chart review
  - SJS/TEN patients
- Two Timeframes
  - (2004-2008)
  - (2009)
- Burn Center established
  - February, 2006

Results

- Causative agents:
  - Bactrim
  - Other antibiotics
  - Anticonvulsants
- Services:
  - Burn service
  - Other services
  - N=24 (04-08)
  - N=16 (09)
- Age (average)
  - 53.1 years (04-08)
  - 47.3 years (09)

<table>
<thead>
<tr>
<th></th>
<th>Burn Service</th>
<th>Other Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services</td>
<td>N=24 (04-08)</td>
<td>N=16 (09)</td>
</tr>
<tr>
<td>Burn service</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Other services</td>
<td>16</td>
<td>9</td>
</tr>
</tbody>
</table>

Best Practice Recommendation
- Mortality overall 32%
- SJS - TEN Patients
- 49% (04-08) 33% (09)
- Epidermal Detachment
  - Burn Service 17%
  - Other Services 20%
  - Overall 23%

ICU Length of Stay (Average)

- p = 0.029 (04-08)
**Quality Measures: SCORTEN Score**

- Severity-of-illness score
- Predict mortality of TEN patient
- Obtain first 24 hours of admission
- 7 independent risk factors:
  1. Age > 40
  2. Malignancy
  3. Epidermal Separation > 10%
  4. Heart rate > 120 BPM
  5. BUN > 28 mg/dL
  6. Serum glucose > 252 mg/dL
  7. Serum bicarbonate < 20 mEq/L

<table>
<thead>
<tr>
<th>Number of Risk Factors</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>3.2%</td>
</tr>
<tr>
<td>2</td>
<td>12.1%</td>
</tr>
<tr>
<td>3</td>
<td>35.3%</td>
</tr>
<tr>
<td>4</td>
<td>58.3%</td>
</tr>
<tr>
<td>5</td>
<td>90.0%</td>
</tr>
</tbody>
</table>

**Conclusions**

- Early referral to Burn Center was re-confirmed
  - Burn Center patients had greater epidermal detachment, but no difference in mortality, and shorter ICU stays

- Education of other services about early referral to Burn Center
  - Comprehensive supportive intensive care
  - Excellent wound care
  - Increased patient survival

**OSUMC Burn Resources**

OSU Burn Center 614-293-2876 (BURN)
Burn Center administrative office
614-293-5710
Burn Unit 614-293-8744
Emergency Department
614-293-8333
Children’s Hospital (under 16 years of age)