University Hospitals of Leicester NHS
NHS Trust

EPIDURAL ANALGESIA POST OPERATIVE WARD BASED FOR NON OBSTETRIC PATIENTS UHL ANAESTHESIA POLICY

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REVIEW DATES AND DETAILS OF CHANGES MADE DURING THE REVIEW

March 2023

Appendix1. Change, Drug Chart reference to Nerve Centre Corrected spelling mistakes
Page 5 section 3.2 changed wording
Page 7 section b updated access to training/education programme
Page 9 MRSA incidence figures removed
Page 13 Addition of NRFit connection and pump connection must be covered
Page 15 method for prescribing epidurals is on nerve centre
Page 17 Epidural Bags sizes removed and update on strengths of mixed bags
Page 21 Bromage score 0-3 is used at UHL Trust
Page 28 Edoxaban, Dipridamole, Fonduparinux, Unfractionated Heparin, Deltaparin, Enoxaparin has been added to the list of anticoagulants
Page 34 Contact telephone numbers changed in line with UHL telephone number changes
Note: The pump remains the same but the manufacturer has changed so the policy reflects these changes where the pump is mentioned

KEY WORDS

Epidural Analgesia, Non Obstetric Patients, Post operative pain management

Introduction

1.1 This policy supports the safe effective and consistent use of epidurals for postoperative analgesia in adult patients on wards across the University Hospitals of Leicester (UHL) NHS Trust. The aim is to improve quality of patient care, reduce complications and enhance patient satisfaction.

1.2 Epidural analgesia is a method of blocking the nerve roots lying within the epidural space, with the use of local anaesthetic and / or opioids. The epidural space is a cylindrical 'potential' space surrounding the spinal cord and nerve roots, lying outside the dura. It contains fat globules and veins and normally lies 4-5cm below the skin surface. A catheter can be inserted into the epidural space so that drugs administered act on the nerve roots as they exit the spinal column. Epidurals can be given as either a continuous infusion, or as an infusion with patient-controlled boluses; patient-controlled epidural analgesia (PCEA).

1.3 Epidurals provide the most efficacious means of analgesia particularly amongst patients undergoing major surgery, who would otherwise experience more severe post-operative pain. The Joint Colleges Working Party Report 'Pain after Surgery' (1990) supports the use of post-operative epidural analgesia on general wards. Ward staff should undertake specific training, including the use of pain assessment in order to ensure delivery of an efficacious and safe service.

1.4 Epidurals achieve optimal analgesia without the need for high doses of intravenous analgesia and the accompanying side effects. The incidence of poor analgesia using epidurals is as low as 3-7% (Counsel et al 1993). Our own audit data indicate that early pain scores are improved by epidurals and that nausea and vomiting are reduced (compared with IV. PCA). As the drugs used in epidural analgesia can produce their own side effects, patients need specific monitoring. Ward staff and clinicians need knowledge of these effects and their management. An understanding of the equipment used is required.

2 Policy Aims

2.1 The aim of this document is to

a) Provide support and guidance to healthcare professional

b) Standardise clinical practice

c) Ensure quality and safe care with regard to the use of Ward Based Epidural Analgesia

3 Policy Scope

3.1 This Policy applies to Non Obstetric Adult inpatients appropriate for epidural analgesia. This policy excludes obstetric patients; please refer to 'Management of epidural analgesia and accidental dural puncture'

3.2 This policy applies to all health care professionals working in a clinical area where they will be expected to administer epidural analgesia. This policy is supported by the Leicestershire medicine code and the UHL IV drug administration policy, The Trust Reference Number is B25/2010

3.3 This policy applies to all staff who is involved in the insertion and care of Ward-Based Epidural Analgesia for Adult Non-Obstetric Patients including Anaesthetists, Surgical Staff, Nurses, Physiotherapists and Pharmacists

3.4 This policy may also be used by staff in trainee posts, Healthcare Professional students and patients

4 Definitions

4.1 PCEA Patient Controlled Epidural Analgesia

5 Roles and Responsibilities

5.1 CMG Management Team (ITAPS Inpatient Acute Pain Lead Consultant, Lead Nurse, Head of Service, Matrons) are responsible for

a) Ensure their CMG Staff are made aware of and comply with this policy

b) Address any concerns raised regarding practice through their CMG incident reporting systems.

5.2 Healthcare Professional Prescribing Epidural Analgesia (Includes Anaesthetists and Acute Pain Nurse Specialists who are Non-Medical Prescribers) are responsible for

a) Assessing the patient as suitable for Epidural Analgesia

b) Prescribing the use of epidural analgesia on the patients drug chart in line with this Policy

c) Ensuring that the Ward caring for or receiving the patient back from Theatre has suitably trained staff to care for a patient with Epidural Analgesia

5.3 Department Managers and Ward Sisters are responsible for

a) Ensuring all their clinical staff are competent to care for a patient with Epidural Analgesia

5.4 All Healthcare professionals who administer Epidural Analgesia are responsible for:

a) Successfully completing the relevant training and be assessed as competent to administer Epidural analgesia (see section 8)

b) Ensure that they keep up to date with their practice

5.5 Acute Pain Team are responsible for:

a) Provide education and training for all healthcare professionals on all aspects of Ward Based Epidural Analgesia and ensure that information is stored into HELM.

b) Ensure all Epidural analgesia equipment is available for use

c) Monitor all patients on Epidural analgesia for side effects, patient satisfaction

d) Monitor compliance with this policy through audit

e) Manage audit data and provide reports as necessary

f) Provide information to the UHL Acute Pain Operational Group as required.

g) Support CMG's with incident investigation and complaint management

5.6 Role of the Anaesthetist siting the Epidural:

5.6.1 Epidural analgesia should be considered for all appropriate elective and emergency cases. It may be used in combination with a general anaesthetic or as the sole method of anaesthesia for the surgical procedure. Avoiding intraoperative systemic opioid administration allows faster recovery from general anaesthesia.

5.6.2 Epidurals should be inserted by experienced anaesthetists only. Thoracic epidurals should only be inserted by anaesthetists who have good experience of lumbar epidural insertion. Multiple attempts to insert an epidural may be associated with complications, particularly loss of skin asepsis. Senior assistance should be sought if the epidural is difficult or the anaesthetist is inexperienced.

5.6.3 **Patient must be counselled** including the following points:

- Risk of numbness / paraesthesia / motor block.
- Patient may have itching.
- Need for special nursing observations.
- Explanation of bolus and lockout when planning PCEA.
- Pain-relief is usually good, but very occasionally is incomplete despite best efforts.

5.6.4 The anaesthetist must ensure, by speaking to the Ward Sister or nurse in charge, that sufficiently trained staff are available. The availability of trained staff varies between different wards and the different sites.

5.6.5 The epidural should be sited at an **appropriate level** for the intended surgical incision. Correct selection of the vertebral level is essential and is most accurately done by counting down from C7 (Vertebra Prominence)

6 Policy Statements and Procedures

6.1 Verbal Patient Consent must be obtained to be able to set up Epidural analgesia and the checklist completed on the back of the Anaesthetic Chart stating that the complications have been discussed. The Trust Consent Policy Reference is A16/2002

6.2 Advantages of Epidural Analgesia

- Potentially excellent analgesia provided continuously; good patient satisfaction.
- Less likelihood of sedation compared with systemic opioids, including Intravenous Patient Controlled Analgesia (IV PCA) and Intra-Muscular (IM) opioids.
- Patient able to comply with physiotherapy / mobilise.
- Improved respiratory function, and therefore less risk of pulmonary complications.
- Reduced duration of ileus, therefore earlier resumption of oral intake.
- Reduced incidence of thromboembolic complications.
- Reduced 'stress response' to surgery i.e. less catecholamine secretion, less tachycardia, less fluid retention and less hypertension.

6.3 Indications for Epidural Analgesia

- Epidural analgesia should be considered for any surgery involving incision below the nipple, particularly surgery with incision through the upper abdominal wall or thorax where pain is expected to be severe.
- Any surgical procedure where poorly-controlled pain relief could cause detrimental effects
    - Patients with pulmonary disease
    - Patients with ischaemic heart disease.
- Can be used either as a supplement to general anaesthesia or as an alternative to general anaesthesia (severe respiratory disease, susceptibility to malignant hyperthermia, patient choice).
- Facilitation of weaning from the ventilator in ICU in patients with postoperative pain.
- Acute pain resulting from trauma.

6.4 Contraindications to Epidural Analgesia

- Shock / fixed cardiac output.
- Known coagulopathy (see anticoagulant guidelines).
- Skin sepsis at proposed site / *documented* bacteraemia / *documented* viremia.
- Compromised immunity
- Raised intracranial pressure.
- Lack of patient consent despite sympathetic explanation and counselling.
- Lack of appropriately trained nursing staff / monitoring.

Relative contraindications include

- Known allergy to local anaesthetic (choose alternative agents).
- Neurological disease: certain types of neurological disease (e.g. MS and muscular dystrophies) may deteriorate after surgery. A causal link between regional block and exacerbations of such disorders has not been established. The patient should not be denied epidural analgesia but must be informed of the risks. Senior anaesthetic advice must be sought before inserting an epidural in such a patient.
- MRSA: It is possible that MRSA may be present in surgical inpatients, usually as a non-pathogenic colonizing organism, which does not cause problems for the majority of patients. It is more common amongst debilitated immuno-compromised patients with malignancy, however may not be recognised pre surgery. Although it is no more likely to cause an abscess than other organisms its consequences are greater because its antibiotic resistance makes it more difficult to treat. The presence of MRSA colonisation is not a total contraindication to epidural analgesia as long as full aseptic precautions are taken at insertion and during subsequent care. The risk-benefit ratio of siting an epidural should be considered on a case by case basis.

Spinal deformity**:** this makes epidural insertion difficult. Senior anaesthetic advice must be sought before starting an epidural in such a patient.

This policy is supported by the following procedures which must be used in conjunction with this policy:

Procedure	**Appendix**
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7 Education and Training Requirements

7.1 Healthcare Professionals required undertaking the preparation and monitoring of Ward Based Epidural Analgesia must:

a) Hold a valid IV certificate of competence

b) Successfully complete the Trust approved competency based training and assessment programme in the form of Acute Pain Study Day or Pain Management Module 1 Inpatients in Pain and Module 2 Pain After Surgery (via HELM) in conjunction with the Acute Pain Service

7.2 The Acute Pain Management team provides formal competency based training for UHL staff which includes:

- A formal lecture and tutorial session provided on a regular basis by the Pain Management Service. This provides standardised teaching across the trust and enables practice at any of the sites.
- Individual informal teaching is available in the anaesthetic room or I.C.U. / H.D.U. from an anaesthetist; this is arranged with an anaesthetist and will involve seeing an epidural being inserted.
- Seeing and being taught about removal of epidurals.
- Assessment: staff who have undergone training will be formally assessed and judged competent in the care of patients with epidural analgesia.
- Staff who work regular 'bank' shifts on surgical wards are encouraged to undertake training.
- Ward Sisters are responsible for ensuring that sufficient numbers of their staff are trained and assessed, so that epidural-trained nurses are available for every shift.

7.3 Healthcare Professionals new to the Trust or employed through an agency must provide evidence of training and summative practical assessment to practice within this Trust. These Healthcare Professionals must then complete an equipment competency to ensure they are able to use the infusion device.

7.4 Verification of a professional's competence must be kept by the Acute Pain Service / Paediatric Pain Service and within the CMG and transferred accordingly. It will also be recorded on the Clinical Skills Passport on HELM.

8 Process for Monitoring Compliance

8.1

a. Auditing of Epidural analgesia is completed at the patients' bedside after use by the ward nurse who disposes of it using the Epidural Chart.

b. This information is then recorded on a database by the Acute Pain Team.

8.1

c. **Key** performance indicators / audit standards on the Epidural chart are as follows

- Patient Satisfaction
- Analgesic Effectiveness
- Patient observation
- Amount used over the period of time
- Length of time used
- Side effects
    - Nausea and vomiting
    - Hallucinations
    - Hypotension
    - Respiratory Depression
    - Motor Block
    - Fall out rate

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements	Lead(s) for acting on recommendations	Change in practice and lessons to be shared
Epidural Chart(see 8.2 for details)	Acute Pain Nurse Specialist	Audit is incorporated into the charts to check compliance	Charts are monitored on ward rounds. Incidents reported on Datix. Reported shared at Acute Pain Operational Groups	Acute Pain Operational Group (meet every 2-3 months)	Lead Clinician for Acute Pain Team and the Acute Pain Team will raise concerns, issues and share best practice with the CMG Management teams for their action.	Update study sessions, dissemination of information through clinical area management

8.1 Ensure clinical staff are competent to monitor Epidural and hold a valid competency certificate/assessment

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements	Lead(s) for acting on recommendations	Change in practice and lessons to be shared
Competency Assessments for all users	Acute Pain Nurse Specialist/ Relevant Clinical Area Managers	Audit is incorporated into HELM to check for compliance after the acute pain study day	The registers from the Acute Pain Study Day to be monitored against HELM every six months to monitor compliance	Senior Acute Pain Nurse Specialist to liaise with relevant Clinical Area Managers if issues raised around compliance	Senior Acute Pain Nurse Specialists raise issues with Clinical Area Managers and share best practice with the CMG Management teams for their action.	Update study sessions, dissemination of information through clinical area management

8.3 Lead for this Section:

Acute Pain Team – collect and report on the data to the UHL Acute Pain Operational Group chaired by Lead Clinician for Acute Pain.

Acute Pain Nursing Team to monitor nursing competency through HELM.

9 Equality Impact Assessment

9.1 The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs

9.2 As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

10 Supporting References, Evidence Base and Related Policies

Faculty of Pain Medicine, Royal College of Anaesthetists: Best practice for the management of epidural analgesia in a hospital setting. Royal College of Anaesthetists 2010

National Patient Safety Agency: Safe Practice with epidural infusions and injections. Patient Safety Alert 21. 28 March 2007

Wheatley RG, Schug SA, Watson D. Safety and efficacy of postoperative epidural analgesia. *British Journal of Anaesthesia* 2001; **78:** 47-61

Werner MU, Soholm L, Rotboll-Nielsen P, Kehlet H. Does an Acute Pain Service Improve Postoperative Outcome? *Anaesthesia and Analgesia* 2002; **95:** 1361-1372.

11 PROCESS FOR VERSION CONTROL, DOCUMENT ARCHIVING AND REVIEW

11.1 The Inpatient Pain Operational Group is responsible for the review of this document every three years.

Appendix 1 : Siting the Epidural

The epidural must be sited in an appropriate environment where asepsis can be maintained and where monitoring and skilled assistance are available – in accordance with Association of Anaesthetists of Great Britain and Ireland (AABGI) who also recommend using **full aseptic technique** and an **NRFIt** epidural kit to maximise safety.

The equipment used must be sterile and kept so on a sterile field on a trolley which has been cleaned with chlorclean and allowed to dry.

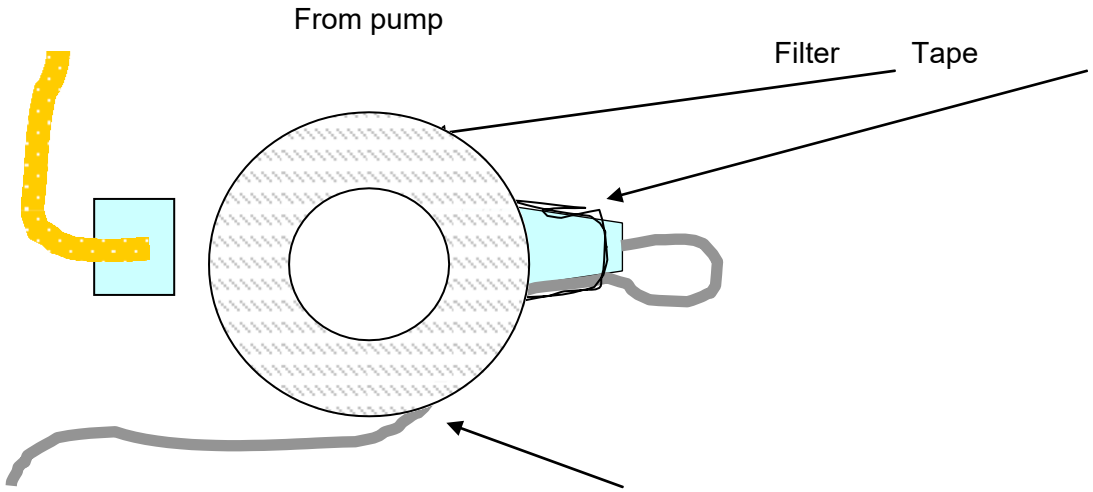
- Full surgical hand wash (with chlorhexidine 4%, povidone iodine 7.5% or Triclosan 2%) for 2 minutes, ensuring that all areas of the hands and wrists are scrubbed paying attention to finger tips, thumbs and wrists. After rinsing thoroughly, dry thoroughly with a sterile towel.
- Gloves, gown, hat and mask
- Preparation of the patient's skin using 0.5% chlorhexidine in 70% alcohol, cleaning in a circular motion from the centre of the site outwards. The skin prep must be allowed to dry for 2 minutes, to allow the alcohol to evaporate and the chlorhexidine to penetrate deeper skin layers.
- Large surgical drape.

Insertion of the epidural catheter makes use of the 'loss of resistance' technique, using a Tuohy needle and syringe. The depth of the epidural space from the skin is identified; this is usually approximately 4 cm from the skin. No more than 4 cm of epidural catheter should be left within the epidural space (leaving a greater length inside is associated with poor or unilateral block or motor block). The catheter can be tunnelled.

Good catheter care is essential to **minimise the risks of infection**. The catheter should be attached to a sterile filter to prevent entry of micro-organisms. A sterile clear occlusive dressing ('Opsite') should cover the epidural insertion site. Sterile 'Steristrips can be used to anchor the epidural catheter, but care should be taken to ensure that the catheter entry site through the skin remains visible under the clear dressing.

'Opsite' spray is inadvisable as the ethyl acetate and acetone that it contains can lead to degradation of the plastic of the catheter. The edges of the occlusive dressing should be taped with 'Mepore' or 'Mefix' to help prevent lifting, and the catheter led and taped over the patient's shoulder to prevent kinking or the patient having to lie on the filter. It is common for epidural catheters to become disconnected at the filter. This problem is reduced by ensuring the catheter and filter is kept to the patient's front. The catheter may be taped to the hub of the filter, to reduce tension if put under strain:

The epidural catheter, filter and pump connection **MUST** be totally covered with a large tegaderm to prevent tampering and fixed over the front in the shoulder region. This **MUST** be situated on the shoulder that is **OPPOSITE** to any neck line. This is to avoid the epidural being confused with any intravenous access in this area.



The epidural catheter or extension tube must be labelled with a sticker saying 'epidural' as **identification**, to ensure that other infusions are not inadvertently connected to the epidural. This is mandatory in accordance with NPSA guidance, and will be monitored. The NPSA also recommend the use of yellow tubing to differentiate epidural lines from all other infusion lines.

The anaesthetist will administer the first drugs via the catheter and monitor the patient appropriately. The anaesthetist should keep the patient under close review until **pain-free and stable**, if necessary administering boluses or changing the infusion rate.

The anaesthetist must **prescribe** the epidural (infusion or PCEA) giving correct details of the drug, route, infusion rate limits, bolus and lockout time on Nerve Centre A Speciality, Surgical, Anaesthetics (Acute Pain) Devises Protocol is set up on Nerve Centre to help prescribing. **Antiemetic's** and **simple painkillers** should also be prescribed.

Strong Systemic opioids (Morphine, Fentanyl, Pethidine) **must never be prescribed** to a patient receiving epidural opioid,

Two Practitioners (Nurses, Anaesthetists, Operating Department Practitioners) who are competent with both epidural analgesia and Epidural pump programming can set up and check an epidural infusion. They should sign the chart indicating they have setup and checked the pump. A further check takes place by an anaesthetist/practitioner to ascertain correct pump settings correct when the epidural is attached to the patient..
The anaesthetist is responsible for **documenting** the patient's details, epidural technique, desired level of block and epidural drugs prescribed on the epidural observation chart. If called to Post Anaesthetic Recovery (PACU), or to a ward, the anaesthetist should document action taken on the epidural observation chart. Epidural infusions should be labelled for Epidural use only and drugs for epidural use that are not routinely kept in the Controlled Drug Cupboard placed in a separate cupboard to other infusions.

It is the anaesthetist's responsibility to ensure the patient is pain-free before leaving PACU. Analgesia is improved if the epidural infusion is commenced during surgery. This lessens the likelihood for bolus requirement in PACU, with less risk of haemodynamic instability. Patients can be discharged from PACU to a ward once stable and pain-free. The patient must also be able to move their limbs to rule out complications causing motor block It is NOT a requirement of UHL Pain Services that patients remain in PACU for a specific period of time.

Appendix 2: Role of Trainee Medical Staff

Trainee Medical Staff (SpR / SHO / FY1 / FY2 / CT / ST) may be asked for advice regarding the care of Epidural Analgesia and are responsible for the following:

- Read, learn from and follow the Policy in Acute Pain folders. Only use techniques for which Policies are provided. Do not use methods for which policy are not given.

- Do not use epidural analgesia in wards where nursing staff have not been trained to look after this type of pain relief. **Communicate** with ward nursing staff if in doubt.

- Always consider pain management as a matter of importance. Prescribe **regular simple analgesia** for regular administration (for example: paracetamol, codeine phosphate, Dihydrocodeine) – this assists nursing staff with epidural reduction.

- Prescribe **antiemetic's** for all patients receiving opioid by any route. Regular prescribing is encouraged.

- **Out of hours problems** specifically relating to epidural analgesia are referred jointly to the surgical team and the first on-call anaesthetic trainee. If this trainee is busy in theatre or the ICU/HDU, the problem should be referred to a more senior trainee or to the anaesthetic consultant on call.

- Any problems and action taken should be **documented** on the Acute Pain observation chart and also in the patient's hospital notes if necessary.

- Often enough, problems arise when the patient has deteriorated due to non-analgesia related complications. **It is important that anaesthetic and surgical staff communicate** if problems such as sepsis, organ failure or fluid imbalance are suspected. It is important that clinical problems are not automatically attributed to the epidural and that the patient is appropriately investigated and treated. More senior anaesthetic or surgical advice should be sought.

- Anaesthetic trainees are strongly encouraged to attend the Acute Pain ward rounds. Information about these ward rounds can be gained from the Anaesthetic Co-ordinators on each site.

If you have any queries or suggestions please speak to a member of the Acute Pain Team.

Appendix 3: Drugs used in Epidural Analgesia

Pre-mixed bags of the solutions below are available from the Pharmacy Department. Wards should ensure that these are ordered as stock items.

Levobupivacaine, a local anaesthetic, reversibly blocks action potentials in nerve fibres in nerve roots in the spinal canal. Small (unmyelinated) sympathetic, temperature and pain fibres are blocked most easily, whilst larger (myelinated) touch and motor fibres are blocked less easily. **Fentanyl**, a synthetic opioid analgesic reversibly binds to μ- receptors in the spinal cord, causing analgesia. The two drugs act synergistically on the nerve roots to provide analgesia (the effect of both together is more than the sum of each individually). Fentanyl epidural bags are available in different strengths, 2 micrograms/ml and 4 micrograms/ml.

Certain patients are susceptible to the sedative effects of fentanyl and the anaesthetist may choose to use a plain levobupivacaine infusion instead. Patients who are at risk of sedation are the elderly, those with renal failure, those with hepatic impairment following (partial) hepatectomy and those with a history of preoperative confusion.

The following mixtures are available to prescribe on nerve centre through the surgical/post anaesthetic devises protocol. They come in varying size bags due to supply. From time to time we may offer different strengths to those listed due to supply. Prescribers/Users of Epidural Analgesia will be alerted at such times of change. Bag size is added to nerve centre at the time of administration, and therefore, does not need to be specifically prescribed.

1) LEVOBUPIVACAINE 0.1% / FENTANYL 2 micrograms/ml MIX

2) LEVOBUPIVACAINE 0.125% / FENTANYL 4 micrograms/ml MIX

3) LEVOBUPIVACAINE 1.25mgs/ml PLAIN

4) LEVOBUPIVACAINE / CLONIDINE MIXTURES

Occasionally patients with a history of chronic pain benefit from clonidine administered by the epidural route and this may be added to plain levobupivacaine using a specified dose regime (see Appendix 1: Guidelines for management of patients with high preoperative opioid use). This should only be done in liaison with the Acute Pain Team and Pharmacy. Risks with clonidine are sedation, bradycardia and hypotension. The patient should be monitored in a High Dependency environment.

5) EPIDURAL BOLUS DRUGS DURING ANAESTHESIA

Occasionally drugs are administered as a bolus during anaesthesia. These can enhance analgesia, and include drugs such as clonidine. There is the risk of side effects as described above. For this reason trainee anaesthetists should not use these techniques without first discussing with a consultant. If a patient is given a ‘single shot’ analgesic, as part of the anaesthetic, the anaesthetist must:

a) ensure the clonidine bolus is documented on the front of the patient’s prescription chart
b) ensure theatre recovery staff are informed
c) ensure ward nursing staff are informed
d) ensure monitoring is performed (as for a standard epidural), for a minimum period of 24 hours.

Appendix 4: The Epidural Pump

The pump types used at the three sites are standard, the Etan Medical **YELLOW** Sapphire Pump.

The 250 ml or 500 ml pre-mixed bag for epidural infusion should be used to prime the dedicated infusion line and the cartridge of which fits into the pump. The pump and reservoir bag should then be fitted into a plastic 'lockbox' ensuring that the bag is in the vertical position. Details of how to set up this pump are kept in Acute Pain Service folders and at all other ward sites where ward-based epidural analgesia is used. If you have queries, please contact the Acute Pain Nurse / Acute Pain Team member.

Appendix 5: Choosing Epidural Infusion Rate

The epidural should provide a block including the site of surgery. Once a satisfactory block exists there is no virtue in 'weaning' the infusion unless there is the intention to cease the epidural. The infusion should only be adjusted if the block is too high (above T2), or too low (if the patient is in pain).

Adjustments to the epidural rate can be made by appropriately trained nursing staff within the prescribed limits Boluses may only be given by medical staff or trained Acute Pain Nurses (see Appendix 18).

Use of PCEA gives greater flexibility in the volume of drug that a patient can receive / access. It therefore is less likely to require the above interventions. The spread of the block depends on several factors:

- **Site of epidural insertion**
  Epidurals in the thoracic region spread more than epidurals in the lumbar region, thus 2ml/hr may be sufficient with a thoracic epidural, whilst more than 10ml/hr may be necessary with a lumbar epidural.

- **Position of patient**
  The drug mixture tends to sink within the epidural space under gravity, so a patient sitting bolt upright may end up with a numb sacral region so pressure area care is vital for these patients.

- **Rate of infusion**
  The greater the rate of infusion the more extensive the block.

- **Height of patient**
  Taller patients tend to require larger infusion rates.

The prescribed infusion rate should not normally exceed 15mls/hr

If the infusion rate is set at more than 15mls/hr the risk of adverse effects from both the opioid and the local anaesthetic becomes greater. Levobupivacaine toxicity is in excess of 2mg/kg/four hours. Siting the epidural at the appropriate level reduces the need for higher infusion rates.

Patient-Controlled Epidural Analgesia (PCEA)

PCEA gives enhanced satisfaction, as patients maintain control of a bolus facility in addition to a continuous infusion. Use of the bolus facility enables the patient to titrate analgesia against amount of pain, lessening episodes of inadequate analgesia and the requirement for additional boluses. The bolus can also assist with weaning from the epidural. Suitable for any patient who

can understand the use of a bolus facility. The anaesthetist must explain technique preoperatively.

Pump Programme:
Choose the programme for infusion plus bolus

- Infusion rate 0 - 10 ml / hour
- Bolus 2 ml
- Lockout 30 min

Appendix 6: Care of the Epidural Catheter and site

All efforts should be made to limit the duration of epidural catheterisation to a maximum of 4 to 5 days, as there is evidence that epidural infections are more likely with increased duration and are associated with the presence of surgical wound infections.

Good catheter and catheter site care minimises the risk of epidural infections. The epidural site should be inspected once every shift and at least twice in a 24 hour period The 'Opsite' dressing covering the skin entry site should not be removed. Likewise, the filter should not be disconnected from the epidural catheter. Care should be taken to prevent the dressing being able to peel-off or the filter being inadvertently detached.

If the epidural entry site is to be exposed, this should only be after a hand-wash using soap and after donning surgical gloves and an apron and using a STRICT aseptic technique. The site should be cleaned with sodium chloride 0.9%, and a sterile 'Opsite' dressing reapplied.

If you witness the filter becoming inadvertently detached, it should be cleaned with a "sanicloth" (2% chlorehexidine and 70% alcohol) and immediately reattached using aseptic no-touch technique and the precautions above. Steps should be taken to avoid filter detachment. If a filter is found to be disconnected, and if there is a risk of catheter contamination, the catheter must be removed in accordance with the anti-coagulation guidelines. If Dalteparin has been given within the last 12 hours the tip should be covered with a sterile dressing until it is safe to remove.

An epidural catheter should be removed if obviously infected (and the tip sent for microbiology), particularly if the patient develops pyrexia without alternative cause.

Appendix 7: Changing Bags on the Ward

Ideally the epidural infusion bag should be changed before it runs out. (NB in-house made clonidine epidural bags have a shelf-life of 24 hours and must be changed daily for microbiological reasons) If there is a period of time without infusion, the block will diminish and the patient will be in pain. As an infusion using the above protocol is designed to maintain rather than increase the block, it will not re-establish a block quickly once severe pain has developed.
When a bag needs changing, there should be full attention to maintaining asepsis. Hands must be washed with soap and water and decontaminated with alcohol hand rub.

The extension set is clamped, the empty bag disconnected and the full bag connected, taking care to exclude air, and using a 'no touch' technique. The extension set is unclamped and the infusion settings are checked before continuing. Two qualified nurses must check the bag as per the Leicestershire Medicines Code

1) Drug prescription, doctor's signature, date and dosage
2) Patient name and DOB
3) Pump settings and connections to patient should be checked by two nurses prior to restarting the pump.

Appendix 8: Other Care Considerations

Whilst an epidural is in progress:

- Intravenous access must be maintained.
- A urinary catheter must be in situ because the patient may not be able to feel their bladder due to sensory block.
- Strong Systemic opioids (morphine, diamorphine, pethidine i.m. or i.v.) are completely contraindicated if the patient is receiving epidural fentanyl.
- Other sedatives (haloperidol, temazepam, zopiclone etc) should be avoided.
- The patient can be mobilised as normal, taking note that postural hypotension occasionally occurs.

The following equipment and drugs should always be available on each ward in case of urgent need:

- Spare large bore (16 / 14 G) i.v. cannulae and i.v. fluids (in case of cannula dislodgment)
- availability of cardiovascular / respiratory monitoring:
- ECG
- non-invasive BP
- pulse oximetry
- full resuscitation equipment including cardiac arrest trolley / drugs:

  defibrillator, self-inflating bag, laryngoscopes, endotracheal tubes
- oxygen supply (cylinders must be checked that they are not empty)
- drugs:

  ephedrine (vasoconstrictor)

  naloxone (antidote to opioid)

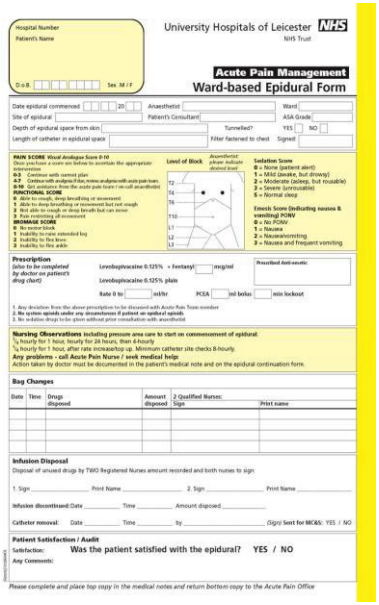
  atropine (in cardiac arrest box)

  Note: Any syringes uses to boluses **must** be labelled with the drug name and epidural use only in accordance with NPSA guidelines

Appendix 9: Nursing observations of patients with epidurals

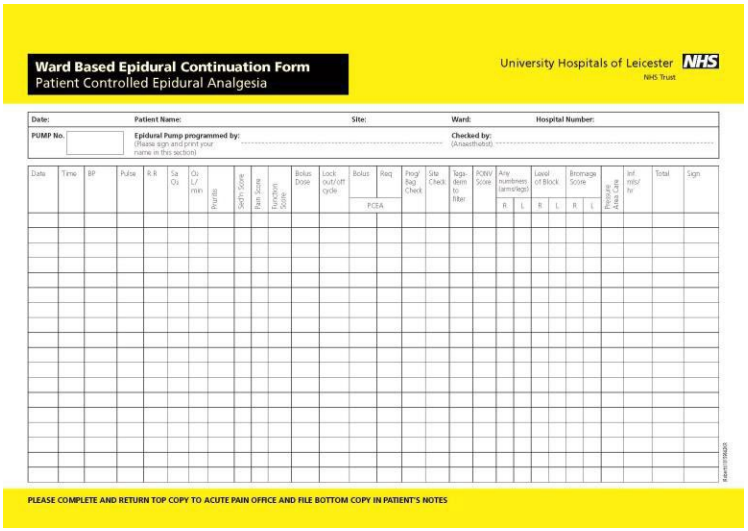
These must only be done by competent practitioners in Epidural analgesia. To monitor the effectiveness of the epidural and to detect any problems the epidural observation chart must be completed as follows:

- 1/4 hourly observations for the first hour (Theatre Recovery), or after an epidural bolus,
- Hourly observations for the first 24 hours
- 4 hourly thereafter.


University Hospitals of Leicester NHS

Acute Pain Management

Ward-based Epidural Form


Ward Based Epidural Continuation Form

Patient Controlled Epidural Analgesia

University Hospitals of Leicester NHS

PLEASE COMPLETE AND RETURN TOP COPY TO ACUTE PAIN OFFICE AND FILE BOTTOM COPY IN PATIENT'S NOTES

If problems develop, advice must be sought immediately. The Acute Pain Nurses review epidural patients, and will liaise with the anaesthetists when necessary. Observations include:

- **Pain Score** Visual analogue score 0 – 10

Pain Assessment Results

Once you have a score you can use this table to ascertain the most appropriate intervention

Pain Score	Action
0-3	Continue with current plan
4-7	Give additional analgesia if due, review analgesia with acute pain team.
8-10	Get assistance from the acute pain team/on call anaesthetist if an epidural patients pain score is this high where the epidural is situated

- **Functional Score** 0 Able to cough, deep breathing or movement
  1 Able to deep breathing or movement but not cough
  2 Not able to cough or deep breath but can move
  3 Pain restricting all movement

- **Blood pressure** A drop of more than 25% is significant and should be acted on

- **Respiratory rate** A respiratory rate of less than 8/min should be acted on

- **Sedation score**

0	none (awake and alert)
1	mild (awake but drowsy)
2	moderate (asleep but rousable)
3	severe (unrousable) normal
S	sleep

- **Bromage Score** (motor loss)

0	No motor block
1	inability to raise extended leg
2	inability to flex knee
3	inability to flex ankle

- **Emesis Score** (nausea and vomiting)

0	no PONV
1	nausea
2	nausea and vomiting
3	nausea and frequent vomiting

- **Bag check:** this is to ensure that the reservoir bag is not becoming empty and that it is correctly positioned so as not to entrain air

- **Pressure area care:** if a patient is immobile following surgery with a functioning epidural, they are less likely to report pressure area discomfort to nursing staff.

- **Programme check:** pump to be checked that it is running according to prescribed programme.

- **Tegaderm to filter:** this should be checked each time observations carried out. It **MUST ALWAYS** be attached and safely secured. It is not acceptable to record NO in this box

The following observations can be done

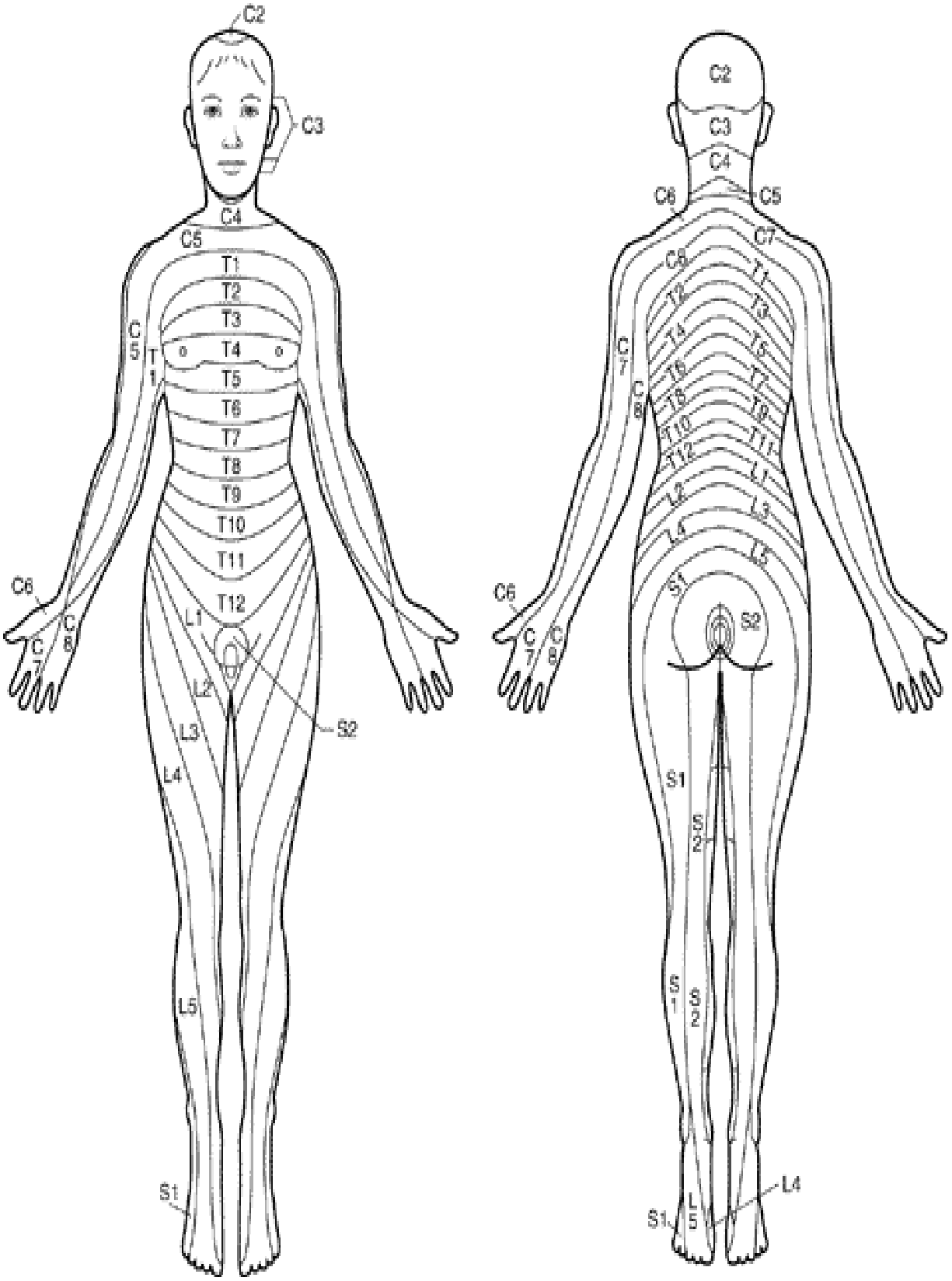
- On arrival into theatre recovery (PACU)
- On departure from recovery (PACU)
- 4 hourly thereafter.
- Whenever the patient complaints of pain score 4+

- **Level of block** this is most easily done using a piece of ice, but can also be done with ethyl-chloride spray. The ice is run up each side of the patient's abdomen and the patient asked to say when they feel it is 'cold' (the temperature sensation nerve fibres are similar to the pain fibres, so a good block of 'cold' will signify an equivalent block of pain sensation)

Block:			
	Above armpit	above T2	too high
	armpit	T2	
	nipple	T4	
	costal margin	T6	
	umbilicus	T10	
	inguinal ligament	T12/L1	
	inner thigh	L2/3	
	outer thigh	L2/3/4	

- **Catheter entry site:** this should be visible through the sterile occlusive dressing. Documentation should be made of any catheter migration, any leakage of fluid or any evidence of infection (redness or pain)

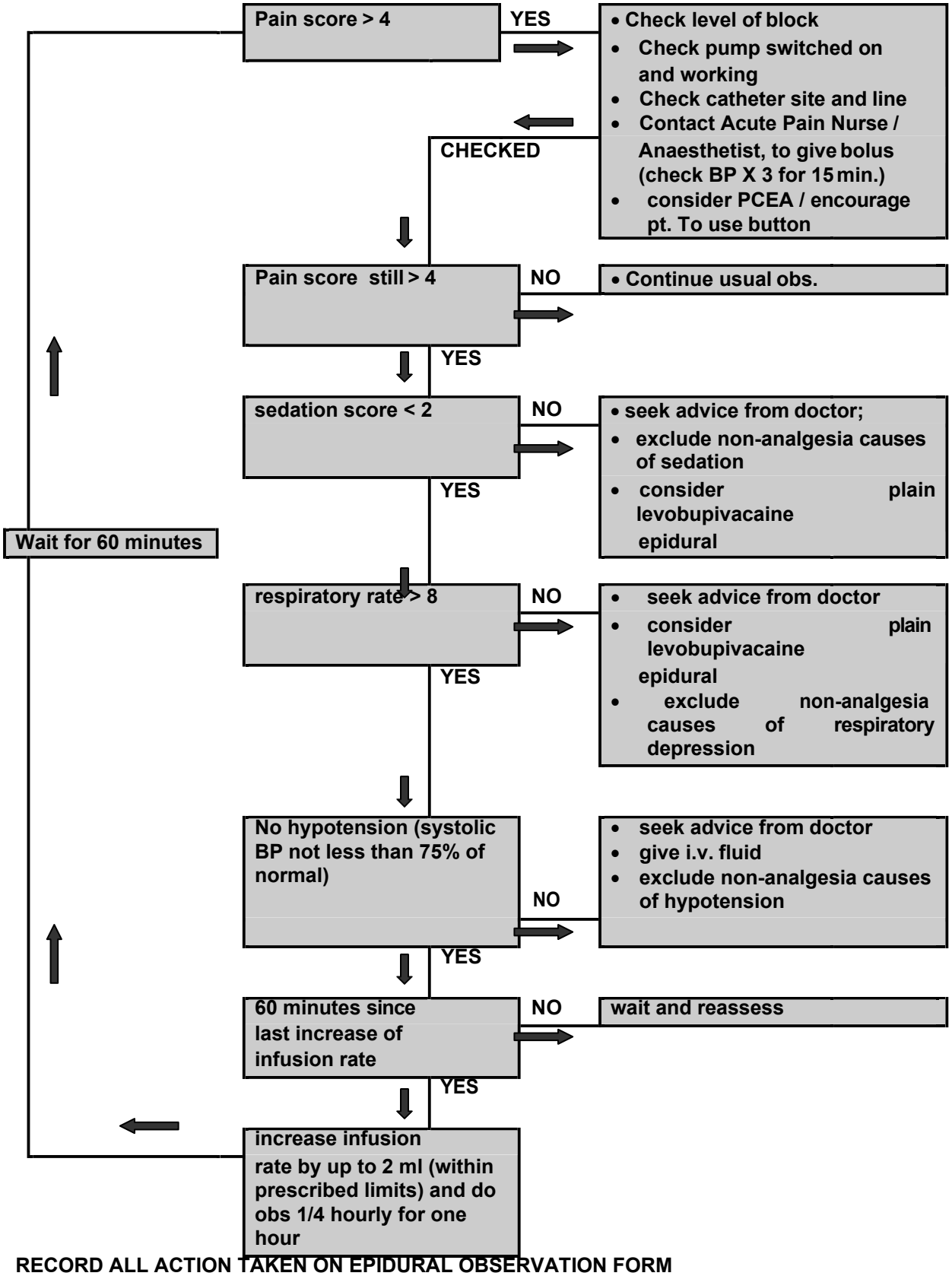
Dermatomes



Appendix 10: Ensuring Good Pain Relief: Changing Epidural Rates

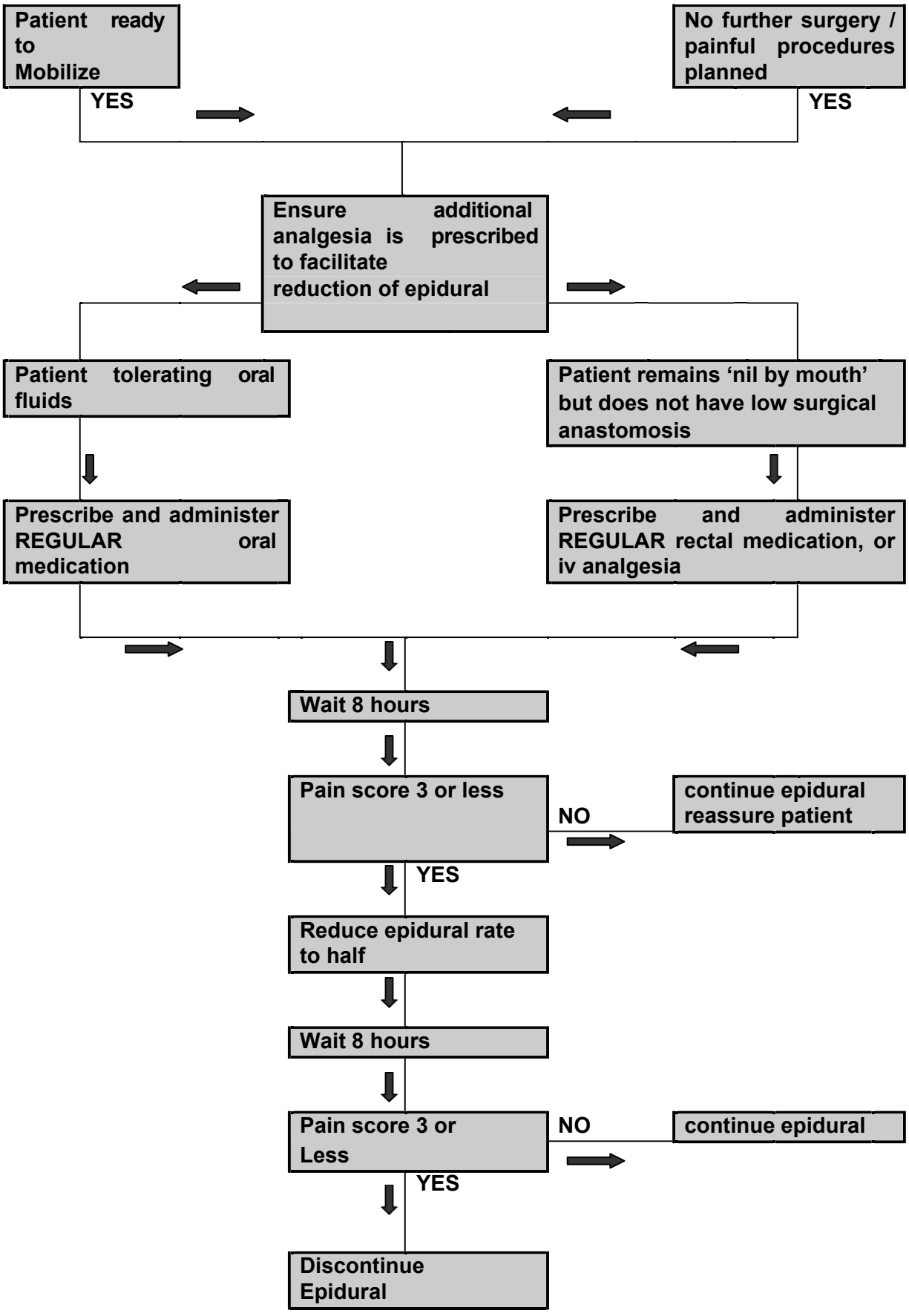
The epidural rate can be increased or decreased by a trained nurse, adhering to the algorithms below.

Algorithm for increasing the rate of an epidural infusion when a patient is in pain



RECORD ALL ACTION TAKEN ON EPIDURAL OBSERVATION FORM

Algorithm for decreasing epidural infusion rate



RECORD ALL ACTION TAKEN ON EPIDURAL OBSERVATION FORM

Appendix 11: Ensuring Good Pain Relief: Use of Simple Analgesia

The Trust Paracetamol Guideline for Oral and Intravenous Analgesia dosing of Paracetamol in adults Reference is B13/2012.

Use of simple analgesia with an epidural enhances pain relief and allows reduction of the epidural rate during weaning. All patients receiving epidural analgesia should have simple analgesia prescribed. This should be prescribed on the 'regular' side of the patient's drug chart and should be administered orally as soon as the patient can tolerate oral fluids.

Some patients require stronger painkillers to 'bridge the analgesic gap' after an epidural. These should only be required for a few days before changing to simple analgesia.

We do not recommend the use of NSAID's in patients who have an epidural catheter in situ. There is concern that these drugs may increase the risk of a bleed into the epidural space (see anticoagulant section). These drugs should only be prescribed by a Senior clinician (Registrar ST4 and above or a Consultant) where the benefits of improved analgesia outweigh the risk. NSAID's may be given once 24 hours has elapsed since removal of the epidural catheter (as long as there are no other contraindications such as risk of renal impairment, cardiac failure and risk of upper GI haemorrhage).

Oral Analgesia

Paracetamol 1 gram 4 times a day (reduce dose if <50kg with health complications)

Codeine and Paracetamol combinations

- Cocodamol 8/500: 8 mg codeine, 500mg paracetamol, 2 tablets 4 times a day
- Cocodamol 30/500: 30mg codeine, 500mg paracetamol, 2 tablets 4 times a day

As these may cause drowsiness and constipation, there is the option to give the constituents separately.

- Dihydrocodeine: 30mg, 4 times a day
- Tramadol: 50 to 100mg, 4 times a day

For 'bridging the analgesic gap' these **Oral Opioids** can be used once the epidural is stopped

Morphine sulphate oral solution 10mg, 'prn' or 2 hourly

Rectal Analgesia

Paracetamol: 1 gram 4 times a day (reduce dose if <50kg with health complications)

Avoid if patient has had rectal surgery or has low rectal anastomosis

Intravenous Analgesia

Paracetamol: 1 gram 4 times a day, (reduce dose if <50kg with health complications)

Tramadol: 50 to 100mg 4 times a day

Appendix 12: Antiemetics

Postoperative nausea and vomiting (PONV) is common and related to many factors which include:

- Type of surgery.
- Drugs used during anaesthesia and as post operative analgesia (includes epidural fentanyl).
- Patient predisposition: past history of PONV, motion sickness, female gender, obesity, being a non-smoker.

All patients receiving epidurals must be prescribed antiemetic's. At-risk patients should have these prescribed on the regular side of the chart for 24-48 hours postoperatively

1) cyclizine: 50mg i.m. or i.v. 8 hrly

2) ondansetron 4-8 mg iv 6 hrly

Ondansetron should only be used for patients whose PONV is not controlled by cyclizine or prochlorperazine or in patients at risk of extrapyramidal side effects. Metoclopramide does not confer benefit for PONV in the postoperative period. Please be aware that due to pharmacological effects it is not advised to give ondansetron and Tramadol at the same time.

Appendix 13: Clotting Disorders, Use of Anticoagulants & Heparin Prophlaxis

Anticoagulation is used as prophylaxis for Deep Vein Thrombosis in surgical patients and is also necessary for other conditions. The use of these drugs requires careful consideration in relation to epidurals because of the enhanced likelihood of bleeding into the epidural space with onset of compressive symptoms.

Absolute contraindication	**Relative Contraindication** assessment of need on a case by case basis
INR >1.5	INR 1.0-1.5
APPT ratio >1.5	
Platelets < 50	Platelets 50-100
Thrombolytic agent within **10 days**	
Clopidogrel within **7 days**	

- Anticoagulants include warfarin, heparins, DOAC's (direct oral anticoagulants) and all thrombolytics such as streptokinase. If systemic anticoagulation (including streptokinase) is required, an epidural catheter should not be sited. If anticoagulation becomes necessary during the perioperative period, the epidural catheter should be removed before it is commenced. Very close neurological observation should be continued for epidural haematoma (see below).
- If the patient is already anticoagulated, therapy should be interrupted (at least 2 hours for heparin infusion, longer for warfarin) and clotting tests checked before catheter removal.
- Asprin 75mgs daily for can safely be given with epidural analgesia

- **Heparin Prophylaxis**

Heparins fall into two categories, unfractionated and low molecular weight heparin (LMWH) whose properties differ as indicated below.

	Unfractionated *Heparin*	Low Molecular Weight Heparin
Action	Complexes with AntiThrombin III, blocking FIIa and FXa	FXa inhibited more than FIIa Higher bioavailability
T1/2	3 hrs	7 hrs
Reversible with protamine	Yes	not fully
Anticoag. Tests	mild ⎫ APPT @ 4hrs	no effect on ACT or APPT
Platelets	long term use	little effect

- **Unfractionated heparin**

Should be avoided for 4 hours prior to and 2 hours after insertion or removal of an epidural catheter. If a traumatic (bloody) tap occurs at insertion, alternative DVT prophylaxis should be used and neurology monitored. Ideally heparin should be prescribed at **06.00 hrs** and **18.00 hrs,** which facilitates with the timing of epidural insertion / removal.

- **Low Molecular Weight Heparin**

Should be prescribed at **18.00hrs** the day prior to surgery, as this fits with the most likely timing of epidural placement / removal. At least 12 hours should elapse between a dose of LMWH (Deltaparin/Enoxaparin)and placement / removal of an epidural catheter. Although the LMWH is acting as DVT prophylaxis at this time, it is not at peak activity and least likely to cause an epidural bleed. If epidural insertion is traumatic, administration of LMWH should be delayed for 24 hours and an alternative form of DVT prophylaxis used. LMWH can be given four hours after placement / removal of an epidural catheter.

- **New Anticoagulants**

	Time to stop before insertion	Time to re-start after removal
Prasugrel	7 days	24 hrs
Clopidogrel	7 days	24 hrs
Ticagrelor	5 days	24 hrs
Apixaban	2 days	12 – 24 hrs
Rivaroxaban	2 days	24 hrs
Edoxaban	2 days	24 hrs
Dabigatran	3 days	24 hrs

- **Thrombolytic Drugs**

Streptokinase	10 days	10 days
Alteplase	10 days	10 days
Anistreplase	10 days	10 days
Reteplase	10 days	10 days

Appendix 14: Problems with Epidurals

Simple problems may be dealt with by the trainee surgical staff in liaison with the Acute Pain Nurse who will provide appropriate advice. These problems may not be 'simple' from the patient's point of view, so the patient must be reassured. All problems should be reviewed, and anaesthetic advice sought if they do not resolve.

1) Mild hypotension readily corrected by 250 millilitres IV fluid stat (speed up IV infusion, using pressure bag).
2) Pruritus (due to fentanyl): can be treated with IM chlorphenamine (10 milligrams).
3) Urinary retention due to inability to feel full bladder: avoided by urinary catheterisation.
4) Nausea and vomiting due to fentanyl: can be treated with standard anti-emetics

It is essential to exclude non-epidural causes of a patient's condition. For example hypotension and / or confusion can occur with blood loss, cardiac dysrhythmia / infarction and septic shock, all of which can occur after surgery.

All actions must be documented on the patient's epidural observation chart.

All significant problems with epidurals warrant immediate action and should be referred as indicated above. **A critical incident form (DATIX) should be completed** on line.

Hypotension

Defined as:

A fall in systolic Blood pressure of more than 25% of normal

Eg : normal BP 120 mmHg, a fall to 90 mmHg is significant

normal BP 100 mmHg, a fall to 75 mmHg is significant

Due to sympathetic blockade by levobupivacaine, therefore normally occurs within 30 minutes of local anaesthetic bolus. A patient may also develop postural hypotension if relatively fluid-depleted at the time of mobilisation. BP should be checked and treatment given, if any patient feels 'faint' or 'dizzy' on standing or mobilising.

Check for: high block - block above T2 blocks sympathetic outflow to a larger area of body and block of cardiac sympathetic nerves (T2-T4) causes bradycardia. In addition, block of the sympathetic nerves to adrenal cortex prevents endogenous catecholamine secretion

Management

- Stop the epidural infusion
- Seek advice from anaesthetist/surgical trainee
- Give high-flow oxygen by facemask with reservoir bag
- Nurse to give IV. fluids 'stat'; give 500mls of an isotonic intravenous fluid (e.g. Sodium Chloride 0.9%)
- Check pulse rate, if low (<45 /min), doctor to give IV atropine 600 micrograms (mcg)
- If no response to fluid, doctor to give IV.ephedrine 3 mg and repeat if necessary
- **Exclude non-epidural causes of hypotension**

Respiratory depression / excess sedation

Defined as:

RR < 8 / min. Usually associated with sedation / somnolence; Sedation Score 3

Due to epidural fentanyl or inadvertent administration of other sedative drugs. The patient would be expected to have pin-point pupils if this is due to opioid. High local anaesthetic block is a more unlikely cause, but can occur if the catheter has entered the CSF. The latter is associated with hypotension

Management

- Stop the epidural infusion, seek advice from anaesthetist
- Give oxygen (4 litres/min) and monitor Oxygen Saturation levels.
- Assess level of consciousness, respiratory efforts and patient's ability to protect airway
- Doctor to give IV. naloxone 400 micrograms (mcg) if clinical evidence of opioid cause
  - – observe response and repeat as necessary according to UHL policy

- If not protecting airway, arrange bed on HDU/ITU (speak to ITU Reg / Consultant).
- Manage hypotension as above.

Ensure that other (non-epidural) causes of excess sedation / respiratory depression are excluded for example hypoxaemia, heart failure, stroke and sepsis.

Epidural 'not working', patient in pain

Defined as:

Pain score of 4 or more or a patient who is dissatisfied with pain relief

The epidural block may be too low for the surgical incision, or there may be 'break-through' pain due to the presence of surgical drains. The block may have become 'patchy' or unilateral. Causes of this are incorrect insertion level for surgical incision, leaving excessive length of catheter inside the epidural space (catheter tip lies in paravertebral space and drug does not spread), leakage or the catheter has 'fallen' out.

Some patients who have chronic pain and who have high preoperative opioid use, may have pain which is difficult to control (see Appendix 1).

Management

- Check level of block, is there a block? Is it low, patchy or unilateral?
- Check epidural site if there is no demonstrable block (do not remove sterile dressings) to see if the catheter has 'fallen out' or if there is a leak.
- Is the infusion connected? Is the infusion running? Check the bag is not empty
- Seek advice from anaesthetist or Acute Pain Nurse

- Has the patient got unusual expectations or been an opioid consumer preoperatively? If so, they will require reassurance. (If an opioid user refer to Appendix 1).
- Ensure regular simple analgesics are prescribed so that 'balanced analgesia' is utilised.
- If the infusion and catheter appear intact, it is worth increasing the infusion (see section 14) or the Acute Pain Nurse or Anaesthetist giving a bolus (see Appendix 2).
- If pain score remains 2 or more, anaesthetist should consider re-siting epidural (in the correct environment eg. Post Anaesthetic Recovery). This will depend on the patient's clinical condition and need.
- If the epidural appears to be providing a sensory block or if the patient has a previous high opioid use one option is to use plain levobupivacaine and add IV PCA morphine (see Appendix 1).
- The patient will benefit from staff who listen and who give reassurance.

Dural tap

Defined as:

The Tuohy needle or catheter inadvertently punctures the dura during the siting of an epidural, potentially allowing a CSF leak to occur

This can cause a severe headache, which is worsened by the patient sitting up, standing or straining. This headache will resolve slowly, but there are reports of patients having significant discomfort for several months. It is important that dural tap or spinal puncture is recognised.

Management

- It should be documented by the anaesthetist.
- The epidural can be sited at an adjacent space.
- The patient should receive an explanation about what has happened, and warned that a headache may occur.
- The epidural infusion must be given cautiously and monitored carefully, as there may be spread of the drug through the hole in the dura into the CSF (where it could have greater effect and cause adverse actions).
- If adverse effects occur (as described above), stop infusion and call anaesthetist.
- Full hydration should be maintained as patient dehydration potentiates headache.
- If a headache occurs, patient should be nursed flat and given simple analgesics (paracetamol, cocodamol etc)
- Decision to perform an epidural blood patch should only be taken by an anaesthetic SpR or consultant, and should be done in a sterile environment (e.g. the operating theatre). The blood patch should be performed under aseptic conditions and not via the existing epidural catheter.

Spinal / Epidural Compressive lesions and/or Motor block

Spinal/Epidural compressive lesion defined as:

A haematoma or abscess compresses the neurological structures within the confined space of the vertebral canal, causing irreversible neurological damage if left untreated

These are an exceedingly rare occurrence, associated with anticoagulation or immuno-compromise. There is probably a causal relationship between epidurals and haematomas in

anticoagulated patients, especially those receiving LMWH. Haematomas can also occur sporadically. Abscess is probably more likely with prolonged epidural catheterisation and may present as meningitis like symptoms (pyrexia, photophobia, neck-stiffness).

Compressive lesions can occur while an epidural is in situ or after removal of the catheter. If Bromage score demonstrates onset of weakness, or there is onset of new sensory or motor deficit, a compressive lesion must be suspected. This must be differentiated from the effects of local anaesthetic which resolve within an hour of the infusion being stopped. If any patient develops severe backache of sudden onset, particularly at the level of needle insertion, suspicion should also be raised. Urgent management is essential. It is only likely to be effective if undertaken within 6- 12 hours.

Motor Block defined as:

Unilateral or bilateral motor block associated with delivery of local anaesthetic to specific nerve roots supplying leg. Results in Bromage Score > 1.

This is associated with leaving more than 4cm of catheter inside the epidural space or high doses of local anaesthetic, and can stop patient from mobilising. Compressive lesions should be suspected. It does not cause new onset back pain.

Management

- **STOP THE EPIDURAL INFUSION and Monitor Pain and Bromage Score ¼ hourly for 1 hour**

RETURN OF MOTOR FUNCTION

- It may be necessary to pull catheter back 1cm if in too far, using full aseptic technique and to re-position patient
- Recommence epidural as soon as there is improvement in Bromage Score at a lower rate
- **NO RETURN OF MOTOR FUNCTION - This is urgent.**
  - assume compressive lesion and manage as above.
- Call the surgical Registrar and on call Anaesthetic Consultant and tell them you think the patient may have an epidural haematoma**, they must review the patient in the next hour**
- Seek immediate advice from Spinal Consultant Surgeon or Orthopaedic Registrar/ ST On Call.
- Urgent CT or MRI scan – access to emergency MRI is only available by referral by a consultant to the on-call consultant radiologist (for the site). Referral should be made without delay. Urgent blood samples for clotting screen and CRP should also be completed.

Appendix 15: Who to Call For Problems with Epidurals

In Working Hours

- Patient
- Ward Nurse
- Acute Pain Nurse
- Surgical Trainee (SHO / SpR / CT/ST/FY2)
- First on-call Anaesthetic Trainee (SHO / SpR/CT/ST / FY2)
- Second on-call Anaesthetic Trainee (SHO / SpR/CT/ST / FY2)
- Emergency theatre Consultant Anaesthetist or Acute Pain Consultant

Out of Working Hours

- Patient
- Ward Nurse
- Anaesthetic first on-call Trainee + Surgical Trainee (SHO / SpR/CT/ST /FY2)
- Second on-call Anaesthetic Trainee (SHO / SpR/CT/ST / FY2)
- On-call General Duties Anaesthetic Consultant

Leicester General Hospital	Leicester Royal Infirmary	Glenfield Hospital
Bleep 3388 Ext: 14157	**Bleep 5539 Ext: 16640** **Bleep 3002 Ext: 16640**	**Bleep 2671 Ext: 13662**
On-call Anaesthetist: Bleep 3226	**On-call Anaesthetist**	**On-call Anaesthetist: Bleep 2601**

Appendix 16: Discontinuing an Epidural

It is usual to continue epidural analgesia for no more than 5 days. The risk of infection increases with duration of catheter placement. The necessity to continue an epidural for longer depends on the severity of surgery and the patient's pre-operative condition.

The epidural should only be discontinued if the patient's pain can be controlled by simple analgesia.

Epidural catheters should be removed in accordance with guidelines relating to anticoagulant use as outlined above. Catheter removal between 10.00 and 14.00 hrs suits the usual timing of heparin administration, and allows time for identification of any compressive lesion, including MRI scanning within normal working hours.

Clotting screen test should be checked from anyone who has had hepatobiliary surgery, a large blood transfusion, on SACU or ITU/HDU for instability (results need to be 0.9-1.4 inclusive)

The catheter should ideally be removed before commencing systemic anticoagulation. If for clinical reasons, anticoagulation has been commenced with an epidural catheter in situ, the anticoagulation status should be checked before removal. An INR or APPT > 1.5 should be corrected.

Four-hourly neurological monitoring for 24 hours is necessary to detect onset of any bleed after removal of the catheter. Important symptoms and signs of epidural haematoma are listed below and warrant immediate action. If any neurological abnormality develops while an epidural is in situ or after catheter removal, management should be as for compressive lesions (see Appendix 14).

- Complaints of weak legs, loss of sensation in the legs, urinary incontinence or faecal incontinence.
- Inability to straight-lift either leg off the bed.
- Inability to bend each knee in turn and kick the foot out
- Inability to push either foot down against the observer's hand.
- Inability to feel light touch all over each leg.
- Severe back pain may occur in the region where the epidural is / was sited.

Removing an epidural catheter should be done aseptically using a basic dressing pack and cleaning solution. Hands must be washed with soap and water and the dressing should be removed. Gentle traction applied to the catheter should cause it come out easily. The catheter should be checked and recorded as complete. A plaster should be applied to the puncture site.

There is no need to send the tip of the catheter for microbiology, unless the patient has evidence of local infection. If the tip is to be sent to microbiology, it must be treated as a sterile sample and contamination avoided (as with any other microbiological sample). It should be collected into a sterile container and cut with a sterile blade.

The bag contents should be emptied into the Drug Disposal Kit. The disposal of bag-contents should be recorded on the epidural front sheet. The epidural forms bottom copy should be returned to the Clinical Nurse Specialist in Acute Pain Management.

Appendix 17: Policy forTreatment of Postoperative Pain after Major Surgery in Patients with a High Preoperative Opioid use.

Including the use of epidural Clonidine

Aim

The aim of this policy is to provide adequate postoperative analgesia in a group of patients who are traditionally very difficult to treat in the perioperative period. Complete analgesia is probably impossible and the aim is not to wean these patients off opioids before discharge from hospital. **If you are looking after such a patient, please contact the Acute Pain Team and Pharmacy Department in advance.**

Preoperative analgesia

Patients should remain on their usual oral opioid dose up until their operation

Intraoperative analgesia

This should consist of an epidural infusion of levobupivacaine 1.25mgs/ml and an intravenous infusion of morphine, the rate depending on the preoperative opioid requirements, although this can be adjusted as necessary.

Postoperative analgesia

The usual epidural fentanyl/ levobupivacaine mix is unlikely to provide adequate analgesia for a patient tolerant to opioid drugs. Therefore, postoperative analgesia should include systemic opioids.

A PCA with a 24 hr background infusion equivalent to the total daily preoperative opioid dose can be used. The temptation to combine opioids via epidural and systemic routes must be resisted, as this is dangerous.

A plain levobupivacaine 1.25mg/ml epidural (with or without the addition of clonidine) can be administered. Once a satisfactory level of block has been achieved, and if the patient is haemodynamically stable, clonidine 2micrograms/kg can be given via the epidural catheter over 10 minutes. If this is effective, an infusion of levobupivacaine 0.125% and clonidine 1micrograms/kg/hr can be started.

You should contact the Pharmacy Department for advice on how to prepare the mixture you prescribe. This preparation can be made within the Aseptic suite (Ext 6405) within the LRI Pharmacy Department and if required on the other sites time will be needed for transportation to the clinical area. Shelf life of bags made is 24 hours at room temperature so a new bag will need to be ordered on a daily basis. On average 2 bags needed per patient.

The epidural levobupivacaine/clonidine mixture should be made up to a concentration so that the patient receives a suitable volume of levobupivacaine per hour to maintain an adequate block. See table below.

Amount of clonidine in micrograms added to a 200 mls of levobupivacaine1.25mg/ml to achieve an infusion rate of clonidine of 1 microgram / kg / hr.

Epidural infusion rate ml hr^{-1}

Kgs	2ml	4ml	6ml	8ml	10 ml
50	5000	2500	1666	1250	1000
55	5500	2750	1833	1375	1100
60	6000	3000	2000	1500	1200
65	6500	3250	2166	1625	1300
70	7000	3500	2333	1750	1400
75	7500	3750	2500	1875	1500
80	8000	4000	2666	2000	1600
85	8500	4250	2833	2125	1700
90	9000	4500	3000	2250	1800

Clonidine can cause sedation, bradycardia, and hypotension. Ideally the patient should be monitored in the High Dependency Unit, for the first 24 hours, so that adjustments to the epidural can be made and full observations including ECG monitoring can be carried out. Other sedative drugs must be avoided, especially after transfer to the ward.

The epidural infusion will continue at the same rate postoperatively. Once the patient is tolerating oral fluids and is able to take oral analgesia, the epidural can be reduced in steps over the next 24 - 48 hrs, when it can be removed. Over the same time course, the background infusion of the PCA pump be reduced by 25% and maintained at this new setting until stomach emptying begins.

When gastric function returns to normal oral morphine will be introduced at a dose depending on the previous 24 hours morphine consumption. At this stage the background infusion of the PCA pump will be stopped although the patients will still be able to self-administer morphine via the PCA device for a further 24 hours.

Additional analgesia

Paracetamol, codeine or other simple / moderate analgesics can be added into the treatment regime at any stage provided there are no contraindications.

Problem Solving (Points for discussion)

If a patient experiences breakthrough pain with the above protocol what rescue analgesia is available? Several opportunities exist:

1) Reassurance of the patient; listening and explanation.
2) A top up from the epidural providing it is in situ.
3) A top up from the PCA device
4) Addition of another analgesic e.g. paracetamol, dihydrocodeine, tramadol.
5) No intervention, we have to accept we can only do so much for these patients.

Appendix 18 Policy for Epidural Bolus by Acute Pain Nurse if a Patient is in Pain

A bolus may only be given within the prescribed limits. i.e. if the upper prescribed limit is 6mls per hour and the patient is receiving 4mls per hour the bolus must not exceed 2mls (infusion rate plus bolus must not exceed prescribed upper limit)

- determine area of deficiency of block i.e.: block too low, block unilateral or band-like block excluding lower part of incision
- check and document upper and lower extent of block on both sides
- determine desired upper and lower levels of block for extent of surgical incision
- check that i.v. cannula is patent and that i.v. fluid is running
- check and document blood pressure, exclude symptoms of postural hypotension (BP lying and sitting)

If infusion at maximum prescribed rate, ask doctor to prescribe bolus.

Give bolus from pump

- Only if blood pressure > 100 mm Hg , sedation score = zero and RR> 8 / min
- Calculate what volume bolus is required:
  for a lumbar epidural 2 mls per dermatome.
  for a thoracic epidural 2 mls per dermatome up to max of 4 mls.
- Sit patient up (on pillows)
- Stop infusion and programme a bolus to administer volume required
- Document bolus on observation chart
- Monitor patient (as below)

Adjust infusion rate within the prescribed limits

- If block is too low and a bolus is required to re-establish the desired level of block, the infusion rate may be increased by up to 30% the original infusion rate
- Document change in infusion rate on observation chart

Monitoring the patient after a bolus or change in infusion rate

- Observations of BP, Respiratory Rate, Pain score, Sedation score and height of block must be performed every 5 minutes for 15 minutes then at every 15 min for the next 45 min after a bolus - these must be documented
- The above observations must be performed every 15 min for an hour after an infusion rate change.

Other analgesia

- The patient should receive additional simple analgesia. The ward doctor should be requested to prescribe this on the regular side of the patient's drug chart.