

---

# Clinical Guidance

---

## Paediatric Critical Care: Early Management of Burns

### Summary

Explanation regarding management of a child with burns. This does not cover pre-hospital first aid and initial management of chemical burns.

Document Detail	
Document type	Clinical Guideline
Document name	PICU: Early management of burns
Document location	GTi Clinical Guidance Database and Evelina London Website
Version	3.0
Effective from	<i>August 2018</i>
Review date	<i>August 2021</i>
Owner	Head of Service, PICU
Author(s)	Shelley Riphagen, Jon Lillie (PICU consultants)
Approved by, date	Evelina London Guideline Group, August 2018
Superseded documents	PICU: Early management of burns v2.0
Related documents	PICU: Pain assessment and management
Keywords	Burns, PICU, TBSA, total burn surface area, Parkland Formula, STRS, Paediatric Critical Care
Relevant external law, regulation, standards	<a href="#">London South East Burn Network (LSEBN)</a> <a href="#">LSEBN identification of burn type</a> <a href="#">LSEBN management of severe burns</a>
<p>This clinical guideline has been produced by the South Thames Retrieval Service (STRS) at Evelina London for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children.</p> <p>This guideline represents the views of STRS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.</p>	

Change History		
Date	Change details, since approval	Approved by
Aug 15	Reviewed LSEBN updates, minor clarifications made and links added.	Clinical Leads and Consultants

# Burns (early management)

- Mandatory multidisciplinary assessment in all cases – including plastic surgeons & anaesthetists
- Burns referral if Total Burn Surface Area (TBSA) ≥ 10%
  - Burns ICU (Chelmsford) if intubated (any reason) or TBSA >20%

**CONTACT NUMBERS FOR BURN CENTRES**  
 Chelsea & Westminster (London) 0203 3152500  
 Queen Vic Hosp (East Grinstead) 01342 414469  
 ICU: Chelmsford- 01245 516038/037 (direct ITU sister)

**If chemical burn ensure fully decontaminated**

**Airway**

- C-spine protection if any possibility of spinal injury
- Maintain patent airway
- Early intubation if anticipated airway problems (\*see right)
- Rapid Sequence Induction with Rocuronium (not suxamethonium)
- CUFFED and UNCUT endotracheal tube (rides up with oedema)  
 Consider suture or wire to teeth in major facial burns to secure

**Breathing**

- Ensure adequate oxygenation and ventilation, maintain sats >92%
- Respiratory failure can be due to chest trauma, inhalational injury or restrictive chest wall eschar formation

**Circulation**

- 2x large bore cannulae or intraosseous access in first 5 minutes
- Blood Gas (lactate, O<sub>2</sub>Hb, COHb, MetHb), x-match, glucose, U&Es, CK; urine b-HCG if female adolescent
- In shock: 20ml/kg balanced crystalloid (check serum K<sup>+</sup>) titrated to cardiovascular response
- Burns fluid resuscitation using **Parkland Formula**
- Refractory hypotension, consider other causes e.g. trauma
- Electrical burn: Baseline 12 lead ECG & monitor for arrhythmias

**Parkland Formula**

- **Applicable to burns > 10% TBSA**
- Fluid requirement starts at time of burn
- Aim to replace fluid lost from burned surface in first 24 hours
- Total volume (first 24hrs) of balanced crystalloid solution  
**4ml x weight (kg) x %TBSA**  
**50% volume in first 8 hrs → 0.25ml/kg/%TBSA/hr**  
**50% volume in next 16hrs → 0.125ml/kg/%TBSA/hr**
- Maintain urine output 1ml/kg/hr; if evidence of myoglobinuria (rhabdomyolysis), aim for 2ml/kg/hr

Other trauma & bleeding may require additional resuscitation.

**Neurological status**

- Assess and document coma score, pupil size & BM.
- Reduced GCS may be multifactorial: consider CT head

**Exposure / Environment:**

- Risk of hypothermia: Actively maintain normothermia
- Secondary survey: Examine head to toe, front and back.
- Check distal perfusion, temperature & colour; consider escharotomy for circumferential limb burns or chest wall injury
- Use Lund & Browder chart to document percentage + depth of burn. Do not count erythema (estimate if no chart: Child's palm =1% BSA)
- Cover burn area with longitudinal cling film (**avoid** circumferential dressings and face)
- Early urethral catheterisation (before oedema)

**\* Anticipate airway problems:**

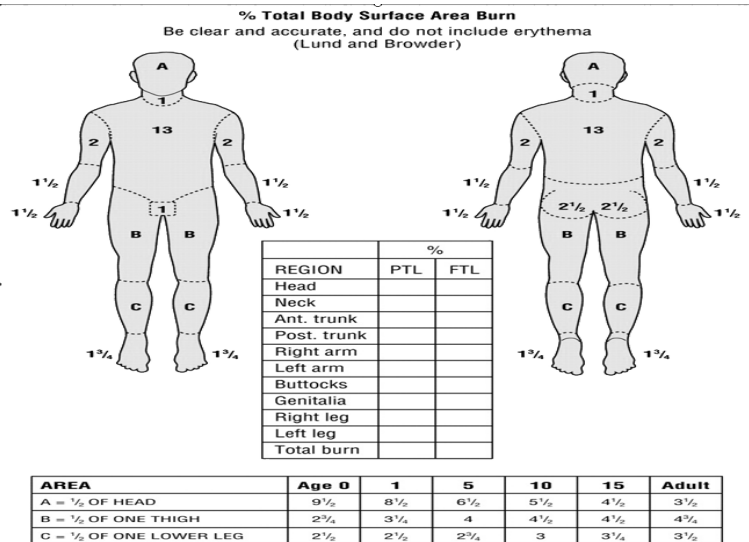
- 1) **Airway burn &/or Inhalation injury:** burns involving face or entire neck circumference; stridor, singed nasal hair, carbonaceous debris in/around mouth or nose & in sputum
- 2) **Reduced or falling level of consciousness**
- 3) **Large burn ≥ 25%**
- 4) **Electrical burns**

**Carbon Monoxide (CO) poisoning**

- Pulse oximetry unreliable (false high SpO<sub>2</sub> despite arterial hypoxia)
- Arterial blood gas (normal COHb levels 1-3%)
- Use 100% O<sub>2</sub> - CO clears in 3-5 hrs
- CO Hb level > 20% may benefit from Hyperbaric Oxygen Therapy

**Cyanide poisoning** (aerosolisation of upholstery and fabrics)

- Features: metabolic acidosis (esp. if lactate >10mmol/l) despite 100% O<sub>2</sub> & adequate fluid resuscitation in first 2 hours of presentation; arteriovenous saturation difference <5%
- Treatment: Hydroxycobalamin (Cyanokit) 70mg/kg IVI or 50% sodium thiosulphate 0.5ml/kg over 10 mins
- Discuss with burns centre & on call GSTT consultant toxicologist



[See LSEBN website for pictures of different types of burn](#)

**Analgesia:** (Dosing & guidelines according to STRS webpage/formulary)

- Assess and document pain score using age appropriate tool
- Regular Paracetamol
- IV morphine infusion preferred to obtain baseline control of pain + boluses; effect augmented with oral/IV clonidine
- IV ketamine for procedures with anaesthetic support

**Other:**

- 1) Consider Non-accidental Injury
- 2) No antibiotics/steroids
- 3) Tetanus prophylaxis/vaccination
- 4) Emerging evidence for Propranolol use to dampen catecholamine response
- 5) Eye Care