The Burn Patient

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Called 'widow-makers' because of a high accident rate, one AAF crewman put an ersatz dial on the panel that said it all -
Objectives

• Describe the types of burns
• Population at risk
• ABA guidelines for transport to burn center
  • Signs of inhalation
• Assessment of surface involved
  • Burn formulas
• Evaluation and management
Epidemiology

- 2 million burns per year
- 30,000 admissions a year
- All age groups at risk
- Mortality increases with age
- Males predominate
- Inhalation, Thermal, Chemical, Electrical
- Scenes are not always safe for providers
Estimates of Involved Surface

- Rule of Nines
Degree of Burn

First degree partial thickness
Second degree partial thickness
Third degree full thickness

Skin reddened
Blisters
Charring

Epidermis
Dermis
Subcutaneous
Muscle
First Degree
Second Degree
Third Degree
NOW, TELL ME AGAIN—WHAT WAS THE FIRST THING YOU SAW? ...
Facial Burns

• Surface
• Ocular
• Airway
• Singed Nasal Hairs
  • Airway edema
  • Glossal Swelling
  • Epiglottic edema
  • Glottic edema
• Rapidly progressive deterioration
Ocular Burns

- Often chemical
- Contact lenses need to be removed
- Copious irrigation
- Sterile dressings
- Notify ED ASAP to arrange Ophthalmology Evaluation
Pulmonary Burns

- Closed space
- Facial involvement
- Carbonaceous sputum
- Singed nasal hairs
  - Lip edema
  - Thermal
  - Chemical
- Foreign debris
- Rapidly progressive deterioration
Pulmonary Burns

- ABC’s
- Definitive control of the airway
  - Humidified Oxygen
  - Prevent Hypoxia
  - Assist Ventilation
- NG / Oral Gastric tubes

- Do Not Delay Transport to a Burn Center for Diagnostic Tests
Circumferential Burns

- Fluid replacement causes edema
- Capillary leaks / tighten the extremity
- Compartment pressures can go above arteriolar

- Monitor . . . . . . .
  - Pulses
  - Doppler flow
  - Tightness / Compartment pressures
Electrical Burns

- CNS injury
- Peripheral nerve injury
- Cardiac arrhythmias
- Occult injury
- Low / high resistance tissues
- Low / high voltage < 1000 volts>
- Muscle injury / Myoglobinemia
- Renal injury / direct electrical / myoglobin
- Entry and Exit wounds
  - AC / DC
Electrical Burns

- Arrhythmia when they occur usually at time of injury, not delayed
- Bone and skin are high resistance, occult injury very common
- Look for entry and exit wounds, all tissue between is at extreme surgical risk
- Myoglobinemia from muscle injury can shut down kidneys
- AC is more dangerous than DC
- Duration of shock determines extent of injury
Burns can be by direct contact or by arcing.
Chemical Burns

- Treatment Specific . . . . . . .
  - Hydrofluoric : Irrigate, Calcium Gluconate
  - HCL / Sulfuric : Bicarbonate irrigation
  - Phenol : No irrigation
  - White Phosphorous : Ignites with irrigation

- Sample or container to hospital ! ! !

- Treatment Kits at Industrial Sites ! ! !
The Whatsehelldoldo Now Dept.:

Situation: Three hours out on a six hour mission, you've consumed a canteen of water and have just struggled 10 minutes to get the relief tube... at last!
Fluid Resuscitation

- Rapid volume depletion
- Diffuse capillary leaks
- > 15 %, Edema even where there is no burn
- Aggressive fluids are not needed for short trip
- Do not waste scene time for IV if under 15 minutes to the burn center

- Fluids critical for the long flight!
Fluid Resuscitation

- Large bore IV (s)
- Non-burn site if possible
- Best tool, Urine Output . . . .
  - 0.5 cc / kg / hr adult
  - 1.0 cc / kg / hr child [ < 30 kg ]

- Too much fluids can be just as bad as too little ! ! !
Parkland Formula

- $\% \text{ BSA} \times \text{Kg} \times 4 \text{ cc} = 24 \text{ hour total need}$
- $\frac{1}{2}$ over the first eight hours
- $\frac{1}{2}$ over the next sixteen hours
- Lactate Ringers is the fluid of choice!
Modified Brooke Formula

- \( \% \text{ BSA} \times \text{Kg} \times 2 \text{ cc} = 24 \text{ hour total need} \)
  - \( \frac{1}{2} \) over the first eight hours
  - \( \frac{1}{2} \) over the next sixteen hours
Wound Care

- After the initial resuscitation
- Remove smoldering clothing
- Do not remove adherent clothing
- Compensate for loss of thermoregulation
- Provide comfort and pain control
- Dry linen dressings, not gauze
- Do not cool wound, can advance the degree of burn
- Regulate ambient temperature
Burn Center Transport Guidelines

- Partial thickness over 15%
- Full thickness over 5%
- Involvement of hands, perineum, face, feet
- Inhalation
- All high voltage
- All chemical
- Patients with significant pre-existing disease
WE'RE ON FINAL! NOW REMEMBER, WHEN WE TOUCH DOWN, RUN LIKE HELL!