Epidural analgesia is highly effective for controlling acute postoperative and trauma pain. The combination of excellent pain relief associated with minimal side effects provides high patient satisfaction when compared with other methods of analgesia. Epidurals can, however, cause serious, potentially life threatening complications and the safe, effective management of this type of intervention requires a coordinated multidisciplinary team approach (Royal College of Anaesthetists (RCA) and Association of Anaesthetists of Great Britain and Ireland (AAGBI), 2004).

Each member of the pain team must act in accordance with their own professional code and they must also follow local and national guidelines. The aim of this chapter is to outline individual specific responsibilities in relation to epidural analgesia.
RESPONSIBILITIES OF THE ANAESTHETIST

RESPONSIBILITIES FOR THE ACUTE PAIN SERVICE

Following the publication of the joint report of the Royal Colleges of Surgeons and Anaesthetists (1990) many trusts have developed acute pain services in a bid to improve pain management for patients. This can be achieved through the implementation of ward based technical delivery systems such as epidural infusions (Bibby, 2001).

The development of an epidural service is predominantly anaesthesia led with the majority of research evidence on this subject emanating from anaesthetists. There should be a named consultant anaesthetist with a specific interest in pain management responsible for the supervision of the acute pain service within each hospital. He or she should have dedicated sessions allocated in order to carry out responsibilities which will include the provision of technical expert support and to review and synthesise current evidence into clinical practice. It is also necessary for the consultant to work closely with the clinical nurse specialist(s) (CNS) to develop and introduce clear protocols and guidelines to support an epidural ward based service.

ASSESSMENT OF PATIENT SUITABILITY FOR EPIDURAL ANALGESIA

The decision to provide epidural analgesia postoperatively is made by an anaesthetist with the patient’s consent (see Chapter 2 for further information). The anaesthetist is uniquely qualified to assess the patient for regional analgesia and, while other professional groups may also be involved, it is the anaesthetist who provides the framework for practice.

Appropriate preoperative management of the patient is as important as postoperative monitoring. A detailed history and physical assessment is vital as preoperative preparation is one of the keys to success with regional anaesthesia and analgesia. The objectives of the anaesthetists, in relation to epidural patient selection, according to the Association of Anaesthetists of Great Britain and Ireland guidelines on preoperative assessment (2001), are to identify potential difficulties and existing medical conditions, and to improve safety by assessing and quantifying risk and by allowing planning of perioperative care.

It is also necessary for the anaesthetists to provide the patients with a careful explanation about the procedure (Chapter 3) which will aid the patient’s cooperation making technical performance of epidural catheter insertion easier. The anaesthetists must provide the patient with an opportunity for explanation and discussion in order to allay fears and anxieties. Explanation is important as the Association of Anaesthetists of Great Britain and Ireland (2001)
suggests that for a patient to wake up with an epidural in place that he or she has little or any understanding of comes as a surprise that may alarm the patient.

The anaesthetist’s preoperative visit to the patient not only gives the opportunity for the assessment to take place; it also creates an environment of trust and confidence and allows a relationship between the patient and the anaesthetist to develop prior to their meeting in theatre.

INTRODUCTION AND MAINTENANCE OF THE EPIDURAL INFUSION

The anaesthetist has ultimate responsibility for introduction of the catheter into the epidural space under strict aseptic conditions (Chapter 3). He or she also has responsibility for prescribing an appropriate dosing regimen for both the initiation and continuation of the epidural infusion (Chapter 4). Alongside this prescription there should be balanced analgesia, a suitable antiemetic agent and the opioid antagonist naloxone prescribed on the patient’s medication chart.

The anaesthetists should be involved in the decision making process regarding the appropriateness of discharging a patient with an epidural infusion in place from recovery back to a designated ward area. Often day-to-day review and management of the patient receiving an epidural infusion, after they have left recovery, is passed to the CNS (RCA and AAGBI, 2004).

SUPERVISION OF JUNIOR ANAESTHETIC STAFF

Ultimate responsibility for an epidural infusion must remain with the individual anaesthetist who instituted it, except in the case of trainees where the supervising consultant is accountable.

Doctors in training must possess defined competencies before performing epidural catheter insertions and establishing infusions without the direct supervision of a consultant or senior colleague (RCA and AAGBI, 2004). (Additional competencies are required when dealing with paediatric cases.) All required competencies are defined in the training manuals available from the RCA website (www.rcoa.ac.uk).

24 HOUR CONTINUING RESPONSIBILITY

In every hospital where an epidural service exists there should be 24 hour access to an anaesthetist for advice regarding the management of continuous epidural analgesia and its potentially serious associated side effects.
RECORD KEEPING

Anaesthetists are required to keep clear, accurate, legible and contemporaneous patients’ records that report relevant clinical findings, decisions made, information given to patients and drugs prescribed (RCA and AAGBI, 2002). Accurate documentation enables the patient to receive effective continuing care because any member of the multidisciplinary team is able to assume care of the patient at any time with accurate up-to-date information available.

RESPONSIBILITIES OF THE SPECIALIST NURSE IN ACUTE PAIN MANAGEMENT

Following the joint report of the Royal College of Anaesthetists and the Royal College of Surgeons (1990), which highlighted the need for improving standards of postoperative pain management, a proliferation of ‘acute pain teams’ has arisen. This multidisciplinary pain management team, as part of its role, should oversee the delivery of epidural infusions throughout the hospital.

The team should include a clinical nurse specialist (CNS) with specific training and skills in the supervision of epidural infusions (Pain Society 2003). The CNS should be working at, or aspiring to work at, a higher level of practice in the field of acute pain management according to the recommendations for nursing practice in pain management set out by the Pain Society (2003). It is essential that the CNS has a thorough knowledge of:

• the physiology of pain;
• the anatomy of the epidural space;
• the epidural catheter insertion technique;
• the pharmacodynamics and pharmacokinetics of the drugs used in the epidural infusion;
• the delivery device and other equipment used to deliver an epidural infusion;
• the side effects associated with epidural infusion including their recognition and treatment.

ACCOUNTABILITY

Clinical nurse specialists as registered nurses who are accountable for their practice must always act in a manner that promotes and safeguards the interests and well being of patients receiving epidural analgesia. The CNS must also ensure that no action or omission regarding management of epidural infusions is detrimental to the interests, condition or safety of patients. He or she should maintain and improve professional knowledge and competence regarding
regional analgesia and acknowledge any limitations in knowledge and/or competence. The CNS has an obligation to decline duties relating to epidural management unless able to perform them in a safe and skilled manner (Nursing and Midwifery Council (NMC), 2004). Competence is described by the NMC (2004) as possessing the skills and abilities required for lawful, safe and effective professional practice without direct supervision.

INFORMATION GIVING

The nurse specialist should be available preoperatively to provide both verbal and written information to patients in a bid to reduce anxiety and pain (Audit Commission, 1998). The material should be accurate, truthful and presented in a way that may be easily understood by patients and in a format appropriate to meet their individual needs (NMC, 2004). An example of useful patient documentation is the RCA and AAGBI (2004) booklet entitled *Epidurals for Pain Relief after Surgery* which can be downloaded from the internet at www.youranaesthetic.info (see Figure 1.1).

Being prepared will help put patients in control and enable them to make informed choices regarding epidural analgesia. The CNS and other members of the multidisciplinary pain management team must remember that it is important to be sensitive to patients’ needs and to respect the wishes of those who refuse information (NMC, 2004).

CONFIDENTIALITY

The CNS along with all members of the multidisciplinary pain management team must treat all information about patients as confidential and use it only for the purposes for which it was given. Breaches or improper disclosure of confidential information must be guarded against at all times (NMC, 2004).

CLINICAL ROLE

The CNS has a key clinical role within the pain team for providing evidence based epidural care. His or her responsibilities include at least once daily visits to each patient receiving an epidural infusion in order to assess efficacy in conjunction with the patient and the ward staff. To achieve this there must be documented evidence of an appropriate pain assessment tool in existence, i.e. a verbal or numerical rating scale (Chapter 8). The pain assessment should be performed regularly using the designated tool and scores obtained must be documented on an appropriate monitoring chart. If the patient complains of pain the epidural should be checked to ensure that the infusion is in progress and that the catheter has not become disconnected or dislodged.
If there is a technical problem with the infusion device or other equipment the CNS should rectify this (Chapter 10). If the equipment is working well but the patient continues to complain of pain, a dermatomal block test should be performed (Chapter 3). If there is insufficient block provided by the infusion, the anaesthetist should be contacted and a prescription obtained for the infusion rate to be adjusted and/or for a bolus dose of epidural solution to be administered via the epidural catheter to the patient. Bolus administration should be undertaken as per the local protocol and with strict monitoring in place (Chapter 10).

Figure 1.1. Royal College of Anaesthetists patient information booklet *Epidurals for Pain Relief after Surgery*. (Reproduced by permission of the Royal College of Anaesthetists.)
It is also important to ensure that adjuvant analgesia is prescribed (Chapter 4), as outlined in the World Health Organisation analgesic ladder, and administered appropriately. It may be necessary to give advice to ward doctors and nurses regarding the importance of regular administration of balanced analgesia alongside the epidural infusion.

The CNS should also assess and advise on the management of any adverse drug reactions or other side effects attributed to the epidural infusion. The charts should be reviewed and the patient questioned in order to establish if the patient has suffered from over-sedation, reduced respiratory function, hypotension, nausea and vomiting, hallucinations, headache, urinary retention, increased motor block or any other associated drug side effects. If any of these problems exists appropriate remedial action must be taken to ensure the patient’s safety and comfort (Chapter 10).

The insertion site of the epidural catheter should also be checked for any signs of infection; if there is any redness, swelling or pus evident at the site or if the patient has a pyrexia of unknown origin the epidural infusion should be stopped. The catheter should then be removed as soon as is appropriate (Chapter 9) and the tip of the catheter sent for culture and sensitivity. If necessary, dependent on the laboratory reports, the patient may need a course of appropriate antibiotics.

The CNS should also keep appropriate written records and liaise and work co-operatively with other members of the healthcare team respecting the skills, expertise and contributions of colleagues (NMC, 2004).

**RECORD KEEPING**

The CNS has a responsibility for record keeping which helps to protect the welfare of patients by promoting:

- high standards of clinical care;
- continuity of care;
- better communication and dissemination of information between members of the interprofessional healthcare team;
- an accurate account of treatment and care planning and delivery;
- the ability to detect problems such as changes in the patient’s condition at an early stage (NMC, 2005).

The quality of the records kept reflects the standard of professional practice, therefore good records are the sign of a skilled and safe practitioner. The CNS should keep pain service records for each patient to allow tracking of caseload; they should also make appropriate entries into the multidisciplinary case notes held on the ward or department where the patient is being cared for. The documentation should be legible, factual, consistent and accurate.
They should be written at the time of reviewing the patient or as soon afterwards as possible. Each entry must be signed, dated and timed. Writing should be clear and any alterations, deletions or additions should also be signed with the date and time entered. Abbreviations, jargon, speculation and offensive subjective statements should be avoided (NMC, 2005).

Information technology is being increasingly used within health care as a method of storing patient data. This system has the advantages that notes are easier to read and less bulky; duplication is reduced and access and communication increased across the interprofessional healthcare team. The CNS is professionally accountable for making sure that the system used is robust and secure; the basic principle for computerised records is guided by the Data Protection Act.

The period for which dedicated pain service patient records should be kept will depend on legislation and health service policy statements issued by the Department of Health. Local protocols will provide specific information, but records should be kept for at least eight years for adults and in the case of children at least until the date of their 21st birthday (NMC, 2005).

COMMUNICATION

The CNS is responsible to ensure that effective written and verbal communication within the healthcare team takes place. Good communication allows knowledge, skills and expertise to be shared with other members of the multidisciplinary healthcare team (NMC, 2004).

EDUCATION AND TRAINING

To practise competently the CNS must possess the knowledge, skills, abilities and competence required for lawful, safe and effective practice without direct supervision. The CNS should acknowledge the limits of professional competence and only undertake practice and accept responsibilities for those activities in which he or she is competent. If an aspect of practice is beyond the individual’s level of competence or training he or she should obtain help and supervision from a competent practitioner until appropriate knowledge and skills have been acquired (NMC, 2004).

Improvements in epidural education have led to improved pain relief for patients; the CNS is ideally positioned to influence nursing practice relating to epidural management. The CNS is responsible for supporting and teaching pre- and post-registration ward nurses to enable them to provide evidence based pain management for all patients receiving epidural analgesia within their care. They are also responsible for providing education to unqualified nurses who provide general care for patients receiving epidural analgesia.
Finally, the CNS has a responsibility for the education of house officers (and other grades) employed within the anaesthetic department. There should be a formal induction course for those clinicians responsible for supervising patients receiving continuous epidural analgesia.

Education should encompass the theoretical side of epidural management including physiology of pain and pharmacology of epidural drugs and competency based training surrounding safe and effective use of the drug delivery devices (Chapter 11). Additional arrangements for education must be put in place where changes are made to the protocols, equipment or drugs used within the epidural service.

It is essential that the CNS works in collaboration with the training and development department within the trust when devising education and training programmes.

DEVELOPMENT OF A LINK NURSE SCHEME

Development of a link nurse scheme is a useful way of increasing the success of the partnership between the pain team and ward based staff. Link nurses have been recognised as playing a part in improving and maintaining the quality of patient care by disseminating information and research based practice from the pain team to the ward area.

AUDIT AND RESEARCH

The CNS has a responsibility for promoting the participation of acute pain services in local and national audits of epidural analgesia (for further information see Chapter 12). Audit forms part of the process for ensuring that a quality epidural service is being delivered and should examine adherence to monitoring standards, effectiveness of epidural infusions, side effect profiles and other epidural related issues such as patient satisfaction. Examples of appropriate audits are given by the RCA in the audit recipe book (2002). Audit tools should be devised at a local level and care monitored against preset standards. Results of local audits should be disseminated to the anaesthetists and also to ward nursing staff (Chapter 12).

Clinical nurse specialists should actively participate in research projects relating to epidural analgesia and should be involved in maintaining and developing strong links with research institutions. The CNS may also initiate research projects or contribute to departmental projects.

It is vital that the CNS reviews current literature and disseminates this information to ward and departmental nursing staff. CNSs are in a key position to help reduce the perceived theory–practice gap. Practice should be reviewed
regularly in light of new research findings and changes made to protocols and practice where appropriate.

MANAGERIAL

The CNS has a responsibility, in association with the consultant anaesthetist, to develop standards of care for epidural practice, local guidelines and protocols in order to maintain a safe environment for the patient. Such protocols, according to the RCA and AAGBI (2004), should describe:

- overall management of patient with epidural infusions;
- instructions for the use of the pump and for troubleshooting;
- description of the drug concentrations used in the hospital;
- instructions for changing epidural solution bags/syringes;
- frequency of observations;
- identification and management of complications;
- management of inadequate analgesia;
- management of accidental catheter disconnection;
- instructions for removal of the epidural catheter;
- management of patients receiving anticoagulants.

Patients receiving epidural infusions must be nursed in a setting which allows close supervision of the patient by appropriately trained staff and where oxygen and resuscitation equipment is available (RCA and AAGBI, 2004). It is the responsibility of the CNS to ensure that these conditions are met.

The CNS also has a responsibility to write business plans in order to ensure continued development of the epidural service in line with changing evidence based practice. Business planning is a continuous process that must be regularly updated; it helps providers to determine local need and commissioners to allocate appropriate funding to secure necessary equipment or staffing in order to sustain or develop the service.

The business case document should put forward the purpose of the epidural service (or a specific part of it) and a vision for the future. It is often useful to start with a SWOT (strengths, weaknesses, opportunities and threats) analysis, which will help to show priorities for the service. The business plan should outline broad aims and objectives, a description of the service at present and of the service required. It should provide information about those people at whom the service is targeted and all of the intended changes will need to be documented. Financial planning is crucial with targets highlighted for income and expenditure. Quality standards should be set along with a plan for staff development to meet the proposed standards. Finally, details of a proposed audit programme to measure standards should be defined.
Although every pain service is different the principles that underpin all epidural services are similar. It is important to include everyone in the business planning who has a stake in the service including existing colleagues, clinicians, professionals allied to medicine, administrative staff, managerial staff, carers and users. Also any external agencies such as appropriate patient groups and local commissioners.

**RESPONSIBILITIES OF THE ANAESTHETIC/RECOVERY NURSE**

The anaesthetic and/or recovery nurse has exactly the same responsibilities as those outlined in the next section entitled ‘Responsibilities of the registered nurse’. In addition to this he or she is also responsible for maintaining up-to-date records of the patients currently receiving epidural analgesia, the pump being used (i.e. device identification numbers) and the ward area where the patients are residing.

The recovery nurse also has a responsibility to ensure that prior to leaving recovery the patient with an epidural infusion, who has also undergone a general anaesthetic, should be conscious with return of reflexes and should be able to maintain his or her own airway. The respiratory rate and pattern should be adequate, with no concerns regarding central and peripheral perfusion. The patient’s blood pressure, pulse and oxygen saturations should have returned to preoperative levels and be stable and adequate analgesia should have been achieved. Attention should be directed to the effects of any residual motor blockage following regional anaesthesia.

The recovery staff should hand over their patient to the ward nurse or escort nurse with all relevant documentation and the patient should be transported back to the ward area with oxygen, suction and monitoring equipment appropriate to the patient’s condition.

**RESPONSIBILITIES OF THE REGISTERED NURSE**

It is the responsibility of every qualified nurse to maintain individual professional knowledge and competence appropriate to the level at which they are practising (NMC, 2004). Epidural infusions should only be utilised in ward areas where they are frequently used so that nurse expertise and patient safety can be maintained (RCA and AAGBI, 2004). Patients receiving continuous epidural analgesia must always (24 hours per day) be under the direct supervision of a nurse or nurses trained in the management of continuous epidural analgesia who are able to be with the patient within seconds of being summoned. If an aspect of practice is beyond the individual’s level of competence
he or she should obtain help and supervision from the pain team CNS or anaesthetist. The nurse should be aware of contact numbers that can be used to call the pain team CNS or anaesthetist at any time, day or night, for advice regarding epidurals.

The registered nurse should work within local protocols, procedures and guidelines relating to epidural analgesia practice. If at any time these guidance documents cannot be adhered to, the nurse should inform his or her direct line manager outlining the problems.

The nurse has a responsibility to monitor patients receiving epidural analgesia recording the observations set out in Chapter 8. At least two-hourly recordings of temperature, blood pressure, pulse, respiratory rate, sedation scoring and motor block should take place. In order to undertake effective monitoring nurses should receive appropriate education to understand nociceptive pain pathways, the anatomy of the epidural space and catheter insertion techniques. They also need teaching relating to the pharmacology of opioids and local anaesthetics and management of associated adverse drug reactions.

Registered nurses should provide documented evidence of regular pain scoring using an appropriate tool. Documented evidence that any failure of analgesia has been acted upon should also be recorded. The nurse should also ensure balanced analgesia has been prescribed and administer it appropriately.

As well as these observations, pump monitoring should be undertaken ensuring that the device is delivering the correct drugs to the correct patient in the correct doses. This information should be documented on an appropriate dedicated monitoring chart. In order to manipulate the device to check the infusion rates, etc., nurses should undergo specific competency based training on the device being used (Chapter 11).

The registered nurse has a responsibility to check the epidural catheter site at least once per shift while the infusion is in progress and once per day for 48 hours after the epidural catheter has been removed. This check should be carried out to identify any potential problems with local infection at the epidural site, so vigilance for any signs of redness, swelling, soreness or pus is essential. If infection is suspected the catheter should be removed as soon as possible (Chapter 9), the tip sent for culture and sensitivity, the entry site cleaned and re-dressed and the pain team CNS informed.

Any drug incidents that occur should be documented and reported to the registered nurse’s direct line manager, the pain team and also the pharmacy department. Any faults with technical equipment should be reported to the pain team and the electrical engineering department so that appropriate remedial action can be taken.

Qualified nurses should also be appropriately trained to remove the epidural catheter once the infusion has been discontinued. Specific information relating to catheter removal can be found in Chapter 9.
Issues relating to confidentiality and record keeping (including electronic records) apply in the same way as set out above for the CNS. All information should be treated as confidential and should not be inappropriately disclosed. Patient records should be kept up to date, with accurate and complete entries that are clearly written, timed and dated (NMC, 2005).

Where appropriate, registered nurses should participate in audit programmes and be prepared to participate in change management practice to ensure evidence based best practice is maintained.

**RESPONSIBILITIES OF THE PHARMACIST**

The pharmacist has a specific role within the pain team in relation to epidural infusions. They should be invited to participate actively in the production of prescribing guidelines for epidural analgesic drugs, and the co-prescribing of balanced analgesia, an opioid antagonist and antiemetics. They should also be involved in decisions about patient information leaflets regarding epidural infusions that are distributed to patients preoperatively in a bid to ensure that any pharmacological information is accurate and appropriate.

They should regularly monitor prescriptions of epidural solutions where preprinted prescriptions are not utilised and of adjuvant therapies such as antiemetics and opioid antagonists. It is also helpful if a designated pharmacist attends regular pain team link nurse/pharmacist meetings where results of such monitoring can be discussed.

Pharmacists are best placed to devise policies to ensure safe and legal handling, administration and disposal of the controlled drugs utilised within epidural infusions. They should advise on storage arrangements that ensure that the drugs required are purchased and distributed to the designated storage areas of the hospital for the epidural service to run smoothly. They must ensure that if epidural solution is made up in the local pharmacy area of the hospital (rather than being bought from an external supplier) it is prepared aseptically and appropriately labelled and stored within the department.

Consistency of advice and information regarding epidural infusions is essential; the pharmacist plays a pivotal role in communication to pain team, ward nurses and medical staff.

**RESPONSIBILITIES OF THE ELECTROBIOMEDICAL ENGINEERING DEPARTMENT**

The electrobiomedical engineering (EBME) department is an essential support for an epidural service. Engineers along with members of the pain team and procurement department should be involved in choosing appropriate
pump devices to deliver the epidural infusions (for further information see Chapter 5). The equipment chosen should ensure safe and effective utilisation of epidural infusions with the following safety mechanisms: programming in millilitres per hour, rate capping, printable extended history via key stroke logging, locking with restricted access, clear vision of fluids, adjustable pressure limits, bolus administration with restricted access for specialist users and bolus administration by patients. The device chosen should be standardised throughout the institution so that it is familiar to all staff involved in providing or supervising epidural infusions (RCA and AAGBI, 2004). Specific handbooks relating to the device should be available in all areas where the device is used.

The engineering department should configure new pumps with preset parameters for maximum infusion rates and bolus sizes, which should be agreed with the pain team consultant anaesthetist and senior CNS. Pumps should be marked so that it is clear that they should be used exclusively for epidural analgesia and the engineers should be aware of the training programme that is in place for all device users.

There are a number of clear guidance documents that direct the engineering department regarding medical devices including the MDA DB 9801 medical devices and equipment management for hospital and community based organisations, the MDA DB 9801 supplement one which checks and tests for newly delivered medical devices and the Welsh Risk Management Standard 30 Medical equipment and devices.

The engineers are involved in equipment service test procedures or performance verification procedures. The frequency of service can vary between manufacturers and device models, although it is recommended that devices are subject to one annual maintenance service to include a full function and electrical safety test.

If pumps fail, the engineering department should undertake repair work. Formal work instructions follow the manufacturer’s guidance, which is obtained from the manufacturer’s operating and service instruction manuals. Engineers are responsible for all service and repair records, which are retained on an equipment management database.

**RESPONSIBILITIES OF THE HEADS OF NURSING AND CLINICAL MANAGERS**

Pain management is recognised as a subspeciality of anaesthesia, therefore financing and organisation of service developments and delivery are the remit of the anaesthetic business managers (AAGBI and Pain Society, 1997).

Managers should ensure adequate resources are available to provide an epidural analgesia service, i.e. funding for appropriate personnel, devices,
drugs, sterile products, etc. They also have a responsibility to allow adequate study time for nursing and medical staff to attend epidural analgesia education and pump training sessions.

The managers should assist by putting systems in place to promote health and safety awareness of guidelines, protocols and policies, i.e. a local intranet system where appropriate information can be easily accessed at ward level. There should also be a system in place for professional support and advice for the CNS in pain management and the opportunities for clinical supervision to take place.

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