



Guidance on the provision of Burns and Plastics Anaesthesia Services

When considering the provision of anaesthesia, the Royal College of Anaesthetists recommends that the following areas should be addressed. The goal is to ensure a comprehensive, quality service dedicated to the care of patients and to the education and professional development of staff. The provision of adequate funding to provide the services described should be considered.

Summary

- In-patient burn injury care should be provided only by specialists trained in burn care.¹
- A burns centre should be equipped and staffed to provide the highest levels of care for the most severely injured, with 24-hour immediate access to a designated, staffed burns operating theatre, critical care facilities, pain management team and laboratory support services.¹⁻⁵
- A burns service should have continuous availability of appropriately skilled anaesthetists who have regular commitments to burns anaesthesia, which should be reflected in their job plans.⁶
- Where burns or plastics procedures will predictably take many hours, consideration needs to be given to provision of rest periods and hand-over for all staff involved in the operative and peri-operative care of the patient.⁷
- Theatre and critical care areas where burns patients are treated should provide the facilities and environment to minimise heat and fluid loss and to manage infection control.^{4,5,8}
- Difficult airway equipment must be available in any area where burns patients are treated.⁹
- Any anaesthetist who may be required to attend patients with burn injury in any emergency department (ED) should have the requisite knowledge and skills to undertake initial assessment of the patient with thermal injury.^{10,11}

Introduction: The importance of burns and plastics anaesthesia services

Demographics of burns and plastics

- A burn-like injury can result from thermal (hot or cold), chemical (acid or alkali) or electrical causes, and some diseases affecting the skin.
- Approximately 175,000 patients per annum with burn or thermal injury present to UK emergency departments (EDs). Approximately 13,000 subsequently require hospital admission; 45% of these are children under 16 years. Approximately 1,000 of these patients will have sustained major burns, i.e. skin burns greater than 15% or more of the body surface area, requiring formal fluid resuscitation and subsequent surgery for removal and graft of the burn area; 50% of this group are children under 16 years of age.¹
- In adults most burns are the result of flame injuries whereas scalds account for over 70% of burns in children.¹²

Anaesthesia services for burns and plastics

- A burns and plastics service will require provision of anaesthesia for a diverse range of surgical procedures in both emergency and elective situations. The anaesthesia service will

also need to deliver appropriate post-operative care and, when required, critical care facilities and acute and chronic pain management for patients requiring the following procedures:

- ◆ Surgery for minor and major hand injuries.
 - ◆ 'Replantation' following traumatic amputations.
 - ◆ Minor and routine cosmetic surgery.
 - ◆ Dressing changes.
 - ◆ Complex surgical procedures such as surgery for head and neck cancers.
 - ◆ Microvascular techniques.
 - ◆ Breast reconstructive surgery.
 - ◆ Surgery for adults and children who have sustained major burn injury.
- Some plastic surgical procedures, e.g. cleft lip and palate surgery, are applicable only to babies and children, and are only available in specialist centres.
 - Microvascular surgical techniques allow the transfer of free vascularised tissue (free flaps) such as skin, muscle and bowel. Anaesthesia is an important factor in determining the outcome of this type of surgery.
 - Most specialised burns and plastics units have anaesthetists with a sub-specialty interest in burns who are involved in the delivery of resuscitation, anaesthesia and critical care. However, patients with thermal injury may present to any hospital emergency department and transfer of these patients from other hospitals to the specialist unit is often necessary. Any anaesthetist who may be exposed to such cases should be adequately trained and competent to deal with the airway and fluid management of these patients. Such transfers require careful co-ordination between the referring hospital and the specialist unit.¹³
 - Burns patients are susceptible to heat and fluid loss, infection and airway difficulties, and require specialist pain control. Theatre and critical care facilities should accommodate these special requirements.

Levels of provision of service

1 Staffing requirements

- 1.1 A burns centre should be equipped and staffed to provide the highest levels of care for the most severely injured, with 24-hour immediate access to a designated burns operating theatre.
- 1.2 A burns service should have continuous availability of appropriately skilled anaesthetists who have

regular commitments to burns anaesthesia. All regular sessions in anaesthesia for burns or plastics patients should be undertaken or supervised by a named consultant or suitably skilled SAS/SD. There must be adequate consultant professional activity (PA) allocation to meet the needs of this specialist service.

- 1.3 Operative procedures can last many hours, may involve significant blood loss, and can require the presence of more than one anaesthetist. Where procedures will predictably take many hours, consideration needs to be given to provision of rest periods for all staff involved in the operative and peri-operative care of the patient. A team approach with a formal hand-over process is an appropriate way of managing the extremely lengthy case to avoid fatigue and provide continuity of care.⁷
- 1.4 Where patients with complex burns need critical care, intensive care doctors who are appropriately trained and experienced in managing burns patients should be available at all times to ensure delivery of care. This needs to be considered in job planning for intensive care consultants working in a burns unit.
- 1.5 Out-of-hours support for microvascular surgical procedures may be most appropriately provided by staff additional to those employed to service other surgical emergencies, in order to prevent delays in the treatment of other patients requiring out-of-hours surgery.

2 Equipment, support services and facilities

Equipment

- 2.1 Patients with thermal injury or cancers to the head or neck can often present difficulties with airway management. Equipment for management of the difficult airway needs to be available in all areas where burns patients are treated, including theatres, EDs and critical care facilities. This equipment must be maintained in good working order.⁹
- 2.2 Patients undergoing extensive burns or microvascular surgical procedures require invasive monitoring during resuscitation, surgery and intensive care.¹⁴ Such equipment should be regularly maintained and be compatible between theatres, anaesthetic rooms and critical care facilities.¹⁵
- 2.3 Regional blockade with local anaesthesia may be appropriate for many patients undergoing microvascular surgery, for both the surgical procedure itself and for post-operative pain relief

Equipment such as nerve stimulators and portable ultrasound machines will be needed to facilitate this.

Facilities

2.4 Severe burns are most appropriately managed in a specifically designed unit. A burns facility equates to a surgical ward within a plastic surgical unit, of which there are 60 across the UK. A burns unit and a burns centre are both wards specifically created and staffed for the management of severe burns and complex injuries.

2.5 Infection is a major threat to patients with a burn injury. These patients should be managed in separate rooms because of the requirement for stringent infection control procedures.

2.6 Heat loss is a significant problem for the burned patient and patients undergoing extensive microvascular surgical procedures. Minimising patient exposure and maintenance of an adequate ambient temperature in the operating theatre, ideally with forced air convection heating, are essential in avoiding hypothermia.

2.7 A large proportion of plastic surgery procedures, both emergency and elective, may be ideally provided for in a day case unit.

Critical care facilities

2.8 The provision of intensive care on a stand-alone burn ward with insufficient workload to maintain the skills and staff within cannot be recommended as a safe arrangement. It has been recommended that burns centres provide a dedicated intensive care facility within the confines of the burns centre with full intensive care support from an adjacent, preferably conjoined, intensive care unit.¹ Critical care beds are frequently provided from an intensive care unit adjacent to the burns centre and guarantee of access to such beds should be acknowledged when planning for the future needs of the service.

2.9 Where units undertake microvascular repair following traumatic amputation, cases may be lengthy and the associated trauma may be significant. If surgery is prolonged and there is significant co-morbidity, a period of post-operative ventilation may be appropriate. Such cases necessitate the provision for post-operative intensive care facilities.

2.10 For patients who may not require admission to an intensive care unit appropriate provision of high dependency facilities must be made.

2.11 If the need for post-operative critical care is anticipated in non-emergency procedures, where possible patients and next of kin should have the opportunity to familiarise themselves with the receiving unit in advance of the proposed surgery.

2.12 Inter-hospital transfer of the burned patient may involve a significant distance of travel and requires full monitoring facilities, an appropriately trained anaesthetist, and in most instances the provision for mechanical ventilation.¹⁵

Pain services

2.13 Management of pain is important during all stages of treatment of thermal injury from the time of acute admission, during procedures such as dressing changes and subsequently should complex neuropathic pain syndromes develop.³ Both acute and chronic pain services will be needed to facilitate optimal pain management.¹

Protocols

2.15 Clear protocols and British Burns Association criteria should be available in a burns centre whose clinicians are required to advise professionals in other hospitals on assessment, resuscitation and stabilisation of the patient with thermal injury.

Support services

2.16 Availability of full laboratory support from haematology, blood transfusion, biochemistry and microbiology departments is essential.

2.17 Provision for adequate pre-operative assessment of patients undergoing major plastic surgical procedures needs to be in place. Further details of pre-operative assessment services can be found elsewhere in this document.

3 Areas of special requirement

Children

3.1 Children with burns should be managed in a unit designed and equipped to care for children and staffed with appropriately trained nurses. The requirements for provision of anaesthesia services for children are covered elsewhere in this document (see Chapter 8: Guidance on the provision of paediatric anaesthesia services).

4 Training and education

4.1 All anaesthetists involved in emergency rotas may be confronted with patients who have sustained a burns injury, with or without smoke inhalation, in emergency departments. Any anaesthetist who may be required to attend such patients should have the requisite knowledge

and skills to undertake initial assessment of the patient with thermal injury, in particular in relation to assessment of smoke inhalation and airway management, and resuscitation and early management of burns.^{10,11}

- 4.2 It is acknowledged that exposure to training in anaesthesia for plastic surgery and/or burns is limited for most trainees in anaesthesia, but when obtained provides unparalleled opportunities to develop skills in regional blockade, management of the difficult airway (see Chapter 5: Guidance on the provision of anaesthesia services for head and neck surgery) and to understand the issues involved in lengthy surgical procedures. Education may need to be supplemented by other teaching and instructional methods such as CD-ROM presentations.
- 4.3 Initial management of burns patients should follow established advanced trauma life support principles of the primary and secondary survey. Training is therefore required in these disciplines.
- 4.4 Intensive one-day courses in the emergency management of severe burns [EMSB] are available to clinicians and allied healthcare professionals.

5 Organisation and administration

- 5.1 The demand for clinical input from anaesthetists in burns units is often acute, unpredictable and urgent. This need should be recognised by provision of associated services.
- 5.2 The complexity of the pathology and surgery of this patient group is significant and frequently requires multidisciplinary input from both medical and surgical specialties. Plastic procedures may require neurosurgical or orthopaedic input.
- 5.3 The ability to respond to the requirement for reception of patients from other hospitals needs to be appropriately reflected in job planning.

Theatre scheduling and management

- 5.4 Anaesthesia for burns surgery requires appropriate allocation of operating theatre time and trained personnel. Laboratory support is central to efficient theatre usage. Clinical indications may require unscheduled lists at relatively short notice.
- 5.5 Where a unit admits large numbers of patients who have sustained hand trauma, detailed attention to organisation of lists and theatre efficiency is required to avoid long waiting times for surgery.

6 Patient Information

- 6.1 Each department should provide written information for patients and relatives on burns and plastic surgical procedures and anaesthesia, including relevant risks.

References

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