Guidelines for the provision of Anaesthetic Services

Introduction

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Acknowledgements

Glossary
Introduction

Dr Peter Nightingale, President

Guidelines for the Provision of Anaesthetic Services (GPAS) is now a well-established and valued publication produced by the Royal College of Anaesthetists for anaesthetists with managerial responsibilities and other healthcare managers. First appearing in 1994 as ‘Guidance for Purchasers’, it has been revised under the current title twice, first in 1999 and again in 2004. This new edition for 2009 incorporates developments in clinical practice, service delivery and education in the last five years, while retaining the original format. A new section has been added to describe anaesthetic services provided outside the operating theatre. The sections on pain management reflect the additional authority derived from the establishment of the new Faculty of Pain Medicine. Each section can be downloaded from the College website, beginning with the general principles for delivering anaesthetic services, followed by specialist areas of practice.

Guidance and standards documents should always be seen as works in progress in which a balance must be struck between general principles and fine detail, between expert opinion and evidence, and between minimal and aspirational standards. They do not replace the need for experienced clinical judgement exercised by individual anaesthetists in the best interests of their patients. Anaesthesia was one of the first clinical disciplines to set standards of practice supported by audit of outcomes, and we therefore continue to make an explicit link between standards and audit by providing hyperlinks to the relevant sections in another of our publications: ‘Raising the Standard: A Compendium of Audit Recipes’. We welcome comments and advice from clinicians and managers which will enable new information obtained from audit and research to be incorporated in GPAS regularly, to ensure that the College’s guidance reflects, and supports, best practice.

In developing these guidelines we have relied on the experience of individual specialists and specialist organisations and societies as our main resource, supported by evidence where available. The editorial process has been managed by Dr John Curran and Professor Julian Bion on behalf of Council, Dr Helen Wise as external reviewer, and most particularly by Mrs Edwina Jones of our Professional Standards Directorate. Each section has been written or revised by one or more content experts, and the college is grateful to them for their work on behalf of the profession and the patients we serve.
Statement of Intent

This document should be considered to contain guidance only. It is not intended to replace the clinical judgement of the individual anaesthetist; the freedom to determine the most appropriate treatment for individual patients in a particular place at a specific moment should not be constrained by a rigid application of this guidance.

The document is presented as a collection of guidance chapters in a binder and each has been developed with reference to the circumstances which can generally be expected to prevail in each care area. It is the view of the Royal College of Anaesthetists that it must be the responsibility of the individual reader to take into account particular local circumstances when applying the recommendations of each chapter.

Every chapter within the guidance document has been prepared on the strength of the best information available at the time of writing; therefore, the user should take into account any information, research or other material which may have been published subsequently. Wherever practicable, chapters will be reviewed regularly and re-issued at intervals no greater than five years from the date of first publication in this binder. Chapters will be reviewed on a rolling process and will be produced in a form that allows each to be removed as stand-alone guidance.

Whilst the College has endeavoured to ensure that each chapter is as current as possible at the time it was prepared, it can take no responsibility for matters arising from circumstances which may have changed, or information or material which may have become available subsequently.

June 2010
# Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AAGBI</td>
<td>Association of Anaesthetists of Great Britain and Ireland</td>
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<tr>
<td>ALS</td>
<td>Advanced life support</td>
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<tr>
<td>APAGBI</td>
<td>Association of Paediatric Anaesthetists of Great Britain and Ireland</td>
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<tr>
<td>APLS</td>
<td>Advanced paediatric life support</td>
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<td>ASA</td>
<td>American Society of Anesthesiologists</td>
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<td>ATLS</td>
<td>Advanced trauma life support</td>
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<td>BMA</td>
<td>British Medical Association</td>
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<td>BOAS</td>
<td>British Ophthalmic Anaesthesia Society</td>
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<tr>
<td>CCST</td>
<td>Certificate of Completion of Specialty Training</td>
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<tr>
<td>CCT</td>
<td>Certificate of Completion of Training</td>
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<tr>
<td>CEMACH</td>
<td>Confidential Enquiry into Maternal and Child Health</td>
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<td>CNST</td>
<td>Clinical Negligence Scheme for Trusts</td>
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<tr>
<td>COSHH</td>
<td>Control Of Substances Hazardous to Health</td>
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<tr>
<td>CPD</td>
<td>Continuing professional development</td>
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<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
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<tr>
<td>DH</td>
<td>Department of Health</td>
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<tr>
<td>DNA</td>
<td>Did not attend</td>
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<tr>
<td>DSU</td>
<td>Day surgery unit</td>
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<tr>
<td>EWTD</td>
<td>European Working Time Directive</td>
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<tr>
<td>FPMRCA</td>
<td>Faculty of Pain Medicine, Royal College of Anaesthetists</td>
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<tr>
<td>GMC</td>
<td>General Medical Council</td>
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<tr>
<td>HDU</td>
<td>High dependency unit</td>
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<tr>
<td>ICU</td>
<td>Intensive care unit</td>
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<tr>
<td>IVRA</td>
<td>Intravenous regional anaesthesia</td>
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<tr>
<td>LA</td>
<td>Local anaesthesia/anaesthetic</td>
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<tr>
<td>NASGBI</td>
<td>Neuroanaesthesia Society of Great Britain and Ireland</td>
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<td>NCEPOD</td>
<td>National Confidential Enquiry into Patient Outcome and Death (Formerly the National Confidential Enquiry into Perioperative Deaths)</td>
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<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>OAA</td>
<td>Obstetric Anaesthetists' Association</td>
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<tr>
<td>ODA</td>
<td>Operating department assistant</td>
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<td>ODP</td>
<td>Operating department practitioner</td>
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<td>PA</td>
<td>Programmed activity</td>
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<td>PCA</td>
<td>Patient controlled analgesia</td>
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<td>PICU</td>
<td>Paediatric intensive care unit</td>
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<td>PMETB</td>
<td>Postgraduate Medical Education and Training Board</td>
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<td>PONV</td>
<td>Post-operative nausea and vomiting</td>
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<tr>
<td>PSC</td>
<td>Professional Standards Committee (RCoA)</td>
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<td>RCoA</td>
<td>Royal College of Anaesthetists</td>
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<td>RCN</td>
<td>Royal College of Nursing</td>
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<tr>
<td>RCUK</td>
<td>Resuscitation Council (UK)</td>
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<td>RO</td>
<td>Resuscitation officer</td>
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<tr>
<td>SAS/SD</td>
<td>Staff and Associate Specialist/Specialty Doctor</td>
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<tr>
<td>ST</td>
<td>Speciality Trainee</td>
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<tr>
<td>TARN</td>
<td>Trauma Audit and Research Network</td>
</tr>
<tr>
<td>TOE</td>
<td>Transoesophageal echo</td>
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# Acknowledgements

The President has identified some key contributors for the development of this guidance in his Introduction. However, there are many more individuals and organisations who have contributed to the revision of the older chapters and the production of their replacements. We hope to have included all those who generously provided their time and expertise below.

<table>
<thead>
<tr>
<th>Section</th>
<th>Lead Adviser/s</th>
<th>Reviewer/s</th>
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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

- Up-to-date directives, guidance and standards of safe specific anaesthetic practice should be referred to when considering the provision of all anaesthetic services. This includes publications from the General Medical Council (GMC), the Royal College of Anaesthetists (RCoA) and the Association of Anaesthetists of Great Britain and Ireland (AAGBI), government bodies such as the Department of Health (DH) and its Arm’s Length Bodies (available on the DH website) and those issued by other recognised learned societies.¹⁻⁵

- An appropriately trained and experienced anaesthetist must be present throughout the conduct of all general and regional anaesthesia for operative procedures, including those procedures requiring intravenous sedation.⁶

- All patients requiring the services of an anaesthetist must undergo appropriate pre-operative assessment and be seen by an anaesthetist before the operation.⁶

- Dedicated skilled assistance for the anaesthetist must be provided in every situation where anaesthesia and sedation are administered.⁷

- Appropriately trained and competent staff must provide care for all patients recovering from anaesthesia or sedation.⁷,⁸

- All anaesthetic and monitoring equipment must comply with standards set by the AAGBI.⁶

- All anaesthetic equipment must be fully serviced at the regular intervals designated by the manufacturer and a service record must be maintained. All equipment should be checked by the user before use.⁹

- Departments of anaesthesia must contribute to an acute pain relief service and either have or provide access to a non-acute (‘chronic’) pain service with nominated lead consultants for each.¹⁰

- Where inter-hospital transfers require an anaesthetist, appropriately trained staff, dedicated equipment and satisfactory safety and personal insurance arrangements must be in place.¹¹

- Departmental guidelines facilitating good anaesthetic practice in accordance with good medical practice and recent national guidance should be in place, observed, regularly reviewed and issued to all members of the anaesthetic department.¹²

- Anaesthetic records should contain the minimum recommended dataset.¹²,¹³

- There must be effective mechanisms for the ‘hand-over’ both of the care of individual patients, and of overall services, providing continuity of care.¹
Chapter 1
Key points, revised 2009

- Appropriate and sufficient secretarial, administrative and information technology support must be provided for staff working in departments of anaesthesia.13,14
- Appropriate facilities and accommodation must be available for all anaesthetists.15
- Continuing professional development and revalidation are mandatory requirements for all anaesthetists, including non-consultant and non-training grades.1 Employers, trusts or otherwise, should ensure that adequate funding is available for this purpose.12,16
- All staff in clinical contact with patients must be appropriately trained in resuscitation skills and maintain their competence in them.17
- Workload, experience and supervision of trainee staff must satisfy the requirements of the RCoA and AAGBI and training standards must satisfy the PMETB requirements.18–21
- A College Tutor representing the Royal College of Anaesthetists or consultant-in-charge of training must be appointed to organise and co-ordinate anaesthetic training. Dedicated time and administrative support should be provided for this activity, and a second Tutor is recommended for larger departments.22
- Trainee rota must be compliant with the ‘New Deal’ and current Working Time Directive (WTD) regulations without having a deleterious effect on medical training.23–25
- Regular audit and review by departments of anaesthesia to measure activity and to quality assure anaesthetic practice and performance against national standards are essential.12
- All anaesthetists should participate in the national anaesthetic audits projects and must contribute to confidential enquiries. Where possible information should be provided for other national and local audits.1,26,27
- Departments of anaesthesia must identify a consultant who is responsible for ensuring that all lists are covered by suitably trained anaesthetists. This consultant should be part of a Theatre Management Group to facilitate optimal theatre efficiency.12
- The anaesthetic department must have a clinical director or lead clinician who is an anaesthetist, and appoint lead clinicians who are responsible for essential components of the service. This work must be recognised in the consultants’ job plans.12
- A critical incident reporting system must be in place and a critical incident co-ordinator appointed. Regular audit, critical incident, morbidity and mortality and managerial meetings should be held and appropriately recorded.12
- Adequate arrangements, including time for preparation of documentation, must be made for annual appraisal of all anaesthetists.1,12,28–30
- A system must be in place for dealing effectively with complaints.12,31
- All patients undergoing procedures should be provided with easily understood information materials covering anaesthesia and post-operative pain relief. Preferably they should receive this before they are admitted to hospital, or on admission if this has not been possible.12,13
Introduction

Departments of anaesthesia will be expected to provide adequately staffed, safe and high quality services anywhere that anaesthesia, or sedation requiring the services of an anaesthetist, are provided. The main areas in which they have a responsibility are:

- **Provision of anaesthesia for in-patient surgery, both emergency and elective.** The service encompasses not only care during anaesthesia but pre-operative assessment and preparation of patients, and post-operative care and pain relief.
- **Provision of anaesthesia for out-patient or day surgery.** This will include the selection of suitable patients using medical and social criteria, the choice and planning of suitable facilities and techniques, and the provision of post-operative care and support.
- **Anaesthesia for obstetric services.** This includes antenatal advice and information, analgesia during and following childbirth, the provision of anaesthesia when needed, the provision of resuscitation skills and care for those mothers requiring critical care.
- **Anaesthesia services in critical care.** In all hospitals providing acute medical and surgical services there must be access to appropriate critical care facilities. These should have full-time cover and be sufficiently comprehensive to serve the needs of the patients, so that transfer of patients once treatment has been started is exceptional.
- **Provision of a pain relief service including services for the relief of acute pain and either provision of or access to a service for the management of non-acute (‘chronic’) pain.**
- **Participation in adult resuscitation services.**
- **Anaesthesia and resuscitation services provided for children.** In some units, provision of anaesthesia for specialist surgery such as cardiothoracic, neurosurgical, and transplant procedures.
- **Provision of anaesthetic services in non-theatre environments.** This includes sites where anaesthesia is administered for electroconvulsive therapy, imaging services, endoscopy, community dentistry and the provision of anaesthesia in the emergency department and for inter-hospital transfers.

Anaesthetists also frequently participate in teaching and training other hospital staff in topics related to their roles, including use of equipment, resuscitation, practical procedures, pain management, and recognition and management of critically ill patients.

Anaesthetists also play a pivotal role in the management of theatre efficiency.

### Levels of provision of service

#### 1 Staffing requirements

1.1 An appropriately trained and experienced anaesthetist must be present throughout the conduct of all general and regional anaesthesia for operative procedures, including those procedures requiring intravenous sedation.

1.2 An anaesthetist must be physically present with the patient whilst administering a general anaesthetic. If in exceptional circumstances the anaesthetist has to leave the patient they must delegate responsibility to another appropriate person in line with GMC guidance on delegation.

1.3 The level of anaesthetic service for emergency activities, including surgery, must be provided by competent anaesthetists who are either consultants or, if non-consultants, must have unimpeded access to consultants and consultant supervision.

1.4 Departments of anaesthesia must ensure that named supervisory consultants are available to all non-consultant anaesthetists and that those they are supervising know their identity, location and how to contact them.

1.5 In hospitals receiving patients with major injury and trauma, there must be a sufficient level of appropriately experienced medical and non-medical staff to provide a 24-hour emergency service.

1.6 A robust mechanism should be in place to cover for staff absences and local guidance must detail procedures for the appointment of locum anaesthetists if needed.

1.7 Consultant work plans should reflect the additional responsibilities of training and direct supervision of trainees while working on full or partial shifts.

1.8 All consultants and specialty doctors must have a job plan which is reviewed and agreed annually.
Chapter 1
Key points, revised 2009

1.9 All staff must have regular annual appraisal.

Pre-operative staffing needs
1.10 All patients undergoing surgery with anaesthesia must be seen by an anaesthetist on the day of operation. This visit should ideally be carried out by the anaesthetist who administers the anaesthetic. Local pre-admission procedures and written information do not replace the final pre-operative meeting between anaesthetist and patient. Further details are available in Chapter 2: Guidance on the provision of anaesthesia services for pre-operative care.

1.11 An anaesthetic pre-assessment service must involve consultant anaesthetists. Adequate medical, nursing and administrative staffing resources are essential for the efficient running of pre-operative anaesthetic assessment clinics for day surgery.

Anaesthetic assistance
1.12 The provision of qualified and competent assistance is essential in every situation where anaesthesia is administered.

1.13 The anaesthetic assistant must be immediately available and provide dedicated assistance to the anaesthetist throughout the entire anaesthetic procedure.

Post-operative staffing
1.14 Until patients can maintain their airway, breathing and circulation they must be cared for on a one-to-one basis by competent and appropriately trained recovery staff.

1.15 Sufficient numbers of recovery staff must be present until a patient is discharged to the ward.

1.16 Adequate provision should be made for a member of the anaesthetic team to visit certain groups of patients within 24 hours following their operation. Specific details can be found Chapter 4: Guidance on the provision of anaesthesia services for post-operative care.

2 Equipment, support services and facilities

Equipment
2.1 All equipment used to provide anaesthesia, including monitoring equipment, should comply with the recommendations of the AAGBI. Health and Safety principles must be observed and compliance with ‘Control Of Substances Hazardous to Health’ (COSHH) regulations ensured.

2.2 Equipment must be serviced regularly and maintained to a standard of safe working order, checked by users and records kept of maintenance and checking.

Support services
2.3 Wherever general and regional anaesthesia is administered there must be access to an appropriate range of laboratory and radiological services.

2.4 All hospitals should provide appropriate services for the relief of pain. Acute pain teams, primarily managing pain after surgery, may have wider roles including liaison with outreach and critical care staff. They also need the support of appropriately trained recovery, ward and other support staff to maintain continuity.

2.5 Departments of anaesthesia require an appropriate level of secretarial and administrative assistance to release anaesthetists from clerical tasks, to maintain an organisational base and to contribute effectively to theatre efficiency. The level of support is dependent on the number of consultants and clinical and administrative activity undertaken, but local requirements for such support must be acknowledged and provided for by the employing organisations.

2.6 Departments of anaesthesia must have adequate information technology support to enable immediate access to the electronic patient data, theatre lists and schedules and staffing rotas. In large and complex departments consideration should be given to electronic rota management so that human resources can be released for other important administrative or clinical tasks related to the day-to-day running of the department and patient care.

Guidelines
2.7 Departmental guidelines for all areas of anaesthetic practice, locally determined in accordance with national guidelines, should be established, followed, regularly reviewed and disseminated to the anaesthetic department staff including every new member.

Facilities
2.8 Patients leaving the operating theatre will require specific care in a recovery facility ordinarily located in the theatre complex. Further details are available in Chapter 4: Guidance on the provision of anaesthesia services for post-operative care.

2.9 Specific facilities are required for children.

2.10 Adequate facilities must be available for all staff to take rest breaks, and access refreshments.
2.11 Departments of anaesthesia are amongst the largest in the hospital. Staff need accommodation for confidential interviews, teaching and educational activities, provision of books, current medical literature, and information technology including computing and internet access.

2.12 When staff are required to be resident or working out-of-hours in the hospital, living and working conditions should meet at least the minimum nationally agreed standards. These include study and rest accommodation, and access to good quality hot and cold food at any time.

3 Areas of special requirement

3.1 Specialist services requiring anaesthesia input, for example, provision of anaesthesia for children, critical care, resuscitation, obstetrics and chronic pain, have unique requirements. These are dealt with in later chapters of this document.

4 Training and education

Continuing professional development (CPD) and revalidation

4.1 It is a professional obligation of all anaesthetists to take part in and demonstrate evidence of CPD. This underpins the GMC’s relicensing and recertification process and the concept of appraisal.1,12,16

4.2 A department of anaesthesia cannot be approved for training unless a majority of consultant anaesthetists are up to date with CPD.

4.3 CPD activities will include attendance at local, regional and national educational meetings, access to journals and the scientific literature, and use of e-learning programmes. Supporting professional activity time should be protected, and evidence that it has been properly utilised should be available at appraisal. Study leave must be properly funded and educational opportunities provided within the hospital.

Arrangements for trainee anaesthetists

4.4 The duties, working hours and supervision of trainees must be consistent with the delivery of high quality safe patient care.19

4.5 Trainee rotas must meet the requirement of the ‘New Deal’, and European Working Time Directive (EWTD) regulations. It is essential that trainee rotas are designed to maximise training opportunities within the hours constraints of these directives.

4.6 Postgraduate training in anaesthesia, intensive care and pain management must be quality managed locally by deaneries, working with the guidance of the Royal College of Anaesthetists, Intercollegiate Board of Intensive Care Medicine and specialty associations.

4.7 Training is delivered by departments of anaesthesia working within a school of anaesthesia. The clinical directorate for anaesthesia within each hospital is responsible for delivering in-service training in accordance with curricula developed by the RCoA and agreed by PMETB. The educational facilities, infrastructure and leadership must be adequate to deliver the approved curriculum.

4.8 Hospitals within a school will generally be expected to offer experience and training in anaesthesia for elective and emergency general surgery, urology, trauma and orthopaedics, obstetrics and gynaecology, ENT and oral surgery, day case surgery and surgery for children excluding neonates. In addition, experience in pain management, resuscitation techniques and intensive care medicine should be provided. Experience in emergency medicine will require an accident and emergency department, which is staffed and operational 24 hours a day.

4.9 All staff, including trainees and locums, must be supported to acquire the necessary skills and experience through induction, effective educational supervision, an appropriate workload, and time to learn.

4.10 Every trainee must at all times be responsible to a consultant.

4.11 Every trainee must have a named Educational Supervisor.

4.12 Regular trainee assessment and appraisal are essential. These are performed by the consultant staff and Educational Supervisors and usually led by the College Tutor. Appropriate time and administrative resources must be allocated for this.

4.13 The teaching and acquisition of technical anaesthetic skills takes time, and teaching lists may need to take this into account when scheduling surgical throughput.

The College Tutor

4.14 Training is led by Royal College of Anaesthetists appointed Tutors (CTs) who are responsible for the training and assessment arrangements in their hospitals. It is not expected that the CT will deliver personally all aspects of training and supervision, but rather that the CT will ensure that training is
properly organised, delivered and accessible by the trainees. It is not a requirement from the College for CTs to take responsibility for the recruitment of trainees.\textsuperscript{21}

4.15 Many of the responsibilities of the CT underpin clinical governance and clinical risk management in the trust to the benefit of the entire organisation. Adequate time and administrative resources must be allocated within the job plan of the College Tutor.

4.16 CTs must be trained in the techniques of appraisal and assessment.

4.17 While the day-to-day responsibility for training rests with the CT, the quality of trainees’ clinical work is the responsibility of the clinical director.

Consultant and SAS/Specialty Doctor trainers

4.18 Clinical supervision, training and workplace-based assessment must be provided by consultants or SAS/Specialty Doctor grades within the department of anaesthesia who are recognised RCoA trainers.

4.19 Those involved in training must take necessary steps to acquire the skills of a competent teacher, and maintain their CPD requirements for the appraisal process and to the satisfaction of PMETB and the RCoA.

Other teaching arrangements

4.20 All departments of anaesthesia must organise programmes of educational activities. These will include lectures and tutorials on relevant topics, meetings and seminars on such matters as mortality and morbidity, critical incident reporting, clinical audit, research and journal review clubs. Interdisciplinary meetings should be organised where appropriate.

4.21 Instruction of foundation year doctors in the pre-operative preparation of patients for surgery, resuscitation techniques and basic critical care principles is commonly undertaken by departments of anaesthesia. Departments are also often involved in training of medical students in the principles of anaesthesia and resuscitation, and basic clinical skills, including fluid management and pain relief. Adequate time needs to be allocated to those arranging such training.

4.22 Anaesthetists provide a wide range of training for non-medical hospital staff, including nurses, midwives, anaesthetic assistants and paramedics. For those anaesthetists who undertake such teaching, adequate time for preparation and delivery is essential.

4.23 All hospital staff and those in clinical contact with patients must be trained in at least basic resuscitation skills, so that the initiation of resuscitation is not unduly delayed while awaiting the arrival of staff trained in advanced life support. Such training has to be repeated at predefined intervals. Resuscitation training officers should supervise this process.

5 Research and audit

Research

5.1 Innovation and improvement in anaesthetic practice for the benefit of patients are facilitated by research. Audits and similar practices cannot replace the fundamental purposes of research, which requires sufficient time and resources. All areas of practice should have opportunities to further their research aims.

5.2 An understanding of the scientific basis of anaesthetic practice is essential for all anaesthetists and research is regarded by the RCoA as integral to the development of anaesthesia, intensive care and pain management. Trainees from intermediate level onwards require experience in research methods. Even if separate time is not allocated, the concepts identified in the CCT should be fundamental to the education of trainees at these stages of training.\textsuperscript{17}

5.3 All research must be managed in accordance with the Department of Health Research Governance Framework and research governance requirements of their employing organisation. Anaesthetists must comply with the GMC guidance ‘Good Practice in Research’.\textsuperscript{1}

Audit

5.4 All doctors must take part in regular systematic audit and departments of anaesthesia must support this.\textsuperscript{1,12}

5.5 All consultants should participate as required in the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) and the Confidential Enquiry into Maternal and Child Health (CEMACH) and Royal College of Anaesthetists National Audit projects.

5.6 Audit of all areas of anaesthetic practice requires time and incurs a financial cost, for which a budget is necessary. It should include critical incident reporting, risk management and outcome measures.

5.7 Hospital data collection systems are an essential support tool in providing the information required
for audit, and must be in place and regularly updated to the highest standards of current technology.

5.8 The RCoA’s audit ‘recipes’ provide templates to plan audit programmes.32

5.9 As part of audit, patients’ attitudes and comments about the anaesthetic service should be sought.

6 Organisation and administration

6.1 Every department should have a written policy in place that takes account of local circumstances to ensure the effective and economic use of anaesthetic resources in terms of:
- staffing
- equipment
- consumables such as drugs and disposable devices.

Lead clinicians in anaesthesia

6.2 Departments of anaesthesia must have a clinical services director (CSD), head of department or lead clinician who is an anaesthetist.

6.3 The lead clinician or CSD is accountable to the chief executive but cannot function without the support of consultant and other colleagues and must therefore be acceptable to them.

6.4 The lead clinician or CSD is responsible for staff management, including management of leave, job planning, management of poorly performing doctors and equitable distribution of work within the department sufficient to cover the service. They are also responsible for ensuring adequate resources, maintaining good communication, both within the department and between the department of anaesthesia and the wider trust network, and ensuring guidelines are in place and regularly reviewed.

6.5 The lead clinician or CSD should be supported by and work closely with business and nurse managers as well as have ready access to specialist managers in such areas as finance and human resources.

6.6 The lead clinicians or CSD should have a separate contract for this part of their work, working with an agreed job description. Adequate time must be available and they should receive appropriate administrative and information technology support to fulfil their roles effectively for the trust.

6.7 Named consultants should also be appointed who are responsible for the individual components of the service, such as critical care, obstetric anaesthesia, acute and non-acute pain services, paediatrics and day surgery. Lead clinicians for these components of the anaesthetic service should ensure that communication is managed in a way that meets the needs of appropriate confidentiality, protects the needs of patients and maintains the efficiency of the overall service.

6.8 Other essential roles that may need further delegation within the department of anaesthesia include pre-operative assessment, major incident planning, rostering and management of leave, equipment, information technology, audit, clinical governance, transfusion, continuing medical education and professional development and training.

Theatre efficiency

6.9 The organisation of theatre services must match the needs of patients and take into account availability of surgeons, anaesthetists, nurses and paramedical staff. This will include 24-hour availability of an emergency theatre service to minimise the need to use out-of-hours services for situations other than true emergency surgery.

6.10 Those managing the anaesthetic service should co-operate and communicate with surgical and other directorates to optimise the treatment of patients and encourage best use of available facilities.

6.11 Optimal theatre efficiency may be facilitated with the support of appropriate planning and management, diagnostic tools, information technology, human resources and service redesign, and implemented by a Theatre Management Group. Anaesthetists must play a key role in this process, to ensure clear communication between all the managerial and clinical staff involved in daily running of theatres.33,34

Human resources, job planning and staff management

6.12 All consultant and associate specialists and specialty doctors must participate in job planning.12,28,34,35

6.13 All doctors must undertake an annual appraisal.1,12,30

6.14 A number of anaesthetists also undertake local, regional and national duties in the fields of education, research and administration. This may occasionally involve them being away from their clinical duties on periods of professional leave. Such activities have the mutual benefit of forming part of CPD and attracting recognition for the employing trust. These activities should be reflected in job planning and appropriate staffing levels.
Chapter 1
Key points, revised 2009

7 Patient information

7.1 Patients have a right to information about their condition and the treatment options available to them, and all doctors have a duty to inform patients in sufficient detail about these options.1

7.2 Patients should be provided with adequate information about anaesthesia, pain relief and any other services provided by anaesthetists so that they can make informed decisions about their treatment and care. Patients should be given adequate time to consider the options available to them and make appropriate decisions about their care. However information is conveyed, it is a duty of the anaesthetist administering the anaesthetic to explain what is proposed in order to satisfy the requirements for informed consent to anaesthesia.

7.3 Leaflets and internet-based material produced by the Joint Patient Information Project of the RCoA and the AAGBI may be offered to patients who are to undergo anaesthesia.36

References


3. Royal College of Anaesthetists publications (www.rcoa.ac.uk/index.asp/PageID=57).


32. Other website links

- The National Institute for Health and Clinical Excellence (NICE) (www.nice.org.uk/).

Guidance on the provision of anaesthesia services for Pre-operative Care

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

- A care pathway for pre-operative assessment should be available for all patients undergoing elective surgery.1-3
- Pre-operative assessment should take place early in the patient’s journey so that all requirements for essential resources and obstacles can be anticipated before the day of the operation.2-4 In the case of emergency surgery, assessment should take place as early as is possible.
- Before undergoing an operation that requires general or regional anaesthesia provided by an anaesthetist all patients must be met by an anaesthetist.1
- Ideally, the anaesthetist who will actually give the anaesthetic should visit the patient before the operation.1
- Sufficient time must be made available in the patient care pathway for the anaesthetist to cover the essential points of pre-operative assessment; job plans should incorporate adequate programmed activities for pre-operative anaesthetic visiting and assessment.1,4
- Each trust should have agreed written policies, protocols or guidelines on the following aspects of pre-operative care:
  - pre-operative fasting1,3
  - thromboprophylaxis (including timing of administration of thromboprophylactic agents to patients undergoing regional anaesthesia)5-7
  - pre-operative investigations5,6
  - pre-operative blood ordering schedule3,8
  - Use of the World Health Organisation Surgical Safety Checklist.10
- All patients should be fully informed about the planned procedure.11,12
- All patients undergoing elective procedures should be provided with easily understood information covering anaesthesia and post-operative pain relief before admission to hospital.13,14

Introduction: The importance of pre-operative anaesthetic care

- Pre-operative assessment is an important part of patient care; it establishes that the patient is fully informed and consents to undergo the procedure, and is as fit as possible for the surgery and anaesthetic.
- Good pre-operative assessment and screening enable identification of all essential resources and obstacles to discharge for patients, and thereby minimise late cancellation of operations, assisting overall patient care and efficiency of operating lists.
- Business planning by trusts and anaesthetic departments should ensure that necessary time and resources are directly targeted towards pre-operative assessment.
- Pre-operative consultation with an anaesthetist is essential for the medical assessment of a patient before anaesthesia for surgery or any other procedure. Nursing and other trained staff play an essential role when, by working to agreed protocols, they screen patients for fitness for anaesthesia and surgery.
Levels of provision of service

1 Staffing requirements

1.1 Any patient who is to undergo a procedure requiring the services of an anaesthetist must be assessed by an anaesthetist before the procedure.

1.2 Anaesthetists need time to cover the following essential points in the pre-operative anaesthetic assessment:
- correct identification of the patient
- interview and medical case notes review for past medical and anaesthetic history
- examination, including airway assessment
- obtaining results of relevant investigations
- discussion and explanation of the anaesthetic technique
- instructions for pre-operative fasting, proposed pain relief method, expected sequelae, and possible major risks (where appropriate)
- establishing the patient’s understanding of and consent to the procedure (see 7.1–7.4)
- documentation of details of discussion in the anaesthetic record
- prescription and ordering of any pre-operative medication.

1.3 An anaesthetic pre-operative assessment service must involve consultant anaesthetists. When patients attend a dedicated pre-operative assessment clinic, an anaesthetist should attend or be available and this should be recognised as a commitment of anaesthetists.

1.4 Local protocols should determine the grade and experience of the nurse accompanying the patient to the operating department.

2 Support services and facilities

2.1 Patients should be admitted to a ward or alternative facility in sufficient time for the operating list on which they are scheduled. This is essential to enable the anaesthetist who will be administering the anaesthetic to complete an adequate pre-operative assessment as detailed in 1.2. If patients are not available in sufficient time before their operation for the anaesthetist to conduct a satisfactory pre-operative assessment, it is possible that surgery will be delayed or postponed until such time as an assessment is possible.

2.2 There must be a locally agreed hospital policy for pre-operative investigations, pre-operative fasting schedules and continuation of regular medication.

2.3 There must be a locally agreed protocol for administration of thromboprophylactic agents to patients undergoing surgery, including identification of patients at low, moderate and high risk, and a recommended prophylactic method for each group. This should include reference to those patients likely to receive regional anaesthesia.

2.4 Patients should be adequately clerked before their final anaesthetic assessment, and the findings documented. Such clerking may be undertaken efficiently in a pre-admission clinic.

2.5 Written guidelines should cover the policy for collection of patients from the ward, as well as the hand-over by ward staff to a designated member of the operating department staff.

2.6 Operating lists should be made available to the anaesthetist well before the list starts.

2.7 Operating lists should include details of the patient’s operation, date of birth or age, hospital identification number and the ward in which they are located. A robust system must be in place for the identification to and by the surgeon as to the side of the operation. The RCoA endorses the use of the World Health Organisation’s Surgical Safety Checklist as the instrument for promoting team working, reliability and patient safety.

2.8 The whole operating team must agree to any change to a published operating list.

2.9 Anticipated difficulty with anaesthesia should be brought to the attention of the anaesthetist as early as possible before surgery. This includes planned admission to a critical care unit, the need for special skills such as that of fibre-optic intubation, or known history of anaesthetic complications.
2.10 A pre-operative blood-ordering schedule should be agreed with the local transfusion service for each procedure.

3 Areas of special requirement

Children
3.1 The special needs of children must be considered at all stages of peri-operative care (see Chapter 8: Guidance for the provision of paediatric anaesthesia services).17

Elderly patients
3.2 Pre-operative assessment of some elderly patients may need cross-specialty advice involving anaesthetists, surgeons and physicians. The development of this team approach requires time and resources that must be recognised and provided.18

3.3 A team of senior surgeons, anaesthetists and physicians needs to be closely involved in the care of elderly patients who have poor physical status and high operative risk.19

Patients with diabetes mellitus
3.4 Diabetes is the most common endocrine disease encountered before surgery. Fasting times, the surgical stress response and inactivity can all have a negative impact on blood sugar control.

3.5 Fasting times for patients with diabetes should be kept to a minimum; they should ordinarily be first or early on the operating list.

3.6 Regular measurement of blood sugar levels is essential.

3.7 Locally agreed regimens for blood sugar control of diabetic patients should be in place.

4 Training and education

4.1 Training of anaesthetists includes attaining the competency to perform medical assessment of patients before anaesthesia for surgery or other procedures.

4.2 The RCoA has established essential knowledge, skills, attitudes and workplace objectives needed in the area of pre-operative assessment in training to attain a Certificate of Completion of Specialty Training (CCST) in anaesthesia.20

4.3 The pre-operative assessment service should enable multidisciplinary training for medical students, nurses, specialist doctors in training and allied health professionals.3 Educational materials are available to facilitate this.21

5 Research and audit

5.1 The NHS Modernisation Agency has outlined measurable key performance indicators in theatre management and pre-operative assessment.3

5.2 Regular audits of the following aspects of pre-operative care may include:
- effectiveness of pre-operative information provided to patients
- pre-operative documentation of consultation by anaesthetists
- consent to anaesthesia
- effectiveness of pre-operative assessment services
- adequacy of surgical clerking
- pre-operative visiting
- pre-operative airway assessment
- pre-operative fasting in adults
- pre-operative medication
- thromboprophylaxis
- choice of technique: general, local or regional anaesthesia.

6 Organisation and administration

6.1 Business planning by trusts and anaesthetic departments should ensure that necessary resources, including enough time, are targeted towards pre-operative assessment.

6.2 Pre-operative screening requires careful co-ordination and communication with individual surgeons, medical records and out-patients’ clinics. Contact with a patient’s general practitioner may establish the need for appropriate pre-operative investigation or treatment, to select admission time and to avoid postponement or cancellation. An identified individual should be responsible for overseeing the adequacy of these processes.2

7 Patient information

Consent
7.1 The competent patient has a fundamental right, under common law, to give, or to withhold, consent to examination, investigation and treatment.31

7.2 No other person can consent to treatment on behalf of any other adult.22

7.3 Doctors may treat a patient who is not competent without consent provided it is necessary and in the patient’s best interests. Where a patient is not competent, there should be a mechanism for appropriate documentation as to why a procedure under consideration is in the patient’s best interests. This should include any evidence obtained from discussion with the family or
other carers relating to whether a patient might reasonably have consented if competent.

7.4 In the case of children under the age of 16 years, consent should be given by the parent or guardian. In England and Wales, a child who is deemed ‘Gillick-competent’ under the age of 16 years may give, but not withhold, consent. 23,24

Information

7.5 Patients should be fully informed about the planned procedure.

7.6 All patients undergoing elective procedures should be provided with easily understood information materials covering anaesthesia and post-operative pain relief before admission to hospital.13,14

7.7 The anaesthetist should explain what the patient will experience before and after anaesthesia, 11 and include any choices of anaesthetic technique and details of post-operative management.

7.8 The anaesthetist should invite and answer questions from the patient or, if appropriate, the patient’s relatives.

7.9 The anaesthetist should document in the patient’s case notes that all of the above have been properly performed.

Patients consenting to be subjects of research

7.10 A patient’s consent to participate in research projects should be obtained by those conducting the study and not by the anaesthetist providing care for the operation. Consent must be obtained on a separate signed document and approval should be sought from the anaesthetist who will be delivering the anaesthetic to the patient.3

References


24 Re: C (Refusal of Medical Treatment) [1994] 1 FLR 31.

Further reading


Theatre improvement programme toolkits. NHS Modernisation Agency (www.wise.nhs.uk/).
Guidance on the provision of anaesthesia services for Intra-operative Care

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

■ An appropriately trained and experienced anaesthetist must be present throughout the conduct of all general and regional anaesthetics and procedures requiring sedation given by an anaesthetist; this is the main determinant of the safety of patients during anaesthesia.

■ An anaesthetic assistant who is trained, competent and holds an appropriate nationally recognised qualification must be present throughout the entire anaesthetic procedure, and provide exclusive assistance to the anaesthetist.

■ All anaesthetic equipment must be checked before use according to the Association of Anaesthetists of Great Britain and Ireland (AAGBI) published guidelines.

■ The recommended standards of monitoring must be met for every patient.

■ Within each theatre suite there must be at least one portable storage unit with specialised equipment for management of the difficult airway.

■ Policies and equipment must be in place to protect patients and staff from cross-infection.

■ Fully resourced, dedicated daytime emergency and trauma lists should be provided.

■ If appropriate resources are not available the level of clinical activity should be limited to ensure a safe provision of intra-operative care.

Introduction: The importance of intra-operative anaesthetic care

■ General anaesthesia is a state of induced, reversible loss of consciousness, during which the patient will be unaware of their surroundings and of painful stimuli.

■ Regional and local anaesthesia are states in which parts of the body are rendered insensible to painful stimuli. These states may be accompanied by sedation which alters the patient’s level of consciousness.

■ The effects of anaesthesia and of the surgical procedure may have profound physiological consequences for the patient, and require monitoring and if needed correction throughout anaesthesia.

■ The continuous presence of an appropriately trained and experienced anaesthetist is essential as the main determinant of patient safety during anaesthesia.

■ Monitors with appropriately set alarms may detect critical incidents and provide an early warning of the consequences of an error.

■ The safe provision of anaesthesia requires the help of competent anaesthetic assistance at all times.

■ Anaesthetic equipment is subject to frequent, repetitive use and needs regular servicing according to manufacturer’s specification to prevent malfunction.
Careful and regular in-service checks of anaesthetic equipment and of drugs minimise the risks posed by anaesthesia.

The anaesthetic record is an important medical document, which should contain the relevant physiological measurements and relevant observations during every anaesthetic.

Levels of provision of service

1 Staffing requirements

1.1 All anaesthetists and anaesthetic assistants, including locum and agency staff, must undergo a proper induction process.9

1.2 An appropriately trained and experienced anaesthetist must be present throughout the conduct of all general and regional anaesthetics and procedures requiring sedation by an anaesthetist.1

1.3 Under the present system of healthcare provision in the UK, one anaesthetist cannot provide direct care for more than one patient receiving general or regional anaesthesia, or sedation.

1.4 As soon as the care of the patient is transferred to the anaesthetist, an anaesthesia assistant who is trained, competent and holds an appropriate national qualification must provide exclusive assistance to the anaesthetist.2

1.5 The anaesthetic assistant must be immediately available throughout the entire anaesthetic procedure.2

2 Equipment, support services and facilities

Equipment

General

2.1 Facilities for monitoring, ventilation of patients’ lungs and resuscitation including defibrillation must be available at all sites where patients are anaesthetised.

2.2 The following ancillary anaesthetic equipment must also be available at all sites where patients are anaesthetised:

- oxygen supply
- facemasks
- suction
- airways (e.g. ‘Guedel’)
- laryngoscopes
- tracheal tubes and connectors
- intubation aids (e.g. bougies, forceps etc)
- laryngeal mask airways
- heat-moisture exchange filters

- self-inflating bag
- trolley/bed/operating table that can be rapidly tilted head-down.

2.3 In each theatre suite there must be at least one portable storage unit with specialised equipment for management of the difficult airway.9 In addition, a fibre-optic laryngoscope should be readily available.

2.4 User manuals should be available as needed for anaesthetic equipment.

2.5 All anaesthetic equipment must be checked before use according to the AAGBI published guidelines.4 Anaesthetic machine checks should be recorded in a logbook or on the anaesthetic chart.

2.6 No anaesthetic machines should be able to supply a hypoxic gas mixture.10,11

2.7 All anaesthetists and anaesthetic assistants should receive systematic training in the use of new equipment.4

2.8 A named consultant should oversee the provision of anaesthetic equipment.12

2.9 There must be a planned maintenance and replacement programme for all anaesthetic equipment.12

2.10 Appropriate equipment must be available to minimise heat loss by the patient and to provide active warming.13

2.11 Additional specialised equipment is needed for babies and young children.

Monitoring

2.12 The recommended standards of monitoring, instrumental or otherwise, must be met for every patient.1

2.13 The following equipment must be available to monitor the anaesthetic machine:

- oxygen analyser
- device to display airway pressure whenever positive pressure ventilation is used, with alarms that warn if the pressure is too high or too low
- vapour analyser whenever a volatile anaesthetic agent is in use
- capnograph.

2.14 The following equipment must be available to monitor the patient:

- pulse oximeter
- non-invasive blood pressure monitor
- electrocardiograph
- capnograph
- a means of measuring the patient’s temperature
- a nerve stimulator when a muscle relaxant is used.
2.15 Some patients will require additional monitoring equipment, such as invasive pressure which should be readily available, and cardiac output monitors to which there should be access.1

2.16 All monitors should be fitted with audible alarms.

Support services

2.17 Local standards and guidelines for patient care should be developed, building on those published nationally.

2.18 Guidelines for the management of rare emergencies, such as malignant hyperthermia, anaphylaxis and peri-arrest arrhythmias, must be displayed prominently.8

2.19 Policies and equipment must be in place to protect patients and staff from cross-infection, including the safe disposal of sharps.5

2.20 Anaesthetic sites must have scavenging systems that meet the Health & Safety Executive’s occupational exposure standards for anaesthetic agents.14

2.21 All anaesthetic records must contain the relevant portion of the recommended anaesthetic data set for every anaesthetic15 and be kept as a permanent document in the patient’s case notes.

2.22 Services must be available for:

- haematology
- blood transfusion
- chemical pathology, including blood gas analysis
- chest radiology
- electrocardiography.

2.23 There should be policies in place for the safe and rational use of blood and blood products.16–20

Facilities

2.24 The anaesthetic room and operating theatre must conform to Department of Health building standards.21

2.25 There must be policies and facilities in place to protect patients and staff who are hypersensitive to latex-containing products.22

2.26 A system must be in place to allow the presence of parents or carers at induction of anaesthesia in children.23

3 Training and education

3.1 See Chapter 1: Key points on the provision of anaesthesia services, for further details of education and training requirements in anaesthesia services.

4 Research and audit

4.1 There should be a multidisciplinary programme for auditing intra-operative care.

4.2 There should be a system in place to allow reporting and regular audit of critical incidents and near-misses.9

4.3 Systematic audit should include the pattern of work in operating theatres.7

5 Organisation and administration

5.1 If appropriate resources are not available, the level of clinical activity should be limited to ensure a safe provision of intra-operative care.8

5.2 Fully resourced, dedicated daytime emergency and trauma lists should be provided.2

5.3 Up-to-date, clear and complete information about operating lists must be available. Any changes must be agreed by all relevant parties, to ensure that the correct operation is performed on (the correct side of) the correct patient.24

5.4 There must be a policy and procedure in place to confirm the patient’s identity, the planned procedure and the side and site of surgery, before induction of anaesthesia.8

6 Patient information

6.1 Information to patients should include what to expect in the anaesthetic room and operating theatre.25

6.2 Patients from non-English speaking groups may need interpreters.

6.3 Patients with learning and other difficulties may need special assistance and consideration.
Chapter 3
Intra-operative care, revised 2009

References


Guidance on the provision of anaesthesia services for Post-operative Care

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

- After general or regional anaesthesia, all patients should recover in a specially designated area, which should conform to the guidelines of the Department of Health (DH) and Association of Anaesthetists of Great Britain and Ireland (AAGBI) for design and equipment.1-3
- Until they have regained control of their airway, demonstrated cardiovascular stability and are able to communicate, patients must be cared for in the recovery area by appropriately trained staff, on a one-to-one basis.1
- An appropriate standard of monitoring should be maintained until patients have recovered from anaesthesia and good records made to support effective ‘hand-over’ to ward staff.1,4
- Agreed criteria for discharge of patients from the recovery room to the ward should be in place.1
- All patients should receive effective control of pain and post-operative nausea and vomiting (PONV). Local guidelines should be available for the treatment of acute pain and PONV. Scoring systems for pain, PONV and sedation should be in place.45
- Where emergency surgery is performed, the recovery unit should be open and staffed by appropriately trained resident or on-call personnel.5
- There should be a specially designated area for the recovery of children.1,6
- For particular categories of patients, visits should be made by an anaesthetist within 24 hours of discharge from the recovery unit.7,8
- Requirements for critical care after surgery should be assessed and facilities made available for all patients deemed to need these.9,10

Introduction: The importance of post-operative anaesthetic care

- All patients who have undergone operations, under either general or regional anaesthesia, are at risk of compromise to airway, breathing and circulation.
- Transport of patients, especially between hospitals, immediately after anaesthesia can be hazardous.
- Most patients can be managed in a recovery room, but some may need to be transferred to a critical care environment.
- The purpose of the post-anaesthetic recovery area is to provide care until patients can be safely discharged awake to a general ward or home in a stable condition, or be transferred to a critical care unit if further close monitoring and care are necessary.
- If adequate standards of care are not provided serious complications can occur.
Levels of provision of service

1 Staffing requirements

1.1 Until patients can maintain their airway, breathing and circulation they must be cared for on a one-to-one basis.

1.2 At least two appropriately trained staff should be present in the recovery room while there is a patient who does not fulfil the criteria for discharge to the ward.

1.3 With the exception of circumstances as detailed in 1.2, it is difficult to give guidance on the exact numbers of staff required for any particular recovery area. The staffing levels will depend on factors such as the case mix, numbers of patients and the number of operating lists per session. If the workload is spread unevenly throughout the week, this will have an effect on the deployment of staff and may encourage the use of part-time staff.

1.4 During whatever hours of the day emergency surgery is undertaken, the recovery unit should be continuously open and adequately staffed.

1.5 After agreed criteria for recovery have been met, an appropriately trained member of staff must accompany patients who are to be transferred to the ward. Relevant information must be given at handover.

1.6 The anaesthetist should ensure hand-over to the recovery room staff. This includes information relevant to after-care. The anaesthetist is responsible for ensuring that the endotracheal tube is removed safely. Nurses who are trained in the management of supraglottic airways may remove them, although an anaesthetist should be immediately available.

1.7 Adequate provision should be made for a member of the anaesthetic team to visit the following groups of patients within 24 hours following their operation:
- those graded as ‘American Society of Anesthesiologists (ASA) Physical Status 3, 4 or 5’
- those receiving epidural analgesia in a general ward
- those discharged from recovery with invasive monitoring in situ
- those for whom a request is made by other medical, nursing or other clinical colleagues
- those for whom there is any other appropriate need.

Chapter 4
Post-operative care, revised 2009

2 Equipment, support services and facilities

2.1 The size, design and facilities of the recovery area should meet the AAGBI and DH guidelines.

2.2 The recovery room should be sited within the operating department and away from the department’s admission area. Similarly, the routes that patients take to individual theatres, to the recovery room and to the wards, should as far as is possible not cross. It is particularly important to make careful provision in this respect when the patients are children.

2.3 The recovery area should be situated as close to the operating theatres as possible, and if there are several operating suites each should have a fully equipped recovery area.

2.4 An emergency call system must be in place and understood by relevant staff.

2.5 There should be enough recovery trolleys of an acceptable design. Where it can be done without compromising safety, patients undergoing major surgery may be transferred to a bed immediately after surgery.

2.6 Oxygen and suction should be present in every recovery bay and ideally be delivered by pipeline.

2.7 Currently acceptable standards of patient monitoring should be available for all patients. This includes pulse oximetry, and non-invasive blood pressure monitoring. An electrocardiograph, nerve stimulator, thermometer and capnograph should be readily available. Ideally, there should be compatibility between operating theatre, recovery room and ward equipment.

2.8 All drugs, fluids and equipment (including a defibrillator) required for resuscitation and management of anaesthetic and surgical complications should be immediately available in every recovery area.

2.9 In every recovery area, emergency boxes or drugs for use for management of cardiovascular collapse, anaphylaxis and malignant hyperthermia must be available and regularly maintained. There should be wall-mounted algorithms for the treatment of these conditions.

2.10 The range of drugs and the means of their delivery should be subject to regular review. The methods of delivery include devices for epidural, patient controlled analgesia and other drug administration.
2.11 Devices such as forced warm air blowers should be available.

2.12 Locally devised protocols should be available for discharge criteria, analgesia and treatment, and prevention of nausea and vomiting.

2.13 The need for X-rays in the recovery room should be carefully weighed against the hazard to staff and other patients, for whose protection appropriate precautions must be taken.

3 Areas of special requirement

Children
3.1 Particular provision should be made for the care of children.\(^6\)

Critically ill patients
3.2 Some patients may require ventilatory support or a longer than usual period of observation and treatment in the immediate post-operative period. When critically ill patients are held in the recovery area because of a lack of availability of appropriate facilities elsewhere, this should only occur if recovery staff are appropriately trained, and the recovery area is appropriately equipped to enable full monitoring and treatment. It cannot be assumed that it is safe to use the recovery facility as an extension of critical care, and local policies and procedures should govern this issue.

Specialist surgical units
3.3 Specialised units such as those involved in cardiothoracic surgery, neurosurgery and transplant surgery should have their own policies and staffing requirements.

4 Training and education

4.1 All specialist recovery staff should be appropriately trained, to nationally recognised standards.

4.2 At least one member of staff present at any given time should be certified as an advanced life support provider.

4.3 Core skills and education of recovery staff must be maintained as a programme of continuing professional development.

5 Research and audit

5.1 Regular revision and audit of standards of care, guidelines and protocols and critical incident reporting are essential in the ongoing development and improvement of post-anaesthetic patient care.

There should be regular meetings of staff to discuss these issues.

6 Patient information

6.1 Information provided to patients about their anaesthetic should include what to expect in the recovery room.

6.2 Some patients, adults or children may need interpreters, parents or other members of their family to be with them: This need is best determined by nursing staff, who are also sensitive to the need for privacy of other patients in the recovery room.

References
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

- Patients undergoing urgent head and neck procedures to relieve a compromised airway resulting from trauma or after surgery must have quick access to a dedicated emergency theatre at all times.1–3
- Upper airway problems are common, and head and neck services should be provided by anaesthetists competent in the advanced management of the difficult airway.4
- Anaesthetists should always work with appropriately trained and skilled assistants, and have access to a range of difficult airway apparatus including fibre-optic intubation equipment and trans-cricothyroid jet ventilation.5,6
- Access to a critical care facility must be available when required.6
- The treatment of neonates, young children with significant co-morbidity and children with complex surgical conditions should only take place in units with specialist paediatric facilities.7

Introduction: The importance of head and neck anaesthesia services

- Head and neck surgery includes a wide spectrum of surgical interventions, ranging from short day case procedures to very long and complex operations.6,9
- Anaesthesia for surgery of the head and neck is likely to include the disciplines of ear, nose and throat, maxillofacial and dental surgery. In some instances, such as surgery on the base of skull and for craniofacial surgery, formal integration with a neurosurgical and plastic surgical service may be required.
- The patient population undergoing head and neck surgery ranges from neonates and young children to the elderly.7,9
- Patients requiring major head and neck surgery frequently have extensive and debilitating co-morbid problems and may need repeated admissions for treatment.9
- Conditions that require head and neck surgery affect patients of all ages, and a significant proportion are children. The treatment of neonates, young children with significant co-morbidity and children with complex surgical conditions should only take place in units with specialist paediatric facilities. Simple procedures such as teeth extraction, the excision of tonsils or adenoid tissue and the insertion of grommets are frequently carried out on children in a general hospital setting.
- The indications for head and neck surgery vary widely from minor infective and inflammatory disorders to extensive malignant disease. In the latter case, surgical excision and reconstruction, often using free tissue transfer, require complex peri-operative anaesthetic management. This kind of surgery often takes time not easily accommodated within the time constraints of a normal operating list.
Cancers of the upper digestive tract form the majority of head and neck oncology, and these patients are typically older and commonly have serious co-existing cardiovascular and respiratory disease, reflecting the social risk factors for their malignancy. Adequate facilities should be available for pre-operative assessment.

Patients undergoing long and complex surgery or who have significant underlying medical problems will need the provision of post-operative intensive or high dependency care.

Many patients with intra-oral malignancy, craniofacial disorders and traumatic facial injuries present with a predicted difficult intubation. This aspect of the service mandates that the full range of human and other resources necessary to manage difficult airways, including fibre-optic intubation equipment, are always available.

It is common for head and neck surgery to encroach upon the airway or, in the case of a tracheostomy, require changing of the airway during surgery. It is therefore essential that there is close liaison and good teamwork between surgeons, anaesthetists and operating department practitioners (ODPs).

Patients presenting with impending airway obstruction may need emergency surgery. The ability to provide this service dictates that a dedicated, appropriately staffed and equipped theatre be available 24 hours a day.

All community dental work requiring general anaesthesia is now carried out in a hospital setting. There are estimated to be 65,000 children and young people with severe learning disabilities in the UK, and a significant proportion of those needing dental treatment will be referred for general anaesthesia.

A significant proportion of head and neck surgery is of a routine nature and much of the service is ideally provided for by a dedicated day-case facility.

Levels of provision of service

1 Staffing requirements

1.1 Anaesthesia for head and neck surgery should be consultant led, and all regular sessions should have assigned to them a named consultant or staff/associate specialist anaesthetist who is skilled and experienced in the provision of this service.

1.2 In large departments it may be desirable to appoint a lead anaesthetist for head and neck services, who could provide specialist medical supervision and liaison with the lead clinician for the department and the theatre management team.

1.3 Where scheduled operations cannot be accommodated within normal list times, consideration should be given to anaesthetic team-work, allowing for appropriate rest periods, both during and following such procedures.

1.4 Anaesthetists must always be supported by dedicated, appropriately skilled assistants, and the recovery facilities should be staffed during all operating hours and have appropriate anaesthetic support, until the patient meets agreed discharge criteria.

1.5 There should be adequate levels of appropriately experienced medical and non-medical staff to provide 24-hour cover for emergency head and neck surgery.

1.6 Where a paediatric service is being provided, all of the medical and assisting non-medical staff, including recovery room staff, must have relevant and recent training in paediatric anaesthesia and resuscitation.

2 Equipment, support services and facilities

2.1 There should be a full range of equipment relating to the management of the difficult airway available within the head and neck theatre suite. In particular, equipment for fibre-optic intubation and trans-cricothyroid jet ventilation must always be available. Suitable theatre-based sterilisation equipment should allow for the quick turn-around of fibre-optic endoscopes.

2.2 There should be clear, written guidelines regarding the management of common or serious airway problems and advanced airway procedures.

2.3 The use of lasers during head and neck surgery is common, and therefore training and safety equipment including laser-protected endotracheal tubes, goggles and theatre door screening need to be provided.

2.4 Patients returning to the ward, who have had a tracheostomy or other airway surgery, should be cared for in designated post-operative observation areas, by adequate levels of nursing staff who are skilled in the care of the surgical airway. The location of this area should also facilitate the quick return to theatre should the need arise.

2.5 Patients who have undergone complex head and neck surgery may require transfer to an appropriate level of critical care facility. Additional equipment
necessary to achieve this safely, including portable non-invasive and invasive monitoring, emergency transfer packs and portable ventilators, may also be required.

2.6 Adequate facilities should be available for the pre-operative anaesthetic assessment of patients undergoing major head and neck surgery.

3 Areas of special requirement

3.1 When providing head and neck anaesthetic services for children, there will be a number of special requirements as covered in the guidance on the provision of paediatric services (see Chapter 8: Guidance for the provision of paediatric anaesthesia services).

3.2 The community dental service will need to cater for patients with learning disabilities undergoing general anaesthesia for dental procedures. This vulnerable group of patients require access, communication and peri-operative care around their individual needs. (Further information about anaesthesia for community dentistry will be available in the 'Anaesthesia in the non-theatre environment' chapter (in preparation).

3.3 Particular emphasis should be placed on the need for specialist post-operative ward care. Wherever possible, patients who have had airway-related surgery should be looked after in the early post-operative period on dedicated wards with adequate levels of medical and nursing staff who are familiar with the recognition and management of related airway problems.

3.4 Where major head and neck surgery is carried out there may be a regular elective requirement for post-operative high dependency and intensive care.

4 Training and education

4.1 Patients requiring head and neck procedures should be managed by anaesthetists who have had an appropriate level of training in this field, and who have acquired the relevant knowledge and skills needed to care for patients undergoing peri-airway surgery.

4.2 In order to maintain the necessary repertoire of skills, consultant anaesthetists providing a head and neck 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 activities.

4.3 Head and neck surgery provides an excellent opportunity for the formal and systematic training of anaesthetists in the use of advanced methods for airway management, including fibre-optic intubation techniques. Where possible, additional equipment such as monitors, video recorders and airway simulators should be made available to facilitate this important aspect of anaesthetic education.

5 Research and audit

5.1 In addition to routine audit and the reporting of critical incidents, any morbidity relating to airway management should be presented at departmental clinical governance meetings, and documented for audit purposes.

6 Organisation and administration

6.1 A pre-operative assessment clinic with the facility to arrange pre-admission anaesthetic consultation for those patients with complex airway problems or severe co-morbidity should exist.

6.2 Where necessary, integration with other surgical specialties, such as neurosurgery and plastic surgery, may be needed to formalise joint operating lists.

6.3 The ability of anaesthetists with other specialist interests, such as neuroanaesthesia and intensive care medicine, to contribute towards the provision, planning and implementation of the service should be recognised.

6.4 Any daytime emergency lists should be organised and staffed by senior anaesthetists and surgeons working to a fixed sessional pattern who have no conflicting clinical commitments.

6.5 Where major elective head and neck surgery requiring post-operative critical care is undertaken, the funding for and provision of these beds must be planned to meet the demands of the service, so that unnecessary cancellations can be minimised and the use of theatre resources optimised.

6.6 When very long operations are scheduled on a regular basis, it will be necessary to arrange the funding and resources to support long duration lists.

7 Patient information

7.1 It is not uncommon in head and neck anaesthesia to use techniques such as inhalational induction and awake fibre-optic intubation. When such techniques are planned, it is especially important to fully inform patients of exactly what to expect.
7.2 Specific information regarding what to expect in the immediate post-operative period is also particularly relevant to head and neck surgery. Examples would include the need to breath through the mouth in nasal surgery, the inability to open the mouth when wires are used for dental occlusion, and blurred vision following the administration of topical eye preparations. Such procedure specific explanations should ideally be supported by written information.

7.3 As part of a ‘difficult airway follow-up’, patients should be informed in writing about any airway problem encountered and be advised to bring it to the attention of anaesthetists during any future pre-operative assessment.

References
4 The UK Difficult Airway Society guidelines (www.das.uk.com/guidelines/guidelineshome.html).
11 Then and now. National Confidential Enquiry into Perioperative Deaths, 2000 (www.ncepod.org.uk/).

Further reading
Guidance on the provision of anaesthesia services for Acute Pain Management

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.

Acute pain is defined as pain of sudden onset that is often severe. Safe and effective management of acute pain associated with surgery, non-surgical interventions and some medical conditions is a basic requirement of any professional health service. Good practice should ensure provision of an evidence-based, high quality, adequately resourced acute pain service dedicated to the safe and effective delivery of pain relief and continuing training of non-specialist staff.

In response to concerns regarding the safe administration of opioids in the hospital setting, the Chief Medical Officers of England, Wales, Scotland and Northern Ireland have written to Chief Executives stressing the importance of local guidelines, monitoring and protocols. They acknowledged that much progress has been made in the management of pain in hospitals and that ‘an important contribution to this has come from the continued existence of consultant-led Acute Pain Services, which have promoted the safe and effective use of parenteral opioids.’

Summary

The following points of service provision are consistent with the ‘Pain Management Services: Good Practice’, a joint publication of the Royal College of Anaesthetists and The British Pain Society, May 2003. Effective and safe management of acute pain in hospitals requires:

- The provision of services for acute pain management in all hospitals dealing with patients who may experience acute pain.

- A multidisciplinary approach involving medical, nursing and pharmacy staff; input from other healthcare professionals (e.g. physiotherapy) may be required when appropriate.

- Local written guidelines and protocols for good clinical practice in acute pain management reflecting evidence-based recommendations. These should include the use of adequate patient information (including provision for non-English speakers), management of the vulnerable (e.g. neonates, children, elderly, patients with mental health disorders, communication and learning difficulties, physical or cognitive impairment and problem drug use) and equality of service access to all patient groups.

- An ongoing programme of education and training for all healthcare staff involved in the management of patients with acute pain.

- Adequate administrative support, accommodation, facilities and equipment.

- Provision of programmed activities for appropriately trained consultants. There should be a named consultant(s) with responsibility for the acute pain service.

- Availability of acute pain management advice and intervention at all times.

- Close liaison between acute pain management and other services (e.g. chronic pain management, emergency
Introduction: the importance of acute pain management services

- Acute pain is commonly associated with surgery, trauma, non-surgical interventions and some medical conditions (e.g. myocardial infarction, ureteric colic, acute pancreatitis, sickle cell disease). It may also be an important component of the pain associated with cancer. It is often inadequately relieved\(^3\)\(^-\)\(^4\) and poor pain management is a common cause of distress and complaint.

- The relief of suffering associated with acute pain is first and foremost a humanitarian matter; however, effective acute pain management is also likely to improve the quality of clinical care by preventing some complications, reducing hospital stay and promoting recovery and rehabilitation.\(^5\) It can enable more efficient use of acute hospital facilities. Inadequately managed acute pain can have psychological, physiological and socio-economic consequences.

- Pain after surgery or trauma may become persistent and result in severe chronic pain states which are devastating for the patient and often difficult to treat.\(^6\) The pain management service ensures optimal acute pain treatment and may reduce the incidence of this complication.

- Day-case and short-stay surgery require the provision of safe and effective acute pain management to reduce the need for interventions within primary care or return to hospital because of unrelieved pain.

- Excellent acute pain services can enable many procedures to be performed as day cases.

- Multidisciplinary acute pain management was developed in the 1990s and it now has an established evidence base.\(^7\) In September 1990, the Royal College of Surgeons of England and the College of Anaesthetists, ‘Report of the Working Party on Pain after Surgery’ stated the perceived needs to include ‘Organisation of services so that the level of care and monitoring is appropriate both for the clinical condition of the patient and the technique employed’ and ‘Provision of in-service training for medical and nursing staff involved in the management of postoperative pain. This should include establishment of programmes for the diagnosis and management of the complications and hazards of particular forms of treatment’.\(^8\) These recommendations are still relevant and were endorsed in 2009 by the Chief Medical Officers of England, Wales, Scotland and Northern Ireland.\(^1\) Similar guidance has been published by Quality Improvement Scotland.\(^9\)

The objectives of an acute pain service include:

- systems for regular assessment and individual treatment of acute and acute-on-chronic pain;

- development of protocols for the alleviation of the common side effects associated with pain relief (e.g. nausea, vomiting) and early detection of severe adverse effects (e.g. excessive sedation, respiratory depression, cardiovascular collapse and neuraxial damage);\(^10\)\(^-\)\(^11\)

- provision of specialist pain management and advice for difficult acute pain problems (e.g. management of patients already taking strong analgesics for cancer and chronic non-cancer pain, problem drug users);

- early diagnosis and management of neuropathic pain after surgery or trauma;

- liaison with other healthcare teams responsible for the shared care of patients with acute pain;

- provision of acute pain management at all times;

- provision and dissemination of information, education and resources for patients;

- education for nurses, medical staff and other healthcare professionals about the assessment and management of acute pain;

- audit and evaluation of the efficacy of acute pain management, complications and staff training;

- provision of specialised methods of pain relief that can facilitate the recovery of patients after
Provision of an Acute Pain Management Service

1 Staff

1.1 The acute pain management service should be led by a named doctor with competence in acute pain management, who takes responsibility and provides leadership for co-ordinating the provision of a safe and effective service. The medical personnel staffing acute pain services in the UK are frequently consultant anaesthetists; they have the appropriate competencies and experience. It is essential that these clinicians have programmed activities for direct clinical care for acute pain as part of their job plans.

1.2 Children’s pain management should be supervised by consultants and specialist nurses with competencies in acute and procedural paediatric pain management.

1.3 Specialist acute pain management advice and intervention should be available at all times and staffing should be sufficient to provide prospective cover for all personnel.

1.4 There should be dedicated clinical nurse specialists who:
- advise on acute pain management;
- undertake regular review of acute pain problems;
- undertake education of ward-based staff informally in clinical areas;
- deliver formal education for all disciplines with medical colleagues and other health care professionals;
- liaise with consultant anaesthetists with overall responsibility for acute pain management.

1.5 Provision of effective acute pain management can be optimised by collaboration with other healthcare professionals (e.g. physiotherapists, pharmacists and clinical psychologists). These healthcare professionals should have job plans that include time dedicated to acute pain management.

1.6 Education, training, staffing arrangements and the provision of local recommendations for clinical practice must ensure safe practice at all times, even when core acute pain staff are not on duty.

1.7 All post-anaesthesia care unit staff must be trained in basic pain management and be able to employ protocols to minimise pain and side effects; this is pivotal to the successful management of post-operative pain.

1.8 Provision must be made for access to specialist pain medicine advice when difficulties with pain management arise. Acute-on-chronic pain may be particularly difficult and often requires input and follow-up from chronic pain teams. The chronic pain service should have sufficient staff and resources to provide support for acute pain teams when needed. It is recommended that hospitals should offer an integrated pain service led by Fellows of the Faculty of Pain Medicine, Royal College of Anaesthetists (FFPMRCA).

1.9 In non-surgical clinical areas (e.g. medical wards, emergency medicine, interventional radiology, palliative medicine), there should be staff with knowledge and skills sufficient to provide safe and effective acute pain management for patients with non-surgical acute pain. Their pain management must be of the same standard as for patients with post-operative pain.

1.10 There should be sufficient administrative and clerical staff to support the acute pain service.

2 Equipment, Support Services and Facilities

2.1 Equipment

Appropriate equipment should be provided to ensure safe and effective pain management in adults and children. This equipment includes specialised delivery devices for ‘spinal’ (epidural and intrathecal) infusion, patient-controlled analgesia systems (PCAS) and monitoring. Pumps and PCAS should be dedicated for use in acute or acute-on-chronic pain management only. It is essential that all staff have formal training and achieve competencies in the use of all medical equipment for which they are responsible. The pain management service should ensure that maintenance contracts and a rolling replacement programme for equipment are in place. All staff should be aware of local recommendations for the introduction and use of new medical devices within their service. They should also be aware of national recommendations regarding patients’ safety and medical equipment (e.g. National Patient Safety Agency). These issues should be covered in induction programmes for new staff members.
2.2 Drugs

For PCAS devices and ‘spinal’ infusions, drugs should be supplied in clearly identifiable, aseptically prepared containers. There must be mechanisms in place that ensure that spinal drugs are not inadvertently administered by other routes. For example, drugs for spinal use must be stored separately from those intended for intravenous infusion in order to reduce the likelihood of administration errors and serious adverse events. Spinal and epidural drugs should be prepared in a central sterile unit; they should not be prepared by staff in clinical areas unless there are exceptional circumstances. In this event, the reason should be recorded in the patient’s notes. The post-anaesthesia care unit should have a suitable stock of necessary drugs and equipment to ensure that optimal post-operative pain relief is established before patients return to surgical wards or are discharged. This facility should be available at all sites where out-of-hours operating occurs. In non-surgical clinical areas, drugs and equipment should be sufficient to provide safe and effective acute pain relief.

2.3 Facilities

Appropriate office space should be provided for the acute pain service, as well as administrative, secretarial and information technology support. Critical care facilities should be available for appropriate patients. There should be storage space for PCAS devices, pumps and educational materials.

2.4 Protocols, guidelines and recommendations for practice

Appropriate recommendations should be promulgated, widely disseminated and readily available in all clinical areas where acute pain is managed; these must be reviewed regularly. Pain and its management must be assessed and documented on a regular basis using validated tools for each clinical setting. As a minimum, such clinical recommendations should address the assessment and documentation of acute pain, analgesic prescriptions, clinical management of acute pain in different situations including PCAS and spinal (epidural and intrathecal) infusions. Pain intensity should be regarded as a ‘vital sign’ and recorded as regularly as pulse and blood pressure. The response to treatment and side effects of pain therapies should also be clearly documented. The prescription of analgesics should be reviewed regularly to ensure that pain management is adequate, timely and appropriate. Protocols relating to pain management techniques, complications and important scenarios (e.g. management of spinal techniques and anticoagulants, prevention/detection of spinal infections after regional techniques) should be in place and adhered to wherever the techniques are used.

3 Areas of Special Requirement

3.1 Specific arrangements must be made for the management of pain in neonates, infants and children; this must be of the same standard as for adults and delivered by appropriately trained staff with competencies in paediatrics.

3.2 Specific arrangements must be made for the management of acute pain in patients:

- with special needs, by virtue of their vulnerability or disability (e.g. elderly, physical and intellectually disabled, non-English speakers);
- with problems of drug and substance misuse;
- with opioid tolerance as a consequence of long-term opioid use;
- with chronic pain who develop acute pain problems.

3.3 Specific arrangements must be made for the management of patients undergoing day-case surgery; effective analgesia and simple instructions must be provided for home use and advice given on seeking further help if pain relief is unsatisfactory.

3.4 There should be an established mechanism for the management of serious complications from epidural analgesia (e.g. neurological damage, haematoma and infection). This must include the immediate availability at all times of laboratory investigations, imaging and support from other teams (e.g. microbiology, radiology, neurology, spinal surgery, neurosurgery). It is essential that all units that provide spinal analgesia have rapid access at all times to appropriate scanning techniques and surgical support.

4 Training and Education

4.1 Education is a key factor in the provision of effective and safe acute pain management. Ultimately, changes in clinical practice and behaviour depend upon the quality and quantity of education and training. The acute pain service should be involved in education and training at all levels.

4.2 All personnel involved in acute pain management should be trained with regard to the delivery of a safe and effective service. Such training should include communication skills, pain assessment, pain management options, use of relevant equipment and the early detection/management of problems.

4.3 Participation in an ongoing programme of continuing education and professional development should be encouraged for all staff.
in pain management services; funding should be provided for these activities and staff must be released to attend. It is important that this training is updated regularly to maintain competencies to assure and improve the quality of care.

4.4 It is essential for the welfare of patients that all trainee anaesthetists are guaranteed training time in pain management sufficient to meet the requirements of training in pain as specified by the Faculty of Pain Medicine, Royal College of Anaesthetists. Some centres will be able to include the option of training at an advanced level to comply with entry requirements for the Fellowship of the Faculty of Pain Medicine.

5 Research and Audit

5.1 There should be a regular and systematic audit of results, outcomes, complications and side effects of pain management; potential topics are suggested in the Royal College of Anaesthetists Audit Recipe Book.15

5.2 Effective critical incident reporting and analysis are essential.

5.3 There should be support for clinical research focused on properly designed and conducted investigations.

6 Organisation and Administration

6.1 Delivering high quality acute pain management is a basic requirement of a modern health service and meets minimal expectations of patients and their carers. It is also concerned with the prevention and management of many serious perioperative complications. Therefore, hospitals should ensure that adequate resources and funding are allocated to enable the acute pain service to function appropriately.

6.2 Purchasing and commissioning organisations should ensure that acute pain management is specified as part of the contracting process; this will require identified funding for designated staff, equipment and facilities.

6.3 An acute pain service requires close links with other services (e.g. chronic pain, palliative care, emergency medicine, primary care).

7 Patient Information

7.1 Patients should be able to make informed decisions about pain management techniques. Recommendations from the Department of Health and the General Medical Council for obtaining consent require that patients are given information in verbal and written forms and in a way that they can understand.

7.2 Special provision is needed for those whose first language is not English or for those who have problems that affect communication (e.g. visual, hearing, or cognitive impairment or learning difficulties).

References

4 NHS Surveys: Focused on patients’ experience (www.nhssurveys.org/).
6 Macrae WA. Chronic post-surgical pain: 10 years on.  BJA 2008;101(1):77-86.
Guidance on the provision of services for Chronic Pain Management

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.

The prevention and management of persistent pain in adults, children and young people should be a fundamental objective of any health service. Good practice should ensure provision of a high quality, adequately resourced, multi-professional service dedicated to the care and support of patients with persistent pain and to the ongoing education and development of staff.

Summary

Persistent pain is a common and distressing condition. Chronic pain services deal with all non-cancer causes of persistent pain. Most also treat cancer related pain, often in partnership with palliative care services. Multidisciplinary management of patients with chronic pain alleviates pain and suffering, aids functional restoration and reduces the socio-economic burden of pain for the individual, health care systems and the community.1–3 Effective and safe management of chronic pain requires:4–8

- ready access for patients to a local, first class chronic pain service;
- a seamless service between primary and secondary care;
- specialised chronic pain management services in each region for adult patients with complex pain problems;
- specialised chronic pain management services in each region for children and young people with complex pain problems with a requirement to work with children and their families;
- established links between acute and chronic pain management services within each hospital to enable patients with pain who present acutely and whose symptoms do not resolve to be managed appropriately as an outpatient;
- co-operation between chronic pain management and palliative care services within hospitals and the community;
- provision of appropriate time for direct clinical care for consultants in pain medicine, allied health professionals, managers and support staff;
- appropriate accommodation, facilities and equipment in accordance with best practice recommendations;
- formal links between hospitals on a regional basis so that a comprehensive range of treatments can be offered to all patients who need them;
- provision of pain management programmes (PMP) that promote restoration of physical and psychological function, encourage self care and decrease use of healthcare resources;
- a robust 24/7 on-call system with support from other disciplines (e.g. spinal/ neurosurgery, radiology, microbiology) if neuromodulation techniques are used;
- sufficient funding to enable the service to achieve required targets and quality standards;
- continuing professional development of all staff;
- equity of access and service provision for all patients;
Chronic pain is defined as pain that persists beyond the expected time of healing following injury or disease. Epidemiological studies show that up to 1 in 7 people in the UK population has chronic pain caused by a wide range of conditions. The 2008 Report of the Chief Medical Officer for England emphasised the importance of chronic pain services.

Nociceptive and neuropathic pains are common and have a significant impact on quality of life: this is supported by published epidemiological investigation. Chronic pain becomes a more significant problem as pain prevalence increases, e.g. with ageing, more survivors of cancer and trauma. Unrelieved chronic pain is a major problem for individual patients and a massive socio-economic burden for the health service and the community.

Patients often have complex multidimensional problems that require multidisciplinary management. This usually involves doctors with appropriate training and competencies, and allied healthcare professionals also with specialist pain medicine knowledge and interest: nurses, clinical psychologists, pharmacists, physiotherapists and occupational therapists.

The interface between primary care and hospital chronic pain services is particularly important as many patients are referred from the community. However, many attending other hospital services will benefit from referral to the pain clinic (e.g. medical and surgical specialties, oncology, child health specialties and psychiatry). Integrated primary and secondary care pain services are increasingly seen as an optimal model of care in the evolving NHS.

There is evidence that multidisciplinary pain management is of benefit in improving the quality of life of patients.
achieving national standards and targets;
- audit and evaluation of pain services and the needs/satisfaction of patients;
- promoting evidence-based healthcare;
- research into causes and management of persistent pain.

Widespread provision of basic core pain management services and the selective provision of more advanced specialist services are necessary to address the problem of persistent pain. Pain management services are required to provide both hospital and community care to patients with a wide range of different conditions.

Provision of a Chronic Pain Management Service

1 Staffing

1.1 The delivery of high quality, multidisciplinary pain services requires the allocation of fixed sessions for all involved healthcare personnel (rather than an ad hoc or informal approach).

The International Association for the Study of Pain has made a series of recommendations on the organisation of pain services. With regards to staffing it states:

The International Association for the Study of Pain has made a series of recommendations regarding the organisation of pain services and this guidance is consistent with the recommendations of the Faculty of Pain Medicine. Key points from the guidance include:

- A recognition that the diagnosis and management of patients with chronic pain is complex and that multiple skills and knowledge are required
- Pain management facilities should include at least one physician who assumes responsibility for obtaining a complete biopsychosocial history and performing a screening physical examination where clinically indicated.
- Previous medical records and results of imaging investigations must be available for review and interpretation.

The specialty of the physician performing this review is not specified but someone with expertise in the type of disease process responsible for the patient’s chronic pain should be either the referring physician or part of the pain treatment facility’s assessment team.

Other types of health care professionals are of great value in a pain treatment facility. These include psychologists, nurses, physical therapists, occupational therapists, social workers, vocational counsellors and others. The variety and number will be determined by the types of patients seen and the number of visits per year to the facility. We should remember that the aetiologies of chronic pain are not well understood; medical treatments have already failed many of these patients and effective evaluation and treatment may be administered by other health care professionals.12

1.2 A chronic pain management service should have:

Specialists in Pain Medicine – Every specialist chronic pain service must include consultants who have been trained and have appropriate competencies in pain medicine. The majority of services are led by doctors whose primary qualification is in anaesthesia; many will be Fellows of the Faculty of Pain Medicine, Royal College of Anaesthetists (FFPMRCA). Anaesthesia is the only specialty that incorporates advanced pain management within its training programme. Doctors play a central role in the assessment of pain and the formulation of management plans for patients. Senior doctors within the team also have responsibility for the education of student and postgraduate medical practitioners. Staff grade and associate specialist doctors with appropriate experience and competencies are well placed to provide excellent contributions to the pain service in the clinical care of patients and in education of staff.

Nurse specialists and nurse consultants play a key role in pain management. They may see outpatients independently for assessment or follow up, assess patients on wards, supervise medication, provide transcutaneous electrical nerve stimulators (TENS), deliver complementary therapies, be involved in PMPs or supervise neuromodulation.

Clinical psychologists with special training in pain management are an essential component of all chronic pain management services. They may offer individual psychological approaches and participate in PMPs.

Physiotherapists make an important contribution to the assessment and management of patients with chronic pain. They deliver physical therapies and play an important role in functional restoration programmes.

Occupational therapists can help patients regain normal function and assist in strategies for return to work.

1.3 The mix and number of allied health professionals in a service should reflect the case-load, types of patients and range of treatments used.

1.4 Medical and nursing staff should be available for the management of in-patients with persistent pain.
In-patients cared for by a consultant from another specialty may receive a considerable amount of care and treatment from the pain management team. This work should be formally recorded and recognized so that appropriate funding for this activity can be allocated. Some pain medicine consultants give support to other secondary care teams (e.g. palliative medicine, spinal surgery, rehabilitation). There should be appropriate recognition for this work within their job plan.

1.5 Pain management is a consultant-based service in most hospitals; individual jobs plans should reflect this as it has implications for the provision of cover and workload.

1.6 Any pain service that provides neuromodulation must have a robust 24/7 on call system with support from other disciplines (e.g. spinal/neurosurgery, radiology, microbiology).

1.7 The prevalence of comorbid mental health disorders in patients presenting to pain services is high. Defined links with psychiatric services are needed to deliver appropriate pain management and to support clinical staff.

1.8 Working in a chronic pain service entails a considerable amount of correspondence, dictation, preparation of reports, telephone calls, case conferences and other clinical administration. Due regard should be taken of this workload within consultant job plans. The working arrangements for pain medicine specialists should resemble those of consultant physicians in terms of job plan, support services (especially secretarial) and accommodation.

1.9 Special problems exist for consultant anaesthetists who divide their time between pain services and anaesthesia. Their job plans should take into account the additional demands of this combination. The individual consultant and the Clinical Director should devise an appropriate allocation of sessions between operating theatre-based anaesthesia and pain medicine to ensure maintenance of competency in all spheres of the consultant’s clinical activity. Continuing professional development is required in both clinical areas and will require routine review as part of the appraisal, job planning and revalidation processes.

1.10 It is recommended that there should be no single-handed practitioners providing a chronic pain service. Where this is unavoidable, appropriate arrangements must be made for networking, external peer-support and review.

### 2 Equipment, Support Services and Facilities

#### 2.1 Equipment

All pain services that use nerve blocks and/or neuromodulation must have access to fluoroscopy and the ability to store and retrieve images. The management of chronic pain may also involve the use of specialist equipment (e.g. radiofrequency lesioning, percutaneous disc decompression. Centres that provide specialist services may require specialist equipment (e.g. for neuromodulation, cordotomy). There should be maintenance contracts and a rolling replacement programme for equipment.

#### 2.2 Support services

**Pharmacy.** Local guidelines for prescribing and information sheets for patients about medications and their uses are helpful. Centres that provide intrathecal drug delivery need the support of the sterile preparation unit. The cost of prescribing for continuing care should have prior agreement with commissioners. Some drugs cannot be prescribed in primary care and so special arrangements are needed.

**Information technology.** The pain service should be provided with up-to-date electronic systems for maintaining patient bookings, medical records, outcome information and other data to support service evaluation, audit and revalidation.

#### 2.3 Facilities

Chronic pain services are delivered in the following environments:

- Out-patient clinics in a hospital setting or in a primary care or community facilities;
- in-patient wards;
- operating theatres or other treatment facilities;
- PMPs – inpatient or outpatient;
- oncology and palliative care units within the hospital or on external sites.

Appropriate outpatient facilities include rooms for consultation, examination and treatment that are provided on a regular basis with access for wheelchairs and disabled patients.

There should be designated operating theatre sessions supported by fluoroscopy/radiographers for performance of diagnostic and therapeutic procedures.

Appropriate office accommodation should be provided for all staff in a non-clinical area that provides security for patient records and information. The service must be compliant
with data protection legislation and patient confidentiality: all staff needs to be able to make confidential calls to patients and health care professionals in an appropriate environment. Appropriate facilities for trainees in pain medicine should be provided.

There should be provision of individual and group PMPs including cognitive behavioural therapy. PMPs may vary in length and intensity depending on the patient’s needs. Standards for physiotherapists and occupational therapists working in PMPs are available. Patient accommodation is required for residential programmes.

Some patients may need overnight admission to a hospital under the care of the pain management service, for example if the patient has undergone a specialised procedure or is admitted for medication rationalization. Access to post-anaesthesia care units should be available for patients following interventions. Robust arrangements are needed for adequate medical cover on a 24/7 basis for any patients admitted to hospital under the care of the pain management team.

3 Special requirements

3.1 Pain management services for patients with cancer

About 10% of adults with cancer-related pain may benefit from specialised pain management; the proportion of children who may be helped is not known. The demands on pain management services vary depending on the size and expertise of local palliative care and oncology services.

Pain medicine specialists use a range of specialist knowledge and skills for cancer pain management that may include interventions (e.g. neural blockade, neuromodulation). Modern palliative care means that pharmacotherapy and simple physical therapies have often been optimized before referral for specialist pain management.

Patients with cancer-related pain may be treated in the hospital as inpatients or outpatients, in a palliative care unit or at home.

Consultants in pain medicine who provide specialist advice and services to palliative care units require appropriate recognition of this commitment in their job plans.

3.2 Other areas of special requirements

Pain management services should make special provision for vulnerable and potentially disadvantaged groups (e.g. children, elderly, learning difficulties, physical impairment, diverse ethnic backgrounds, non-English speakers). Particular difficulties may be encountered with those who habitually use drugs, prisoners and survivors of torture.

There is a need for specialised multidisciplinary clinics for certain conditions or patient groups (e.g. sickle cell disease, chronic pelvic pain).

There is a need for regional services for children and young people with chronic pain. These should be staffed by health care professionals with experience in managing children. There must be liaison with primary care, secondary care, schools, Children’s and Adolescents Mental Health Services and other relevant services. Transitional arrangements to adult services are essential.

4 Training and Education

4.1 All those involved in chronic pain management should be trained adequately to ensure that they achieve the competencies needed for the delivery of a safe and effective service.

4.2 There should be an ongoing programme of continuing education and professional development for all staff within the pain management services. Time and funding should be provided for these activities.

4.3 Training in the management of pain medicine forms an integral part of the training programme for anaesthetists; this includes provision for up to 12 months of advanced training in pain medicine. Rigorous assessments of competency in pain medicine have been developed by the FPMRCA. Regional Advisers in Pain Medicine have been appointed by the FPMRCA who supervise the provision of pain medicine training and assessment. Anaesthetists who have achieved the advanced pain medicine competencies can apply for the Fellowship of the FPMRCA. These competencies are essential in all other routes to the Fellowship for specialists in pain medicine.

5 Research and Audit

5.1 There should be regular evaluation and audit of outcomes and complications of treatment. Whenever appropriate, audit activities should be integrated with those of related departments (e.g. anaesthesia, orthopaedics, palliative medicine).

5.2 The views of service users should inform service delivery and development.

5.3 There should be a culture that is supportive of research into persistent pain, especially the
6 Organisation and Administration

6.1 Every pain management service should be clinically led by a health care professional with expertise in pain management who is responsible for coordinating the provision of a safe and effective service in consultation with colleagues.

6.2 Some specialist chronic pain management can be delivered in primary care or a community facility; it is important that this work is carried out by appropriately trained staff. Those working in this role in primary or community care should be under the leadership of doctors who have achieved the competences and experience in advanced pain medicine as defined by the FPMRCA.15

6.3 Chronic pain services should have designated management support; managers, administrative, secretarial, and clerical/IT support staff should be available to underpin inpatient and outpatient work in the same proportion that they are available for other medically-based specialties. A pain management service more closely resembles a traditional medical or mental health service rather than a surgically based model in terms of volumes and complexity of case mix.

6.4 The organisation of the service should encourage close co-operation with related specialties including, if appropriate, joint clinics with other doctors who have a special interest in a specific patients. Useful links may be established with occupational health specialists and employment advisors.

6.5 The organisation of clinics should take account of the fact that patients with complex persistent pain problems require thorough physical, mental health, social and vocational assessment. Therefore, the initial consultation may be prolonged and clinic schedules should recognise this. In this regard, comparison should be made with specialties such as psychiatry.

6.6 There should be agreed referral and discharge policies with established lines of communication between pain, primary care and relevant secondary care services.

6.7 The chronic pain service should be responsive to the needs of patients and primary care professionals. Input should be sought from patients and patient support groups.

7 Patient Information

7.1 The culture and practice of the service should embrace the need for patients to make informed decisions about their management, supported by verbal and written information. This should cater for those whose first language is not English or those who have communication difficulties.

7.2 Patients should be made aware of sources of support (e.g. Expert Patient’s programme,16 British Pain Society patient resources, condition-related self help groups).

References


16. Expert Patients Programme (www.expertpatients.co.uk/).
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

- Anaesthesia services for children require specially trained clinical staff together with equipment, facilities and an environment appropriate to the needs of children.1,2
- The service should be led at all times by consultants who regularly anaesthetise children.3,4
- At all times, there must be adequate skilled, dedicated assistance;5 assistance for paediatric anaesthesia should be provided by staff specifically trained for the task.
- In a life-threatening emergency where transfer is not feasible, the most senior appropriately experienced anaesthetist available should undertake anaesthesia.6
- Paediatric resuscitation equipment must be available wherever and whenever children are treated, and anaesthetists must maintain their skills in paediatric resuscitation to the level of advanced paediatric life support or equivalent. Equivalent requirements are a matter for local agreement.7
- There should be a properly staffed1 and funded acute pain service that covers the needs of children.
- Neonatal and paediatric high dependency and intensive care services should be available as appropriate for the type of surgery performed.8,9
- Parents (or carers) should, wherever possible, be involved in all aspects of care and decisions regarding the management of their children.10–12

Introduction: The importance of paediatric anaesthesia services

- Children comprise 25% of the population. Many will require anaesthesia to allow treatment for a variety of surgical conditions including ENT, orthopaedic, dental, plastic, cardiothoracic, ophthalmic and paediatric general surgery.
- Children who undergo anaesthesia and surgery have special requirements. They are not small adults: they differ physiologically, emotionally and socially. Doses of drugs and fluids need to be precisely calculated and anaesthetic equipment for smaller children differs from that used in older children and adults.
- Wherever and whenever children undergo anaesthesia and surgery, their particular needs must be recognised and they should be managed in separate facilities and looked after by staff with appropriate experience and training.
- Most surgical procedures performed on children will be elective, relatively straightforward and performed in district general hospitals, usually on fit infants and children.
- Children with significant acute or chronic medical problems, those undergoing more complex procedures, neonates and small infants are usually...
referred to specialist units or tertiary paediatric centres.\textsuperscript{13–16}

Nevertheless, district general hospitals should have arrangements for managing and treating simple surgical emergencies; in addition, they should be able to resuscitate and stabilise seriously ill children of all ages, prior to their transfer.\textsuperscript{17}

At all times anaesthesia in children should be undertaken or supervised by consultants who have undergone appropriate training in paediatric anaesthesia (see section 4: Training and education).

All consultant anaesthetists with a CCT or equivalent will have obtained paediatric anaesthetic training as STs, following which they should, as a minimum, have been competent to provide peri-operative anaesthetic care for common surgical conditions, both elective and emergency, for children aged 3 years and older. Unless there is no requirement to anaesthetise children it is expected that this competence will need to be sustained through regular exposure, CPD and/or refresher courses. However, there will be consultants who have acquired more advanced competencies thus allowing provision of a more extensive anaesthetic service; these competencies will still require to be sustained through the same mechanisms. There should be locally agreed guidelines on cases which can be managed on site and those which require transfer to a specialist unit.

Levels of provision of service

1 Staffing requirements

1.1 Children should be anaesthetised by consultants who have regular and relevant paediatric practice sufficient to maintain core competencies. Children may also be anaesthetised by staff or Associate specialist (SAS) anaesthetists or specialty doctors (SDs), provided they fulfil the same criteria and there is a nominated supervising consultant anaesthetist. When trainees anaesthetise children, they should be supervised by a consultant with appropriate experience.

1.2 The level of supervision of a trainee will vary according to their ability and experience, the complexity and location of the procedure, the presence of any relevant co-morbidity and the age of the patient. For example, while ST1s with limited experience require direct supervision, experienced STs who have undergone a period of paediatric anaesthetic higher training might be supervised by a consultant outside the hospital. If clinical supervision of a trainee is being provided by an SAS/SD, the trainee must always have unimpeded access to a consultant.\textsuperscript{18}

1.3 When a child undergoes anaesthesia, the anaesthetist must be assisted by staff (operating department practitioners/assistants/anaesthetic nurses) who have specific paediatric training and skills.

1.4 In the period immediately following anaesthesia, the child should be managed in the recovery ward or post-anaesthesia care unit on a one-to-one basis, by designated staff who undergo regular paediatric resuscitation training. A registered children’s nurse should be directly involved with the organisation and training of staff in this area, and a member of staff trained and competent in advanced paediatric life support should always be on shift.

1.5 Children should be nursed on a ward where there are at least two registered children’s nurses on duty for every shift that the child is present.

2 Equipment, support services and facilities

Equipment

2.1 A full range of monitoring devices, paediatric anaesthetic equipment and disposable items for general and regional anaesthesia should be available in theatres and all other areas where children are anaesthetised.\textsuperscript{19} This should incorporate a full range of equipment including the following which should be appropriate for use in children of all sizes and ages:

- airway management equipment
- blood pressure cuffs
- intravenous cannulae
- temperature probes
- pulse oximetry
- ultrasound devices.\textsuperscript{20,21}

2.2 Resuscitation drugs and equipment, including an appropriate defibrillator, should be routinely available at all sites where children are to be anaesthetised.

2.3 Anaesthetic machines should incorporate ventilators, which have controls and bellows permitting their use over the entire age range together with the facility to provide pressure controlled ventilation.

2.4 There should be appropriate thermostatic control of the operating room; temperature monitoring and patient warming devices should be available in both the operating room and recovery area.
2.5 Intravenous fluids should be administered in a way that allows rapid and accurate delivery.

Support services
2.6 Paediatric high dependency and intensive care services should be available as appropriate for the type of surgery performed.8,9

2.7 Children undergoing anaesthesia and surgery as day cases or in-patients will benefit from the input of play-specialists who can help in the preparation of the child for surgery.1

2.8 On-site haematology, chemical pathology, radiology and blood transfusion services should meet the requirements of infants and children with particular reference to the removal and analysis of small blood samples. The use of routine pre-operative blood testing should be kept to a minimum, unless there are specific clinical indications.

2.9 There should be pharmacy staff with specialised paediatric knowledge available to provide advice and ensure safe and effective management of drugs in children.1 Where appropriate, intravenous injections and infusions for children should be prepared in the pharmacy under controlled conditions. Copies of the ‘British National Formulary for Children’ or equivalent should be widely available and used in all ward and theatre areas.22

2.10 There should be a properly staffed and funded acute pain service (APS) which covers the needs of children and undergoes regular audit (see Chapter 6: Guidance on the provision of anaesthesia services for acute pain management).23 Analgesia guidelines appropriate for children should be readily available and pain scoring, using validated tools appropriate to developmental age, should be performed routinely on any child who has undergone a surgical procedure.21 A member of the acute pain service should attend paediatric wards daily, and all children who have had major surgery should be assessed regularly.

2.11 Particular care is required when infants and children undergo investigations or surgical procedures under sedation alone. Recommended guidelines for the conduct of paediatric sedation have been published by The Scottish Intercollegiate Guidelines Network.24

Facilities
2.12 Children should be separated from and not managed directly alongside adults, whether in the operating theatre department, the post-anaesthesia care unit (recovery), a critical care unit, in-patient wards or the day care unit.25 Theatre design, the appearance of the anaesthetic and recovery areas and working practices should all reflect the emotional and physical needs of children.3 If there are genuine problems, such as the need to use older buildings or the need for children to be cared for close to a facility that is essential for any aspect of their care, efforts should be made to comply with the overall requirement for separation from adult patients.

2.13 Recovery areas for children should be separate or screened from those used by adults and provided with paediatric airway and resuscitation equipment.

2.14 In the accident and emergency department there should be a separate area for children, together with all the necessary resuscitation equipment and protocols required to manage the seriously ill child.1

2.15 Services and facilities should take account of the specific needs of adolescents and young people, which are different from those of children and adults.

2.16 Resident accommodation should be available for parents of children who require overnight admission to hospital.

3 Areas of special requirement

Intensive care: care of the critically ill child
3.1 Children may require admission to critical care facilities as a planned part of their care, for example after surgery, because of trauma or an acute illness or because of extreme prematurity or illness at birth. Paediatric intensive care is provided in designated units, staffed by doctors and nurses with specialised training.3,26 Most paediatric intensive care units are based at children’s hospitals or tertiary paediatric centres and serve a defined geographical area; they must comply with national standards.7-9 Children who require intensive care following an operation should therefore undergo their surgery in one of these hospitals/units with a designated paediatric intensive care unit (PICU).

3.2 However, arrangements for the immediate care of critically ill children should be in place in any hospital which manages children.7,17 It must be recognised that this need can arise suddenly and unpredictably in the accident and emergency department, the operating theatre or the in-patient wards. In-house arrangements are therefore required for providing emergency treatment, initiating intensive care and stabilising critically ill children, prior to their transfer to a PICU.6
3.3 In all accident and emergency departments receiving children, neonatal and paediatric resuscitation equipment should be readily available together with all the necessary equipment, drugs and infusions necessary to resuscitate, stabilise and prepare an infant or child for PICU transfer. Resuscitation equipment should also be available in all other sites where children undergo treatment.¹

3.4 There should be hospital protocols for management of critically ill children. These include the management of head injuries, the indications for CT scanning, management of acute upper airway obstruction, suspected meningococcal septicaemia, seizures, severe asthma, poisoning and major burns. Clinical management of these children, in tertiary or non-tertiary settings, will require close co-operation and multidisciplinary teamwork between nurses, paediatricians, surgeons, anaesthetists, intensivists, and other relevant clinicians. Both during and following the initial stages of resuscitation of a critically ill or ‘collapsed’ child, it is important that further stabilisation and management are not left within the sole remit of the anaesthetist. ‘In a retrieval network the tertiary centre(s) have a responsibility to the DGH units ... both to offer clinical advice and help in locating a sitable PIC bed.’¹⁷

3.5 A critically ill child may require short-term admission to a general critical care facility while awaiting the arrival of the PICU retrieval team. There may also be occasions when a child requires a very short period of intensive care; these may not require transfer to a PICU, provided there is a suitable facility within the hospital and the episode will last only a few hours.²

3.6 Transfer of critically ill children to specialist care services is normally undertaken by a paediatric emergency transfer team operating from the appropriate PICU.³ When this is not feasible (e.g. because the transfer is urgent and the transfer team is not immediately available), the general hospital making the referral may have to undertake the transfer of a critically ill child who is ‘intubated and ventilated’. This may occur, particularly, in the case of the child who presents at a district hospital with a serious head injury and an expanding intracranial haematoma requiring urgent surgical decompression by a neurosurgeon. Under these circumstances:
- there should be a designated consultant with responsibility for transfers
- portable monitors, transfer equipment, drugs and relevant guidelines must be available
- The on-call consultant has a duty to deploy staff appropriately. Patients being transferred should normally be accompanied by a doctor with relevant training and experience in paediatric life support including advanced airway management skills, who should be accompanied by a suitably trained assistant. It is the responsibility of the hospital management to ensure adequate and appropriate staffing levels.⁷

3.7 Portable transfer monitors and equipment with appropriate staff will also be required when transferring a critically ill child between different departments of a hospital (e.g. accident and emergency department to CT scan or ICU).

### Day care surgery and anaesthesia

3.8 Day care surgery is particularly appropriate for children, provided the operation is not complex or prolonged and the child is healthy with no significant co-existing medical illness.

3.9 The management and care of day cases should comply with standards contained in the report ‘Just for the Day’, irrespective of whether children are managed in a specialist paediatric unit or an adult unit adapted for children.²⁵

3.10 Selection for day care surgery should be made according to surgical, anaesthetic, medical and social criteria.

3.11 The lower age limit for day case surgery depends on the facilities and experience of staff and the medical condition of the infant. Preterm or ex-preterm neonates should not be considered for day case surgery unless they are medically fit and healthy and have reached 60 weeks post-conceptual age. Infants with a history of chronic lung disease or ‘apnoeas’ should be managed in a centre equipped with facilities for post-operative ventilation.¹⁶⁻¹¹

3.12 Babies who require surgery in the neonatal period should be managed in facilities offering post-operative intensive care. Generally, care is delivered jointly by consultant neonatologists/intensivists and surgeons, with input from consultant paediatric anaesthetists.

3.13 Parents and children should be provided with good quality information which includes fasting guidelines and what to do if the child becomes unwell before or after the operation.

3.14 There should be clear discharge criteria following day care surgery; patients should be given drugs for pain relief with clear instructions to parents for their use.

### 4 Training and education

- The Royal College of Anaesthetists
- Guidelines for the Provision of Anaesthetic Services
4.1 Children who undergo anaesthesia must be managed by staff who have received appropriate training and whose competency in anaesthesia and resuscitation is adequate for the management of the children they serve.

4.2 Consultants with a substantial commitment to paediatric anaesthesia, including full-time paediatric anaesthetists, are usually appointed to posts in specialist children’s hospitals or tertiary paediatric units. They will normally have satisfied the higher and advanced level competency-based training requirements of the RCoA.\(^2\)

4.3 Some consultants are appointed to posts with a designated sub-specialty interest in paediatric anaesthesia at district general hospitals. In many instances, they are nominated as the lead consultant for paediatric anaesthesia. Typically, they might undertake at least one paediatric list or equivalent per week and are responsible for co-ordinating and overseeing anaesthetic services for children, with particular reference to equipment, protocols, guidelines, pain management, resuscitation services, sedation, teaching etc. These individuals should normally acquire the competencies listed for higher training in paediatric anaesthesia during ST years 5, 6 or 7.\(^2\) They should also have advanced training in life support for children and have maintained the skills so learnt.

4.4 All anaesthetists who work with children should maintain appropriate clinical skills, have training in child protection and be aware of the arrangements for child protection in their own hospitals.\(^2\)

4.5 In paediatrics, as in all areas of anaesthetic practice, anaesthetists must recognise and work within the limits of their professional competence. Some anaesthetists working in district general hospitals do not have a regular paediatric commitment; they may, in the absence of a separate paediatric rota, have to provide out-of-hours cover for emergency surgery in children. Anaesthetic involvement may also be required in the management of critically ill children who, on presentation, require intubation, resuscitation and initiation of intensive care before the arrival of a retrieval team and eventual transfer to a PICU. Whilst virtually all career grade anaesthetists, as trainees, will have received some formal training in paediatric anaesthesia, several years may have elapsed since this was obtained. It is important that such consultants obtain training in paediatric resuscitation and are able to maintain these skills. In addition, there should be arrangements for undertaking regular supernumerary attachments to paediatric lists (see below), or secondments to specialist centres/paediatric simulator work, in order to update and maintain paediatric knowledge and skills.

4.6 There must be arrangements which are fully funded to enable all consultant and career grade staff who provide anaesthesia or anaesthetic cover for children to participate in CPD which relates to paediatric anaesthesia and resuscitation. In particular, consultants who have no fixed paediatric lists but have to provide out-of-hours cover should undertake regular annual CPD which involves supervised work with a paediatric anaesthetic colleague.

4.7 Arrangements should also be made between specialist paediatric units and district general hospitals to facilitate continuing professional development (CPD) and refresher training in paediatric anaesthesia. The establishment of regional groups/networks of paediatric anaesthetists may facilitate joint CPD.

4.8 Where appropriate, joint appointments may be considered, allowing designated consultants from district general hospitals a regular commitment within a dedicated tertiary paediatric centre in order to maintain and develop their skills.

5 Research and audit

5.1 Audit plays a vital role in the quality assurance process and in measuring performance. Simple indicators, such as unplanned in-patient admission following day case surgery or unplanned admission to the intensive care unit following surgery, can easily be measured and the reasons documented. The information can be analysed and compared with accepted norms. A number of suggested topics, specifically relating to paediatric anaesthesia or adaptable from those suggested for adult anaesthesia, are set out in the Royal College of Anaesthetists document ‘Raising the Standard: a compendium of audit recipes’.\(^2\)

5.2 There should be departmental audit and morbidity meetings relating to paediatric anaesthesia. Where appropriate, this should be multidisciplinary and incorporate input from parents, guardians and patients.

5.3 Audit activity should include the regular analysis of critical and untoward incidents. Serious events and near misses will need to be investigated thoroughly and reported to the National Patient Safety Agency in England and Wales, or equivalent elsewhere, in line with national requirements.

5.4 There should be an audit of all children transferred between hospitals. This should be monitored by the
referring and receiving hospitals’ paediatric or other appropriate committee.

6 Organisation and administration

6.1 There should be a hospital committee consisting of a paediatrician, anaesthetist, surgeon, pharmacist and registered children’s nurse. Local protocols should define surgery possible in that particular hospital with regard to such matters as the age and condition of patients, extent of elective and emergency surgical provision, staffing, local environmental constraints and thresholds for transfer to a larger or tertiary unit. This committee should be responsible for the overall management, improvement, integration and audit of anaesthetic and surgical services for children.

6.2 When children are admitted for surgery, their overall care should be supervised by a specialist paediatric surgeon or paediatrician. Where this is not the case, a named paediatric medical consultant should oversee care in conjunction with the child’s surgeon.

6.3 Children who undergo surgery should normally be concentrated on designated paediatric operating lists, ideally in a separate children’s theatre area.2

6.4 In hospitals where children undergo anaesthesia, there should be readily available evidence-based guidelines and protocols relating to resuscitation, peri-operative care and the management of conditions such as anaphylaxis and malignant hyperpyrexia.

6.5 All patients should be assessed before their operations by an anaesthetist; both the parents and the child should be given the opportunity to ask questions.

6.6 There should be systems to ensure the safe use and prescription of drugs in children. There should be awareness of the implications of using ‘off-label’ and ‘unlicensed’ drugs for children. Copies of the ‘British National Formulary for Children’ or equivalent should be available.22

6.7 Parents (and others in loco parentis) should be involved in the care process. This includes physical and psychological preparation of the patient for surgery. A child centred approach to anaesthesia and surgery should be employed, with, as far as possible:
- segregation between adults and children in the operating department, post-anaesthesia care unit, day care unit, in-patient wards and the accident and emergency department
- provision for parents to accompany children, both to the anaesthetic room and into recovery areas.1 There may be exceptions to this; for example, anticipated difficulty in tracheal intubation or rapid sequence induction.

6.8 Arrangements should be in place with a specialist paediatric unit for the transfer of sick infants or children.

6.9 It is recommended that regional networks be developed, with the establishment of close links between departments of anaesthesia and critical care in district general hospitals and the corresponding departments in tertiary paediatric centres.2,3,9 This should facilitate provision of advice (when required), the production of evidence-based protocols and guidelines, and the arrangement of clinical attachments.

7 Patient information/consent

7.1 Before the admission of a child for elective surgery, parents should receive full written information together with a contact telephone number should they have further questions. Written information should be based on or make reference to that provided in ‘Anaesthesia Explained’ and the information leaflets relating to paediatric anaesthesia that are available from the Royal College of Anaesthetists.9

7.2 Anaesthetists should be aware of legislation including the Children Act, rights of the child, child protection issues and the process of obtaining consent.31,32

7.3 Although separate written consent for anaesthesia is not mandatory, there should be discussions with the child and/or parent about methods of induction and provision of post-operative pain relief including the use of suppositories. Where special techniques such as epidural blockade, invasive monitoring and blood transfusions are anticipated there should normally be written evidence that these have been discussed with the child (when appropriate) and with parents.

7.4 In infants and younger children, consent for medical and surgical treatment is obtained from the parent or the legal guardian; minors age 16 and over can consent to medical treatment. Nevertheless, there are some children under the age of 16 who have sufficient maturity and understanding to decide whether to undergo surgery (see section 7 of Chapter 2: Guidance on the provision anaesthesia services for pre-operative care).

References


27 The CCT in Anaesthesia IV: Competency Based Higher and Advanced Level (Specials) Training (ST) Years 5, 6 & 7 Training and Assessment. *RCoA*, London April 2009 (www.rcoa.ac.uk/docs/CCTpiv.pdf).


Further reading


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

- **There should be a named lead clinician responsible for ophthalmic anaesthesia services.**
  
- ** Patients undergoing procedures involving local anaesthesia using a sharp needle technique and those requiring intravenous sedation must have an anaesthetist immediately available in the theatre suite.**
  
- **Local anaesthesia using topical or sub-Tenon’s block does not require the immediate availability of an anaesthetist in the theatre suite.**
  
- **On local anaesthetic lists without an anaesthetist present, patients must be monitored by trained professionals during establishment of local anaesthesia and throughout the operative procedure.**
  
- **Patients do not need to be starved for cataract surgery under local anaesthesia or when hypnotic or sedative drugs are used in low doses to produce only anxiolysis. Patients do need to be starved when conscious or deeper planes of sedation are employed, or when using combinations of drugs or infusions.**
  
- **Needle-based local anaesthetic blocks should be performed or directly supervised only by a surgeon or anaesthetist who has been specifically trained. This training should be provided for trainees and new staff and overseen by an expert.**
  
- **Pre-admission anaesthetic assessment by appropriately trained staff is highly desirable because of the high proportion of day case patients, and significant incidence of medical co-morbidity.**
  
- **Attention should be paid to current guidelines for day case anaesthesia.**
  
- **Paediatric patients should have their procedures where possible as day cases.**
  
- **Paediatric patients should be on designated paediatric lists where possible and anaesthetised by an appropriately trained and experienced anaesthetist.**
  
- **Children under five years old should normally be anaesthetised by a consultant or under the direct supervision of a consultant.**
  
- **The elderly and systemically sick must be anaesthetised in an appropriate environment with arrangements in place to gain prompt access to in-patient medical and critical care if required.**
  
- **Departments should have protocols covering the prioritising of patients requiring urgent procedures based on surgical need and medical fitness for anaesthesia. Many procedures can wait to be done in routine hours.**
Introduction: The importance of anaesthesia services for ophthalmic surgery

- Ophthalmic surgery is undertaken within multidisciplinary units, such as general hospitals, in isolated units and in large single specialty centres, as in-patient or day cases. All environments require appropriate staffing levels, skill mix and facilities.
- Anaesthesia for ophthalmic surgery is a recognised sub-specialty of anaesthetic practice. Anaesthetic services are provided for a wide age range of patients, from neonates to the very elderly.
- Ophthalmic surgery is often required for ocular manifestations of systemic disease and there is a relatively high incidence of patients with uncommon medical conditions.
- There is an increasing trend towards day case services and use of local anaesthesia (LA) for ophthalmic procedures. Local anaesthesia can be provided topically (by use of eye drops), by sharp needle technique (peribulbar and retrobulbar blocks) and blunt needle techniques (sub Tenon’s).

Levels of provision of service

1 Staffing requirements
1.1 All intraocular surgery performed under LA should be carried out in a facility which is appropriately staffed for resuscitation.
1.2 Lists under local anaesthetic (LA) which do not require the immediate presence of a anaesthetist in the theatre suite do require the presence of an appropriately trained anaesthetic nurse, ophthalmic theatre nurse or operating department practitioner (ODP) to monitor the patient during establishment of local anaesthesia and throughout the operative procedure. This should be his/her sole responsibility.
1.3 Dedicated skilled assistance for the anaesthetist must be provided in every situation where anaesthesia or sedation is employed.
1.4 If in-patients are cared for in isolated/single specialty units there must be appropriate medical cover and nursing care.

2 Equipment, support services and facilities

Equipment
2.1 All intraocular surgery performed under LA should be carried out in a facility which is appropriately equipped for resuscitation. Oxygen and suction must be available.

2.2 Minimum anaesthesia monitoring standards should be adhered to.
2.3 All anaesthetic equipment and monitoring should conform to the current standards and should be regularly checked, maintained and in good working order.
2.4 Appropriate facilities for monitoring in the post-operative period must be available.

Support Services
2.5 Pre-admission assessment. Pre-admission anaesthetic assessment is highly desirable. Patients are often elderly and have concomitant systemic disease requiring optimisation prior to surgery. There is a relatively high incidence of uncommon conditions which may need forward planning or correspondence with other units. Pre-admission assessment also plays a part in allocating patients appropriately to LA or general anaesthetic techniques and selecting patients for day case. This process requires careful assessment by appropriately trained staff underpinned by guidelines on patient selection.

Facilities
2.6 Isolated units must have appropriate facilities for the care they aim to provide.
2.7 Ophthalmic surgery under both general and local anaesthesia is often provided as a day case service and the facilities available should be compliant with the current day case recommendations.
2.8 Facilities and staffing in the operating facility must allow for physical infirmity of patients. There should be comfortable patient access to the theatre suite, e.g. wheelchair if required. There should be adequate staff to help patients on and off operating tables with gentleness and dignity. There should be devices available to adjust patient position for maximum comfort and surgical access.

Guidelines and protocols
2.9 There must be a robust procedure for checking the laterality of the eye to be operated on prior to local anaesthetic block. This should include the eye being marked by the responsible surgical team prior to admission to the surgical suite. On arrival in the anaesthetic room the consent form must be checked. This must be done by the anaesthetist or surgeon performing the block and an ODP or theatre nurse. The patient must be asked to confirm on which eye they expect to have the operation.
2.10 Guidelines and protocols should exist on the following:

- Patient selection for day case procedures.
- Patient selection for procedures under LA.
- Sedation of patients for ophthalmic procedures.
- Scheduling of urgent procedures in- and out-of-hours.

3 Areas of special requirement

Children

3.1 Children should be anaesthetised where possible on a day case basis.\textsuperscript{5} An appropriately trained and experienced anaesthetist should anaesthetise children.\textsuperscript{2,8} There should be designated paediatric operating lists exclusively for children where possible. Children under five years old must be anaesthetised by, or under the direct supervision of, a consultant.\textsuperscript{8}

Procedures performed with only local anaesthesia

3.2 Cataract surgery should be performed under LA where possible. When choosing a local anaesthetic technique, attention must be paid to the physical condition of the patient with respect to ability to lie comfortably on the operating table for the anticipated duration of the block and operating procedure. A trained surgeon or anaesthetist must administer needle-based blocks. Only sub Tenon’s and topical anaesthesia do not require intravenous access for the procedure or the immediate presence of an anaesthetist in the theatre suite. Procedures under sharp needle techniques such as peribulbar and retrobulbar anaesthesia require intravenous access and the immediate presence of an anaesthetist in the theatre suite. Many units in this country are not starving patients for LA procedures and this may be considered reasonable practice.\textsuperscript{1,16}

Procedures requiring sedation

3.3 All patients receiving intravenous sedation require an anaesthetist to be immediately available in the theatre.\textsuperscript{1} Patients do not need to be starved when hypnotic or sedative drugs are used in low doses to produce simple anxiolysis. Patients do need to be starved when conscious or deeper planes of sedation are employed, or when using combinations of drugs such as opioid analgesics with benzodiazepines or low dose propofol infusion. In view of the risk of unexpectedly deeper sedation, it is desirable to develop local protocols in conjunction with the department of anaesthesia for sedation of patients undergoing ophthalmic procedures.\textsuperscript{1,16}

Patients with systemic illness

3.4 Patients requiring general anaesthesia who are systemically unwell should undergo operation in a facility with full medical back-up. In isolated units this may mean making arrangements for the operation to be done at a local multidisciplinary unit. Protocols must be in place for transfer to multidisciplinary units for the patients who become sick in isolated units and require in-patient medical or critical care.

4 Training and education

4.1 There should be a structured training programme in place to ensure that anaesthetists and ophthalmologists new to local anaesthetic techniques learn the anatomy of the orbit and are formally trained to perform invasive eye blocks. The training should be overseen by an expert. Only when a trainee’s competence has been assessed by an experienced practitioner should they practise independently on patients.

4.2 All trainee anaesthetists should undergo competency-based assessment appropriate to their level of training on the knowledge, skills, attitudes and behaviour appropriate to ophthalmic anaesthesia.\textsuperscript{17}

4.3 All anaesthetists working in ophthalmic services should have access to continuing educational and professional development facilities for advancing their knowledge and practical skills associated with ophthalmic anaesthesia.

4.4 All ophthalmic theatre nurses, anaesthetic nurses and ODPs must have up-to-date basic life support training and ophthalmic nurses should be trained in cardiopulmonary resuscitation.\textsuperscript{1}

5 Research and audit

5.1 Research in ophthalmic anaesthesia should be encouraged and time set aside for this activity.

5.2 Ophthalmic anaesthesia should be included in departmental audit programmes, including ongoing audit of complications and adverse events.\textsuperscript{1}

6 Organisation and administration

6.1 In multidisciplinary units there should be a named lead clinician responsible for ophthalmic anaesthesia services. In single specialty centres, the anaesthetic department should adopt the generic standards described throughout this document. This should include a lead paediatric anaesthetist if children are treated. The service should be consultant led.
6.2 Many procedures do not have to be performed out-of-hours. Anaesthetists and surgeons together should devise departmental protocols for the handling of patients requiring urgent procedures, to allow prioritisation from both surgical and anaesthetic perspectives. The eye condition, American Society of Anesthesiologists (ASA) grade and age of patients need to be considered when arranging out-of-hours surgery. This is particularly important in isolated units.

7 Patient information

7.1 Patient information covering procedures for the day of admission and details of local or general anaesthetic must be available prior to admission. It should be available in large print or Braille if required.

References

5 The British Association of Day Surgery (www.daysurgeryuk.org).
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.

Chapter 10
Obstetric services, revised 2009

Summary

- Many of the following points are drawn from the joint Obstetric Anaesthetists’ Association (OAA) and Association of Anaesthetists of Great Britain and Ireland (AAGBI) ‘Guidelines for Obstetric Anaesthesia Services’, May 2005.

- Each obstetric unit should have a nominated consultant in charge of obstetric anaesthesia services with programmed activities (PAs) allocated for this, in addition to those for clinical ‘sessions’. As a basic minimum for any consultant led obstetric unit, there should be 10 consultant anaesthetic PAs per week, and where elective lists are run daily this would mean at least 15 PAs.

- There should be a named consultant anaesthetist with responsibility for Caesarean section lists.

- Each obstetric unit with an anaesthetic service should have a nominated consultant anaesthetist responsible for training in obstetric anaesthesia.

- A process should be in place for the formal assessment of trainees prior to allowing them to go ‘on-call’ for obstetric anaesthesia with distant supervision.

- Provision should be made for those who cover delivery suite on-call, but do not have regular sessions there, to spend time in the delivery suite in a supernumerary capacity with one of the regular obstetric anaesthetic consultants.

- Antenatal education: women should have access to information, in an appropriate language, about all types of analgesia and anaesthesia available, including information about related complications. Patient information leaflets are available at www.oaa-anaes.ac.uk.

- Parturients requiring anaesthesia have the right to the same standards of peri-operative care as other surgical patients. Skilled anaesthetic assistance and post-anaesthetic recovery care are of particular importance in obstetrics.

- Guidelines should be available to obstetricians and midwives on conditions requiring antenatal referral to the anaesthetist.

- There should be at least one fully equipped obstetric theatre within the delivery suite.

- Anaesthetists should help organise and participate in regular multidisciplinary ‘fire drills’ of emergency situations including haemorrhage and collapse.

- Access to Level 3 critical care must be available for all obstetric patients and preferably available on site. Portable monitoring with facility for invasive monitoring must be available to facilitate transfer of obstetric patients to the ICU.

- Anaesthetists should have some managerial responsibility and should be involved in planning decisions that affect the delivery of maternity services.
Introduction: The importance of obstetric anaesthesia services

- Anaesthetists are involved in the care of over 60% of pregnant women.2
- There have been changes in staffing, training and working time legislation affecting obstetric anaesthetic services.3,4
- Obstetric anaesthetic consultants are involved increasingly in the assessment of patients, teaching, training, administration, research and audit.5
- There is a need for a dedicated obstetric anaesthesia service for all consultant-led obstetric units. The anaesthetic pre-assessment of high-risk women necessitates the early involvement of senior anaesthetists and transfer to intensive care facilities for high-risk cases.6,7 This is supported by the Clinical Negligence Scheme for Trusts (CNST).8
- The Caesarean section rate in the UK and age of parturients with medical conditions are both increasing.9,10
- Anaesthetic delay can be a factor in some stillbirths and infant deaths.11
- There have been concerns about the staffing of isolated obstetric units, the level of experience of anaesthetic staff on-call, and the reduction of exposure to emergency general anaesthesia in obstetrics.7,12

Levels of provision of service

1 Staffing requirements

The duty anaesthetist

1.1 The term ‘duty anaesthetist’ will henceforth be used to denote an anaesthetist who has been assessed as competent to undertake duties on the delivery suite under a specified degree of supervision (see section 4: Training and education). It follows that consultant support and on-call availability are essential 24 hours per day.

1.2 The duty anaesthetist should be immediately available for the obstetric unit 24 hours per day. The duty anaesthetist should not be primarily responsible for elective obstetric work.

1.3 In the busier units (i.e. one of the following: > 5,000 deliveries/year, epidural rate > 35%, Caesarean section rate > 25%, tertiary referral centres/centres with a high proportion of high risk cases), it may be necessary to have two duty anaesthetists available 24 hours per day, in addition to the supervising consultant.

1.4 In units that offer a 24-hour epidural service, the duty anaesthetist should be resident on site (i.e. not at a nearby hospital). Details of accommodation that should be offered are given in section 2.

1.5 If the duty anaesthetist has other responsibilities, these should be of a nature that would allow the activity to be delayed or interrupted should obstetric work arise, to allow provision of analgesia as well as anaesthesia to parturients.

1.6 Although the difficulties of smaller units are appreciated, it is strongly recommended that the duty anaesthetist for the delivery suite should not be solely responsible for the ICU or cardiac arrests as that anaesthetist could be urgently required in two places simultaneously. Equally, if the duty anaesthetist covers general theatres, there must be another anaesthetist to take over immediately should they be needed on the delivery suite. The lead clinician should audit and monitor the feasibility of such arrangements.

1.7 Where duty anaesthetists work on a shift pattern, adequate time for formal hand-over between shifts must be built into the timetable. Ideally, the timetable of different professional groups should be compatible: e.g. anaesthetic and obstetric shifts should start/finish at the same time to allow multidisciplinary hand-over.

Consultant responsibilities

1.8 Each obstetric unit should have a nominated consultant in charge of obstetric anaesthesia services with programmed activities (PAs) allocated for this, in addition to those for clinical ‘sessions’. The nominated consultant should be responsible for the organisation and audit of the service, for maintaining and raising standards, through provision of evidence based guidelines, and for risk management.

1.9 Previous recommendations of a minimum of one fixed, consultant session per 500 deliveries are no longer adequate. As a basic minimum for any consultant-led obstetric unit, there should be 10 consultant anaesthetic PAs per week.9

1.10 In units in which trainee anaesthetists work a full or partial shift system, consideration should be given to providing additional consultant PAs to allow training and supervision into the evening, on one or more occasions per week. The number of such additional hours should be increased where there is a high turnover of trainees (i.e. a three-month interval or more frequent).

1.11 Extra consultant PAs should be available to units which are busier than average (see above). Tertiary...
referral units which are likely to have a higher than average proportion of sick mothers should also have extra consultant PAs.

1.12 There should be at least one consultant PA available per week for antenatal referrals whether or not a formal clinic is run.

1.13 When formal elective Caesarean section lists are necessary there should be a separate consultant available, particularly in busier units.

1.14 There should be a named consultant responsible for every elective Caesarean section operating list.

1.15 Anaesthesia for elective Caesarean sections should only be performed by trainees in isolated units when there is a consultant anaesthetist in the same building.

1.16 When there is no consultant anaesthetist available to cover the delivery suite, there should be a nominated consultant to cover who must be instantly able to leave a list to attend the delivery suite if necessary.

1.17 Each unit should display prominently the name of the consultant anaesthetist responsible for the delivery suite at that time. That consultant should not be more than half an hour away from the delivery suite at any time. The names of all consultants covering the delivery suite should be prominently displayed and contact numbers readily available.

1.18 There should be a named consultant anaesthetist and obstetrician responsible for all high dependency unit (HDU) patients 24 hours per day.

1.19 It is part of the lead consultant obstetric anaesthetist’s role to ensure there is an ongoing audit programme in place to audit complication rates.

Anaesthetic assistance

1.20 Parturients requiring anaesthesia have the right to the same standards of peri-operative care as all other surgical patients. Skilled anaesthetic assistance is of particular importance in obstetrics.

1.21 In the United Kingdom, anaesthetic assistance may be provided by an operating department practitioner or nurse (ODP/N) or a registered nurse. Whatever the background, the training for all anaesthetic assistants must comply fully with current national qualification standards.13 If such a person is not available for any reason, a registered nurse or midwife with current and effective registration, who has received equivalent anaesthesia training to a nationally or regionally recognised standard, may be employed to perform such duties. Employment of anaesthetic assistants without national accreditation is unacceptable.13

1.22 The anaesthetic assistant should assist the anaesthetist on a regular basis, not only occasionally, to ensure maintenance of competence. Such a person thus employed should have no other duties in the operating department at that time (i.e. the midwife attending the mother and baby cannot also assist the anaesthetist).

Post-anaesthetic recovery staff

1.23 The training undergone by staff in recovery, whether these are midwives, nurses or ODP/Ns, must be to the level recommended for general recovery facilities.13,14 A midwife with no additional training is not adequately trained for recovery duties.

1.24 Where non-midwifery staff work in recovery as a team with midwives, it is important that basic midwifery care is given (e.g. checking the uterus and lochia).

1.25 When high dependency care is required, the midwife/nurse to patient ratio must be at least one midwife/nurse to two patients. Appropriately trained staff should be available 24 hours per day.

Other staff

1.26 A trained adult and neonatal resuscitation team should be available.

1.27 There must be adequate secretarial support for the antenatal anaesthetic assessment clinic and other duties of the consultant obstetric anaesthetist – teaching, research, audit, appraisal activities and other administrative work.

1.28 There should be a suitably trained senior member of nursing, midwifery or ODP staff with overall responsibility for the safe running of obstetric theatres, who ensures that current standards in all aspects of theatre work are met. He or she must have considerable experience of working in theatre and must undertake the role on a regular basis. This individual should ensure all staff who work in theatre are appropriately trained and undergo regular appraisal and continuing professional development (CPD).

2 Equipment, support services and facilities

For the efficient functioning of the obstetric anaesthetic service, the following equipment, support services and facilities are essential. The standards of equipment and monitoring must be of the same standard as that of a non-obstetric anaesthetic service.
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Equipment

2.1 Blood gas analysis and the facility for rapid estimation of haemoglobin (e.g. HemoCue®) and blood sugar should be available on the delivery suite.

2.2 The delivery suite rooms must be equipped with monitoring equipment for the measurement of non-invasive blood pressure. There should also be readily available equipment for monitoring electrocardiogram (ECG), oxygen saturation, temperature and invasive haemodynamic monitoring if required.

2.3 All delivery suite rooms must have oxygen, suction equipment and access to resuscitation equipment.

2.4 Delivery suite rooms must have active scavenging of waste anaesthetic gas to comply with COSHH guidelines on anaesthetic gas pollution.15

2.5 A supply of O rhesus negative blood should be available in the delivery suite at all times for emergency use.

2.6 The standard of monitoring in the obstetric theatre must allow the conduct of safe anaesthesia for surgery as detailed by the AAGBI.16

2.7 A blood warmer allowing the rapid transfusion of blood and fluids, and warm air blower/blankets must be available.

2.8 A cell salvage machine should be available for massive blood loss and Jehovah’s Witness parturients.17

2.9 A difficult intubation trolley with a variety of laryngoscopes, tracheal tubes, laryngeal masks and other aids for airway management must be available in theatre.

2.10 Patient controlled analgesia (PCA) equipment and infusion devices must be available for post-operative pain relief.

2.11 The maximum weight that the operating table can support must be known and alternative provision made for women who exceed this. It is recommended that the obstetric operating table should be able to safely support a minimum weight of 160 kilograms.

2.12 Ultrasound imaging equipment should be available for central vascular access and epidural cannulation of high-risk and morbidly obese women.18,19

Support services

2.13 A system should be in place to ensure that women requiring antenatal referral to the anaesthetist are seen and assessed by a senior anaesthetist within a suitable time frame, preferably in early pregnancy.

2.14 All women requiring Caesarean section should, except in extreme emergency, be visited and assessed by an anaesthetist before arrival in the operating theatre. In many units, mothers will be admitted on the day of surgery. The mothers must be seen pre-operatively by an anaesthetist.

2.15 There should be arrangements for prescription of pre-operative antacid prophylaxis and for laboratory investigations.

2.16 Ideally, all women who have received regional analgesia/anaesthesia or general anaesthesia for labour and delivery should be reviewed following delivery. Women must fulfil locally agreed discharge criteria before going home.

2.17 Haematology and biochemistry services must be available to provide rapid analysis of blood and other body fluids and to make blood and blood products for transfusion available without delay according to clinical need.

2.18 Pharmacy services are required for the provision of necessary routine and emergency drugs. The provision of sterile pre-mixed low dose local anaesthetic combined with opioid solutions for regional analgesia should be available as well as other sterile opioid solutions used for patient controlled analgesia.

2.19 Physiotherapy services should be available 24 hours a day 365 days a year for patients requiring high dependency care.

2.20 An acute pain service should be available for advice on post-operative pain relief in the maternity unit.

2.21 There must be rapid availability of radiological services.

2.22 Medical physics technicians are required to maintain, repair and calibrate anaesthetic machines, monitoring and infusion equipment.

2.23 Hotel services must provide suitable on-call facilities including housekeeping for resident and non-resident anaesthetic staff. Refreshments must be available throughout the 24-hour period.

Facilities

2.24 There should be at least one fully equipped obstetric theatre within the delivery suite. Where this is not possible a lift, which can be commandeered for the rapid transfer of women to theatre, must be available. The number of operating theatres required should depend on the number of deliveries
and operative risk profile of the women delivering in the unit.

2.25 An operating theatre with appropriately trained staff must be readily available for women requiring emergency Caesarean section.

2.26 There must be easy and safe access to the delivery suite from the main hospital at all times of the day.

2.27 Adequate recovery room facilities including the ability to monitor systemic blood pressure, ECG and oxygen saturation must be available within the delivery suite theatre complex.

2.28 A fully equipped HDU should be available in units caring for high-risk obstetric patients. High dependency care should be available on or near the delivery suite with appropriately trained staff or, if this is unavailable, women should be transferred to a general HDU in the same hospital.

2.29 Access to the ICU must be available for all obstetric patients and preferably available on site. Portable monitoring with facility for invasive monitoring must be available to facilitate transfer of obstetric patients to the ICU.

2.30 For obstetric units on site but not part of the main hospital, adequate links or transport arrangements must be in place to allow the safe transfer of obstetric patients to the main theatres or ICU.

2.31 An anaesthetic office, in proximity to the delivery suite, should be available to the duty anaesthetic team. The room should hold a computer with intra/internet access for the audit of the anaesthetic service, and access to up-to-date information. A library of specialist reference books and/or journals and local multidisciplinary evidence-based guidelines must be available. The office space, facilities and furniture should comply with the standards recommended by the AAGBI guidelines.

2.32 There should be a separate anaesthetic consultant’s office available to allow teaching, assessment and appraisal which should comply with AAGBI guidelines.

2.33 A communal rest room in the delivery suite should be provided to enable staff of all specialties to meet. A seminar room(s) must be available for training, teaching and multidisciplinary meetings.

2.34 All hospitals should ensure the availability of ‘on-call’ rooms for those doctors working night shifts, to allow them to take rest breaks.

2.35 Standards of accommodation for doctors in training must be adhered to. Where a consultant is required to be resident, the on-call accommodation provided should be commensurate with their status.

Guidelines and protocols

2.36 All obstetric departments should provide and regularly update the following protocols, which should be readily accessible.

- Conditions requiring antenatal referral to the anaesthetist.
- Management of major haemorrhage.
- Management of pre-eclampsia and eclampsia.
- Management of failed/difficult intubation.
- Management of high regional block.
- Management of regional anaesthesia including:
  - regional block for analgesia
  - regional blocks for surgery
  - inadequate regional block.
- Management of accidental dural puncture.
- Management of postdural puncture headache.
- Severe hypotension during regional block.
- Admission and discharge criteria from/to HDU.
- Management of regional techniques in patients on thromboprophylaxis.
- Antacid prophylaxis and fasting policies for labour and delivery.
- Oral intake during labour.
- Management of post-operative pain.
- Resuscitation of the pregnant patient.

3 Areas of special requirement

Regional analgesia

3.1 Most consultant obstetric units should be able to provide regional analgesia on request at all times. Smaller units may be unable to supply dedicated cover at all times; women booking at such units should be made aware that epidural analgesia may not always be available.

3.2 The anaesthetist is responsible for ongoing regional analgesia in labour and must be able to assess the mother as required.

3.3 Midwifery care of a parturient receiving epidural analgesia in labour should comply with local guidelines. The midwife must be trained to an agreed standard in regional analgesia and be aware of potential complications and their management. The midwife must be able to assess and document sensory block height. If the level of midwifery staffing is considered inadequate, epidural block should not be instituted.

3.4 Units should have guidelines for management of epidural blocks and there should be appropriate
levels of medical and midwifery staff for delivery of the service. Units should be able to provide low dose regional analgesia.24

3.5 Regional analgesia should not be used in labour unless an obstetric team is immediately available in the same hospital to treat emergencies.

3.6 There should be a locally agreed regional analgesia record and a protocol for the prescription and administration of epidural drugs.

3.7 The time from the anaesthetist being informed about an epidural until they are able to attend the mother should not normally exceed 30 minutes, and must be within one hour. This should be an auditable standard.

Emergency Caesarean sections

3.8 There should be a clear line of communication between the duty anaesthetist, theatre staff and ODP/N once a decision is made to undertake an emergency Caesarean section. The anaesthetist should be informed about the category of urgency of Caesarean section.25

3.9 There should be clear guidelines available for whom to call if two emergencies occur simultaneously. Anaesthetists in other parts of the hospital may need to be summoned if the second anaesthetist is attending from home.

Complaints

3.10 If complaints are made about aspects of care a consultant anaesthetist should review and assess the mother’s complaint, discussing her concerns and examining her where appropriate. This should be documented. Referral for further investigations may be required. Complaints should be handled according to local policies.

4 Training and education

4.1 Each obstetric unit with an anaesthetic service should have a nominated consultant responsible for training in obstetric anaesthesia. This consultant may or may not be the lead clinician for obstetric anaesthesia. Adequate PAs should be allocated for these responsibilities.

4.2 An appropriate training programme, as defined by the RCoA, should be in place for anaesthetic trainees according to their grade.26–28

4.3 A process should be in place for the formal assessment of trainees prior to allowing them to go on-call for obstetric anaesthesia with distant supervision.1 This assessment applies to:
- more experienced trainees who are working in the UK for the first time
- newly appointed STs who have not successfully completed a formal assessment.

4.4 There should be induction programmes for all new members of staff including locums. Locums should be assessed prior to undertaking unsupervised work.

4.5 Any doctor providing anaesthetic cover on the delivery suite must ensure that their own knowledge and skills are kept up to date. This should include regular multidisciplinary meetings and attendance at appropriate CPD activities.

4.6 Any non-trainee anaesthetist who undertakes anaesthetic duties in the labour ward must have been assessed as competent to perform these duties in accordance with QAA and RCoA guidelines.1,26–28 Such a doctor must work regularly in the labour ward but must also regularly undertake non-obstetric anaesthetic work to ensure maintenance of a broad range of anaesthetic skills.

4.7 Provision should be made for those who cover the delivery suite on-call, but do not have regular sessions there, to spend time in the delivery suite in a supernumerary capacity with one of the regular obstetric anaesthetic consultants. The frequency of these sessions will vary for each individual.

4.8 Assistance for the anaesthetist should be trained to the standards recommended by the AAGBI.13

4.9 The recovery staff within a maternity unit should be trained to the same standard as that for all recovery nurses, whether they are ODPs or midwives.13 Recovery skills should be regularly updated with time spent in a general recovery unit.

4.10 All staff working on the delivery suite should have regular resuscitation training, including the specific problems of pregnant patients.

4.11 Midwives expected to care for patients with epidurals in situ should be trained to local guidelines before they top up epidurals or look after such patients.

4.12 Anaesthetists should contribute to the education and update of midwives, ODAs, ODPs, anaesthetic nurses, physicians’ assistants (anaesthesia) and obstetricians, covering the scope and limitations of obstetric anaesthesia services.

4.13 Anaesthetists should help organise and participate in regular multidisciplinary ‘fire drills’ of emergency situations including haemorrhage and collapse.
4.14 Midwives should be trained in HDU care, particularly in a tertiary referral unit with high-risk cases.

4.15 Maintenance of standards of post-operative care requires continuous update, and staff should work in a theatre recovery unit on a regular basis.

4.16 All staff must be given regular access to CPD opportunities.

5 Research and audit

5.1 There should be an ongoing audit programme in place to audit anaesthetic complication rates (e.g. accidental dural puncture) and problems.

5.2 Delays in elective cases should be audited.

5.3 Ongoing audit of patient satisfaction with the obstetric anaesthetic service should be undertaken.

6 Organisation and administration

6.1 It is important that obstetric anaesthetists develop good working relationships and lines of communication with all other professionals including those whose care may be needed for difficult cases. This includes midwives and obstetricians, as well as professionals from other disciplines such as intensive care, neurology, cardiology, haematology, and other physicians and surgeons.

6.2 An obstetric anaesthetist should take part in regular multidisciplinary ‘labour ward forum’ meetings.

6.3 A clear line of communication from the duty anaesthetist to the on-call consultant should be assured at all times.

6.4 The theatre manager should be responsible for maintaining communication with staff groups, and ensuring competent staffing and suitable equipping of all theatres.

6.5 Larger units and those with high Caesarean section rates should have elective Caesarean section lists with dedicated obstetric, anaesthetic and theatre staff, to minimise disruption due to emergency work.

6.6 Anaesthetists must have some managerial responsibility and should be involved in planning decisions that affect the delivery of maternity services. Anaesthesia should be represented on the Maternity Services Liaison Committee, Labour Suite Working Party, Labour Ward Forum, Obstetric Risk Management Committee, Obstetric Directorate and any other bodies involved in the planning and delivery of such services.129

7 Patient information

7.1 Parturients and purchasers of services should be informed of the level of availability of anaesthesia and regional analgesia in each unit. The Epidural Information Card should be used to provide information to women requesting an epidural before the arrival of the anaesthetist as part of the consenting process.11

7.2 Antenatal education: when feasible, women should have access to information, in an appropriate language, about all types of analgesia and anaesthesia available, including information about related complications.

7.3 This should be a detailed unbiased explanation about pain relief and operations under regional and general anaesthesia. Women planned for Caesarean section should receive written information about anaesthesia for the procedure when they are booked for the procedure.

7.4 It should be documented that women have received information. It is still necessary to give the patient an explanation at the time of the proposed procedure.

7.5 There is no difference between the principle of obtaining consent for obstetric anaesthesia and any other medical treatment.32

7.6 The patient is entitled to receive an explanation of the proposed procedure in appropriate language. Interpreters should be made available to women who do not speak English; when feasible these should not be family members. The explanation should include the nature and purpose of the proposed procedure, as well as any material risks attached to it. The patient should have the opportunity to ask any questions.

7.7 All explanations given to the patient should be clearly documented.

7.8 The setting up of a patient advocate system should be encouraged.
References


Guidance on the provision of services for Neuroanaesthesia and Neurocritical Care

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

- Neuroanaesthesia should only take place in designated neuroscience centres.1
- There should be sufficient numbers of clinical programmed activities in consultants’ job plans to provide cover for all elective neurosurgical operating lists and interventional neuroradiology sessions, and also to provide adequate emergency cover.1,2
- Staffing levels in the operating theatre should be sufficient to allow neuroanaesthetists to work in teams during long and complex operations.3
- There should be a designated consultant lead for neurocritical care and sufficient consultant sessions to provide daytime and out-of-hours cover.4
- There should be sufficient numbers of neurocritical care beds to allow timely access for patients from within an agreed geographical area. Management of critically ill patients outside the critical care unit should take place only in exceptional circumstances.4,6
- The care of head-injured patients is an integral part of neuroanaesthesia and neurocritical care. Units accepting head-injured patients must have specific arrangements in place, including evidence-based protocols, appropriately trained staff and sufficient resource to allow timely access for those requiring life-saving surgery.1,4,5,7–9
- Protocols and appropriate facilities should be in place for transfer of critically ill neuroscience patients between hospitals, and within neuroscience units.10,11
- There should be appropriate support facilities to allow delivery of a safe and high quality service.4

Introduction: The importance of neuroanaesthesia and neurocritical care services

Anaesthesia for neurosurgery – neuroanaesthesia – is based in recognised neuroscience centres, which allow the grouping together of the interrelated specialties required to support neurosurgery. These centres, whether they be in specialist, teaching or district general hospitals, should provide neurosurgical, neurological, neuroradiological and other supporting specialist and general services necessary for the management of patients with neurological disease.

The provision of adequate numbers of neurocritical care beds is a prerequisite for the delivery of such specialist services.

The centralisation of neuroscience practice is essential to ensure critical mass for delivery of efficient and high quality clinical care. The pace of development, and the scope of procedures being undertaken in neurosurgery and interventional neuroradiology, continues to increase the specialist nature of neuroanaesthesia and neurocritical care.

The clinical service should provide:
- anaesthesia for neurosurgery – intracranial, complex spinal and associated surgery
Levels of provision of service

1 Staffing requirements

Neuroanaesthesia

1.1 The organisation of cover for neuroanaesthesia and neurocritical care requires a specific group of consultant anaesthetists (neuroanaesthetists) who may be part of, or closely affiliated with, a general department of anaesthesia and intensive care. A neuroanaesthesia service requires adequate provision of consultant programmed activities to support elective and emergency workload.

1.2 There should be immediate availability of a resident anaesthetist for 24 hours each day, to manage post-operative and emergency patients. In neuroscience units with a substantial caseload, this will require the provision of a resident anaesthetist dedicated to this group of patients. Out-of-hours, consultants should be available for immediate telephone advice and be able to attend the hospital within 30 minutes.

1.3 There should be sufficient programmed activities to ensure consultant cover of all neurosurgical operating lists and interventional neuroradiology sessions. Adequate arrangements for cross covering annual and study leave should be incorporated into consultants’ job plans. Adequate consultant cover is also required to provide general anaesthesia and sedation for diagnostic radiology sessions, including CT and MRI scans.

1.4 Consultants working in neuroanaesthesia should have sufficient regular programmed activities within this field to ensure that their specific skills and experience are maintained. A minimum of one day per week is likely to be required to fulfil this requirement.

1.5 Allocation of a single neuroanaesthetist to an operating list with long neurosurgical cases is insufficient and a team of anaesthetists should service long and complex operations. Comprehensive hand-over arrangements must be in place to ensure continuity of care during long cases.

Neurocritical care

1.6 The Royal College of Nursing suggests that the nurse:patient ratio for a patient requiring Level 3 and Level 2 care should be 1:1 and 1:2 respectively, but the actual nursing establishment to support neurocritical care services may be higher. It may not be possible to leave Level 2 patients with neurological disorders alone even when they are physiologically normal, and an allowance to cover the need for closer supervision of such patients should be made when calculating the nursing establishment.

1.7 Allied health professionals are key members of the multi-professional team and a sufficient establishment is crucial to the delivery of high quality neurocritical care services.

1.8 Consultants responsible for the care of neuroscience patients requiring critical care support should have the knowledge, skills and experience needed to treat this group of patients, irrespective of whether the services are provided in a dedicated neurocritical care unit or within the context of a general intensive care unit. There should be a designated lead consultant for neurocritical care (or director of neurocritical care) and this consultant should have programmed activities allocated to this function.

1.9 Although the management of patients requiring neurocritical care is closely shared with the neurosurgical team, a minimum of 10 daytime clinical consultant programmed activities is required to cover a small neurocritical care unit (4-8 beds). In larger units it may be necessary for two consultants to be available during weekdays for all or part of the day. However, the consultant establishment for neurocritical care should be reviewed locally so that it reflects local conditions, including the skill mix of other members of the multi-professional team. It has been recommended that, in large and busy units, there may be a requirement for up to 30 consultant programmed activities per week.

1.10 In large units it may be appropriate to allocate consultant programmed activities to provide support to patients throughout the hospital via an outreach service.

1.11 There should be a resident doctor with appropriate skills and competencies immediately available for neurocritical care 24 hours each day.

1.12 Staffing levels must be sufficient to enable an appropriately qualified and experienced doctor and trained assistant to accompany critically ill patients during transfer between neurocritical care and operating theatres, CT and MRI scanners and angiography suites.
2 Equipment, support services and facilities

Equipment

2.1 There is a high incidence of difficult intubation in neurosurgical units carrying out complex cervical spinal surgery. Specific equipment to manage the difficult airway, including the provision of sufficient numbers of fibre-optic laryngoscopes, should be available.

Support services

2.2 The demand for critical care beds in neuroscience centres is high and the actual number and configuration of Level 3 and Level 2 beds should be determined locally. However, capacity should be sufficient to allow access by critically ill patients in an appropriate time scale, e.g. within 4 hours for those who require life-saving surgery. The Society of British Neurological Surgeons recommends the provision of 10 designated Level 2 and level 3 beds per million population for neurosurgical patients, and the Association of British Neurologists additionally estimates that between 5–7 neurocritical care beds per million population are required to support the care of neurology patients.4–6

2.3 A 24-hour acute pain service should be provided for post-operative neurosurgical patients.

2.4 24 hours a day neuroradiology support should be provided for interpretation of neuro-imaging. Online review of CT scans from referring hospitals and within the neuroscience centre should be available locally, and consideration should be given to the provision of such access in the homes of consultants who provide cover to neurocritical care out-of-hours.

2.5 There should be on-site laboratory provision, or point of care testing, for arterial blood gases, serum electrolytes and activated clotting time, to allow safe management of patients in the operating theatre, during endovascular procedures and on the neurocritical care unit.

2.6 Rapid access to other biochemical and haematological investigations, blood transfusion and cerebrospinal fluid (CSF) microscopy should also be provided.

2.7 Expert neuropathological expertise should be available on request, with the ability to carry out ‘frozen section’ examinations on site.

2.8 Pre-admission clinics for elective neurosurgery should be available with input from the department of neuroanaesthesia.

2.9 For stand-alone neuroscience centres, local arrangements should be in place for specialist opinion and review of patients by other disciplines. Named consultants should be identified in ‘core’ specialities to facilitate such liaison. There should be same day availability of cardiac echo investigations (including transoesophageal echo) and ultrasound scanning. To avoid the transfer of critically ill patients, this should be provided at the bedside for patients on the neurocritical care unit.

Guidelines

2.10 Neurocritical care outcome can be improved by the delivery of management guidelines based on expert consensus. All members of the neurocritical care multi-professional team should input to the development of local protocols, which should cover all the common pathologies managed by that unit. Protocols for the management of severe head injury are particularly important and guidance for management in the acute phase should be developed in collaboration with clinicians from referring hospitals.

2.11 Local guidelines should be agreed between clinicians in the neuroscience unit and referring hospitals for transfer of patients, and audited as a routine.

Facilities

2.12 Critically ill patients often require transfer to and from the operating theatre, CT and MRI scanners and angiography suites. Theatres, ICU and radiological facilities should therefore be in the closest possible proximity and preferably on the same floor. Adequate provision should be made for monitoring patients during such transfer. Local guidance should be developed for the intra-hospital transfer of critically ill neuroscience patients, based on guidance from the Intensive Care Society.11

3 Areas of special requirement

Children

3.1 Children requiring neurosurgery need specific arrangements. Whilst specialist paediatric neurosurgical units exist, many children are treated in adult neuroscience centres. However, paediatric neurosurgeons and anaesthetists should be involved in the management of children requiring neurosurgical intervention wherever that care is delivered. In providing neuroanaesthesia for children, appropriate planning is necessary and this might include shared responsibility between neuroanaesthetists and paediatric anaesthetists.

3.2 All children under the age of 16 requiring neurocritical care should be managed in a paediatric intensive care unit.

3.3 Detailed guidance for the management of children has been issued and applies equally to
those requiring neurosurgical intervention (see Chapter 8: Guidance on the provision of paediatric anaesthesia services).

4 Training and education

4.1 The specialist nature of neuroanaesthesia dictates that it is a consultant-delivered specialty. Trainees receive only a limited exposure based on a clinical attachment during years 1 or 2 of training, with some having longer attachments forming part of years 3–5. Because of the limited time that trainees spend on neuroanaesthesia attachments, each department should develop structured training programmes to cover all core topics. Trainees should also be encouraged to attend other training opportunities within the neuroscience unit, such as grand rounds, and radiology and pathology case conferences and mortality and morbidity meetings.

4.2 Fellowship posts should be identified to allow additional training for those who wish to follow a career in neuroanaesthesia or neurocritical care. These should be suitable for trainees who wish to take time out of training programme or for those who are post-CCT. Such posts should provide similar or enhanced levels of teaching, training and access to study leave as regular training posts.

5 Research and audit

5.1 Departments of neuroanaesthesia and neurocritical care should be encouraged to develop research interests, even if not part of an academic department. Research collaboration with other neuroscience disciplines is good practice.

5.2 Audit programmes should be developed locally but should include continuous audit of transfer of brain-injured patients, neurocritical care capacity and demand, rates of readmission to ICU and caseload of trainees. In general, local practice should be audited against national and expert consensus guidelines.

6 Organisation and administration

6.1 Much of neurosurgery involves acute work with a high degree of urgency. The provision of associated services must recognise this need and inappropriate delay cannot be allowed to occur due to the lack of key personnel or facilities. Laboratory services, neuroradiology and availability of operating theatre time must all be organised to cope with these demands.

6.2 Departments of neuroanaesthesia and neurocritical care, even if part of a large general department, must be provided with adequate secretarial and administrative support. Consultants with lead responsibility for neuroanaesthesia and neurocritical care should have programmed activities allocated to this function. Appropriate levels of administrative support, including data collection and analysis, should be available for neurocritical care.

6.3 Consultants in neuroanaesthesia and neurocritical care should be involved in the planning of neuroscience services at a local and regional level.

6.4 A lead consultant responsible for patient transfer should be identified both in the neuroscience unit and in referring hospitals.

7 Patient information

7.1 Each department should provide written information specific to neurosurgical procedures, including relevant risks. Information for relatives of patients requiring neurocritical care should also be available, including contact details of relevant charities and helplines.

References

Guidance on the provision of anaesthesia services for Resuscitation

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

- Recognition of the patient at risk of cardiac arrest, and prompt, effective treatment to prevent it occurring, are more likely to improve outcome than changing the way resuscitation is undertaken.¹
- Anaesthetists play a significant role as resuscitation team members and in the resuscitation training of doctors, nurses and paramedics.
- National standards for clinical practice and training in cardiopulmonary resuscitation have been published elsewhere.²
- The majority of in-house resuscitation training in the UK is undertaken by resuscitation officers (ROs) but the instructor body on a Resuscitation Council (UK) ALS course will usually include anaesthetists.³
- All resuscitation attempts should be included in continuous audit.⁴
- The resuscitation services in a trust should be co-ordinated by a resuscitation committee.²

Introduction: The importance of anaesthesia services for resuscitation

- The incidence of in-hospital cardiac arrests is 1–5 per 1,000 admissions. Approximately 17% of these patients will be resuscitated successfully and will survive to hospital discharge.⁵
- A resuscitation attempt typically includes chest compressions and ventilation of the lungs, the delivery of electric shocks to restart the heart, and the injection of drugs.
- Anaesthetic departments make a considerable contribution to the resuscitation services in most hospitals. Anaesthetists are valuable members of the resuscitation team because they are highly skilled with most of the interventions used during a resuscitation attempt.⁶
- Anaesthetists are often involved in training other doctors and nurses in advanced life support (ALS).
- Anaesthetists are often involved in training clinical staff to recognise patients at risk of cardiac arrest and to initiate preventative treatment.
- Anaesthetists are skilled in airway management and will be involved in teaching these skills to hospital staff and to paramedics.
- The Chair of the hospital resuscitation committee is most commonly a consultant anaesthetist.

Levels of provision of service

1 Staffing requirements

1.1 In many UK hospitals the resuscitation team will include an anaesthetist or the resident doctor from the critical care unit (who is commonly an anaesthetist). The essential requirement, however, is for the presence of an individual, appropriately trained and assessed in advanced airway management skills. This core role on the team, which necessitates immediate availability at all times, is increasingly being taken by other clinical staff.
1.2 If a resuscitation attempt is initially successful, the patient will usually require transfer to the critical care unit. This transfer will normally be undertaken by an anaesthetist or another doctor from the critical care unit.

1.3 The majority of in-house resuscitation training in the UK is undertaken by resuscitation officers (ROs) but the instructor body on a Resuscitation Council (UK) ALS course will usually include anaesthetists.

1.4 Instructors need to maintain their knowledge and skills and need to teach regularly (two courses each year) to maintain their instructor status.

1.5 The time needed for anaesthetists to teach on these courses must be taken into consideration when planning the departmental workload. It is inappropriate for instructors to be expected to use their own study leave to deliver resuscitation training.

1.6 One consultant anaesthetist should take a lead role in resuscitation – this individual should be a member of the trust resuscitation committee and is often the Chair. In large trusts, this role may carry a significant workload and should be supported with appropriate administrative time.

2 Equipment, support services and facilities

Equipment

2.1 Relatively little equipment is required by the resuscitation team.

2.2 The defibrillator-monitor (typical cost is approximately £5,000) is central to the resuscitation attempt and these must be located strategically to enable shock delivery within three minutes of a patient arrest anywhere in the hospital.

2.3 Other equipment is required for airway management and intravenous access – these items are relatively inexpensive.

2.4 A comprehensive list of the equipment required for adult and paediatric resuscitation is given on the Resuscitation Council (UK) website (www.resus.org.uk).

2.5 Additional equipment (e.g. transport monitor, ventilator) will be required for transferring the resuscitated patient to the critical care unit.

2.6 Equipment for training, including adult and paediatric manikins, airway management trainers, an ECG monitor and rhythm simulator and at least one defibrillator dedicated for training should be available. Training defibrillators should be the same as those used in the clinical areas of the institution.

Support services

2.7 Every hospital should have at least one RO, who is responsible for co-ordinating the teaching and training of staff in resuscitation.

2.8 The role of the RO and the facilities required to deliver resuscitation training are detailed in ‘Cardiopulmonary Resuscitation – Standards for Clinical Practice and Training: A Joint Statement from the Royal College of Anaesthetists, the Royal College of Physicians of London, the Intensive Care Society, and the Resuscitation Council (UK)’.

2.9 Other members of the resuscitation team will usually include general medical trainees and ward nursing staff.

Facilities

2.10 Resuscitation trainers must have access to a designated training room that will accommodate at least 10 people and all the relevant training equipment.

3 Areas of special requirement

3.1 Paediatric resuscitation. The typical causes of cardiac arrest in children are different from those of adults and there is some variation in the resuscitation techniques used in children and the newborn. Most hospitals have a separate paediatric cardiac arrest team – an anaesthetist will be a key member. Training in paediatric resuscitation is delivered typically by ROs, paediatricians and anaesthetists. Regular members of the paediatric resuscitation team should have completed either the advanced paediatric life support (APLS) or the European paediatric life support (EPLS) course. Anaesthetists comprise a significant proportion of the faculty on these courses.

3.2 Trauma resuscitation. Many hospitals have a trauma team for the resuscitation of seriously injured patients. Airway management can be particularly challenging in these patients and the anaesthetist has a vital role to play in the trauma team. Anaesthetists will also be responsible for intra- and inter-hospital transfer of injured and critically ill patients – this can involve considerable resources in terms of time and personnel. Anaesthetists who are expected to resuscitate patients with major injuries should have received advanced trauma life support (ATLS) training. Senior anaesthetists are frequently involved in ATLS training for doctors of all disciplines.

3.3 Prevention of in-hospital cardiac arrest. The majority of patients sustaining in-hospital cardiac arrest show signs of physiological deterioration
in the hours leading up to the event. If these critically ill patients are recognised and treated promptly, many cardiac arrests could be prevented. Many hospitals have established medical emergency teams or outreach systems that are called to patients showing signs of deterioration. Anaesthetists/intensive care physicians are frequently members of these teams and are also involved in training doctors and nurses in the recognition and treatment of critically ill patients.

3.4 Ethics. Every hospital should have an ethical resuscitation policy. This is normally based on the document ‘Decisions Relating to Cardiopulmonary Resuscitation’. Anaesthetists/intensive care physicians usually make a significant contribution to the preparation of the local ethical resuscitation policy.

4 Training and education

4.1 All anaesthetists in training are expected to undertake specific training in resuscitation. For the majority, this means undertaking courses in ALS, ATLS and APLS/EPLS. Personnel who work in maternity services are also required to have training in newborn life support (NLS). This includes anaesthetists who regularly work in this capacity.

4.2 These courses are normally funded through existing study leave budgets but it is not uncommon for trainees to fund some of these courses themselves. The provider certificates are valid for four years. Regular updating of resuscitation knowledge is required; this may be achieved by completing another course, attending a specific revalidation course or by in-house training.

4.3 The faculty on these life support courses frequently include several anaesthetists – this represents a considerable workload for the average anaesthetic department and must be taken into account when planning requirements for permanent staff.

4.4 Most pre-hospital resuscitation in the UK is undertaken by paramedics. These individuals require training in intravenous cannulation and airway management. Paramedics are taught these skills by anaesthetists during elective surgical lists.

5 Research and audit

5.1 All resuscitation attempts should be included in continuous audit. There are international recommendations for the core data that require collection to enable meaningful audit of resuscitation practice. As members of the resuscitation team, anaesthetists will participate in resuscitation audit. The resuscitation committee is responsible for evaluating and presenting resuscitation audit data and the anaesthetic lead for resuscitation will feed the results of the audit back to the anaesthetic department.

5.2 The recent European legislation on consent in research makes prospective controlled trials in resuscitation very difficult. Nevertheless, anaesthetists are encouraged to participate in resuscitation research and they are responsible for many of the UK studies published in this field.

6 Organisation and administration

6.1 The resuscitation services in a trust are co-ordinated by a resuscitation committee, which typically meets quarterly. The anaesthetic lead for resuscitation will be a key member of this committee and will frequently be the Chair. In large trusts this will represent a significant time commitment and should be recognised in job planning. Much of the day-to-day resuscitation training will be delivered by resuscitation training officers but more advanced training, especially for the medical emergency team systems, is often delivered by anaesthetists.

7 Patient information

7.1 A model information leaflet that accompanies the ‘Decisions Relating to Cardiopulmonary Resuscitation’ document has been produced by the BMA, RC(UK) and the RCN. Many trusts have produced their own patient information leaflets based on the national document.
References


Guidance on the provision of Vascular 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

- Services should be organised so that anaesthesia for all patients undergoing major vascular surgery is provided by a consultant experienced in vascular anaesthesia.

- Anaesthetists undertaking major vascular surgical cases should be supported by adequately trained assistants who work regularly in the vascular theatres.

- Vascular anaesthetists should have some managerial responsibility and should be involved in planning decisions that affect the delivery of vascular services.

- Adequate Level 2 and Level 3 critical care facilities must be available on site for all patients undergoing major vascular surgery.

- Facilities should be available to allow the anaesthetist to be fully involved in decision making for patients undergoing major vascular surgery. This includes access to the tools required for adequate pre-operative assessment. Ideally, this should be within the setting of a formal pre-operative assessment clinic, which should be adequately staffed, supported and allocated sessional programmed activities.

- Provision should be made for those who may cover vascular emergencies, but do not have regular sessions in vascular anaesthesia to spend time in a supernumerary capacity with a consultant anaesthetist who has a regular vascular commitment.

- Units undertaking major vascular anaesthesia should nominate a named lead clinician to assist dialogue and relationships with vascular surgeons, radiologists, and other appropriate specialists. Departments should facilitate joint audit and management meetings between these parties.

- Patients undergoing major vascular surgery should have access to a multidisciplinary acute pain management service.

- Facilities should be available to conserve blood (e.g. cell salvage or acute normovolaemic haemodilution) and be supported by the facilities to manage major haemorrhage.

- Local guidelines should exist to assist with the appropriate administration of blood and coagulation products immediately when required.
Chapter 13
Vascular services

Introduction: the importance of vascular anaesthesia services

- Vascular anaesthesia encompasses a number of procedures which range from short day case procedures (such as varicose vein surgery) to prolonged complex major arterial surgery. The majority of patients requiring major arterial surgery are elderly, with a high incidence of cardiovascular and respiratory disease.14–17

- Because of these factors, pre-operative evaluation of patients presenting for vascular surgery presents many challenges.

- The vascular anaesthetist has particular expertise in pre-operative risk assessment, and formal anaesthetic assessment should be part of the decision-making process for patients contemplating high-risk major vascular surgery.

- It has been suggested that individual anaesthetists should not be caring for very small numbers of patients undergoing major elective and emergency aortic or carotid surgery. Anaesthetic departments should review the allocation of vascular cases in order to ensure optimal concentration of experience and expertise.2

- Major vascular surgery includes a significant urgent and emergency workload. The ability to provide emergency cover means that facilities and expertise should be available 24 hours per day. Staffing and resources should also be planned and funded to allow for unpredictable changes in service requirements for urgent vascular procedures.

- Aortic surgery carries high risks of morbidity and mortality,16,17 which are greater after emergency than elective procedures.2 Patients undergoing aortic surgery require post-operative Level 2 or Level 3 critical care, and these facilities must be available before elective surgery is contemplated. If elective aortic aneurysm surgery is cancelled because of a lack of critical care resources or ward beds, the patient may be exposed to risk of aneurysm rupture.16,17 It has been recommended that surgery should be undertaken within eight weeks of the decision to operate.2

- Delay in performing carotid endarterectomy also increases the risk of death or disabling stroke, particularly in symptomatic patients. Current evidence suggests surgery should be performed within two weeks of initial symptoms.20

- Access to diagnostic radiological services may be accorded a lower priority than access for patients with or suspected to have cancer.2 Since delays in treatment for major vascular surgery may lead to death or permanent disability, patients with vascular disease should be accorded a similar priority to other groups of patients.

- Minor vascular procedures may be straightforward but some procedures such as thoracic or thoraco-abdominal aortic surgery may involve collaboration with cardiac surgeons or involve the use of extracorporeal circulation. These uncommon or especially high-risk procedures should only be performed in specialist centres which have the experience, skills and facilities to manage them successfully.

- Increasing numbers of vascular procedures are undertaken by radiologists (e.g. endovascular aneurysm surgery). The morbidity and mortality of some of these procedures can be lower than conventional surgery.21,22 However, the risks of anaesthesia in such frail patients remain and may be compounded by the problems of undergoing procedures in an unfamiliar or remote environment (e.g. the radiology department).

- Major lower limb amputation is required in a significant proportion of patients who undergo peripheral vascular reconstruction for acute or chronic limb ischaemia. Mortality and morbidity are very high after major amputation23 and these patients should receive appropriate peri-operative care from experienced practitioners.

Levels of provision of service

1 Staffing

1.1 Vascular surgery is performed in many hospitals in the UK, ranging from district general hospitals to specialist units in large teaching hospitals. Because of the surgical and support infrastructure required, the significant emergency workload, and the problems of maintaining expertise when low volumes of cases are performed, there is some pressure to concentrate services in larger units.3

1.2 Vascular anaesthesia is increasingly recognised as a sub-specialty in its own right, with its own specialist society.24 The special skills and knowledge required by all anaesthetists involved in the care of vascular surgical patients overlap with those in other areas of sub-specialisation. In particular they include expertise in the pre-operative assessment of the high-risk patient for major surgery, pre-operative optimisation of co-existing medical conditions, the use of invasive cardiovascular monitoring and
cardioactive or vasoactive drugs, peri-operative renal myocardial and cerebral protection, maintenance of normothermia and the management of major haemorrhage.

1.3 Additional skills required in specialist units include expertise in spinal cord protection, visceral perfusion and ‘one lung’ ventilation.

1.4 The pre-operative assessment and decisions regarding the risks of vascular surgery are often complex, time-consuming and require detailed discussions with the patient and other colleagues. It is inappropriate that these decisions are devolved to trainees, and vascular anaesthetists involved in regular pre-operative risk assessment require the appropriate time and facilities to perform this (see section 2.1 below).

1.5 The workload generated by urgent and elective vascular pre-operative assessment referrals should be acknowledged by appropriate recognition in terms of consultant programmed activities (PAs) within a department, whether or not a formal clinic operates.

1.6 A vascular anaesthetist should be nominated as lead clinician for vascular anaesthesia. This role should include close collaboration with the wider vascular team and other specialists (e.g. radiologists, cardiologists, renal and respiratory physicians), attendance at vascular multidisciplinary meetings, promotion of local evidence-based guidelines and co-ordination of joint audit/research.

1.7 An anaesthetist who understands the implications for vascular anaesthesia should be a member of the hospital or trust transfusion committee.

1.8 Anaesthesia for major vascular surgery of moderate complexity can be performed by experienced trainees with supervision by a consultant. However, trainees who are not directly supervised should not undertake complex vascular cases in medically unfit patients; there should be a named consultant anaesthetist responsible for every major vascular surgical case. These considerations also apply to vascular patients who require major lower limb amputation after unsuccessful interventions at limb salvage or reperfusion. Mortality and morbidity are very high and these patients may present additional problems because of co-morbidity, immobility and chronic pain. As a high-risk group, lower limb amputees should receive appropriate peri-operative care from experienced practitioners.

1.9 When major arterial surgery is performed the anaesthetist must be assisted by a fully trained anaesthetic assistant who has specific training and experience in vascular anaesthetic practice.

1.10 Additional theatre staff, who are trained and who possess appropriate competencies, should be available if cell salvage techniques are utilised.

1.11 Adequate numbers of trained critical care staff must be available before undertaking major aortic surgery in patients who will require Level 2 or 3 care post-operatively.

1.12 For more minor procedures, patients may be initially managed after surgery in a recovery unit or post-anesthesia care unit. Appropriate numbers of trained staff must be available to manage these patients on a one-to-one basis; staff should be trained in the use of invasive cardiovascular monitoring. Facilities to provide continued Level 1 care should be available on a 24-hour basis.

1.13 Medical, nursing and other staff should be adequate to facilitate transfer to an alternative or more specialised vascular unit for emergency patients when required.

1.14 Where vascular surgical procedures are performed in the radiology department, requirements in terms of anaesthetic assistance and post-operative nursing are identical to those of patients undergoing vascular surgery in the operating theatre suite. Units performing such procedures must be staffed accordingly.

2 Equipment, support services and facilities

The following equipment, support services and facilities are required for the efficient and safe functioning of the vascular anaesthetic service.

Pre-operative assessment facilities

2.1 A vascular pre-operative assessment clinic provides the ideal environment for risk assessment, patient referral and optimisation in advance of surgery. Regular sessional time and PAs should be made available to adequately fulfil these requirements.

2.2 The clinic should be consultant led with an adequate support infrastructure, i.e. nursing, secretarial and adequate office space.

2.3 The clinic should be supported by immediate access to baseline investigations, e.g. blood tests, electrocardiogram (ECG) and chest X-rays (CXR).

2.4 Funding should be also made available for the purchase of simple clinical equipment which may influence risk analysis during the clinic visit. This
includes pulse oximetry, spirometry and blood gas analysis.

2.5 Appropriate time should be allocated to individual patients for risk assessment and informed discussion of complex issues relating to patient care.

2.6 Clinicians involved in vascular pre-operative assessment should have ready access to senior colleagues in other specialties, e.g. cardiology, respiratory medicine or radiology, who can facilitate specialised or invasive investigations and provide specialist input for certain cases. These referrals should be prioritised so that undue delays to surgery are avoided. Locally drawn up referral criteria will facilitate this process.

2.7 Where vascular services are centralised, many patients may live at distant locations. Transport facilities should be available for patient convenience. Facilities should be available for regular audit and improvement of clinic performance.

Equipment

2.8 Major vascular surgery often requires the use of large ancillary equipment not usually required by other surgical specialties. These include radiological equipment, rapid blood transfusion devices, cell salvage devices, additional monitoring and infusion devices, and occasionally extracorporeal circulation devices. Vascular theatres should be of adequate size to safely utilise this equipment, with additional storage space nearby.

2.9 Sufficient space should be available in any areas where patients about to undergo vascular surgery are anaesthetised, to perform invasive monitoring and regional anaesthetic techniques in a safe and sterile manner.

2.10 All areas where patients undergoing vascular surgery are anaesthetised must be equipped with the facility to perform invasive pressure monitoring. If anaesthesia is induced in an anaesthetic room, then the monitoring should be of similar specification and condition to that used in the operating theatre.

2.11 All theatres where aortic surgery is performed should ideally have the capability to perform cell salvage and/or normovolaemic haemodilution. Essential equipment includes a rapid fluid infusion device, fluid and patient warming devices, and infusion pumps.

2.12 Facilities and equipment to perform one-lung ventilation must be available when thoraco-abdominal procedures are performed.

2.13 Equipment must be available nearby for rapid blood gas analysis and the measurement of haematocrit and blood glucose. The provision of near patient biochemistry and coagulation analysers is highly desirable.

Support services

2.14 On-site pharmacy services are required for the provision of necessary routine and emergency drugs, including sterile pre-mixed drug solutions for regional analgesia and patient controlled analgesia.

2.15 Acute pain management services should be available for all patients undergoing major vascular surgery with the facilities for both post-operative patient controlled analgesia and epidural analgesia in the ward setting. Sufficient equipment and support must be available for all patients requiring such post-operative pain relief at all times.

2.16 Recovery from major vascular surgery may be prolonged, and units must be supported by suitable rehabilitation services, including physiotherapy, occupational therapy and prosthetics services.

2.17 Physiotherapy services should be available 24 hours a day.

2.18 As with all anaesthetic services, medical physics technicians are required to maintain, repair and calibrate anaesthetic machines, and monitoring, measurement and infusion equipment.

2.19 Haematology and biochemistry services must be available to provide rapid analysis of blood and other body fluids and to make blood and blood products for transfusion available without delay, according to clinical need.

2.20 Facilities should be available for the rapid and appropriate provision of blood and blood products for all major vascular cases. Hospitals should ensure that personnel directly involved in the distribution and administration of blood and blood components are qualified to perform those tasks and are provided with timely, relevant and regularly updated training.

2.21 Protocols and guidelines should be drawn up locally for the management of major haemorrhage so that necessary blood products and drugs are available without delay. This should be facilitated through the trust or hospital transfusion committee.
3 Areas of special requirement

Pre-operative assessment

3.1 The pre-operative evaluation of patients presenting for vascular surgery presents particular challenges because of the incidence of co-existing disease, in particular cardiorespiratory disease, diabetes and renal disease. All patients undergoing elective major vascular surgery should be seen well in advance of planned surgery to enable appropriate risk analysis.

3.2 Determination of a patient’s functional capacity is important to aid risk assessment but this may be difficult if exercise tolerance is limited by peripheral vascular insufficiency, respiratory or other disease. Risk stratification based on clinical history may help guide management. Guidelines should be drawn up based on best available evidence for further investigation, referral, optimisation and management.

3.3 The aims of pre-operative vascular assessment should be to assess risk assessment and the decision to perform surgery, to establish the best surgical options (e.g. non-invasive or endovascular surgery) for an individual, to allow optimisation of co-existing medical conditions including coronary revascularisation if indicated, to permit consideration and institution of secondary prevention measures, and to allow timing of surgery and required facilities (e.g. ICU) to be organised. In order to fully achieve these aims, a properly resourced multidisciplinary pre-operative assessment clinic is required.

3.4 Clinicians involved in vascular pre-operative assessment should have ready access to other specialists and tools for non-invasive risk assessment. Local expertise and facilities vary and the precise type of assessment tool used is probably less important than the local expertise.

3.5 Short- and long-term outcome in vascular patients can be improved by certain lifestyle changes (e.g. cessation of smoking, weight reduction) and therapies. The pre-operative assessment clinic should be used as an opportunity to implement these, and should therefore be operated by senior clinicians able to assess the need for such interventions, with access to appropriate support services (e.g. pharmacy, dietetics, smoking cessation services).

Peri-operative monitoring

3.6 Patients undergoing major vascular surgery may suffer large blood loss or fluid shifts. Peri-operative invasive cardiovascular monitoring is usually indicated, and the facilities, equipment and expertise should be available in all cases where clinically indicated. Cardiovascular instability and myocardial ischaemia are common during major vascular procedures and are associated with a worse outcome. Specific ST segment ECG monitoring should be available routinely and other monitoring modalities (e.g. non-invasive cardiac output monitoring or transoesophageal echocardiography) may be required for certain cases.

3.7 Surgery may be prolonged and lead to temperature loss. Hypothermia has a number of adverse physiological effects and is associated with a worse outcome in the short and long term. Hypothermia is usually preventable by manipulation of the ambient temperature in conjunction with the use of appropriate patient and fluid warming devices. These should be available and should be used.

3.8 The considerations regarding monitoring, expertise, trained assistance, and hypothermia are important wherever the location of the vascular intervention. This is particularly relevant when procedures are performed in a radiology suite as the environment may be unfamiliar. It is important that all facilities required for peri-procedural care are of the same standard as the operating theatre environment. This includes recovery facilities and post-operative care.

Post-operative facilities

3.9 Units should possess adequate critical care facilities to provide adequate and appropriate Level 2 or Level 3 care at all times before the start of any major vascular procedure.

3.10 Some patients undergoing vascular surgery (e.g. aortic surgery, procedures associated with the use of radiological contrast media or large blood loss) are at increased risk of post-operative renal impairment. Post-operative renal failure is associated with a poor prognosis. Facilities to provide renal replacement therapy on site are highly desirable. Where this is not possible, staffing, relationships and guidelines should be in place to facilitate transfer to a unit where renal support can be provided.

3.11 Units performing major vascular surgery should incorporate a fully staffed and functional acute pain management team, with the facility to provide post-operative epidural analgesia services in the ward setting.

3.12 Post-operative pain services must be continually audited and evaluated.
3.13 Recovery from major vascular surgery may be prolonged, and units must be supported by suitable rehabilitation services, including physiotherapy, occupational therapy and prosthetics services.

4 Training and education

4.1 Patients undergoing elective major vascular surgical procedures should be managed by anaesthetists who have had an appropriate level of training in this specialty.

4.2 In order to maintain the necessary knowledge and skills, consultant vascular anaesthetists should have a regular commitment to the specialty, and adequate time must be made for them to participate in relevant multidisciplinary meetings and continuing professional development (CPD) activities. This should include the facility and resources to visit other centres of excellence in order to exchange ideas and develop new skills where appropriate.

4.3 Much of the knowledge skills and attitudes required to successfully manage high-risk patients undergoing major vascular surgery are not specific to the sub-specialty. However, it is recognised that the outcome of major vascular surgery may be better provided by those with a specialist interest. Whilst all senior anaesthetists will have experience of relevant issues, such as the management of major haemorrhage or the use of invasive monitoring and vasoactive drugs, this may not reflect their current practice. Some such individuals do not have a regular vascular anaesthetic commitment, but may be expected to provide emergency cover, particularly out-of-hours. Arrangements must be in place and funded to enable all consultant and career grade staff providing occasional vascular anaesthetic cover to participate in appropriate CPD, including occasional accompanied sessions with vascular anaesthetic colleagues. Notwithstanding this, all anaesthetists must recognise and work within the limits of their professional competence.

4.4 An appropriate training programme should be in place for anaesthetic trainees according to their grade. This programme should allow the development of an understanding of the widespread nature of cardiovascular disease, and its relation to peri-operative management.

4.5 All vascular anaesthetists should be able to undertake appropriate pre-operative clinical risk assessment based on a sound knowledge of the individual patient’s pathophysiology, available clinical evidence, and local outcome data.

4.6 Those providing assistance for the anaesthetist should be trained to the standards recommended by the AAGBI.

5 Research and audit

5.1 All departments undertaking major vascular surgical cases should organise regular interdisciplinary audit meetings with vascular surgeons and radiologists in addition to departmental clinical governance meetings.

5.2 In addition to auditing adverse events and patient outcome, departments should audit delays or cancellations in major elective vascular surgery.

5.3 Departments are encouraged to contribute to national audit databases (as organised by the National Vascular Database and the Vascular Anaesthesia Society of Great Britain and Ireland), and the systems needed to provide the necessary data should be available and supported.

5.4 Departments should facilitate the collection of data required for anaesthetists undertaking major vascular cases to keep a personal logbook.

6 Organisation and administration

6.1 Secretarial and administrative support should be available to facilitate patient referrals for pre-operative assessment, within and outside the confines of a formal pre-operative assessment clinic.

6.2 Cancellation of patients requiring major elective vascular surgery can have serious physical as well as psychological consequences for the patient. Departments should provide elective vascular theatres with appropriately trained staff; senior vascular surgeons and anaesthetists should be available to provide a service which reliably covers the needs for planned surgery throughout the year. Funding and provisions should be made to honour these commitments with adequately trained individuals to cover for sickness, annual and professional or other leave.

6.3 Patients requiring major vascular surgery frequently require Level 2 or Level 3 care post-operatively. The funding and provision of critical care beds must be planned to meet the demands of the service and avoid unnecessary cancellations. Appropriate planning can also improve the use of theatre resources. Patients may present with conditions requiring urgent surgery which is best performed on the next available daytime list. Departments should ensure that theatre time is identified and that senior anaesthetists
and surgeons are available to perform these urgent procedures, so as to respond to changes in demand.

6.4 Daytime vascular urgent or emergency lists should be organised and staffed by senior anaesthetists and surgeons working to a fixed sessional pattern and who have no conflicting clinical commitments.

6.5 Individuals should not be pressurised into undertaking major vascular cases if any of these procedures or expertise are not available.

6.6 When very long surgical procedures are scheduled on a regular basis, it will be necessary to arrange the funding and resources to support long duration lists.

7 Patient information

7.1 Patients undergoing major vascular surgery are at significant risk of major complications, including death. All patients should be able to come to an informed decision about the relative risks and possible benefits of any planned surgical intervention. It is recommended that a specialist in vascular anaesthesia be involved both in assessing an individual patient's general medical condition and fitness for surgery, and in the decision to perform surgery. This is particularly important in the highest-risk cases, and if surgery is declined by any of the parties involved.

7.2 All major complications should be explained to the patient, in an appropriate setting and in a language they can understand. Explanations should include the consequences of these complications (e.g. renal failure requiring dialysis, stroke causing disability).

7.3 Options for post-operative pain relief and their risks should be discussed with the patient.

7.4 Departments should be able to provide written information leaflets explaining the planned procedure and the possible risks.

7.5 These discussions should occur well in advance of planned surgery to allow reflection and informed decision making. All such discussions should be documented, although it is still necessary to give relevant explanations at the time of the procedure.

7.6 The above evaluations and discussions are ideally held in the context of a pre-operative assessment clinic, and the facilities to support this should be provided.

References


24 The Vascular Anaesthesia Society of Great Britain and Ireland (www.vasgbi.com).


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.

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.

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.

2.2 Patients undergoing extensive burns or microvascular surgical procedures require invasive monitoring during resuscitation, surgery and intensive care. Such equipment should be regularly maintained and be compatible between theatres, anaesthetic rooms and critical care facilities.

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. 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.

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. Both acute and chronic pain services will be needed to facilitate optimal pain management.

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.\textsuperscript{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

8 ABC of Burn Care. BMJ Clinical reviews. BMJ, August 2005 (14 articles) (www.bmj.com/cgi/search?&titleabstract=%22abc+of+burns%22&journalcode=bmj&hits=20).
10 Good Practice Skills. Association of Burns and Reconstructive Anaesthetists (www.mathampson.homechoice.co.uk/abra/psba_good_practice.doc).
There should be appropriately staffed and equipped operating theatres and an imaging suite immediately available for injured patients who need life-saving interventions.\textsuperscript{1,2}

All hospitals that receive acutely injured patients should have a defined response to major trauma that includes the prompt assembly of a multidisciplinary trauma team in the emergency department. An anaesthetist with sufficient skills and training to deal with major trauma should be involved in the immediate management of such cases.\textsuperscript{2,3}

Trained assistance must be available for the anaesthetist in all locations where anaesthesia is conducted, including the Emergency Department and the imaging suite, as well as in the operating theatre.\textsuperscript{4}

Children undergoing surgical care require all facilities and staffing that would be expected in any paediatric unit.\textsuperscript{3,5–7} Members of the anaesthesia team conducting anaesthesia for children must be trained and skilled in paediatric anaesthesia and resuscitation.\textsuperscript{3}

Specialised equipment for difficult airways must be readily available in all areas where trauma patients are anaesthetised. Anaesthetists and assistants providing anaesthesia for these patients must be competent in difficult airway management.\textsuperscript{4,9}

Patients with fractures of the femoral neck should normally have these surgically corrected within 24 hours of admission to hospital. A system should be in place to ‘fast-track’ them from the emergency department through other areas to theatre. Preoperative assessment and optimisation should be a priority but not delay surgery. Experienced anaesthetists and orthogeriatricians should work together to ensure delays do not occur.\textsuperscript{10,11}

Flexible management of trauma lists, exclusive daytime trauma lists or additional evening and weekend sessions in dedicated, fully staffed and suitably equipped operating theatres will improve efficiency of dealing with trauma during the normal working day and reduce the need to operate out-of-hours.\textsuperscript{12,13}

Healthcare providers have responsibilities to ensure the health and safety of their employees and others and to control and manage the risk of infection, blood spray and exposure to radiation.\textsuperscript{14}
Trauma and orthopaedic surgery encompasses a wide range of emergency and elective work in patients of all ages presenting with minor injuries, congenital abnormalities, high-energy trauma, fractures in the elderly due to falls or fragility, or degenerative joint conditions.

Immediate, life-saving surgery may be needed for trauma patients. Others need operations within a few hours to meet standards associated with an improved outcome. Many can be scheduled for the next available list or next day.

Prompt surgical intervention in stable patients can reduce their length of stay.

Most patients requiring surgery for trauma are admitted through the emergency department.

General anaesthesia is essential for many orthopaedic procedures. Some limb surgery can be performed under regional or local anaesthesia but still requires the presence of a competent anaesthetist.

Fractured neck of femur surgery

Fractured neck of femur is the most common condition requiring emergency orthopaedic surgery in the UK. Most patients are aged over 65 years. Many elderly patients have co-existing illnesses and confusional states that may need pre-operative assessment or treatment by physicians, as well as anaesthetists. The 30-day mortality is over 10%.

Pre-operative treatment must be timely and realistic. Prolonged delays increase the risk of chest infections in those who are immobile after injury. Early surgery helps to provide pain relief and promote mobilisation. Efficient planning and running of operating lists are of critical importance in avoiding delay.

Major trauma

General anaesthesia is usually necessary for emergency operations for major trauma.

Airway and ventilatory support is often required in the initial management of a severely injured patient in the emergency department and requires competent anaesthetists, anaesthetic assistance and appropriate equipment.

There is a high incidence of airway management difficulties requiring difficult airway equipment due to actual or suspected cervical spine injury.

Some patients need emergency operations within an hour. These include:
- life-threatening pelvic injuries
- major traumatic amputation
- multiple injuries requiring damage control surgery
- fractures, dislocations or soft tissue injuries with vascular compromise or continuing bleeding
- heavily-contaminated open fractures
- compartment syndrome.

Other conditions will require operations within a few hours, e.g. open fracture (within six hours) and fractures, dislocations or soft tissue injuries with potential vascular compromise or high analgesia requirements.

Immediate, abbreviated, life-saving surgery may be necessary to control bleeding and prevent further contamination. Simultaneous surgery may be required for separate injuries to limit operative time. Senior anaesthetic involvement is essential.

A high index of suspicion of other life-threatening injuries must be maintained when treating patients with serious bony injuries. Multidisciplinary care is an essential pre-requisite at all stages of their treatment.

Many patients presenting after major trauma require intra-transfer to the operating theatre, to radiology suites (for further investigation or haemostasis by embolisation) or to the critical care unit. Inter-hospital transfer to other specialist units may also be required (e.g. neurosurgical or cardiothoracic units for patients with serious head or intra-thoracic great vessel injuries). Trained anaesthetic staff, assistance and equipment are essential in the provision of these services.

Specific training in skills required for anaesthesia for emergency surgery and trauma is essential for all consultant anaesthetists and anaesthetic trainees working in this area.

Joint replacement surgery

Patients undergoing major joint replacement are often elderly, with co-existing medical conditions and are prone to deep venous thrombosis. This can make anaesthesia more difficult, requiring experienced anaesthetic input.

As the life expectancy of the population increases, more patients present for revision of major joint replacements. These operations are more difficult
than primary joint replacement, take longer and are associated with greater blood loss. Appropriate planning for such cases is essential for a successful outcome.

Levels of provision of service

1 Staffing requirements

1.1 Anaesthesia for trauma and orthopaedic surgery should be consultant led. All regular sessions should have a named anaesthetist assigned who is skilled and experienced in the provision of this service. When the assigned anaesthetist is not a consultant, there must be unimpeded access to a consultant anaesthetist.

1.2 The definitive care of complex spinal and pelvic injuries requires specialist spinal (orthopaedic or neurosurgical) and pelvic surgery. The anaesthetist managing such cases should have undergone training in the management of these cases and their associated complications.

1.3 Trained anaesthetic assistance must be present at all times in all clinical areas where anaesthetics are administered, including the emergency and radiology departments.

1.4 In hospitals receiving patients with major injury and trauma, there must be adequate levels of appropriately experienced medical and non-medical staff to provide a 24-hour emergency service.

1.5 The reception of major trauma patients in the emergency department should be provided by a multidisciplinary team, including an anaesthetist sufficiently trained to deal with airway management of the trauma patient.

1.6 In hospitals in which trainee anaesthetists work a full or partial shift system, consideration should be given to providing additional consultant programmed activities to allow training and supervision to take place in the evening.

1.7 Patients presenting to district general hospitals with trauma may need transfer to a tertiary referral centre. An anaesthetist trained in inter-hospital transfer of severely injured, anaesthetised and ventilated patients will be necessary. The provision of this anaesthetist may impact on remaining anaesthetic human resources in the hospital. Sufficient team members should be available and mobilised to ensure that safe provision of emergency anaesthesia can be maintained within the hospital.

1.8 There must always be adequate numbers of staff to ensure safe transfer and positioning of anaesthetised patients, both at the start and end of surgery and anaesthesia.

2 Equipment, support services and facilities

Operating theatre equipment

2.1 Major joint replacements and surgery involving bone implants or internal fixation should be carried out in an operating theatre with a laminar air flow system to reduce risks of wound infection. Other infection control systems should be supported by the whole operating team.

2.2 There must be adequate protection from blood spray for all working in the operating theatre.

2.3 An appropriate range of equipment should be available for the safe positioning and transfer of patients. Staff should be trained in the correct use of such equipment.

2.4 Reliable, well-maintained tourniquets and inflation devices of suitable sizes should be available for upper and lower limb surgery requiring a bloodless field.

2.5 Warming devices for patients should be readily available for use in the anaesthetic room, operating theatre, recovery unit and emergency department.

2.6 A high-performance, blood warming system with a ready supply of disposables should be rapidly available to allow rapid infusion of blood and fluids.

2.7 A cell salvage system with a ready supply of disposables and staff trained in its use should be available for major trauma with ongoing haemorrhage and for other patients undergoing orthopaedic procedures associated with a risk of life-threatening blood loss.

Facilities

2.8 Hospitals that receive patients with major trauma should have an emergency operating theatre situated sufficiently close to the emergency department to allow rapid transfer.

2.9 The facility for the rapid estimation of haemoglobin, arterial blood gases and blood sugar should be available during surgery for patients with major trauma and those undergoing orthopaedic procedures associated with a risk of major haemorrhage.

2.10 Group O rhesus negative blood should be available in or adjacent to the theatre suite at all
times for emergency use. Type-specific and fully cross-matched blood should be made available to the operating theatre within 20 and 50 minutes respectively of an appropriate request. Other transfusion products to improve coagulation should be available rapidly when indicated according to a locally agreed protocol. In the dynamic situation of major haemorrhage, it is appropriate to administer such products using senior clinical judgement or agreed clinical guidelines before laboratory confirmation of abnormal coagulation.

2.11 There must be 24-hour access to a fully-staffed and equipped post-anaesthesia care unit (recovery unit) including the facility for invasive haemodynamic monitoring.

Critical care services

2.12 Hospitals admitting patients with major trauma should have a high dependency unit (HDU) of Level 2 standard and ICU of Level 3 standard on site. Portable invasive haemodynamic monitoring must be available to facilitate transfer to and from the critical care areas.

2.13 A fully-equipped HDU of Level 2 standard should be available on site for high-risk patients undergoing major orthopaedic surgery. If the hospital does not have a Level 3 facility, protocols should be in place to advise as to when and how transfer to a Level 3 facility should be expedited.

Imaging requirements

2.14 Hospitals admitting patients with major trauma should have 24-hour availability of plain radiography, CT scanning and angiography within or close to the emergency department. Radiographers for plain films should be immediately available at all times. CT radiographers and a radiologist skilled in CT interpretation should be available within 30 minutes of the patient’s arrival in hospital. An appropriately trained interventional radiologist should be rapidly available to undertake embolisation or other radiological interventions within one hour of the patient’s arrival.

2.15 An ultrasound scanner and a radiologist or other trained operator must be available to perform a focused assessment of the chest and abdomen in the resuscitation room 24 hours a day to exclude or confirm significant blood in the peritoneum, pericardium and pleural cavities.

2.16 Magnetic resonance imaging (MRI) should be available in all hospitals receiving patients with major trauma. Patients with unstable spinal fractures, dislocations and subluxations, with fractures through the foramen transversarium, or with clinical or radiological evidence of spinal cord or nerve root injury, should undergo prompt MRI scanning. Where there is evidence of serious nerve or nerve root compression, the MRI should be performed within four hours.

2.17 Trained radiographers and an image intensifier with facilities for producing plain films should be available in the operating theatre 24 hours a day for trauma and orthopaedic surgery.

2.18 A computerised image system should be in place, with viewing facilities in the operating theatre, recovery, critical care areas and wards.

2.19 Radiation protection screens or gowns and collars for thyroid protection must be available for all staff remaining in the operating room or imaging suite when radiographs are taken, an image-intensifier is used or a CT scan is performed.

2.20 Imaging suites receiving patients with major trauma should be equipped as a critical care environment. They should be situated sufficiently close to the emergency operating theatre to allow rapid transfer there when indicated.

Difficult airway management

2.21 A ‘difficult intubation trolley’ with a variety of laryngoscopes, tracheal tubes, laryngeal masks, and other aids for airway management must be available in all areas where major trauma patients may be received, including the emergency department.

2.22 Equipment for fibre-optic intubation for patients with potentially difficult airways, should be available. For elective use, intubating bronchoscopes should be fully and recently sterilised according to infection control standards. For appropriate emergency use, the time lapsed since the last sterilisation may be extended.

Local anaesthesia and analgesia

2.23 An acute pain service should be available for advice on and delivery of post-operative pain relief.

2.24 Patient controlled analgesia equipment and infusion devices must be available for post-operative pain relief.

2.25 An appropriate nerve stimulator and an ultrasound scanner with a probe for visualising vessels, nerves and other structures to facilitate regional nerve blocks should be available.

2.26 Reliable, well-maintained, double-cuff tourniquets should be available if intravenous regional anaesthesia (IVRA) is used.
A supply of sterile pre-mixed solutions of low-concentration local anaesthetic drugs, alone and in combination with opioids, should be available for use in continuous regional anaesthetic techniques, as well as other opioid solutions for use in patient-controlled analgesia devices.

There should be clear guidance on whom to call for problems with post-operative pain relief. There should be a locally-agreed regional analgesia record and a protocol for the prescription and administration of epidural drugs and training needed to manage epidurals on the ward.

There should be clear, written guidelines regarding the management of haemodynamically unstable patients, including immediate treatment in the emergency department, imaging suite or operating theatre and ongoing care after immediate interventions.

Other guidelines that should be in place include:
- management of patients with suspected or diagnosed spinal injuries, including lifting and handling, immobilisation and clearance of injuries
- the management of failed difficult intubation
- the management of major haemorrhage
- prevention of thrombo-embolic events post-operatively
- the management of regional techniques in relation to thrombo prophylaxis
- the management of high regional block, failed regional block, accidental dural puncture and post-dural puncture headache
- the management of patients known to be taking anti-platelet drugs.

Patients requiring surgery within the hour require interruption of a current list or the availability of a dedicated operating theatre. Acute nerve or spinal cord compression requires immediate referral to a neurosurgeon or specialist spinal surgeon and facilities to expedite safe transfer.

In elective orthopaedic surgery where heavy blood loss is anticipated, specific measures should be considered in patients who are Jehovah’s Witnesses, including re-infusion of post-operatively drained blood or cell salvage. All options must be discussed with the patient first if possible. Such patients should be operated on and anaesthetised by senior and experienced members of surgical and anaesthetic staff.

Children

Children presenting for orthopaedic or trauma surgery must have access to appropriate facilities, staff and equipment.

4 Training and education

Anaesthetists and surgeons who manage patients with major trauma should undertake advanced trauma life support (ATLS) or equivalent training. Those who continue to practise should continue to update this training at regular intervals.

All anaesthetists providing anaesthesia for trauma or orthopaedic surgery should have the knowledge, skills, attitudes and behaviour in accordance with the Royal College of Anaesthetists training standards.

Consultant anaesthetists responsible for the intra-operative anaesthetic care of patients with major trauma must maintain their skills and be up to date with current recommendations.

Specific skills, drills and scenario training for the initial management of major trauma care should be regularly conducted for all members of the trauma and theatre team.

Major incident training exercises should take place at regular intervals.

Where a service is being provided for children, all of the anaesthesia team members must have regularly updated training (appropriate to their roles) in paediatric anaesthesia and resuscitation.

Staff in the recovery area and in the wards who receive patients after surgery with epidural infusions, nerve blocks or intravenous opioid infusions (including PCA) should have received formal training in caring for these forms of analgesia.

Trauma theatre teams should be trained in the correct use of all essential theatre equipment for trauma surgery and anaesthesia, including tourniquets, high-performance blood warming systems and cell-savers.

Medical staff undertaking IVRA should be trained in the technique and in the correct use of local anaesthetic agents including dose limits and in resuscitation.
4.10 Nurses expected to care for patients with epidurals *in situ* should be trained to local guidelines before they top up epidurals or look after such patients.

5 Research and audit

5.1 Research in anaesthesia for trauma and orthopaedic surgery should be encouraged and time set aside for this activity.

5.2 Trauma and orthopaedic surgery should be included in anaesthetic departmental audit programmes, including ongoing audit of complications and adverse events.

5.3 A range of specific quality indicators should be developed, such as:
- time to operation, length of stay and mortality in patients with fractures of the femoral neck
- wound infection rates and the incidence of MRSA in all surgical cases
- blood and blood product usage.

5.4 All hospitals that receive patients with major trauma should subscribe to the Trauma Audit and Research Network (TARN).

5.5 De-anonymised comparative data analysis is invaluable for quality assurance and has been endorsed by the Healthcare Commission.

6 Organisation and administration

Fractured neck of femur service

6.1 Patients with a fracture of the femoral neck should normally have surgical correction within 24 hours of admission to hospital. A system should be in place to ‘fast-track’ them from the emergency department through other areas and to theatre. They should receive prompt, appropriate pain relief and fluid resuscitation and standardised pre-operative investigations according to locally agreed protocols.

Emergency orthopaedics and trauma

Hospitals receiving patients with major trauma should have the following organisational arrangements.

6.2 There should be a defined agreement for immediate or urgent access to an operating theatre with appropriately trained and experienced staff to provide rapid intervention in life-threatening/limb-threatening conditions. Less urgent cases will require the trauma list to be interrupted between cases or a separate theatre to be opened and staffed. A flexible approach to emergency theatre list planning and management is required.

6.3 Theatre teams should be informed whenever a patient who is unstable with major trauma is expected, has arrived or has been identified in the emergency department. A member of the theatre team should have responsibility for ensuring the availability of appropriately trained staff and facilities.

6.4 There must be a defined response in the call-out of a multidisciplinary trauma team led by a defined trauma team leader. All medical team members should be trained in ATLS or its equivalent.

6.5 Protocols must be established to ensure that any surgical specialties not on site (e.g. vascular or plastic surgery) can be contacted efficiently without undue delay.

6.6 A clear line of communication from the duty anaesthetist to the on-call consultant should be assured at all times. Any conflict of priorities should be referred to senior staff.

6.7 Consultants in anaesthesia and intensive care must be involved in the planning of local trauma services.

6.8 Trauma operating lists should take place on a daily basis in working hours to prevent a backlog that results in unnecessary overnight operations. The provision of extra trauma lists in the evenings and at weekends further helps to prevent patients requiring surgery late at night.

6.9 All acute hospitals should have a defined major incident plan that complies with current recommendations. This should cover the call-in of extra staff and the assignment of specific roles.

6.10 Joint orthopaedic-anaesthetic trauma audit meetings should take place to evaluate compliance with defined standards, to discuss morbidity and mortality, and to feed back information from TARN.

Elective orthopaedics

6.11 Elective orthopaedic operating lists should be separated from those for traumatic orthopaedic surgery to allow efficient planning in advance for elective cases, prevent cancellation of planned cases and allow a flexible response for emergencies.

6.12 There should be a pre-operative assessment clinic for elective orthopaedic surgery. There should be an agreed list of conditions that require pre-admission assessment by an anaesthetist and a defined mechanism to ensure that patients with these conditions are referred.
7 Patient information

Patients with difficult airways

7.1 When an awake fibre-optic intubation is required, it is important to fully inform the patient of what to expect.

7.2 As part of a ‘difficult airway follow-up’, patients should be informed about any airway problem the anaesthetist has encountered and be advised to highlight this problem in any future pre-operative assessment.

Regional anaesthetic techniques

7.3 When a regional anaesthetic technique is planned on an awake patient, it is important to fully inform the patient of what to expect. The potential complications and the risk in relation to the benefits of the technique should be explained and documented in the patient’s notes.

Informed consent and the confused patient

7.4 Informed consent may be impossible for many patients undergoing trauma and fractured neck of femur surgery due to confusion, dementia, altered conscious level, severe pain or the effects of sedative drugs. Patients should not be asked to sign a consent form if they are not competent so to do and a ‘two doctor’ consent process should be used if urgent surgery is in the patient’s best interests. A high level of integrity must be maintained, and good documentation is essential.

Death and dying

7.5 Major trauma results in a sudden loss of health, disability and a risk of dying. Communicating with the patients and their families is essential. On occasions, explanations and detailed discussion may need to be deferred or delegated to others so that emergency treatment can proceed without delay. Breaking bad news to close relatives in the event of a death occurring should be undertaken by senior medical and nursing staff in appropriate surroundings as soon as is feasible. Follow-up arrangements should be offered.

7.6 When it is considered appropriate for an order not to attempt resuscitation in the event of a cardio-respiratory arrest (DNAR) it must be discussed with competent patients, including those who have expressed their own wish not to be resuscitated (e.g. living wills). In patients incompetent to consent, every attempt should be made to discuss this with the close family (or an Independent Mental Capacity Advocate), according to local trust guidelines.

References


Further reading

- Changing the Way We Operate. NCEPOD, London 2001 (www.nceptod.org/).
Chapter 15
Trauma and orthopaedic surgery, revised 2009

- Tomycz ND et al. MRI is unnecessary to clear the cervical spine in obtunded/comatose trauma patients: the 4-year experience of a Level-1 Trauma Center. *J Trauma* 2008;64:1258–1263.
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**

- Day surgery should have a dedicated clinical lead or clinical director with allocated programmed activities to allow them to lead service development.\(^1\)\(^-\)\(^3\)

- Anaesthesia for day surgery should be consultant led. All anaesthetists delivering day surgical care must be trained, experienced and skilled in day surgery practice as high quality anaesthesia is pivotal to successful day surgery.\(^1\)

- Consultant anaesthetic involvement is essential in policies, protocols and guidelines designed to facilitate smooth running of the day surgery unit.\(^1\)\(^,\)\(^4\)\(^,\)\(^5\)

- The location of day surgery units (DSUs) must be given careful consideration in order to accommodate all of the necessary facilities and access to peri-operative support services.\(^1\)

- Patient selection and pre-assessment of criteria of fitness for general anaesthesia for day surgery must be developed and agreed by anaesthetists.\(^1\)\(^,\)\(^4\)\(^,\)\(^5\)

- Pre-assessment clinics should be consultant led and delivered by a specifically trained pre-assessment team.\(^5\)

- The recommended standards of monitoring, trained anaesthetic assistance and post-anaesthetic recovery must be met for every patient undergoing day surgery under a general anaesthetic or sedation.\(^6\)\(^-\)\(^10\)

- Children experiencing day surgical care require all the facilities and staffing that would be expected in any paediatric unit.\(^11\)\(^-\)\(^16\)

- Training in anaesthesia for day surgery is essential so that anaesthetists practising in this area develop techniques that permit the patient to undergo the surgical procedure with minimum stress and maximum comfort and optimise their chance of early discharge.\(^2\)\(^,\)\(^17\)

- Effective audit is an essential in the provision of quality anaesthesia for good day surgery.\(^2\)\(^,\)\(^18\)\(^,\)\(^19\)

- Specific instructions and information must be available for patients, their relatives and community services.\(^3\)\(^,\)\(^20\)

**Introduction: The importance of anaesthesia services for day surgery**

- Day surgery encompasses a spectrum of surgical procedures which allows the patient to go home after a few hours.

- Increasing day surgery rates is a key government target.\(^21\) Anaesthetic advancements and the introduction of minimal-access techniques allow a range of surgical procedures to be undertaken on a day case basis which formerly would have required in-patient services.\(^21\)

- ‘True day surgery’ patients are those undergoing day surgery requiring full operating theatre facilities and/or a general anaesthetic. This chapter
encompasses the anaesthetic service provision to ‘true day surgery’ patients who are admitted and discharged on the day of their surgical treatment. It does not include ‘short-stay’, endoscopy or outpatient procedures.

Some patients may have ‘day surgery’ in one centre which would be performed as in-patient work in another. The decision will reflect the skills of the medical team, the patient’s fitness, the technical ease of the procedure, the post-operative morbidity and the social circumstances of the patient in relation to the available community resources.

Many hospitals perform a variety of day surgery work, such as dental and ophthalmic surgery, in specialised units. This chapter encompasses standards of provision of anaesthetic services for day surgery in these sites. However, standards of provision of anaesthesia in imaging suites, stand-alone dental departments and psychiatric units will be outlined in a later chapter of this document ‘Anaesthesia in a non-theatre environment’ (in preparation).

Outsourcing of surgical activity may mean that day surgery units (DSUs), or ‘treatment centres’, may be sited in a geographically separate location from the main hospital building. Self-contained units must be sufficiently equipped and have access to all the necessary peri-operative support services.

Increasing numbers of patients will present to day surgery for more complex surgical procedures. Many will present with significant co-morbidities requiring early anaesthetic input.

Anaesthetists play a pivotal part in the successful outcomes of day surgery patients. Anaesthetists can and usually do contribute in more ways than providing anaesthesia.

Roles which must have senior anaesthetic input include:2,4,19
- agreement, development and support of pre-operative assessment and post-operative care guidelines and processes
- pre-operative assessment of complex patients for suitability for day surgery and for those needing investigation and treatment
- referral to other specialties
- liaison with surgical teams.

The success of a day surgery unit is also determined by the skill and experience of pre-assessment staff. Adequate resources for training, staffing and support services are essential to the pre-assessment service.

Levels of provision of service

1 Staffing requirements

1.1 Day surgery must be a consultant-led service with a dedicated clinical lead or clinical director who has programmed activities (PAs) allocated to their job plan.1,3

1.2 High quality anaesthesia is pivotal to successful outcomes in day surgery. All anaesthetists delivering anaesthesia for day surgery must be experienced and skilled in techniques appropriate to day surgery practice.1 The majority of anaesthesia for day surgery should be delivered by consultant anaesthetists.20 Consultant anaesthetists must have been trained in this field to the Royal College of Anaesthetists standards.20 Staff or associate specialist grades may also provide anaesthesia for day surgery, as can sufficiently experienced trainee anaesthetists. However, these doctors must have undertaken suitable training in the provision of anaesthesia for day surgery, and must have unimpeded access to a consultant anaesthetist for advice and supervision.17

1.3 All patients undergoing surgery with anaesthesia must be seen by an anaesthetist on the day of operation.5

1.4 Trained anaesthetic assistance and post-anaesthetic recovery staff must be provided for every patient undergoing general anaesthesia.7–9

1.5 Pre-assessment clinics should be consultant led and delivered by a specifically trained pre-assessment team.5

1.6 Adequate levels of trained nursing staff must be provided in recovery for the numbers of patients and their needs. No fewer than two staff should be present when there is a patient in the recovery room who does not fulfil criteria for discharge to the ward.7,8

2 Equipment, support services and facilities

Facilities

2.1 The minimum operating facility required is a dedicated operating session in a properly equipped operating theatre.

2.2 The ideal day surgery facility is a purpose-built, self-contained DSU with its own ward, recovery areas and dedicated operating theatre(s). This may be contained within a main hospital or in its grounds to facilitate access to in-patient or critical care facilities, or it may be a freestanding unit remote from the main hospital site.
2.3 If a purpose-built unit does not exist and surgery is undertaken in the main theatre suite then patients should be admitted to a dedicated day surgery ward.

2.4 Facilities for privacy and confidentiality during pre-operative discussion and examination must be provided. Pre-operative discussions with patients in the middle of crowded waiting rooms are not appropriate as they do not allow patient confidentiality.24

Equipment

2.5 Theatre and anaesthetic-related equipment must always be equivalent to in-patient surgery and be regularly maintained.125

2.6 The recommended standards of monitoring must be met for every patient.6

2.7 Full resuscitation equipment and drugs must be provided as outlined by up-to-date resuscitation guidelines and hospital policy.126

2.8 Peripheral nerve blocks, spinal/epidural blocks and intravenous regional anaesthesia often provide excellent conditions for day surgery. Equipment to facilitate these blocks, such as nerve stimulators and ultrasound, should be available.

2.9 Equipment and drugs to deliver total intravenous anaesthesia should be available in day surgery.

Support services

Pre-operative services

2.10 Adequate time and facilities should be provided within the DSU to allow:

- review of pre-assessment and laboratory investigations
- elicit any further clinical information
- undertake any relevant clinical examination, including airway assessment
- discuss anaesthetic technique to be used
- provide post-operative instructions (reinforced by patient information leaflet)
- document any relevant discussion and findings on an anaesthetic record
- ensure consent is understood and signed, and laterality of operation site confirmed.

2.11 Local pre-assessment guidelines and protocols should be established, and effective training organised under the direction of named consultant anaesthetists.

2.12 Consultant anaesthetic advice should be available to comment on an individual patient’s suitability for day surgery.

2.13 Appropriate clinical investigations should be ordered at pre-assessment according to a robust locally agreed protocol. A mechanism for the review and interpretation of the results of tests ordered before the day of surgery must be developed.

2.14 The support services of radiology, pharmacy and investigative laboratories must be available. The facility to perform a 12 lead electrocardiogram (ECG) should be available within the DSU itself.

Post-operative support services and facilities

2.15 Each DSU must have a fully equipped recovery area, staffed by recovery personnel trained to defined standards.24 Transfer from the immediate recovery area to a second (ambulatory) recovery area may take place when the patient is awake, in control of their airway, oriented and without continuing haemorrhage.24

2.16 The secondary recovery area must provide essential close and continued supervision of all patients who should be visible to the nursing staff.

2.17 There must be easy access to in-patient beds for peri-operative complications. If a patient requires overnight admission, an in-patient bed must be found.

2.18 If day surgery is being undertaken on an isolated site, protocols must define finding an in-patient bed and mechanism of transport for a patient needing an overnight stay.

2.19 Locally agreed written discharge criteria must be established. Discharge may be delegated to senior nursing staff according to protocols. If a patient does not satisfy the agreed discharge criteria they must be referred to the anaesthetist or surgeon concerned (or their deputies) for assessment.27

2.20 Locally agreed policies must be in place for the management of post-operative pain after day surgery. This should include pain scoring systems in recovery, prescription of pain relief medication on discharge with written and verbal instructions on how to take medications and what to take when the medications have finished.

2.21 Patients may be discharged home with residual sensory or motor effects after nerve blocks or regional anaesthesia. The duration of the effects must be explained and the patient must receive written instructions as to their conduct until normal sensation returns.
2.22 Post-operative short-term memory loss may prevent verbal information being assimilated by the patient. If post-operative analgesia has been provided, clear, written instructions on how and when to take it and the maximum safe dose should normally be provided.

2.23 A 24-hour telephone number must be supplied so that every patient knows whom to contact in case of post-operative complications. This should not be an answer-phone.

2.24 Patients who have undergone procedures under general anaesthesia must be accompanied home by a responsible adult who remains available for 24 hours after surgery.

2.25 Transport home should be by private car or taxi; public transport is not normally appropriate.

2.26 The general practitioner (GP) must have been notified of the patient’s proposed treatment in advance. Where the patient’s GP may need to provide post-operative care within a short time of discharge, arrangements for this should have been made in advance of the patient’s admission. The patient’s GP should be informed of the patient’s discharge as soon as possible, either by telephone call or fax/email. A discharge summary should be written for each patient by the surgeon concerned.

Information technology
2.27 Information technology systems in the DSU should provide appropriate information but must not burden staff.

3 Areas of special requirement
Management of children
3.1 Day surgery is particularly appropriate for children, provided that the proposed operations are neither too complex nor prolonged, and individuals have no significant co-existing medical disease.

3.2 The lower age limit for day surgery depends on the facilities and experience of staff and the medical condition of the infant. Ex-preterm neonates should not be considered for day surgery unless medically fit and beyond 60 weeks post-conceptual age. Infants with a history of chronic lung disease or apnoeas should be managed in a centre equipped with facilities for post-operative ventilation.

3.3 The specific needs of children must be considered at all stages of day care. Children experiencing day surgical care require all the facilities and staffing that would be expected in any paediatric unit. This may be achieved by providing separate paediatric day surgery units in larger institutions, separate areas for children in a single unit, or closing the unit to adults on particular days when only paediatric surgery is undertaken. It is particularly important that children are recovered in separate areas by appropriately trained and qualified staff.

3.4 The management and care of children undergoing day surgery should comply with standards of care irrespective of whether children are managed in a specialist paediatric unit or an adult unit adapted for children.

3.5 Nursing staff caring for children must be skilled in paediatric and day surgical care and trained in child protection.

3.6 Anaesthetists who anaesthetise children must have received appropriate training. Their competency in anaesthesia, resuscitation and child protection must remain current. If they do not undertake regular paediatric sessions then a mechanism should be found using CPD time to maintain skills, often by attachment to a local paediatric unit.

3.7 There must be clear discharge criteria for children following day care surgery.

3.8 There must be access to a paediatrician. Where the DSU does not have in-patient paediatric services, robust arrangements should be in place for access to a paediatrician and transfer to a paediatric unit if necessary.

3.9 Other safeguards must be in place when providing day surgery for children in DSUs that are not in hospitals with in-patient paediatric care.

3.10 The provision of good quality information to parents and children is essential. This should include:
- fasting guidelines
- clear instructions for use of drugs for pain relief
- what to do if the child becomes unwell before or after the operation.

3.11 A pre-admission programme for children should be considered to decrease the impact and stress of admission to the DSU on the day of surgery.

4 Training and education
4.1 As day surgery will form a substantial proportion of most consultant anaesthetists’ workload, appropriate and comprehensive training in this sub-specialty must be given according to current standards.
4.2 Training needs to emphasise the following aspects:
- effective post-operative pain relief
- post-operative nausea and vomiting prevention strategies
- the necessity of a team approach in day surgery care
- the requirement for ‘street fitness’ on discharge
- the post-operative management of patients in the community.

4.3 Appropriate continuing professional development programmes are also essential to maintaining safe day surgery.

5 Research and audit

5.1 Each DSU should have a system in place for the routine audit of important basic parameters such as unexpected admissions following surgery, DNA rates and patients cancelled on day of operation.

5.2 Audits should rely only on procedure-specific data and not on overall percentages. Auditors can compare activity by procedure and unit.

5.3 The Royal College of Anaesthetists has also issued guidance for audit in day surgery.\(^{19}\)

5.4 Audit should be co-ordinated and led by designated staff members.

5.5 Audit should be integrated in wider areas of anaesthetic and surgical practice.

5.6 Audit in clinical practice and patient care in day surgery should involve all staff. A system should exist for the regular feedback of audit information to staff to reinforce good practice and help to effect change. This feedback may take the form of regular meetings or updates, or a local news-sheet.

5.7 Traditionally, much anaesthetic research (particularly the development of anaesthetic agents) has been conducted in the day surgery setting. This setting is likely to be an area used for further research and development in the future.

6 Organisation and administration

6.1 Each DSU should have a clinical director or specialty lead. This will often, but not always, be an anaesthetist. The role of the clinical director is to champion the cause of day surgery and ensure that best practice is followed. This role should be recognised by adequate programmed activity allocation and provided with appropriate administrative support.\(^{1-3}\)

6.2 There should be a senior nurse manager who, with the clinical director, can provide the day-to-day management of the unit.

6.3 Many larger units, especially those that are freestanding, may find it helpful to have a separate business manager to support the clinical director and senior nurse.

6.4 The clinical director should chair a management group and liaison with all those involved in day care. This will include representatives from surgery, anaesthesia, nursing, pharmacy, management, finance, community care (both nursing and medical), audit, professions allied to medicine, and representatives of patient groups.

6.5 Mixed in patient and day surgery lists, while common, can lead to substandard care. In-patient nursing documentation is often used and in-patient nurses may not have been trained to put the same emphasis on ensuring that the patient is fit for discharge as those trained in day surgery nursing.

6.6 The surgeon involved in the case must remain responsible for the patient, and he/she or a suitable deputy must be available to deal with any problems that arise.

6.7 For commissioning purposes, suggested indicators of quality of a DSU include: day surgery existing as a separate directorate within the trust, appointment of a senior manager directly and solely responsible for day surgery, dedicated day surgery pre-operative assessment staff, timely information, appropriate staffing levels, appropriate follow-up and outreach, and involvement of patients, the public and community practitioners.\(^{3}\) This list, however, is not exhaustive and other factors – such as theatre utilisation, levels of unplanned overnight admissions after day surgery, management of pain relief and post-operative nausea and vomiting, and patient information and satisfaction – are also important quality indicators which should be audited regularly.

7 Patient information

7.1 Clear and concise information given to patients at the right time and in the correct format is essential to facilitate good day surgery practice. Much of this information may be given to patients at pre-assessment. Verbal information should always be reinforced with printed material. Alternative means of communication with patients, including the internet and text messaging, should be considered.

7.2 Information must be arranged in such a way that it is comprehensive and comprehensible and should be available in a format suitable for the
11 visually impaired. It may be necessary to provide information leaflets in a number of different languages to accommodate the needs of the local population.

7.3 Whatever form the information takes it must be sufficient to allow informed consent.20

7.4 At a minimum, information provided to patients should include:

- Date and time of admission to the unit.
- Location of the unit, and travel instructions.
- Details of the surgery to be undertaken, and any relevant pre-operative preparations required of the patient.
- Information on the anaesthetic to be provided, including clear instruction for pre-operative fasting, and the way in which patients will manage their medication.
- Post-operative discharge information, including details of follow-up appointments, management of drugs, pain relief and dressings, and clear instruction on whom to contact in the event of post-operative problems.
- Patients must also be made aware at the pre-admission visit that conversion to inpatient care is always a possibility.

References


18 NHS Better care, better value indicators. NHS Institute for Innovation and Improvement (www.productivity.nhs.uk/default.aspx).

Further reading

Guidance on the provision of Cardiac and Thoracic 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

- Each cardiothoracic unit must have consultant anaesthetists with dedicated, individual responsibility for cardiac and thoracic anaesthetic services.
- Minimum staffing levels to provide 24-hour consultant anaesthetic cover for theatres and ICU would equate to nine full-time equivalent consultant cardiac anaesthetists for 1,200 adult cardiac operations per year.
- Minimal monitoring during bypass must conform to the standards recommended by the joint working group of the Society of Clinical Perfusion Scientists, Association of Cardiothoracic Anaesthetists and Society of Cardiothoracic Surgeons.
- Post-operative recovery facilities for cardiac surgery should be appropriately staffed and equipped, ring-fenced and located close to the theatres.
- In cardiothoracic units, there must be immediate access to critical care facilities, which must be staffed by appropriately trained personnel.
- There must be appropriate support facilities provided on site for cardiothoracic units including perfusion services, blood transfusion services, microbiology, pharmacy, pathology, respiratory function testing and radiological services. These must be backed up by modern information technology (IT) systems.
- Special provision of staff, environment, facilities and services must be made for children undergoing cardiac or thoracic procedures.
- Patients who have undergone thoracic procedures must be managed in dedicated thoracic units post-operatively with access to an acute pain service and pain relief protocols.
- Consultant anaesthetists providing anaesthesia for cardiac surgery are expected to maintain the individual competencies recommended by the Royal College of Anaesthetists. Evidence of continuing educational and professional development will be necessary to demonstrate fitness to practise in this specialty.
- Anaesthetic trainees attached to the cardiac or thoracic unit should be of appropriate seniority to benefit from higher training in this area and an anaesthetist training in cardiothoracic anaesthesia should be supervised at all times by an appropriately trained consultant or specialist.
- All cardiothoracic units must participate in local and national audit.
- Patients receiving anaesthesia for cardiac or thoracic procedures should be provided with written information regarding the surgery and peri-operative care.
Introduction: The importance of anaesthetic services for cardiac surgery

- Cardiac anaesthetic services are provided for patients undergoing cardiac and thoracic vascular investigations and surgery.

- Cardiac surgery may involve adult, paediatric and neonatal patients and includes all forms of open and closed heart surgery, whether elective or emergency. It also includes some interventional cardiological procedures, more commonly performed in children, but increasingly in adults, such as percutaneous atrial septal defect (ASD) and patent foramen ovale (PFO) closure and ablation of aberrant pathways causing complex dysrhythmias. It also includes heart or heart/lung transplantation, increasing use of ‘off-pump’ surgery (performed without cardiopulmonary bypass), and the use of ventricular assist devices (VADs) to support the failing circulation for periods of days or weeks in the intensive care unit (ICU).

- Cardiac surgery is mainly carried out in specialist units within teaching hospitals or specialist hospitals dedicated to cardiothoracic work.

- Many factors are influential in determining the viability of a cardiac surgical unit. However, the most important of these is clinical activity, based mainly on the yearly caseload of heart operations.

- The nature of cardiac surgery demands that all patients should be cared for post-operatively in a unit which conforms to the standards of general Level 3 and 2 intensive care facilities.

- Evidence suggests that clinical excellence in cardiac anaesthesia has an important influence on outcome.

- Cardiac anaesthesia provides an important area of training for trainee anaesthetists. It offers training in the peri-operative care of patients with severe heart and lung disease, essential for all anaesthetists whatever their future area of practice.

The importance of anaesthetic services for thoracic surgery

- Thoracic surgery in adults includes surgery to the lungs (including lung transplantation), pleura, thymus, oesophagus and other thoracic structures as well as the chest wall. Thoracic procedures include lobar resection, pneumonectomy for malignant and non-malignant conditions, mediastinoscopy and mediastinotomy, and bronchoscopy for diagnostic and interventional indications. Video-assisted thoracoscopic surgery (VATS) is also performed for drainage and investigation of effusions, lung resection, sympathectomy and removal of mediastinal tumours. Other procedures include surgical management of air-leaks, management of empyema, operations on the chest wall, endobronchial laser surgery and tracheal stenting.

- Anaesthesia for lung transplantation, although limited in the UK at present due to donor shortage, may sometimes require the use of cardiopulmonary bypass. There is also an expanding use of extracorporeal membrane oxygenation (ECMO) for acute lung injury (ALI).

- Although thoracic surgical units usually exist as part of a cardiothoracic service within a larger hospital, their needs may vary to some extent from those of pure cardiac units.

Levels of provision of service

1 Staffing

Cardiac anaesthetic services

1.1 Each unit should have a consultant anaesthetist who is responsible for cardiac anaesthetic services.

1.2 24-hour consultant anaesthetist availability is required, preferably with a dedicated cardiac anaesthetic on-call rota.

1.3 Minimum staffing levels to provide 24-hour consultant anaesthetic cover for theatres and the ICU would be nine full-time equivalent consultant cardiac anaesthetists for 1,200 adult cardiac surgery operations per year.1

1.4 The level of expertise and availability of anaesthetist and surgeon must be adapted to the evolving needs of the patient following surgery. In the early stages this will require the immediate availability of both anaesthetist and surgeon.

1.5 Perfusion services must be provided by suitably trained and accredited perfusion technicians.2

1.6 Interventional cardiology services must take into account the likely impact on anaesthesia, intensive care and nursing resources according to patient acuity. General anaesthesia may be needed to facilitate complex interventions, or required in an emergency in the event of major complications during invasive cardiological procedures. Both eventualities require the provision of anaesthetic staffing, assistance, equipment and monitoring.
Thoracic anaesthetic services

1.7 Each unit should have a designated lead consultant for thoracic services.

1.8 The complexity of the cases may necessitate additional sessional commitment for pre-operative visiting and assessment.

1.9 Two anaesthetists may be required for more complex procedures.

1.10 24-hour consultant anaesthetic availability is required, preferably with a designated thoracic on-call rota, particularly if lung transplantation is performed.

1.11 It is essential that wherever thoracic anaesthesia and surgery are performed, there should be a resident anaesthetist and thoracic surgeon.

1.12 The consultant anaesthetists in cardiothoracic units will be responsible for the provision of service, teaching, production of protocols, management, research and audit. Adequate sessional time will be required for these activities.

2 Equipment, facilities, environment and support services

Equipment and monitoring

2.1 Cardiac anaesthesia and surgery are carried out under intensive physiologic patient monitoring. Routinely used monitoring during cardiac surgery will include the following:

- In the induction/anaesthetic room: electrocardiogram (ECG); pulse oximetry; invasive and non-invasive blood pressure (BP) monitoring; respired gas monitoring.
- During surgery: ECG; pulse oximetry; invasive monitoring of arterial including pulmonary artery and central venous pressures; measurement of body core temperature. Transoesophageal echocardiography should be immediately available.
- During the transfer of the patient at the end of surgery to post-operative care unit: ECG; invasive BP; pulse oximetry; disconnection alarm for any mechanical ventilation system; fractional inspired oxygen concentration; and end tidal carbon dioxide.

2.2 Monitoring during cardiopulmonary bypass must conform to the standards recommended by the joint working group of the Society of Clinical Perfusion Scientists, Association of Cardiothoracic Anaesthetists and Society of Cardiothoracic Surgeons.2

2.3 On ICU, equipment for a variety of methods of mechanical ventilation is required.

2.4 Comprehensive monitoring facilities are required. For complex thoracic cases, facilities for pulmonary artery catheterisation and cardiac output measurement are required. For patients undergoing lung transplantation, additional facilities will be needed.

Facilities

2.5 A dedicated thoracic or cardiothoracic ward is desirable.

2.6 Cardiac surgery must take place in dedicated cardiothoracic operating rooms. It is unlikely that an operating room will be kept available at all times for emergencies. It is preferable that all cardiac surgery be carried out in a dedicated environment whenever possible.

2.7 Many units care for selected cardiac surgical patients in the immediate post-operative period in facilities other than designated ICUs. These may be called high dependency unit (HDU), cardiac recovery, cardiac fast-track or by another similar name. They have in common the aim of selecting patients and minimising or abolishing the period of mechanical ventilation in the post-operative period. The patient monitoring requirements of such a facility are no less than the essential monitoring requirements of patients cared for in ICU.

2.8 After major thoracic surgery, patients must be transferred to a properly equipped and staffed area. In the United Kingdom most patients will return to an HDU. However, in some instances, e.g. elderly patients who have had oesophageal surgery and some patients undergoing lung surgery, there may be a need for post-operative mechanical ventilation on ICU. Access to ICU or HDU is therefore essential. Nursing staff on ICUs and HDUs that receive patients who have had thoracic surgery should be trained in thoracic nursing care and have access to the same services that are available on a general thoracic ward.

2.9 There should be an appropriately sized, equipped and staffed post-anaesthetic recovery unit for those patients who do not require HDU or ICU.

2.10 On rare occasions, when unexpected difficulties arise in thoracic surgery, access to a cardiopulmonary bypass facility is essential.

Support services

2.11 Haematology, blood transfusion and biochemistry services should be available with rapid access.
for both cardiac and thoracic surgery. In cardiac surgery, wherever possible, there should be satellite or point of care laboratory facilities in or near the operating room for the measurement of blood gases, electrolytes, haemoglobin and anticoagulation.

2.12 There should be immediate access to X-ray facilities, and computerised axial tomography (CT) and Magnetic Resonance Imaging (MRI) services must be available for patients undergoing cardiac or thoracic surgery. For cardiac patients, dedicated echocardiography equipment, including transoesophageal echo (TOE) should be available in the operating suite. The demand for echocardiography services is likely to increase considerably in the future.

2.13 Access to respiratory function measurements is required for patients undergoing thoracic surgery, including facility for pulmonary exercise testing.

2.14 Physiotherapy services are required during the pre-operative preparation and post-operative care of patients undergoing thoracic surgery.

2.15 Medical physics or other suitably qualified technicians are required to maintain, repair and calibrate anaesthetic machines, mechanical ventilators, monitors, infusion equipment, the heart/lung machines, cooling/warming devices and other machinery that may be essential such as intra-aortic counter-pulsion balloon pump equipment. Some specialised equipment may need to be maintained by contractual arrangement with an external supplier.

2.16 For patients undergoing thoracic surgery, physicians and surgeons experienced in specialist non-thoracic areas, such as cardiac and endocrine disease, should be available for consultation.

2.17 The provision of an acute pain service is necessary for thoracic surgery. Pain relief and clinical management protocols must be clearly defined for thoracic and cardiac patients.

3 Areas of special requirement

3.1 Children undergoing thoracic surgery have special requirements and the responsibility for paediatric anaesthetic care may be shared with paediatric anaesthetists.

3.2 Paediatric patients who have undergone cardiac surgery must be cared for in a unit designed and equipped to care for paediatric patients, and staffed by appropriately trained nurses. Such a unit should meet the standards laid down for paediatric intensive care.

4 Training and education

4.1 Cardiac and thoracic anaesthesia is a ‘Key unit of training’ for Intermediate Level Training in anaesthesia. Trainee anaesthetists must be of appropriate seniority to be able to benefit from this area of training, i.e. specialist trainee year 3 or above.

4.2 Anaesthetists intending to undertake anaesthesia for cardiac or thoracic surgery should have received background training to higher level in adult intensive care, adult cardiac and/or thoracic anaesthesia in recognised training centres as part of general training.

4.3 An anaesthetist training in cardiothoracic anaesthesia should be supervised at all times by an appropriately trained consultant, and should not normally be expected to supervise other trainees in theatre.

4.4 The number of centres which perform thoracic surgery is decreasing. It is therefore essential that the training opportunities for anaesthetists, nursing staff, physiotherapists and other staff are used to the maximum and that teaching and training in thoracic anaesthesia are given a high priority.

5 Organisation and administration

5.1 Perfusion services must be included in a medical directorate or equivalent, under the managerial control of an NHS consultant who may be a consultant anaesthetist.

5.2 Clinical protocols can be developed from national guidelines and reviewed on a regular basis.

6 Research and audit

6.1 Most research in thoracic anaesthesia will be done in specialist thoracic units and must therefore be given high priority.

6.2 Regular clinical audit of the work of cardiac units and cardiac anaesthesia is essential.

7 Patient information

7.1 Booklets providing information for patients about their stay in hospital should be available for all patients. This will include the patient information booklets published by the British Heart Foundation on cardiac disease, prevention, treatment and lifestyle modification and information on the anaesthetic.

7.2 Information about cardiac rehabilitation generally, and information regarding the availability of such courses locally, should also be available.
References


Guidance on the provision of Anaesthetic Care in the Non-Theatre Environment

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. Adequate funding for anaesthetic services outside the theatre environment is essential for patient safety.

Summary

- Anaesthetic services in the non-theatre environment include life support and resuscitation as well as the provision of sedation and anaesthesia for patients in the intensive care unit, radiology department, emergency department (ED), endoscopy, and for those undergoing cardioversion, electroconvulsive therapy (ECT), or intra- and inter-hospital transfer during critical illness.

- The risks associated with anaesthesia in the non-theatre environment should be minimised by proper planning and anaesthetic service provision.

- There should be a named lead anaesthetist responsible for each of the principal services provided outside the main operating theatres.

- Monitoring and anaesthetic equipment should comply with the national standards stipulated for use in operating theatres. This should include the routine use of capnography in any situation where anaesthesia is to be induced.

- Where general anaesthesia is provided, skilled and dedicated assistance for the anaesthetist is essential.

- An appropriate location for the post-anaesthesia recovery of the patient must be identified.

- Inter- or intra-hospital transport of the unconscious or anaesthetised patient should meet published standards. Emergency and critically ill patients must be resuscitated and stabilised before transfer.

- Regular audit should be performed of anaesthesia or sedation in the non-theatre environment for quality assurance.

Introduction: the importance of anaesthetic services in the non-theatre environment

- The demand for anaesthetic expertise outside the operating theatre is increasing. The complexity and diversity of the cases have also increased as interventional radiological procedures replace major surgical procedures such as open subarachnoid aneurysm repair (coiling) and open aortic aneurysm repair (endovascular aneurysm repair [EVAR]).

- Many of the procedures are undertaken in geographically remote locations, e.g. ECT in isolated psychiatric units. All environments require appropriate staffing levels, skill mix and facilities.

- A wide range of services require anaesthetic support outside the operating theatre. The most common areas are:
The Royal College of Anaesthetists
Guidelines for the Provision of Anaesthetic Services

Chapter 18
Anaesthetic Care in the Non-Theatre Environment, revised 2011

1.3 If patients are cared for in an isolated/single specialty unit, there must be appropriate medical cover and nursing care.

1.4 If patients are recovering from anaesthesia or sedation in an isolated unit, they should receive care to the same standard as that required in an operating theatre post-anaesthetic care unit (PACU). For major procedures such as endovascular aneurysm repair (EVAR), which may require prolonged recovery, this may mean transferring the patient to the main PACU in the hospital.

1.5 Where anaesthesia or sedation is carried out frequently, a named consultant anaesthetist should be involved in developing the service, helping with training and revalidation of staff, ensuring safety standards are met and that appropriate audit is performed.

2 Equipment, support services and facilities

2.1 Any environment in which patients receive anaesthesia or sedation must have full facilities for resuscitation available including: a defibrillator, suction, oxygen, airway devices and a means of providing ventilation. All patient trolleys should be capable of being tipped into the head down position.

2.2 The anaesthetist must ensure that an adequate supply of oxygen is available before starting any procedure. Many of the sites where anaesthesia is provided outside the main operating theatres do not have piped oxygen. Where piped oxygen is used back-up cylinders must be available.

2.3 Ideally, anaesthetic equipment should be standardised throughout the hospital. Remote anaesthesia locations have often suffered from having old equipment not in use elsewhere. This is not acceptable and must be avoided if at all possible.

Drugs

2.4 Wherever anaesthesia or sedation is undertaken a full range of emergency drugs, including specific reversal agents such as naloxone and flumazenil, must be available. In remote locations where anaesthesia is undertaken drugs to treat rare situations, such as dantrolene for malignant hyperpyrexia, should be immediately available. Emergency drug stores, and individual drugs retained for rare events, should be subject to regular check of expiry date.
Environment

2.5 Many remote locations are not designed specifically for the management of anaesthetised patients. There may be radiological equipment that makes access to, or visualisation of, the patient difficult. The room may be darkened to provide optimal image viewing, but render direct observation of the patient difficult. Many of the tables on which radiological procedures are undertaken do not tip. Equipment arms may move around the patient with the risk of dislodgement of airway tubing, lines and monitoring equipment. The environment may be deliberately cooled to provide optimal operating conditions for equipment or operators, posing a particular problem when managing paediatric patients. The anaesthetist must consider all these factors when planning anaesthesia. Simple solutions to be considered include the availability of a torch to record notes and observe the patient, the provision of warming equipment for all patients, and transport incubators for babies.

Safety

2.6 There are environmental hazards for staff such as radiation exposure, MR fields and lack of scavenging. Pregnant personnel may be particularly at risk in these environments and should follow local occupational health policy. All staff should complete a screening questionnaire before entering the magnetic field of an MR system.

2.7 In remote off-site locations, such as psychiatric hospitals where anaesthesia is provided for ECT, advanced plans should be made to manage patient transfer if required.

Pre-admission assessment

Guidelines and protocols. Many patients having elective procedures outside the operating theatre can be managed as day cases and should be assessed accordingly in conjunction with local guidelines. More complex patients require assessment to at least the same standard as that required for surgery. If there is any concern about the safety of the procedure being undertaken at a remote location, e.g. ECT in a psychiatric hospital, then arrangements should be made to perform the procedure in an operating theatre environment.

The emergency department

3.2 Patients requiring anaesthesia in the emergency department are frequently critically ill or injured, and may be in extremis. Their physiological derangement and sensitivity to anaesthetic agents, coupled with the potential for increased difficulty in tracheal intubation, requires the presence of an anaesthetist with the competence to manage these challenges in a timely and effective manner. NCEPOD commented in their 2007 report that patient care for critically ill and injured patients may be compromised by inexperienced doctors providing anaesthesia, compounded by a lack of trained assistance, inadequate supervision and problems with availability of drugs and equipment.

The College of Emergency Medicine recognises that emergency physicians should have the requisite skills to manage an airway in the first 30 minutes of admission. Many emergency patients are managed with rapid sequence induction by emergency physicians most of whom are senior doctors. This procedure should only be undertaken by doctors with adequate training and experience in anaesthetic agents and airway management. The safe management of these vulnerable patients depends on close liaison between emergency physicians and anaesthetists to ensure that clear guidelines are in place, and that audit and discussion of complications are undertaken regularly. A designated consultant anaesthetist should be responsible for ensuring that services meet the recommendations laid out in this and other guidelines.

Failed intubation is more common in the emergency department. There should be a particular focus on the availability of difficult intubation equipment, capnography and training for the management of the emergency airway.
As airway management in the ED can be particularly challenging, skilled assistance should be provided. This may require innovative staffing solutions such as training ED nurses to assist with intubation.

Hospitals need to ensure that their anaesthesia and/or intensive care services are staffed to a level which allows them to respond in a timely manner to care for emergency patients in the ED. The RCoA Audit guidelines make recommendations about response times for anaesthetists to the ED. Local response times should be audited and standards set.

Other considerations for the management of the critically ill patient in the ED are:

- the ability of equipment to warm or cool rapid infusions of fluid or blood
- the easy availability of a blood gas analyser to monitor arterial blood gases in the emergency department
- many of these patients will require transfer within the hospital to ICU, radiology or the operating theatre. A tipping transfer trolley equipped with a portable defibrillator, oxygen cylinders, suction, a transport ventilator, infusion pumps and monitoring with adequate battery life should be readily available and checked regularly
- documentation, to the standard used in the operating theatre, should be kept for all cases and this should include the grade and specialty of the doctor performing and supervising the anaesthetic.

The radiology department

3.3 The frequency with which complex procedures are carried out in the radiology department is increasing. Patients requiring general anaesthesia in the radiology department may have life-threatening conditions. The radiology department represents a more difficult environment in which to give an anaesthetic than an operating theatre. Staff should be aware of the environmental challenges, and exposure to ionising radiation should be kept to a minimum by the use of screens or lead gowns; staff should remain as distant from the patient as possible if they must remain in the X-ray environment.

Patients who are moved from the emergency department for investigation must be stable before transfer. The anaesthetist accompanying the patient must be senior enough to manage all eventualities in an isolated environment and should be accompanied by appropriately trained staff.

Equipment for induction, maintenance and emergence from routine general anaesthesia should be available at all times and of similar quality to that available in the operating theatre. Radiology tables do not tilt into a head down position. The patient may therefore require induction, or emergence from anaesthesia on a tipping trolley.

Trainee anaesthetists must be familiarised with equipment and the location of resuscitation devices in the radiology department, as part of their induction to a new hospital; they will frequently be the anaesthetist accompanying patients for emergency scans.

MRI. Guidelines are available for the management of patients in the Magnetic Resonance Suite. Essential points to be considered are:

- anaesthetic equipment that is used in the MRI scanning room must be MR compatible
- remote monitoring of the patient is essential to allow the anaesthetic team to monitor the patient from outside the magnetic field
- particular consideration must be given to the problems of using infusion pumps. All non-essential pumps and equipment must be removed from the patient before entering the magnetic field
- all staff taking a patient to MR should understand the unique problems caused by monitoring and anaesthetic equipment in this environment. It is not acceptable for inexperienced staff unfamiliar with the MR environment to escort or manage a patient here, particularly out of hours
- the patient and all staff should have an MR safety and exclusion questionnaire completed before entering the magnetic field
- in the event of an adverse incident in the MRI scanning room, the patient should be removed from the scanning room without delay; immediate access to an anaesthetic preparation room or resuscitation area is essential.

Interventional radiology

If a radiology department provides an emergency interventional service for which general anaesthesia may be required, plans for staffing this anaesthetic service should be made, particularly outside normal working hours. Procedure specific agents, such as those required to manipulate coagulation, intracranial pressure and arterial blood flow, should be immediately available. Interventional vascular radiology may involve treating unstable patients with severe
Anaesthesia for electroconvulsive therapy (ECT)

3.4 Anaesthesia provided for ECT is frequently performed in remote locations and its conduct may directly influence the efficacy of treatment. It should therefore be conducted by at least a post-fellowship trainee. The unit should have been assessed and accredited by the ECT Accreditation Service (ECTAS). Anaesthetists must have a specialised knowledge of the effect of concurrent medication, anaesthetic agents and anaesthetic techniques on the conduct and efficacy of ECT, as well as the specific anaesthetic contraindications.

There must be a named consultant responsible for provision of the service in each anaesthetic department, and a consultant must be responsible for determining the optimal location for provision of anaesthesia for patients of ASA III or above. Contingency plans for transfer to an acute facility must also be in place.

Minimum standards specific to ECT include the provision of a treatment room and a recovery room. Whilst an anaesthetic machine may not be required, there must be a flow-controlled oxygen supply, either by pipeline or cylinder with a reserve supply immediately available. Equipment for managing the airway, including the difficult airway, emergency drugs and resuscitation equipment must all be available. Standards for monitoring and recovery are stipulated by the AAGBI and must be adhered to for all ECT cases.

It is recommended that patients refrain from driving for 24 hours after anaesthesia. However, the DVLA has recommended that patients should cease to drive during the acute phase of a severe psychiatric illness because of significant cognitive impairment. This includes patients receiving a course of ECT.

Anaesthesia for direct durrent (DC) cardioversion

3.5 Patients requiring DC cardioversion may present as emergency or elective cases. The disturbance of physiological rhythm, the reduction in cardiac performance and the risk of embolic phenomena all place these patients at risk of serious complications when undergoing both anaesthesia and DC shock.

Precautions prior to embarking on DC cardioversion should include the immediate availability of emergency anaesthetic drugs, resuscitation and external pacing equipment. Resuscitation equipment should be checked prior to induction of anaesthesia. Recent serum electrolytes, in particular potassium and preferably magnesium, as well as the patient’s anticoagulation status and a recent ECG should all be checked prior to embarking on anaesthesia. A pre-procedure cardiac echo is likely to provide useful information.

The optimal anaesthetic technique is undergoing review and results from the Cochrane group are still pending at time of writing. Current evidence would indicate prolonged recovery times and post-procedural confusion following the use of midazolam and diazepam.

The anaesthetist should not be responsible for cardioversion; an appropriately trained physician, cardiologist or nurse specialist is responsible for this role.

Anaesthesia for radiotherapy

3.6 Anaesthesia may be required for radiotherapy to facilitate patient positioning and to alleviate pain. Due to the unique nature of the procedures involved in radiotherapy, the remoteness of the location and the lack of direct access to the patient, only anaesthetists familiar with the therapy should embark on anaesthesia for these patients. A service must be familiar with the adverse effects of high concentrations of oxygen in the presence of some antineoplastic agents and adjust their technique accordingly. Facilities for recovering patients may be unavailable so either the anaesthetist must be available until the patient is fully recovered, or transfer to the main theatre recovery area should be organised. Tumours of the lower body may be amenable to regional anaesthesia and so equipment and facilities to instigate, monitor and manage regional blockade must be available.

Paediatric cases warrant the presence of an experienced paediatric anaesthetist.

General anaesthesia and sedation for dental procedures

3.7 General anaesthesia for dentistry must only be administered by anaesthetists in a hospital setting; this stipulation resulted from a DoH report.
Gastrointestinal endoscopy

3.8 Many of the initial concerns relating to the safety of patients receiving sedation and anaesthesia outside operating theatres related to gastrointestinal endoscopy. Despite marked improvements in procedures, this is still a high risk area; the British Society of Gastroenterology states that there is no room for complacency. Half of the claims from the American Society of Anesthesiologists Closed Claims database (1970–2001) relating to sedation outside the operating theatre, stem from procedures performed within the gastrointestinal suite. The causative mechanism of patient insult was inadequate oxygenation or ventilation. Anaesthetists are not usually involved in the routine sedation of patients for endoscopy; indeed, many centres now use nurse sedationists. The British Society of Gastroenterology guidelines should be followed. Anaesthetic involvement may be requested for high-risk patients including those having a major GI bleed. In these circumstances, full general anaesthesia with rapid sequence induction and intubation in an operating theatre may be the safest option.

References


