

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

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DRAFT

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

Aims and objectives

The objective of this chapter is to promote current best practice for service provision in anaesthesia for burn and plastic surgery. This guidance is intended for use by anaesthetists with responsibilities for service delivery and healthcare managers.

This guideline does not comprehensively describe clinical best practice in burn and plastic surgery anaesthesia, but is primarily concerned with the requirements for the provision of a safe, effective and well-led service, which may be delivered by many different acceptable models. The guidance on provision of anaesthesia for burn-injured patients applies to all burn care services (facility, unit and centre) unless otherwise stated. The guidance on provision of anaesthesia for plastic surgery applies to all settings where this is undertaken, regardless of funding. All age groups, from neonates to the elderly, are included within the guidance unless otherwise stated, reflecting the broad nature of this service.

A wide range of evidence has been rigorously reviewed during the production of this chapter, including recommendations from peer-reviewed publications and national guidelines where available. However, both the authors and the CDG agreed that there is a paucity of level 1 evidence relating to service provision in burn and plastic surgery anaesthesia. In some cases it has been necessary to include recommendations of good practice based on the clinical experience of the CDG. We hope that this document will act as a stimulus to future research.

The recommendations in this chapter will support the RCoA Anaesthesia Clinical Services Accreditation (ACSA) process.

Scope

Objective

To provide and describe current best practice in the provision of anaesthetic services within burn and plastic surgery and/or burn and plastic surgery interventions supported by evidence and national recommendations where available, for anaesthetists with responsibilities for service delivery and healthcare managers.

Target population

Groups that are covered:

- all ages of patients undergoing elective or emergency anaesthesia for burns that meet the thresholds for referral to specialised burn care services.¹
- all ages of patients undergoing elective or emergency anaesthesia for plastic surgery procedures.
- all ages of patients undergoing elective anaesthesia for cosmetic surgery.
- anaesthetic departments that treat patients in the above group.
- anaesthetists working with patients in the above group.

Groups that are not covered:

- provision of burn and plastic services provided by a specialty other than anaesthesia.

Healthcare setting

All settings in which anaesthetic services are provided to patients for burn or plastic surgery and/or interventions.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

Clinical management

Key issues that will be covered:

Key components needed to ensure provision of high quality anaesthetic services for patients requiring burn and plastic surgery procedures which involve anaesthetists.

Areas of provision included:

- levels of provision of service, including (but not restricted to) staffing, equipment, support services and facilities
- areas of special requirement, such as critical care, resuscitation, paediatrics, interventional radiology, endoscopy, satellite sites and the Emergency Department (ED)
- training and education
- research and audit
- organisation and administration
- patient information.

Issues that are not covered:

- Clinical guidelines specifying how healthcare professionals should care for people.
- National level issues.

A note on cosmetic/aesthetic surgery

The Royal College of Surgeons categorises cosmetic treatments as follows:

- level 1a: Invasive – medium to high risk; may require general anaesthetic; may require an overnight stay
- level 1b: Invasive – low to medium risk, usually only requires local anaesthetic, outpatient
- level 2: Minimally invasive – lower risk, usually non-permanent/reversible, day case, local anaesthetic if any.

Anaesthetists only provide services for level 1a or level 1b procedures.

Anaesthetic services provided for any surgery/intervention should adhere to the guidance on the general provision of anaesthetic services, which is detailed in chapter 2 as described above.

This guidance applies to all patients who require anaesthesia or sedation and are under the care of an anaesthetist, regardless of the funding model of the setting.

Anaesthetic services provided for head and neck surgery, for any purpose, should adhere to Chapter 12: Guidelines for the Provision of Anaesthesia Services for ENT, Oral Maxillofacial and Dental surgery 2021.

Introduction

The range of procedures requiring anaesthesia for burn and plastic surgery is wide and includes patients of all ages. These range from those with common minor injuries (dog bites, nail bed injuries), to planned congenital cleft lip and palate and hand procedures, and less frequently major burns and free-flap cases requiring multidisciplinary perioperative critical care. The recommendations in this chapter should be read in conjunction with those for general surgery, outlined in chapter 2, which unless otherwise stated, still apply.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

Burns

Approximately 140,000 patients sustain burn injuries each year, with approximately 10% requiring admission to hospital, of which 50% are children. Burn care is stratified with four operational delivery networks in England and Wales and one in Scotland. Services are tiered for children and adults, following nationally agreed referral criteria, with referral to Burn Facilities, Burn Units or Burn Centres dependent on the severity and complexity of the injury and locality.¹ The Burn Care Standards were revised in 2018 to allow services to be peer reviewed against agreed benchmarks for specialist infrastructure and staff.² The recommendations in this chapter apply to all tiers of burn care services, unless otherwise stated within individual recommendations.

Anaesthetists who care for burn patients should be part of a multidisciplinary team and actively partaking in collective decision-making, inputting into ward management (including dressing changes and analgesia), critical care, and multidisciplinary team meetings.

Understanding the complexity of surgery for major burns surgery is vital. This includes the need to be prepared for massive blood loss, difficulties with monitoring and venous access, management of heat loss, prevention of thromboembolic events, and sepsis; as well as complex analgesia requirements, and an understanding of the impact on the patient and their family, and the need for ongoing care for many years ahead. Anaesthetic services are not confined to provision of care in a theatre or critical care environment. Provision of remote analgesia, sedation and anaesthesia comes with its own potential difficulties with regard to monitoring and access to anaesthetic equipment. Services need to be able to provide care to meet standards for the admission to theatre of a patient with a major burn with little notice. Repeat and prolonged surgery for major burns is likely to continue for many weeks to months, with an impact on facilities, staff and equipment. Age appropriate services for anaesthesia and critical care must meet national and RCoA standards.

Plastic Surgery

Plastic surgery describes a reconstructive procedure designed to restore form and function to the body. It covers all aspects of wound healing and reconstruction after congenital, acquired (including secondary to cancer) or traumatic tissue defects. Other common conditions that can require plastic surgery include reconstruction of large skin defects, pressure sores and other chronic wounds, venous and other leg ulcers, and the results of devastating infections. Clinicians anaesthetising for plastic surgery procedures need an understanding of the principles of free-flap surgery. Age appropriate staff and facilities are required for complex surgery for congenital conditions, including cleft palate, congenital hand deformities, and trauma procedures. Prolonged procedures are common and require attention to detail regarding positioning, fluid management, blood flow, and prevention of thromboembolic complications.

Aesthetic Surgery

Aesthetic surgery is surgery carried out solely to change a person's appearance. Where a patient is receiving anaesthesia or sedation and is under the care of an anaesthetist for this type of surgery, the recommendations in this chapter and those relating to all types of surgery in chapter 2, still apply, regardless of the funding model of the setting.

Recommendations

The grade of evidence and the overall strength of each recommendation are tabulated in Appendix I. These recommendations should be read in conjunction with chapters 7,³ 10,⁴ 12,⁵ and 16,⁶ along with the Guidelines for the provision of intensive care services⁷ and the Paediatric Intensive Care Society's 'Quality Standards for the care of critically ill children'⁸ as there is considerable overlap.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

1 Staffing requirements

- 1.1 An appropriately trained and experienced anaesthetist with regular commitments to burn and plastic surgery should be present during the conduct of general and regional anaesthesia for operative procedures, including those procedures requiring intravenous sedation where it has been agreed that this will be provided by the anaesthetic department.
- 1.2 An anaesthetist should be physically present when a general anaesthetic is administered. In exceptional circumstances, anaesthetists working singlehandedly may be called on briefly to assist with or perform a lifesaving procedure nearby. This is a matter for individual judgement, and the dedicated anaesthetic assistant should be present to monitor the unattended patient.⁹
- 1.3 A clinical lead for burn and plastic surgery anaesthesia should be appointed in each hospital providing anaesthesia for this specialty. The clinical lead (see [Glossary](#)) anaesthetist in burn and plastic surgery units will be responsible for the provision of service, teaching, production of guidelines, management, research, and audit, and be able to support quality improvement initiatives. Sufficient time should be included in job plans to support these activities and the continuing professional development of those anaesthetists.
- 1.4 Anaesthetists should always be supported by dedicated, appropriately skilled and trained assistants, and the recovery facilities should be staffed during all operating hours and have appropriate anaesthetic support until the patient meets agreed discharge criteria.¹⁰
- 1.5 There should be adequate numbers of competent medical and non-medical staff to provide 24/7 cover for emergency burn and plastics anaesthesia.¹¹
- 1.6 Where a paediatric service is being provided, all of the medical and non-medical staff, including recovery room staff, should have relevant and recent training in paediatric anaesthesia and resuscitation.^{12,13,14}
- 1.7 There should be specific consultant programmed activity for burn anaesthesia in hospitals where burn surgery is undertaken.¹²
- 1.8 An appropriately skilled or experienced Stage 2 or above resident anaesthetist should be available immediately at all times. Appropriately experienced staff grade, associate specialist and specialty (SAS) doctors and on-call consultants should also be available within 30 minutes. Where paediatric services are provided, consultant paediatric anaesthetists should be available.¹²
- 1.9 There should be sufficient programmed activity time available for anaesthetists to assess patients perioperatively and attend multidisciplinary ward rounds.
- 1.10 There should be sufficient programmed activity to provide support to sedation and analgesia services for burn patients.

2 Equipment, services and facilities

General equipment, services and facilities for anaesthesia are described in chapters 2. Additional specialised recommendations for burn and plastic surgery anaesthesia are given below.

Equipment

- 2.1 Appropriate equipment should be available to enable prone positioning of patients.^{15,16}

Airway and ventilation

Burns and plastic surgery patients have a higher incidence of difficult airway.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

- 167 2.2 A difficult airway trolley, including the equipment necessary for failed intubation and surgical
168 airway access, should be available.¹⁷ Appropriate specialist intubation equipment, including
169 fibre-optic intubation equipment should be available. A fibre-optic scope should be
170 available to assess inhalational injury.^{18,19,20,21,22,23}
- 171 2.3 Equipment necessary for the formation of a surgical airway, including front of neck access
172 (FONA) should be available.^{24,25}
- 173 2.4 Ventilators with advanced ventilatory mode functions should be available.²⁶
- 174 2.5 Burns anaesthetists should have access to and knowledge of nasendoscopy.
- 175 **Monitoring**
- 176 Physiological monitoring can be difficult in patients with major burns, as there may be a lack of sites
177 available for probes, cuffs, and electrodes.^{18,27}
- 178 2.6 Equipment to comply with the Association of Anaesthetists standards for anaesthetic
179 monitoring should be available.²⁸
- 180 2.7 Pulse-oximetry ear probes should be available.^{27,29}
- 181 2.8 It may be difficult to make the electrocardiogram (ECG) gel electrodes adhere to damaged
182 skin. ECG electrodes could be sited away from the chest²⁷ or could be attached to crocodile
183 clips, surgical staples or steel sutures placed in burned areas.^{18,22,30}
- 184 2.9 Invasive arterial blood pressure monitoring should be available for extensive burn
185 debridement and major plastic surgery, to allow the benefits of continuous pressure
186 monitoring, pulse-contour analysis and ease of blood sampling.^{18,21,22,30}
- 187 2.10 An arterial blood-gas machine should be immediately available.
- 188 2.11 Equipment for central venous pressure, core and peripheral temperature, and urinary output
189 monitoring should be available.^{31,32}
- 190 2.12 Equipment to measure carbon monoxide levels in blood should be available.¹⁸
- 191 **Equipment for delivery of anaesthesia services outside the operating room**
- 192 2.13 Many burn-injured patients will require frequent sedation or anaesthesia for procedures
193 outside the operating theatre. These should take place in a specified location that is
194 provided with all the equipment required for the safe delivery of anaesthesia and to meet
195 minimum monitoring standards.^{3,28,33}
- 196 2.14 Equipment, such as TV screens and tablet computers, for distraction during painful
197 procedures, including dressing changes, should be considered.^{34,35,36}
- 198 **Equipment for temperature management**
- 199 Intraoperative hypothermia poses a significant risk to patients undergoing both burns and plastic
200 surgery. The combination of lengthy procedures, large exposed body areas, administration of intra-
201 venous fluids together with a low ambient temperature may lead to marked intraoperative
202 hypothermia. The impact and consequences of hypothermia are serious and deleterious in this
203 patient group with worse overall outcomes following burns and plastic surgery. Specifically, effects
204 can include cardiac events and impairment of coagulation resulting in increased blood loss. There
205 is also an association with higher incidence of surgical wound site infections and prolonged hospital
206 stay all of which may lead to higher costs associated with surgery.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

It has also been observed that warmed patients have lower intraoperative analgesic requirements and shorter recovery times.^{37,37,38}

2.15 Core and peripheral temperature monitoring equipment should be available and easily accessible.^{18,22,30}

2.16 Active warming equipment should be available and easily accessible, including warmed blankets for body areas not being operated on, forced-air warming devices^{18,22,30,39} and devices for heating mattresses.³²

2.17 Consideration should also be given to the provision of radiant heaters and more sophisticated warming devices.¹⁸

2.18 Warmed intravenous fluids should be available.^{18,32}

Thromboprophylaxis

Burn patients and patients undergoing prolonged plastic surgery are at particular risk of venous thromboembolic (VTE) complication.⁴⁰

2.19 For burn and plastic surgery patients, mechanical methods of VTE prophylaxis, including graduated compression stockings, intermittent pneumatic compression devices, and venous foot pumps, should be available for any procedure that lasts more than one hour, and for all patients receiving general anaesthesia.^{32,41}

Blood transfusion

Debridement of major burns has the potential for significant blood loss.

2.20 Equipment for blood transfusion should be available, including rapid transfusion devices.

2.21 Point of care testing for coagulation and haemoglobin, including thromboelastometry, could be considered to allow targeted use of blood products in major surgery for burns.^{42,43}

2.22 For burns procedures where significant fluid loss is anticipated, blood and blood products should be immediately available.^{12,18,21,22}

2.23 Advice from a haematologist should be available at all times.

Services

2.24 Psychology and physiotherapy should be available to help manage the consequences of complex repetitive anaesthesia, and of the sedation and analgesia requirements of burn-injured patients.^{12,44}

2.25 There should be access to an acute pain service.^{12,27,45,46}

2.26 There should be adequate, age-appropriate critical care facilities, including high-dependency and critical care units fulfilling national standards, to allow the timely admission of patients who require these services following surgery, including those with resuscitation burns and undergoing free-flap surgery.^{7,12,31,47,48}

Facilities

2.27 Burn care services should have access to an appropriately sized, temperature and humidity controlled theatre at all times, with a maximum temperature setting of at least 30°C.^{12,22}

2.28 A burns theatre should be located in reasonable proximity to any service providing critical care for burn patients.¹²

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

2.29 A dedicated burns theatre should be adequately stocked and resourced. Theatre anaesthetic equipment and transport monitoring should be compatible with that used in the critical care rooms. Single use patient items are preferred, and protocol-based cleaning is needed between cases.¹⁸

2.30 Anaesthetic led sedation for dressing changes should take place in rooms equipped with monitoring, piped medical gases, scavenging (where needed), suction, means of ventilation, and drug-infusion pumps.⁴⁹

2.31 Access to a high dependency unit for patients undergoing reconstructive surgery should be available.⁵⁰

3 Areas of special requirement

Children

General recommendations for the provision of anaesthetic services for children are described in [chapter 10](#).³

3.1 Wherever children and young people undergo anaesthesia, their particular needs should be recognised, and they should be managed in age appropriate facilities and be looked after by staff with relevant experience and ongoing training.³

3.2 Children with burns should be cared for in burn services in accordance with the National Burns Care Referral Guidance and with staff and facilities according to the Burn Care Standards.¹²

3.3 Anaesthetists looking after paediatric burns patients should be trained in paediatric multi modal pain management.⁵¹

3.4 Children requiring surgery for cleft lip and palate should be treated by a specialist cleft service.

3.5 Wherever sedation services for paediatric burn management exist, anaesthetists should be involved with setting up, monitoring and auditing the service.

3.6 Anaesthetists who prescribe sedation for paediatric burn patients should have received appropriate training.^{14, 52}

3.7 Anaesthetists who prescribe oral sedation for paediatric burn patients do not need to be physically present for the procedure for which sedation is being prescribed, but they, or other suitably trained and experienced staff, need to be available to return immediately if the need arises.⁵³

3.8 General anaesthesia may be more appropriate than sedation for an individual. If general anaesthesia is performed in non-theatre environments, the recommendations in chapter 7 should be followed.³

3.9 Children undergoing anaesthesia and their families should be offered input from play specialists to help prepare the child for anaesthesia.¹²

Child protection

It is essential to exclude non-accidental injury in children with burn injuries.

3.10 Healthcare workers, including the anaesthetist, must be aware of the local policy for child protection, and they have an obligation to document and report any concerns to a responsible individual.⁵⁴

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

3.11 Hospitals must have guidelines in place to ensure the safety of children admitted to hospital, monitor injured children known to be at risk, and identify concerns arising from any injury or pattern of injuries.^{27,55} They must provide the appropriate training related to these guidelines.

Critical care

Major burn injuries and complex plastic surgery cases often require critical care services. Recommendations for the provision of such services are described in Guidelines for the provision of intensive care services.⁷

3.12 Staffing models should promote shared care between burn and critical care teams as this may improve safety.⁵⁶

Procedural sedation

Dressing changes, with or without showering or bathing, are a frequent accompaniment to the early phase of burn treatment. Where possible, they are conducted without general anaesthesia.

3.13 Any sedation service should be age appropriate, with general anaesthesia an option available for some cases.^{27,49,53,57,58}

4 Training and education

Different levels of training and ongoing education are required, depending on the level of service provision provided by hospitals.

4.1 Patients requiring burn or plastic surgery procedures should be managed by anaesthetists who have an appropriate level of training in this field, have regular commitment to the burn and plastic surgery specialty, and have acquired the relevant knowledge and skills needed to care for these patients.

4.2 In order to maintain the necessary repertoire of skills, anaesthetists providing a burn and plastic surgery anaesthetic service should have a regular commitment to the specialty, and adequate time must be made for them to participate in a range of relevant continuing medical education (CPD) activities.

4.3 Because burn care is a small specialty with relatively few anaesthetists able to participate in burn care during training, each service should have plans in place to establish and maintain an appropriate anaesthetic workforce.⁵⁹

4.4 A small number of centres perform burn surgery. These centres should offer external training opportunities for anaesthetists, nursing staff, physiotherapists and other members of the multidisciplinary team.⁶⁰

4.5 Anaesthetists who provide emergency care outside burn services should be trained in the initial management of the patient with severe burns, including timely emergency assessment, resuscitation, and transfer to a burns service.⁶¹

5 Organisation and administration

Burns

Requirements for links to other departments

Teams rather than individuals deliver care of the burn-injured patient. Effective teamwork can increase safety, whilst poor teamwork can have the opposite effect. It is therefore important that burn services anaesthetists develop good working relationships and lines of communication with other healthcare professionals involved in burn patients' care.⁶²

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

328 5.1 The anaesthetist should be part of a burns multidisciplinary team.¹²

329 Organisation of lists

330 5.2 Burn surgery operating lists should be scheduled in working hours.⁶³

331 5.3 Additional burn surgery operating lists may be planned at weekends and bank holidays to
332 prevent unnecessary delays in treatment.⁶³

333 5.4 Any scheduled burn lists should be organised and staffed by appropriately trained
334 anaesthetists and surgeons, working regularly in that area, who have no conflicting clinical
335 commitments.⁶³

336 5.5 Patients requiring planned or emergency burn surgery should be cared for by theatre staff
337 with current experience in burn care.¹² Anaesthetists who provide emergency care outside
338 burn services should be trained to manage the initial treatment of the patient with severe
339 burns, including timely emergency assessment, resuscitation, and transfer to a burns service.

340 5.6 Theatre and recovery staffing arrangements should be compliant with national
341 guidelines.^{10,28,64}

342 5.7 Safe sedation and analgesia for burn injured patients undergoing painful procedures outside
343 of the operating theatre environment should be available, for example staple removal,
344 wound dressing and showering.^{3,28,49,65}

345 5.8 A nurse led sedation service should be supported by an appropriately trained and
346 experienced anaesthetist, at all times.⁵³

347 Contingency plans for urgent procedures

348 5.9 Timely access to theatre staff with experience in burn care should be available outside of
349 normal working hours in burn centres and units.¹²

350 5.10 Theatre teams should be informed whenever a major burn case is expected or has arrived. A
351 member of the theatre team should be responsible for ensuring the availability of
352 appropriately trained staff and facilities.¹²

353 5.11 All specialist burn services should participate in major incident planning with national and
354 regional networks.¹²

355 5.12 Providers of emergency care outside burn services should have the knowledge and
356 equipment needed to treat burn-injured patients should there be an extended delay in
357 transporting the patients to a burn centre, as might be the case in a mass casualty incident.⁶⁶

358 5.13 Transfer of the critically ill, burn-injured patient between services should follow national
359 guidelines.^{67,68,69}

360 5.14 Burn service leaders should actively engage in local and regional surge in demand planning.

361 5.15 Each burn service should prepare to provide mutual aid to other burn services who may be
362 overwhelmed.

363 5.16 Early communication between service leads is vital.⁷⁰

364 Policies

365 5.17 Agreed local clinical guidelines should be in use which have been produced by an
366 appropriately constituted multiprofessional team, comprising anaesthetists, specialist nurses,

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

surgeons, critical care clinicians, pharmacists, specialty consultants and managers. These guidelines should cover at least the following:

- assessment and management of pain and pruritis, including the recording of pain and itch scores^{11,71}
- sedation for painful procedures ¹²
- initial assessment and management of burn-injured patients ¹²
- recognition and management of the acutely unwell and deteriorating patient, including the need to escalate care and transfer to a higher level of care ¹²
- assessment and management of burns to the face and airway ¹²
- local clinical guideline on the analgesia and sedation for the use of enzymatic debridement of burn injuries
- transfer policy, including the resources required ¹²
- all trusts with an emergency department should have a plan for the management of major incidents involving burn-injured patients^{72,73} which makes reference to the national burn major incident plan¹²
- management of multi-drug resistant infections
- perioperative temperature control^{18,74}
- thromboprophylaxis
- major haemorrhage and transfusion policy⁴²
- provision of sedation and anaesthesia outside of the operating theatre environment ⁶⁵
- a lipid rescue protocol should be in place where local anaesthetic infiltration is used.⁷⁵

Plastic surgery

Organisation of lists

5.18 Elective plastic surgery operating lists should be separated from those for plastic surgery trauma to allow efficient planning in advance for elective cases, prevent cancellation of elective cases and allow a flexible response to emergencies.⁶³

5.19 Hospitals should provide scheduled local anaesthetic lists, using a dedicated area for initiating and assessing local nerve blocks. Organising cases in this way fosters the development and maintenance of expertise in the anaesthetists and support staff, and minimises delay between cases.

5.20 For planned burn and plastic surgery there should be a preoperative assessment clinic organised as described in [GPAS chapter 2: Guidelines for the Provision of Anaesthesia Services for the Perioperative Care of Elective and Urgent Care Patients](#).

5.21 There should be specific guidelines for assessing a suspected difficult airway, for example in patients with head and neck malignancy and in reconstructive burn surgery.⁷⁶

5.22 Where major elective reconstructive surgery requiring postoperative critical care provision is undertaken, the funding for, and provision of, these beds should be planned to meet the demands of the service, so that unnecessary cancellations can be minimised.

5.23 All major head and neck surgery should be overseen by a named consultant anaesthetist with a subspecialty interest in this area.⁷⁷

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

407 5.24 There should be funding for, and provision of, staff trained in post-operative monitoring of free
408 tissue transfers and replanted tissues to reduce the incidence of flap failure.^{47,78}

409 5.25 When very long surgical procedures are scheduled on a regular basis, appropriate funding
410 and resources should be in place to support long duration lists.

411 Contingency plans for urgent procedures

412 5.26 Planned acute plastic surgery trauma lists should take place daily in working hours to prevent
413 unnecessary overnight operating.⁶³

414 5.27 Patients should not unnecessarily undergo surgery at night. In order to prevent this, planned
415 operating lists may be necessary in the evening and weekend, in addition to scheduled
416 weekday trauma sessions.^{63, 79}

417 5.28 Any scheduled plastic surgery trauma lists should be organised and staffed by senior
418 anaesthetists and surgeons, working regularly in that area and without conflicting clinical
419 commitments.⁶³

420 5.29 Departments should develop and regularly review burn and plastic surgery referral guidelines
421 and major incident plans.⁶⁶

422 Policies

423 5.30 Agreed local clinical guidelines should be in use, produced by an appropriately constituted
424 multiprofessional team, comprising anaesthetists, specialist nurses, surgeons, critical care
425 clinicians, pharmacists, specialty consultants and managers. These guidelines should cover at
426 least the following:

- 427 • airway management, including follow up for difficult patients (both plastic surgery and
428 burn reconstructive surgery)⁷⁶
- 429 • monitoring of free flaps⁴⁷
- 430 • monitoring of local anaesthetic blocks
- 431 • thromboprophylaxis⁴¹
- 432 • perioperative warming.³⁸

433 6 Financial Considerations

434 The costs of burn care are high due to the combination of specialised treatment and the often
435 long lengths of stay.⁸⁰ Part of the methodology used in this chapter is a consideration of the
436 financial impact for each of the recommendations made. Very few of the literature sources
437 referenced have included financial analysis.

438 The majority of the recommendations are not new, but are a synthesis of pre-existing work. Current
439 compliance rates with the recommendations are unknown, and so it is not possible to calculate the
440 financial impact of their implementation in future practice. It is impossible to make an overall
441 assessment of the financial impact of these recommendations with the currently available
442 information.

443 7 Research, audit and quality improvement

444 7.1 Anaesthesia for burn and plastic surgery should be included in regular anaesthetic
445 department mortality and morbidity meetings, audit meetings and quality improvement
446 programmes. Burns Services should actively participate in the network and national mortality
447 meetings.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

7.2 Multidisciplinary audit meetings involving surgical teams should be encouraged, where mortality and morbidity should be discussed alongside all serious untoward incidents relative to the service.

7.3 Anaesthetic departments should be integrated into the overall clinical audit and governance structure of the hospital. Each anaesthetic department undertaking anaesthesia for burn and plastic surgery should have a system in place for the routine audit of important areas such as:

- perioperative temperature management³⁷
- optimisation of perioperative blood transfusions⁴²
- management of perioperative pain and quality of analgesia⁸¹
- management of perioperative blood-pressure control in plastic surgery⁸²
- management of post-burn pruritus.⁸³

7.4 Burn services should undergo regular peer reviews within the national burn care network.¹²

7.5 Departments of anaesthesia should be encouraged to develop local key quality indicators relevant to their activity, which will assist in the process of supporting quality improvement.¹²

7.6 Research in anaesthesia for burn and plastic surgery should be encouraged. Staff members undertaking research should have received appropriate training.⁸⁴

8 Implementation Support

The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the RCoA, aims to provide support for departments of anaesthesia to implement the recommendations contained in the GPAS chapters. The scheme provides a set of standards, and asks departments of anaesthesia to benchmark themselves against these using a self-assessment form available on the RCoA website. Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are reviewed annually and republished approximately four months after GPAS review and republication to ensure that they reflect current GPAS recommendations. ACSA standards include links to the relevant GPAS recommendations so that departments can refer to them while working through their gap analyses.

Departments of anaesthesia can subscribe to the ACSA process on payment of an appropriate fee. Once subscribed, they are provided with a 'College guide' (a member of the RCoA working group that oversees the process), or an experienced reviewer to assist them with identifying actions required to meet the standards. Departments must demonstrate adherence to all 'priority one' standards listed in the standards document to receive accreditation from the RCoA. This is confirmed during a visit to the department by a group of four ACSA reviewers (two clinical reviewers, a lay reviewer and an administrator), who submit a report back to the ACSA committee.

The ACSA committee has committed to building a 'good practice library', which will be used to collect and share documentation such as policies and checklists, as well as case studies of how departments have overcome barriers to implementation of the standards, or have implemented the standards in innovative ways.

One of the outcomes of the ACSA process is to test the standards (and by doing so to test the GPAS recommendations) to ensure that they can be implemented by departments of anaesthesia and to consider any difficulties that may result from implementation. The ACSA committee has committed to measuring and reporting feedback of this type from departments engaging in the scheme back to the CDGs updating the guidance via the GPAS technical team.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

9 Patient Information

The Royal College of Anaesthetists have developed a range of [Trusted Information Creator Kitemark](#) accredited patient information resources that can be accessed from our [website](#). Our main leaflets are now translated into more than 20 languages, including Welsh.

Patients with difficult airways

9.1 When an awake fibre-optic intubation is required, patients should be informed. As part of a difficult airway follow up, patients should be informed verbally and in writing about any airway problem the anaesthetist encountered, and be advised to bring this to the attention of anaesthetists during any future preoperative assessment. The patient's GP should also be informed in writing.⁸⁵

Regional anaesthesia

9.2 Where alternative techniques are available, the patient's preference must be fully taken into account.⁸⁶

Consent

9.3 Anaesthetic risks must be communicated appropriately to the patient as part of the consent process.⁸⁶ The Royal College of Anaesthetists series of leaflets on 'The Risks of Anaesthesia' could aid this discussion.⁸⁷

9.4 There is a high incidence of "awareness" under sedation and subsequent post-traumatic stress. The anaesthetist should obtain informed consent from the patient before any sedation is administered. This includes using descriptions of levels of sedation from the patient's perspective.⁸⁸

Areas for future development

Topics in anaesthesia for burn and plastic surgery in need of further research:

- adjuncts to pain control in burn injured patients³⁴
- effective treatments for post burn pruritus^{83,89}
- core burn outcomes for research⁹⁰
- fluid management
- use of technology, such as telemedicine, to help burns assessment
- financial implications of anaesthesia for burn and plastic surgery.

Glossary

Clinical lead - SAS doctors undertaking lead roles should be autonomously practicing doctors who have competence, experience and communication skills in the specialist area equivalent to consultant colleagues. They should usually have experience in teaching and education relevant to the role and they should participate in Quality Improvement and CPD activities. Individuals should be fully supported by their Clinical Director and be provided with adequate time and resources to allow them to effectively undertake the lead role.

Chapter 17

Guidelines for the Provision of Anaesthesia Services for Burn and Plastics Surgery 2022

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Chapter 17

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