UK HEMS

Clinical Excellence in Helicopter Medicine

Burns

Aims:

- Describe the clinical management of burns.
- Understand the appropriate triage of burns victims.

Background:

Burns may be superficial (erythema), partial thickness or full thickness. Partial thickness burns are painful. The skin often blisters or sloughs off. Full thickness burns are painless, as all the nerve endings have been destroyed. The skin appears leathery, charred or nonblanching and is inelastic. Rarely, full thickness (FT) burns cause airway or ventilator compromise and require escharotomies to be performed. Similarly, limbs may become ischaemic as a result of FT circumferential burns. In addition to the burn itself, consideration should be given to additional trauma, thermal airway injury and asphyxiant inhalation (carbon monoxide and cyanide)

Policy:

General Management

Assess scene safety. Consider ongoing sources of explosion, electrocution or fire. If first on scene, ensure the wounds are cooled and any smouldering clothes doused in water and removed. Burns patients become hypothermic very quickly. Only cool burns of <10% for maximum 10 minutes. The majority of burns victims attended by HEMS personnel have had aggressive cooling measures before the team's arrival. More often than not, the patients are shivering, extremely cold and bordering on hypothermic. In these circumstances, remove any gels to assess the extent of the burn and cover the wounds with cling film. When applying the cling film to the torso or limbs, do not apply in a circumferential manner as swelling can lead to constriction and impairment of limb perfusion or ventilation.

Burns patients lose heat fast and are often cold when handed over in ED. Remove wet clothes and warm the patient with warm dry blankets. Do not use space blankets. When in the
back of the ambulance or aircraft, turn on the heating. Anaesthetised patients should have bubble wrap / heater applied and oesophageal temperature recorded. If the mechanism includes explosion, electric shock or other trauma, consider other injuries especially spinal injuries. Patients may have been thrown significant distances. Where full thickness burns are circumferential around the chest it may rarely be necessary to perform escharotomies to allow ventilation. With short scene times and ventilation using small tidal volumes and high FiO2 most patients do not require this procedure immediately. Infection and bleeding are potentially life threatening complications. Escharotomies on circumferential limb burns can usually be delayed until arrival in hospital. If escharotomies are necessary, they should be performed longitudinally.

Anaesthesia for Burns Patients

Indications as per RSI SOP, in particular those patients who:

- Are persistently hypoxic despite high inspired oxygen.
- Have, or are likely to develop airway compromise.

If in doubt seek consultant telephone advice

If airway burns are suspected have a low threshold for intubation. A normal sounding airway can become hoarse and obstructed in 5-10 minutes. Remember you will not hear stridor during flight if you chose to airlift a self-ventilating patient. Signs of airway burns include a hoarse voice, stridor, soot in the mouth / nostrils, carbonaceous sputum, oral blistering. If in doubt, secure the airway prior to transport.

The surgical airway kit should be laid out and ready for use when RSI is undertaken for a patient with face / neck burns or inhalational injury. The London HEMS prehospital database suggests that the most common reason for surgical airway in burns patients is poor mouth opening caused by full thickness burns to the neck.

Whatever the percentage burn the level of consciousness in this patient group is often high. Care must be taken to monitor for signs of awareness and provide adequate sedation and analgesia. Ketamine may be useful.

Triage

The following patients should be transferred directly to a burns unit. Local policy should be followed with regard to direct transfer to burns units and agreed protocols should be in place

- Inhalation injury
- >20% TBSA in an adult
- >10% TBSA in a child
- Burns to special areas – hands, feet, face, genitalia
- Electrical/ chemical burns

The management priority is to make the patient safe – i.e intubate if necessary and commence a burns IV fluid regime. Although rapid burn excision and care in a burns centre is mandatory for significant burns it is not critical to arrive within the first few hours. Therefore if a burns bed cannot be located quickly the patient should be transferred to a local emergency department rather than delayed on scene. If the patient has trauma in addition to their burn they should be conveyed to a hospital which can deal with the injuries rather than a burns centre that cannot. A multi-disciplinary centre with plastic surgery capability would be appropriate.

Asphyxiant inhalation

Carbon monoxide (CO)

A colourless odourless gas formed as a result of incomplete combustion of organic products. Smoke inhalation from enclosed space fires cause most of the fatalities from CO poisoning. Poisoning presents with a constellation of non-specific signs and symptoms ranging from malaise to cardiac arrest.

Patients who have suffered smoke inhalation from a structure fire should be commenced on 100% oxygen as soon as possible to reduce the half life of CO from about 4 hours to about 45 minutes. Endotracheal intubation may be required (as per RSI indications). Hyperbaric chamber therapy is not appropriate for CO poisoning in association with severe burns injuries.

Cyanide (Cn)

Cyanide is released when natural fibres burn. The majority of enclosed space structural fires will produce smoke containing hydrogen cyanide gas. There is no rapid test for cyanide poisoning (either on scene or in the ED) and clinical signs are neither specific nor sensitive. Cyanide poisons the causes a failure of oxygen utilisation by the tissues. There is cellular hypoxia regardless of the oxygen content of the blood.

Hydroxycobalamin (Cyanokit) has been licensed for the prehospital treatment of suspected cyanide poisoning and has been used safely in Europe for over 10 years and in the USA since 2006. Local policies should be followed regarding its use.