BURNS

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Prehospital care programme
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Objectives 1

• To develop a structured approach to the assessment of burns patients.

• To be able to assess burn depth and estimate burn surface area.

• To be able to calculate a fluid regime.
Objectives 2

• To understand issues surrounding airway management

• To understand the indications for escharotomies.
Background

- UK
- 175,000 ED attendances / yr
- 15,000 admissions / yr

- In the past - simple management not very well done
- Few guidelines until 1998
- PHC Consensus guidelines March 2002
Paediatric Burns

50 000 children present to ED / yr
10% require admission
0.1% require intensive care
Boys > girls
Prevention

Child proof home
Limit hot water temp to 49-52 C

Full thickness burn
  2 minutes immersion at 52 C
  5 seconds immersion at 60 C
History

Trapped?
Type of furniture?
Rescued / escaped?
Explosion?
Other injuries?
Mechanism of Injury

- Thermal
- Electrical
- Chemical
- Radiation
- Mechanical
Assessment

• A
• B
• C
• D
• Estimate burn size and depth
• Fluid calculation
• Glucose
• Jewellery - remove it
Airway

- High index of suspicion
- Hoarse voice
- Soot, oral blisters
- Stridor / wheeze
- Facial / neck burns

- It will only get worse! Get help!
Airway

• Thermal injury with progressive oedema
• Inhalational injury - smoke, hot gases, steam
Indications for intubation

- Actual / anticipated airway compromise
- Extensive burns - marked fluid loss / O2 delivery issues
- Persistent hypoxia despite high flow O2
Airway

Maximise oxygenation - 100%

Anaesthetist
- Early intubation
- Cervical spine
- Uncut ETT
- Surgical airway kit to hand
Sedation / analgesia

- Patients will be “lighter”
- Risk of awareness
- Higher analgesic requirements
Smoke Inhalation

- History - trapped?

- FIRE = CO + HCN + reduced O2

- Other toxic + irritant substances

- 50% fire deaths due to inhalation injury
Carbon Monoxide - symptoms

Headache
Dyspnoea
Nausea / vomiting
Weakness
Altered higher mental function
Visual disturbances
Coma
Convulsions
Cyanide

Released by combustion of
Natural, polymers - silk, wool
Synthetic polymers - melamine, polyurethane
Old sponge filled furniture - sofas

Occupational exposure - electroplating, photography, insecticides, rubber, synthetics
Cyanide - symptoms

- **CNS**
  - Headache
  - Dizzy
  - Anxiety
  - Confusion
  - Transient LOC
  - Convulsions
  - Coma

- **CVS**
  - Hypotension
  - May have normal HR
  - Cardiac arrest
  - Not pale / cyanosed
  - No O2 consumed
Cyanide - treatment

- Diagnosis - usually on clinical suspicion
- High flow O2
- Airway Mx
- Safest antidote - Hydroxycobalamin
Cyanide - symptoms

Prospective study

• Soot in mouth / sputum / + neurological signs = HCN intoxication
• None of these = not exposed
• Neurological signs + in fire = At risk

(Favier et al)
Hydroxycobalamin

Vitamin B12
Binds cyanide
Proven safety record - 50 fire victims

**Indications**
Smoke inhalation with decreased LOC or CVS instability
Known cyanide ingestion / inhalation
Safest antidote if unsure of exposure
Breathing

Inhalational injury
Circumferential full thickness burns
Exclude other injuries
Circulation

Hypovolaemia - fluid loss from burned tissue

Takes hours to develop

Early shock - think again!
Circulation

IV access
Fluids
Urine output > 1ml/kg/hr
Electrical burns
  - myoglobin
  - urine > 2ml/kg/hr
Environment - Temperature

- Only cool for 15 minutes. TBSA <10%
- Avoid water gel dressings
- Clingfilm - not circumferential
- Warm dry blankets
- Close doors / windows
Estimation of burn size

- Burn surface area (BSA)
- Child’s palm = 1%
- Burn chart
Rule of 9s
Estimation of burn depth

• Erythema doesn’t count!

• Partial thickness
  - superficial
  - deep dermal

• Full thickness
Erythema
Superficial partial thickness
Full thickness burn
Paediatric fluid calculations

Give IV fluid if:

- Infants > 10% BSA
- Children > 15% BSA
- Smoke inhalation - up to 50% more fluid required

Several different formulae available
Parkland Formula

2-4ml / kg / %BSA

- Give half calculated requirement in first 8hrs from burn time
- Give second half over next 16hrs
- Reassess frequently
Fluids

Reassess fluid requirements frequently
Monitor urine output
Inhalation injury will increase fluid loss
Replace insensible losses (gastric + burn)
Type of fluid - Hartmann’s
May need to add dextrose and electrolytes later on
Sedation & Analgesia

- Relief from anxiety and pain
- Amnesia
- Variety of routes
- Start simple
- Titrate IV opiates
- Ketamine
- Monitored, resus equipment and staff
- Observation chart
Special Considerations

- Face / Airway
- Hands
- Feet
- Perineum

- Electrical
- Chemical
- Explosion

- NAI - not just children
Escharotomy

- Eschar - rigid scar tissue
- May need dividing
- Ventilation / perfusion
- Chest / limb

- Aim: release tension in damaged tissue
How to do it…..

- Sterile
- Blood loss ++ (diathermy)
- Remember anatomy - vessels, nerves
- Must incise until healthy tissue reached
Indications for escharotomy

- Unable to ventilate after ETT due to FT circumferential chest burns

- Critical perfusion of limb. Check pulses, cap refill, oximetry waveform

- If it needs doing, ask for help.
Referral to Burns Unit

• Child TBSA > 10%
• Adult TBSA > 20%
• Inhalation injury
• Special areas / conditions
• Electrical / chemical burns
• ?NAI
Minor Burns

- Documentation
- Draw a picture
- Dressing
- Anti-Tetanus
- No routine antibiotics
- Advice
- Review?
- Paediatrics
Electrical Burns

- Domestic / industrial supply
- Lightning
- Entry / exit
- ECG / monitoring
- Relatively uninjured limbs?
- Urine
- Spinal injury
- Eyes / ears
Chemical Burns

- >25 000 products
- Daily life / occupation
- Face / eyes / extremities
- Cement
- Hydrofluoric acid
Hydrofluoric Acid

- Damage due to hydrogen ion / free fluoride ions
- Pain persists until free fluoride is neutralised
- Systemic effects
- Skin signs may be delayed - blue/grey
- Calcium gluconate 5%
- >1% can be fatal
Scenario 1

- 2 yr old
- Scald to chest and face
- Chip pan fire - fat splashed out
- Screaming
Scenario 2

• 70 yr old male
• Dragged out of lounge
• Unconscious
Summary

• ABCDEFG
• Consider early intubation
• Surgical airway kit ready
• Think of poisoning - CO / HCN
• Give adequate analgesia and sedation
• Remember NAI