Mid Essex Hospital Services NHS
NHS Trust

Epidural Infusion Analgesia (EIA) and Patient Controlled Epidural Analgesia (PCEA)	**Type: Clinical Guideline** **Register No: 06006** **Status: Public**

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Consulted With	**Post/Committee/Group**	**Date**
Dr Mark Alexander-Williams Dr Tom Durcan (Lead for Acute Pain)	Pain Consultants	2/2/2018
Lynne Mustard	Service Manager	2/2/2018
Alison Bloor	Pain specialist Pharmacist	2/2/2018
Professionally Approved By	Lead Consultant, IPMS Dr Mark Alexander-Williams	2/2/2018

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Author/Contact for Information	Lynne Mustard, Clinical Nurse Specialist, Pain Management
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5.0	Lynne Mustard	October 2010
5.1 Inclusion to section 6.1 re indwelling catheters	Jayne Somerset	November 2011
5.2 Inclusion to section 6.3 re anti-coagulants	Jayne Somerset	January 2013
6.0	Jayne Somerset	Sept 2014
6.1 Inclusion to section 5.3 Re; no further opioids whilst epidural infusion in progress, and 5.4 long term opioid users and their pain management	Jayne Somerset	17 March 2015
6.2 Inclusion to section 6.1 to clarify how to input pain observations when using the Vital Pac system	Jayne Somerset	9th May 2016
7.0	Jayne Somerset	20 March 2018
7.1 Inclusion in section 6.1 re; Local anaesthetic toxicity	Jayne Somerset	18th July 2018

Contents

1.0 Purpose

1.1 This guideline is designed to provide instruction and guidance for medical and nursing staff caring for patients with EIA (Epidural Infusion Analgesia) or PCEA (Patient Controlled Epidural Analgesia).

2.0 Staff and Training

2.1 This guideline is aimed at all qualified nursing and medical staff delivering care to patients receiving EIA or PCEA.

2.2 Nursing staff managing patients receiving EIA or PCEA must have the appropriate knowledge and clinical skills to provide safe, evidence based care.

2.3 Training for nursing staff is provided within the Trust by the IPMS (Integrated Pain Management Service), and assessment of competency arranged with the pain link nurses.

2.4 It is the individual's own responsibility to remain current in clinical skills and identify his/her own training needs in conjunction with the appraisal system. Competency records to be kept by the individual nurse in:

- Patient assessment
- Relevant monitoring
- Recognition of epidural-related problems and actions required
- Technical competencies in managing pump and lines, as per CNST
- Clinical skills in removing the epidural catheter and aftercare of the patient

2.5 The ward/unit manager is responsible for ensuring appropriate skill mix, and monitoring that staff are competent.

2.6 Specialist trainee anaesthetists are provided with in-house training under the guidance of senior expert anaesthetists: mentors are allocated under the guidance of the College Tutor.

2.7 A teaching programme for both medical and nursing staff is undertaken in liaison with the Training and Development dept.

3.0 Scope of practice

3.1 Estimated activity per annum: 500 EIA/PCEA

- 24 hour cover by IPMS
- A prompt response service operates by pager system
- Clinical Nurse Specialists are available Monday to Friday, 8.00hrs to 17.00hrs and Saturday from 08.00 to 12.30hrs.
- On-call service provided out of hours by anaesthetist
- 3 consultant rounds per week
- Training and education provided by IPMS

4.0 Policy

4.1 All EIA/PCEAs are schedule 2 controlled drugs and are to be prescribed by qualified anaesthetists.

4.2 The EIA/PCEA programme is set and initiated by an anaesthetist.

4.3 Skill mix (i.e. appropriately trained nurses) and staffing levels on the ward are sufficient to ensure safe care of the patient. The nurse in charge should inform the anaesthetist or the IPMS prior to the start of the list if these criteria cannot be met.

4.4 EIA/PCEA is connected to the patient by the anaesthetist, recovery staff or IPMS staff appropriately trained, and checked in accordance with the Policy for Administration of Medicines for the MEHT.

4.5 Anaesthetists selecting patients for EIA or PCEA are responsible for securing informed verbal consent, and for providing expert implementation and management of the chosen modality, whether for surgery or non-surgical pain control (e.g. trauma, palliative care).

5.0 Analgesia

5.1 Epidural infusion solutions are commonly in 500ml bags of sodium chloride. Strengths of local anaesthetic solution may vary. The choice of prescription is that of the anaesthetist and subsequent changes may be made in liaison with the anaesthetists/pain team

BUPIVACAINE 0.15%
BUPIVACAINE 0.15% plus DIAMORPHINE 0.005%

5.2 Infusion lines and pumps are YELLOW for epidural use only.

5.3 No other opioids are to be administered to the patient when the Epidural in progress.
Opioid drugs may ONLY be prescribed via an alternative route when the epidural contains 0.15% Bupivacaine only.

5.4 Patients receiving long term opioids prior to epidural insertion ideally need to be assessed by the anaesthetist pre-operatively. Could you please inform the IPMS of patients who are receiving long term opioids as soon as possible in order to optimise their pain relief post-operatively.

6.0 Management of the Patient Receiving Epidural Infusion Analgesia

6.1 Procedures and monitoring

- All epidural catheters to be inserted, and infusion connected under aseptic conditions following appropriate skin decontamination

- Skill mix, staffing levels and appropriate competencies should be sufficient to ensure safe care of the patient – the nurse in charge of the shift must inform the anaesthetist prior to the start of the list if these criteria cannot be met

- The epidural programme is initiated by the anaesthetist – programming of the pump is carried out by the anaesthetics, recovery staff or pain sister. Subsequent changes to the programme or additional bolus administration are only made by an anaesthetist or the IPMS

- Intravenous access must be obtained prior to commencing EIA and must be maintained at all times whilst EIA is in situ

- If there is an indwelling urinary catheter in place please do not remove before the epidural is discontinued. Removal prior to discontinuation could lead to urinary retention or incontinence due to the effect of the epidural solution on the motor and sensory nerve fibres in the pelvis whilst the epidural is in progress.

- Monitoring required: respiration rate, pulse, blood pressure, sedation score 0-3, pain assessment 0-3, nausea, vomiting, motor function 0-3 (see Appendix B)

- **There is a risk of Local Anaesthetic Systemic Toxicity (LAST)**
    - This occurs when there is an accumulation of the drug. This can be from overdose, or where metabolism of the drug is slowed (the pharmacokinetics of a drug may be altered by existing co-morbidities such as cardiac or hepatic failure, alterations in plasma protein binding, or interactions with other drugs. This can occur at any time.

    - Classic symptoms of LAST include the patients' subjective symptoms due to CNS (Central Nervous System) excitability. LA toxicity signs and symptoms form the basis for patient observation.

- **Early / mild toxicity symptoms**
    - Confusion
    - Vagueness / restlessness
    - Metallic taste
    - Twitching
    - Auditory changes
    - Tingling or numbness in and / or around the mouth
    - Dizziness or feeling light-headed

    - The patient may not divulge these symptoms so always ask if they experience any of the above and ask the patient to let a member of medical staff know immediately if they occur.

- **Severe Toxicity symptoms**

    - From central nervous system (CNS) excitability the patient may experience seizures progressing to CNS depression (coma, respiratory arrest)
    - In higher blood concentrations, cardiac excitability may be followed by cardiac depression (bradycardia, asystole, decreased contractility, and hypotension).

- There may be large variability in LAST clinical presentation.

- The management of LAST can be referred to in the Appendix section. These are the guidelines set out by the Association of Anaesthetists of Great Britain and Ireland (AAGBI) in 2010. They are the most up to date guidelines for the treatment of LAST. Management consists of Recognition, Immediate management, Treatment, and Follow-up. For the infusion of Intravenous Lipid emulsion, which is used in LAST, there is not a set regime for the MEHT Trust. The table and link found in the Appendix section shows details of suggested infusions by the AAGBI. This is not a standard of medical care. The ultimate judgement with regard to a particular clinical procedure or treatment plan must be made by the clinician in the light of the clinical data presented and the diagnostic and treatment options available.

- Early detection remains the most effective way of reducing the frequency and severity of LAST. This is why patient observation is paramount.

- Intralipid 20% solution is stocked in the following areas if required. A&E Majors, Main theatres drug room, Neonatal unit, Day stay theatre, and Burns ICU.

- **When Recording Observations On The Vitalpac System**

    - Total / good tries are to be recorded as **U** (unmeasurable) as they are not required. This measurement has not shown to add clinical significance to pain assessment

    - Sensory block level is to be recorded as **U** (unmeasurable) as they are not required. Sensory block levels are to be measured as required by pain team or anaesthetist

- Integrity of line and condition of insertion site to be checked and recorded daily

- The monitoring should be recorded at 15 minute intervals for first 2 hours, 30 minute intervals for the next 2 hours then 1 hourly for a minimum of 24 hours, changing to 2 hourly as clinically indicated

- The volume to be infused **(VTBI)** of the solution used must be recorded hourly as read from the pump display

- Back pain or headache must be documented and reported to IPMS.

- All monitoring activity and subsequent actions to be recorded in patient notes

- A pressure relieving mattress should be available to reduce risk associated with sensory impairment (low thoracic/lumbar epidurals only)

- The patient will be seen at least once daily by the pain team to make a clinical assessment and for auditing purposes. The patient's progress and further management will then be discussed with the ward staff. Epidural-

related problems that arise at other times must be communicated to IPMS (or on-call anaesthetist out of hours).

- Catheter tip and swab to be sent for MC&S if signs of infection and IPMS to be informed. Patient's condition to be monitored for 48 hours for neurological deficit and signs of systemic infection.

6.2 Technical Problems

Technical problems with the pump must be referred to IPMS or on call anaesthetist as soon as possible. Replacing the infusion bag or the batteries, when needed, should be done by the ward nurse as soon as possible to avoid deterioration of the patient's pain control.

6.3 Discontinuation of Infusion

- Weaning and discontinuation of the EIA/PCEA must be done in liaison with the anaesthetist or IPMS and alternative analgesia provided

- For the removal of the patients' epidural catheter for patients receiving anti-coagulants please follow guideline below

Anti-coagulant	**Epidural catheter can be removed or placed**	**When next dose of anti-coagulant can be given post epidural catheter removal**
Clexane	12 hours after administration	2 hours post removal
High doses of Clexane 1.5mg/kg once daily	24 hours after administration	4 hours post removal
*Rivaroxaban	18 hours after administration	6 hours post removal
Heparin Infusion	2 - 4 hours after infusion stopped. Patients' coagulation status needs to be evaluated prior to removal.	1 hour post removal

*Rivaroxaban is used on the Orthopaedic wards only.

- Removal is carried out using a non-touch technique. Document the date, time of removal, and condition of catheter tip and site in the patients notes.
- Disposal of any remaining EIA/PCEA should be in accordance to the Controlled Drugs Policy 08083

7.0 Infection Prevention

7.1 The infection prevention practice within MEHT is for all staff to have strict hand hygiene before and after patient contact.

7.2 Any equipment must be cleaned between patients unless it is a single use item which will be disposed off appropriately as per the Waste Management Policy.

7.3 Aprons and gloves to be worn as appropriate.

8.0 Non-Compliance with this Guideline

8.1 Ineffectiveness of the EIA/PCEA will lead to inadequate analgesia, poor patient satisfaction, and possible delayed post-operative recovery.

8.2 Untreated adverse effects of EIA/PCEA may lead to opioid overdose with risk of respiratory depression leading to respiratory arrest/death, and/or systemic reaction to local anaesthetic solution leading to critical hypotension and potential renal failure. Unnoticed sensory deficit may lead to undiagnosed spinal migration of the catheter or formation of epidural haematoma or abscess, leading to permanent paralysis or death.

8.3 A Risk event form must be completed for each event of non-compliance with this Guideline.

9.0 Audit & Monitoring

9.1 Each patient receiving PCEA will be assessed at least once daily by the Pain Team. Data recorded will be:

- Patient Satisfaction
- Pain levels
- Motor function score
- Condition of epidural insertion site
- Nausea
- Vomiting incidence
- Any adverse clinical events
- Incidence of non-compliance with the guideline

9.2 Individual incidents of non-compliance are addressed by the Pain Service immediately, and risk assessments done as indicated. Critical incidents to be reported at audit meetings and reviewed by practitioners.

9.3 Ensuing actions are undertaken by the Pain Service to ensure omissions and errors are brought to the attention of the appropriate person(s) and to reduce the risk of repeat: i.e. training and education or system reviews.

9.4 Data are entered onto a central secure database held by the Pain Service and evaluated yearly for trends at a Departmental meeting. Dissemination of data via the appropriate forum (e.g. audit sessions, MDT), is the responsibility of the acute lead Consultant of the IPMS.

9.5 Continuous audit of practice on each ward, and for individual patients, to be carried out by IPMS

9.6 A secure database of all staff trained in the management of epidural infusion analgesia to be kept by IPMS.

10.0 Communication and Implementation

10.1 Corporate services will ensure that the guideline is uploaded to the intranet and the website and notified to staff via Focus.

10.2 The IPMS will post quarterly bulletins to all Trust staff via Focus.

10.3 The IPMS will inform all link nurses of updated guidelines at regular meetings for them to disseminate to their areas/wards.

10.4 The IPMS will inform all Medical staff of revised guidelines via senior medical staff within the IPMS at audit meetings and twice yearly teaching sessions for all FY1 and FY2 doctors. Newly appointed anaesthetic trainees will receive written information in their induction pack.

11.0 References (epidural infusion analgesia)

1. Good practice in the management of continuous epidural analgesia in the hospital setting. *Produced by the Pain Society, in collaboration with the Royal College of Anaesthetists, Association of Anaesthetists of Great Britain and Ireland, Royal College of Nursing, European Society of Regional Anaesthesia and Pain Therapy.* 2004

2. Dougherty L, Lister S (eds). The Royal Marsden Hospital Manual of Clinical Nursing Procedures, 6th ed. 2004, p519-35, Blackwell Oxford (pub)

3. McCaffrey M, Pasero C (eds). In: Pain, Clinical Manual, 2nd ed. 1999, p213-39, Mosby London (pub)

4. NPSA: National Patient Safety Alert/2007/21. www.npsa.nhs.uk

5. DoH Essence of Care. Benchmarks for prevention and management of pain. October 2010

Appendix A
Pain/Sedation and Nausea Measurement Tool

This tool can be used for all patients requiring analgesia. Movement = e.g. patient attempts to touch the opposite side of the bed or deep breathe

Pain Score

Score 0 (none)	No pain at rest, no pain on movement
Score 1 (mild)	No pain at rest, mild pain on movement
Score 2 (moderate)	Intermittent pain at rest, moderate pain on movement
Score 3 (severe)*	Continuous pain at rest, severe pain on movement

* Call doctor or pain team

Sedation Score

Score 0 (none)	Awake and fully responsive
Score 1 (mild)	Occasionally drowsy, easy to rouse
Score 2 (moderate)	Frequently drowsy, easy to rouse
Score 3 (severe)*	Somnolent, difficult to rouse

* Call doctor or anaesthetist

Nausea Score

Score 0	No nausea
Score 1	Nausea
Score 2	Vomiting
Score 3	Refuses treatment

Motor Function

Score 0	Normal power
Score 1	Can’t raise leg
Score 2	Can’t bend knee
Score 3 *	No leg power

* inform anaesthetist/pain team

Appendix B
Epidural Infusion Analgesia (EIA) – Side Effects and Treatment

Local anaesthetic +/- opioid – for effective continuous analgesia for severe pain below the level of thoracic vertebrae 4 (T4)

Side Effect	**Treatment**
Back pain & increasing weakness +/- sedation	Medical emergency until proven otherwise Stop EIA. Call anaesthetist – may be epidural haematoma
Respiratory depression & over-sedation (sedation score 1>2)	Maintain airway High concentration oxygen Consider naloxone Call for assistance Stop epidural infusion Inform IPMS
Hypotension Systolic < 100mmhg* Systolic <80mmhg	Consider causes e.g. hypovolaemia, sepsis, others *If asymptomatic with adequate urine output, monitor only. Seek medical advice if unsure. Give IV fluid bolus, 20 mls/kg Do not stop EIA unless unresolved Give oxygen Stop EIA Lie flat (not legs raised) Call surgical team Call anaesthetist Consider vasopressors
Urinary retention	Catheterise Do not stop EIA Inform IPMS
Lower limb weakness	Call IPMS/anaesthetist Do not stop EIA Vigilant pressure area care Reassure patient
Confusion (may be opioid related hypoxia) – consider other causes	Give oxygen Do not stop EIA Call surgical team Inform IPMS
Numbness after infusion stopped	Monitor, reassure patient Review in 2-4 hours and at 24 hrs Inform anaesthetist/CAPS
Itching	Do not stop EIA Administer topical lotion Consider low dose naloxone Inform IPMS
Unilateral analgesia or numbness	Do not stop EIA Call IPMS/anaesthetist Position onto unaffected side

Appendix C
Table 1

<table>
<tr><th colspan="3">AAGBI Safety Guideline
Management of Severe Local Anaesthetic Toxicity</th></tr>
<tr><td>Step 1

<u>RECOGNITION</u></td><td colspan="2">• Sudden alteration in mental status, severe agitation or loss of consciousness, with or without convulsions
• Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur
• Local anaesthetic (LA) toxicity may occur some time after an initial injection</td></tr>
<tr><td>Step 2

<u>IMMEDIATE MANAGEMENT</u></td><td colspan="2">• Stop injecting / infusing the local anaesthetic
• Call for help, if unresponsive start rescusitation procedures
• Maintain the airway and, if necessary, secure it with a tracheal tube
• Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis)
• Confirm or establish intravenous access
• Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses
• Assess cardiovascular status throughout
• Consider drawing blood for analysis, but do not delay definitive treatment to do this</td></tr>
<tr><td>Step 3

<u>TREATMENT</u></td><td><u>In circulatory arrest</u>

• Start cardiopulmonary resuscitation (CPR) using standard protocols
• Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment
• Consider the use of cardiopulmonary bypass if available

Give intravenous lipid emulsion (following the regimen below)
• Continue CPR throughout treatment with lipid emulsion
• Recovery from LA-induced cardiac arrest may take >1 h
• Propofol is not a suitable substitute for lipid emulsion
• Lidocaine should not be used as an anti-arrhythmic therapy</td><td><u>Without circulatory arrest</u>

Use conventional therapies to treat:
• hypotension
• bradycardia
• tachyarrhythmia

Consider intravenous lipid emulsion(following the regimen below)
• Propofol is not a suitable substitute for lipid emulsion
• Lidocaine should not be used as an anti-arrhythmic therapy</td></tr>
<tr><td>Step 4

<u>FOLLOW-UP</u></td><td colspan="2">• Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved
• Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days
• Report cases as follows:
• in the United Kingdom to the National Patient Safety Agency (via www.npsa.nhs.uk)
• If Lipid has been given, please also report its use to the international registry at www.lipidregistry.org. Details may also be posted at www.lipidrescue.org</td></tr>
</table>

Appendix C
Table 2: Suggested regime for Lipid emulsion from the AAGBI (2010)

Immediately		
Give an initial intravenous bolus injection of 20% lipid emulsion 1.5 ml.kg^{-1} over 1 min	and	Start an intravenous infusion of 20% lipid emulsion at 15 ml.kg^{-1}.h^{-1}
after 5 min		
Give a maximum of two repeat boluses (same dose) if: • cardiovascular stability has not been restored or • an adequate circulation deteriorates Leave 5 min between boluses A maximum of three boluses can be given (including the initial bolus)	and	Continue infusion at same rate, but: Double the rate to 30 ml.kg^{-1}.h^{-1} at any time after 5 min, if: • cardiovascular stability has not been restored or • an adequate circulation deteriorates Continue infusion until stable and adequate circulation restored or maximum dose of lipid emulsion given
Do not exceed a maximum cumulative dose of 12 ml.kg^{-1}		
An approximate dose regimen for a 70-kg patient would be as follows:		
Immediately		
Give an initial intravenous bolus injection of 20% lipid emulsion 100 ml over 1 min	and	Start an intravenous infusion of 20% lipid emulsion at 1000 ml.h^{-1}
after 5 min		
Give a maximum of two repeat boluses of 100 ml	and	Continue infusion at same rate but double rate to 2000 ml.h^{-1} if indicated at any time
Do not exceed a maximum cumulative dose of 840 ml		