NHS
South West UK Burns
Operational Delivery Network
North Bristol NHS Trust

SWUK

Intensive Care: First 48 hours

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ICU Management: First 48 hours

- **Key Features of First 48 hours of Burns ICU:**
- Highly dynamic phase of Burns management
- Multi-system response to thermal Injury
- On-going fluid resuscitation can exacerbate clinical picture
- Surgical Intervention and dressing changes

LEARNING OUTCOMES

- **Framework for ICU Management following Major Burn Injury**
- Airway Considerations & Ventilation Strategy
- Changes in Cardiovascular parameters
  - *Practical guidance on use of invasive lines & infusions*
- Management of Hyper-metabolic state
  - *Temperature control & nutrition in presence of SIRS*
- Considerations for sedation and analgesia

AIRWAY CONSIDERATIONS

- **Fluid Resuscitation will exacerbate oedema of head & neck**

- **Tube:** Endotracheal tubes can be easily displaced
- **Teeth:** Record the length of ETT at TEETH
- **Travel:** Review location of tube at frequently / procedures
- **Ties:** Re-adjust Tube ties as required

- *Anticipate that re-intubation may be very difficult*

VENTILATION STRATEGY

- **Lung Protective Strategy:**
  - Tidal Volume < 6mls per kg Ideal Body Weight
  - Plateau pressure < 30 cmH_2O

- Can be complicated by **Acute Respiratory Distress Syndrome**

- Ventilation difficulties may also be exacerbated by:
  - Fluid resuscitation
  - Bronchorrhoea & bronchospam smoke inhalation
  - Underlying Chronic Lung disease

CARDIOVASCULAR STATUS

- **Anticipate elevated Heart Rate – up to 2 x normal**
- Cardiac Output can increase by up to 150-200%

- **Feature of Hyper-metabolic state following Acute Burn Injury**

- Massive fluid loss from intravascular space:
  - Lactic Acidosis & oliguria secondary to hypovolemia

- **Fluid resuscitation is a cornerstone of management**
  - Parkland formula provides a guide only
  - Aim for Urine Output 0.5-1 ml / Kg / hour & review
  - May also require vasopressor support

PRACTICAL CONSIDERATIONS

- **Measure Skin & Core Temperatures**
- **Aim to keep differences in values < 3° C to optimise skin perfusion**

- Arterial and Central Venous Access are essential

- **Insert lines through un-burned skin where possible**

- **Beware displacement of IV lines with emergent oedema**
  - Consider use of longer lines
  - Femoral site is often spared as a site for Central access
  - Consider use of 5 x CVC lines where available

SEDATION & ANALGESIA

SEDATION & ANALGESIA

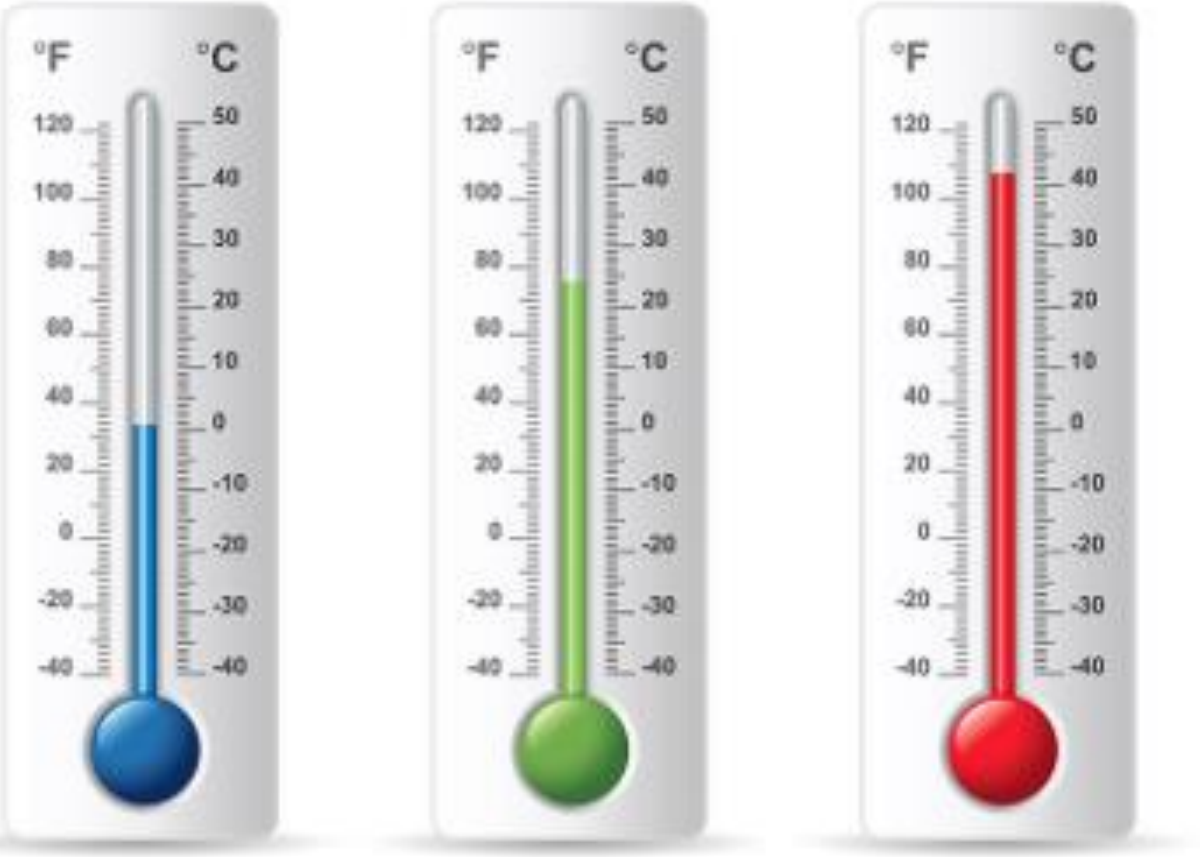
- **Multimodal approach**
- **Combination of short and longer acting agents**

- Sedation can be challenging in presence of SIRS following burns

- **Step wise approach and daily review of sedation & analgesia**
  - Anticipate changes following surgical intervention
  - Propofol can unmask underlying hypovolemia

- **Use of Remifentanil infusions for dressing changes and rolling**

HYPERMETABOLISM & NUTRITION



HYPERMETABOLISM & NUTRITION

- **Burn Injury >20% associated with Hypermetabolic Response**

- **Increased catabolism**
  - Commence NG feeding early post injury
  - Consider NJ feeding where possible

- **Hyperglycaemic Insulin resistant state requiring insulin**

- **Increased Body Temperature**
  - Core Temperature of up to **38.5˚ C** can be considered normal
  - Secondary to massive SIRS response

HYPERPYREXIA MANAGEMENT

- **Defined as a Core > 39° C**

- **Hyperpyrexia, even for short periods can be highly detrimental**

- If Core Temperature **> 39° C :**
  - **Septic Screen including Blood Cultures**
  - **Check CK levels and Renal profile**
  - Antipyretics
  - Consider Ice Packs to Axillae and refrigeration NG feed
  - Consider opening Burns dressings where possible

HYPERPYREXIA MANAGEMENT

- **Defined as a Core > 39° C**
- **Hyperpyrexia, even for short periods can be highly detrimental**
- **If Core Temperature > 40° C for more than 6 consecutive hours**
  - Commence active cooling with CVVHDF
- **If Core Temperature > 41° C for more than 2 consecutive hours**
  - Commence active cooling with CVVHDF
- Discontinue active cooling measures when temperature < 38.5° C

SEPSIS

- **Burns patients are vulnerable to infection**
  - Skin Loss
  - Immunosuppression following Thermal Injury

- **Massive SIRS response makes diagnosis challenging**
- **High Index of suspicion in all cases following Acute Burn Injury**
- **Consider Sepsis if Temp > 39° C or < 36.5° C**

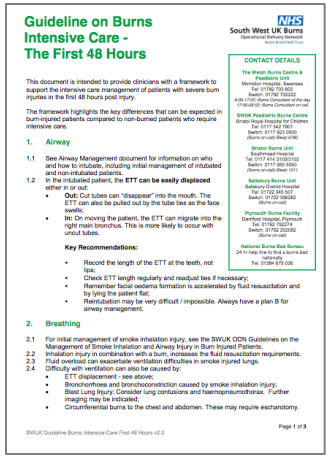
- Use of Infection control measure essential
- Isolate patients in single cubicles were possible

SUMMARY & KEY RECOMMENDATIONS

- **Complex Multisystem response following Acute Burn Injury**
  - Fluid resuscitation cornerstone of ICU management
- **Fluid & therapeutic intervention can exacerbate clinical picture**
- **Multimodal approach to sedation & analgesia**
  - Use of infusions to minimise cardiovascular instability
- **Raised Core Temperature common feature following burn injury**
  - **High Index of suspicion for occult sepsis**
  - Use of active cooling measures where required

FURTHER INFORMATION

- **Management of first 48 hours following Burn Injury SWUK**
- ABA Guidance on Sepsis in Burn population



Guideline on Burns Intensive Care - The First 48 Hours

South West UK Burns Operational Delivery Network

This document is intended to provide clinicians with a framework to support the intensive care management of patients with severe burn injuries in the first 48 hours post injury.

The framework highlights the key differences that can be expected in burn-injured patients compared to non-burned patients who require intensive care.

1. Airway

1.1 See Airway Management document for information on who and how to intubate, including initial management of intubated and non-intubated patients.

1.2 In the intubated patient, the **ETT can be easily displaced** either in or out:

- **Out:** Cut tubes can "disappear" into the mouth. The ETT can also be pulled out by the tube ties as the face swells;
- **In:** On moving the patient, the ETT can migrate into the right main bronchus. This is more likely to occur with uncut tubes.

Key Recommendations:

- Record the length of the ETT at the teeth, not lips;
- Check ETT length regularly and readjust ties if necessary;
- Remember facial oedema formation is accelerated by fluid resuscitation and by lying the patient flat;
- Reintubation may be very difficult / impossible. Always have a plan B for airway management.

2. Breathing

2.1 For initial management of smoke inhalation injury, see the SWUK ODN Guidelines on the Management of Smoke Inhalation and Airway Injury in Burn Injured Patients.

2.2 Inhalation injury in combination with a burn, increases the fluid resuscitation requirements.

2.3 Fluid overload can exacerbate ventilation difficulties in smoke injured lungs.

2.4 Difficulty with ventilation can also be caused by:

- ETT displacement - see above;
- Bronchorrhoea and bronchoconstriction caused by smoke inhalation injury;
- Blast Lung Injury: Consider lung contusions and haemopneumothorax. Further imaging may be indicated;
- Circumferential burns to the chest and abdomen. These may require escharotomy.

CONTACT DETAILS

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Salisbury Burns Unit
Salisbury District Hospital
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Plymouth Burns Facility
Derriford Hospital, Plymouth
Tel: 01752 202 774
Switch: 01752 202082
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National Burns Bed Bureau
24 hr help line for all UK burns bed requirements
Tel: 01384 675 036

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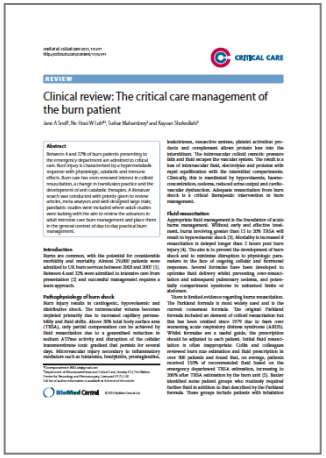

CRITICAL CARE

REVIEW

Clinical review: The critical care management of the burn patient

Abstract

Introduction

Pathophysiology of burn shock

Fluid resuscitation

BioMed Central