CLINICAL

EPIDURAL INFUSION ANALGESIA POLICY AND MANAGEMENT PROTOCOLS FOR ACUTE HOSPITAL CARE

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# Policy Development, Review and Control Policy

## Version Control

<table>
<thead>
<tr>
<th>Version Number</th>
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<tr>
<td>1.0</td>
<td>Version Control introduced July 2011 and the previous versions of the policy, prior to this date are available on the Electronic Document Store.</td>
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<tr>
<td>2.0</td>
<td>Annual Policy review Sixth version Policy updated to include: -Version control -Sections to enhance distinction between policy, protocols, principles of best practice and procedural guidelines. -Protocols updated following introduction of epidural infusion analgesia in the Paediatric and Palliative care setting. - Reference to NHS Tayside Informed Consent Policy 2009 -Reference to “This is me” and “All about me” documents.</td>
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1. PURPOSE AND SCOPE
The purpose of this document is to set out the standards and recommendations for practice in NHS Tayside, which aim to ensure that Health Professionals are able to comply with both local and national guidance on the care of patients receiving epidural infusion analgesia.

This policy applies to medical staff, registered nurses and midwives who care for patients receiving epidural infusion analgesia in NHS Tayside Acute Hospitals.

Epidural analgesia is an invasive technique involving the administration of pain relieving drugs into the epidural space. Epidural analgesia is highly effective for controlling acute pain during labour or after surgery or trauma to the chest, abdomen, pelvis or lower limbs (Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine 2010, Rigg et al 2002, Block et al 2003 and Guay 2006).


In cancer pain, interventional techniques such as epidural infusion can provide appropriate analgesia where opioids have been ineffective or give undesirable side effects (Bhaskar, 2012)

2. STATEMENT OF POLICY

Epidural analgesia is not without risk. Complications that can occur range from trivial to life-threatening or result in permanent harm (Royal College of Anaesthetists, 2009). Health care professionals must have the knowledge of the factors that enhance the risk of complications hence leading to safe and effective, evidence based practice (NHS QIS, 2004).

The recommendations for practice contained within this document will :-

- Promote and utilise evidence based practice.
- Help staff to manage pain effectively.
- Ensure that all staff involved in patients receiving epidural infusion analgesia can provide safe care.
- Set out actions and treatments, which can help recognise and prevent complications.
- Set out actions and pharmacological treatment of problems associated with epidural infusion analgesia.
- Ensure uniform practice throughout NHS Tayside acute hospitals in relation to epidural infusion analgesia.
3. RESPONSIBILITIES AND ORGANISATIONAL ARRANGEMENTS

CLINICAL SERVICE MANAGERS, HEADS OF PATIENT CARE AND NURSING SERVICES AND SENIOR CHARGE NURSES Will...

Ensure that all patients receiving continuous epidural analgesia are nursed in designated clinical settings ie, HDU, ICU and wards that have been designated to provide epidural analgesia care.

Ensure 24 hour availability of staff on site to deliver care who have successfully completed NHS Tayside Clinical Skills Programme, Management of Patients Requiring Epidural Infusion.

Ensure records of epidural analgesia competency and infusion device training are kept locally.

MULTIPROFESSIONAL TEAM.

Each member of the multi professional team will...

Act in compliance within their code of professional conduct.

Follow agreed Drug Administration, Intravenous and Epidural policies and guidelines.

Adhere to Safe and secure Handling of Medicines Manual 2008

Maintain and update their knowledge and skills regarding epidural analgesia.

Demonstrate competency in the use of equipment associated with epidural analgesia.

Utilise appropriate monitoring chart and document effectiveness of epidural analgesia.

Ensure that suitable alternative analgesia is prescribed prior to discontinuing the epidural thus adhering to NHS Tayside Pain Management Guidelines.

ANAESTHETIST.

The anaesthetist will...

Provide pre-operative assessment of suitability for epidural analgesia.

Prescribe epidural medication as per protocol. (See Section 1, p8)

Ensure that the appropriate equipment is selected for epidural analgesia. (See Section 1, p8)

Ensure that the epidural pump is programmed correctly and connects the administration set to the patient.

Assist the Anaesthetic service to provide out-of-hours advice/support for the provision of epidural analgesia.
THE ACUTE PAIN NURSE/TEAM

The Acute Pain Nurse/Team will...

Ensure that local policies, protocols and guidelines are followed throughout duration of epidural analgesia.

Provide education and support to all staff undertaking care of the patient with epidural infusion analgesia.

Advise staff on achieving optimal analgesia and appropriate management of side effects.

Ensure protocols/guidelines for safe administration of epidural analgesia are developed and reviewed annually.

Ensure that annual maintenance of equipment is implemented.

Develop and evaluate epidural services in line with current practice.

Carry out annual epidural safety audit as per National Patient Safety Agency (2007).

RESPONSIBILITIES OF REGISTERED NURSES AND MIDWIVES.

The Registered Nurse/Midwife will...

Ensure that he/she has attended an epidural training session and has completed the competencies within the clinical skills epidural training programme and deemed competent by an appropriate assessor.

Fully understand the application of the epidural equipment in use including the electronic infusion device and be competent in its use.

Attend an annual update and maintain knowledge and skills in relation to epidural infusion analgesia including the electronic infusion device.

Ensure that he/she is aware of the assessment techniques, potential complications of epidural analgesia and be able to act as per recommendations for practice and implement treatment as per protocols. (See over for paediatric/midwifery exceptions)

Complete regular assessments and reinforce education of epidural analgesia to the patient.

Monitor and record observations following recommendations for practice and document on appropriate chart.

Keep the anaesthetic record by the patient’s bedside for the first 24 hours.

Check infusion pump is delivering correctly as per NHS Tayside Patient Equipment Management Policy

Adjust the parameters of the infusion rate within prescribed limits according to the level of pain or as indicated by the protocols, eg when the sensory block is too high. (Except Registered Paediatric nurses and Midwives – contact anaesthetist)
Report any relevant clinical problems to the Acute Pain Nurse or Anaesthetic staff as indicated in the protocols.

Ensure that any technical faults with equipment are reported and that appropriate action is taken.

Ensure that the patient receives adjunct analgesia as appropriate ie Paracetamol and NSAIDs (if not contra-indicated).

Ensure appropriate analgesia is administered before stopping the epidural infusion.

Remove the epidural catheter as per protocol and document the time of removal.

Continue motor block assessment and inspect the epidural catheter site for 24 hours following removal of catheter. Document these observations on designated chart.

Provide written information for the patient outlining what worrying features might develop following removal of the catheter. Patient Information Leaflet LN0442

IN ADDITION, Anaesthetic and recovery nurses will...

Keep a record of the patients currently receiving epidural analgesia, the pump being used (ID Number), the patients ward and the date the pump was issued in the logbook.

Ensure appropriate equipment is selected for epidural analgesia. (See Section 1, p8).

Paediatric / Midwifery exceptions...

Registered Paediatric nurses and Midwives will be aware of the protocols but on identifying a problem, their first point of contact will be the Anaesthetist.

RESPONSIBILITIES OF THE CLINICAL PHARMACIST.

The Clinical Pharmacist will...

Provide prompt, accurate and up-to-date medicines information.

Monitor epidural prescribing.

MEDICAL PHYSICS RESPONSIBILITIES.

Medical Physics Staff will...

Provide support and advice on all infusion devices.

Ensure that devices are maintained in accordance with manufacturer’s recommendations.

Implement agreed local configuration of epidural devices.

Ensure effective systems are in place for annual service of epidural devices.
SECTION I. PROCEDURAL PROTOCOLS.

1. PATIENT SELECTION AND CONSENT.

Patient selection for epidural analgesia will be based on careful risk/benefit analysis for each patient.

Specific consent should be obtained and include a discussion of the risks and potential benefits of epidural analgesia as well as the features of other options for post-operative analgesia. This will be documented on the anaesthetic record (The Royal College of Anaesthetists, 2010). Health Professionals must comply with NHS Tayside Informed Consent Policy 2009.

Written information should be provided where possible (NHS QIS, 2004). A leaflet entitled Epidurals for Pain Relief After Surgery is available for this purpose. (The Royal College of Anaesthetists and The Association of Anaesthetists Great Britain and Ireland, 2004).

Rationale: Continuous epidural analgesia carries risks over and above those associated with general or regional anaesthesia for surgery.

2. PATIENT LOCATION.

Patients receiving continuous epidural analgesia must be nursed in a setting that allows close supervision of the patient. They must be nursed in designated wards or areas where staffing levels allow patients to be monitored as stated in Section 2, p11.

Continuous epidural infusion analgesia should only be administered on wards or units where the technique is employed frequently enough to ensure expertise and safety. (The Royal College Of Anaesthetists, 2010).

Rationale: Epidural analgesia can cause serious, life-threatening complications and its safe, effective management requires close monitoring of the patient throughout the period of continuous infusion.

3. INFUSION SOLUTIONS AND STORAGE

Where possible, ready prepared, standard solutions for epidural analgesia must be used (See Protocol number 1). Variation from these protocols may be necessary in exceptional circumstances, for example in palliative care setting. The rationale for this should be documented in the patient’s notes.

Epidural infusion bags must be clearly marked FOR EPIDURAL USE ONLY. Use labels provided by Fresenius Kabi.

Epidural infusion bags must be stored separately from other intravenous infusion solutions. Ampoules of local anaesthetic for “top up” must be stored in a locked cupboard. Intralipid infusion bags must be available where epidural infusions are managed.
Rationale: A number of risks are related to epidural injections and infusions, including how the medicines and devices are labelled and stored. Classic error involves the switch between the intravenous and epidural route. Accidental administration via the wrong route can be fatal. Managing these risks successfully will make patient care safer. (National Patient Safety Agency 2007 and The Royal College of Anaesthetists 2009).

4. DEDICATED EQUIPMENT

The infusion device must be used exclusively for epidural analgesia or, if not, the pump should be marked clearly that it is for epidural infusion (The Royal College of Anaesthetists, 2004 and National Patient Safety Agency, 2007).

The Abbott Gem Star pump is the recognised epidural infusion pump in NHS Tayside. In Ninewells they are yellow or blue. PRI ONLY YELLOW pumps are used for epidural.

Specific handbooks should be available to all users of the device.

The epidural infusion administration set must be clearly identifiable (coloured yellow) with an anti-syphon valve and bacterial filter attached.

Label the administration set “epidural” near to the bacterial filter.

5. PRESCRIPTION FOR EPIDURAL ANALGESIA INCLUDING PCEA

The standard solution for use for post-operative pain or chest trauma is:

Levobupivacaine 0.1% with
Fentanyl 2 micrograms per ml
This comes ready prepared in 250ml bags marked for EPIDURAL USE ONLY.

Prescriptions for epidural analgesia should be clearly written on the Tayside Prescription and Recording sheet (TPAR) and the epidural chart (PCEA bolus).

The prescription should state the drug(s), concentrations(s) and dilutant and infusion range. PCEA bolus dose and lockout time should also be recorded on the chart.

- Rate of infusion 5mls – 20mls per hour
- Bolus 5ml
- Lockout 15 minutes

Where Fentanyl is not required in the epidural solution, please note the concentration of Levobupivacaine and size of bag changes. **Levobupivacaine 0.125% - 200ml bag.**

Prescription for Epidural Analgesia in Maternity - This can be written on the epidural prescription chart
The standard solution is:
Levobupivacaine 0.1%
Fentanyl 2 micrograms per ml

- No continuous infusion
- Bolus 10mls OR Bolus 15mls
- Lockout 30 minutes Lockout 45 minutes
Note: No other opioids should be prescribed while the patient is receiving opioid epidural analgesia unless the patient has had recent exposure to high doses of opioid. The Acute Pain Team/Nurse should be made aware of such a patient.

Where appropriate, adjunct analgesia such as Paracetamol and NSAIDs as well as prophylactic anti-emetics should be prescribed.

5. TREATMENT PROTOCOLS –Section 4, p24-35

The treatment protocols stipulate the locally agreed actions, prescriptions, management of side-effects and complications. Deviation in practice from the protocols must be explicitly explained and documented in the patient’s notes.
SECTION 2

PRINCIPLES FOR BEST PRACTICE

1. PATIENT OBSERVATIONS

This section is applicable to all healthcare professionals for information.

Paediatric practitioners:- refer to paediatric epidural protocol p22 for frequency of observations.

Palliative care practitioners will be given specific instructions with regards individual patient centred care the Consultant for Palliative Medicine or Consultant Anaesthetist, Chronic Pain.

The frequency and timing of patient observations will depend on the patients’ condition. However, if stable, the following is recommended.

In Recovery:
The patient’s blood pressure, pulse rate, respiratory rate, oxygen saturation, pain, sedation and nausea scores should be recorded every 15 minutes.
Infusion rate, sensory block level and degree of motor block, HOURLY.
The patient’s temperature is recorded HOURLY.

In HDU/ICU or Wards:
The patient’s blood pressure, pulse rate, respiratory rate, oxygen saturation, pain, sedation and nausea scores, infusion rate, sensory block and degree of motor block should be recorded HOURLY during the day.

At night, blood pressure, pulse rate, respiratory rate and infusion rate can be recorded HOURLY without disturbing the patient.

Pain scores, sedation score, level of sensory block and degree of motor block can be assessed 2 HOURLY if stable.

Temperature should be recorded at least 4 hourly while the epidural catheter is in situ.

After 24 hours
Unless there is cause for concern, or the epidural infusion has required intervention such as change of rate or “top up”, 2 hourly observations are acceptable.

Following epidural “top-up” by anaesthetist
Blood pressure should be checked every 5 minutes for a period of 20 minutes.
A nurse/midwife should stay with the patient and observe for this period of time.
The Anaesthetist will observe the patient closely during administration of the bolus dose and should remain in the vicinity for 20 minutes afterwards.

Maternity setting
The midwife will carry out the above observations after the lady activates PCEA bolus (A larger bolus dose is programmed in maternity).

Rationale:
To promote early detection and intervention for adverse effects.
Local anaesthetic can block sympathetic outflow leading to vasodilation and hypotension. These effects are compounded by any hypovolaemia. Prolonged hypotension can lead to spinal cord ischaemia (The Royal college of Anaesthetists, 2009).
Detection of epidural catheter migration will be prompt and appropriate as per protocols.
Migration of the epidural catheter into the subarachnoid space may produce profound hypotension accompanied by light-headedness, bradycardia and decreased muscle tone.
Migration of the epidural catheter into a blood vessel can be detected early by patient’s report of numbness of the tongue and lips, light-headedness, slurring of speech, tinnitus and blurred vision. Bupivacaine is cardiotoxic and contractility of the myocardium is reduced leading to hypotension and cardiovascular collapse (Park et al, 2000). Levobupivacaine has, therefore, replaced Bupivacaine throughout NHS Tayside, as it is less cardiotoxic.

TREATMENT FOR LOCAL ANAESTHETIC INDUCED CARDIAC ARREST SEE Section 4, p34-35
There are boxes containing Intralipid infusion, administration sets and dose guidelines for administration in all areas where Epidural Infusions are managed.

MANAGEMENT OF HYPOTENSION: – Refer to treatment protocol 4, p27.

PAIN ASSESSMENT:
All patients should have their pain assessed, recorded and treated. Where possible, patients should actively participate in the assessment process (NHS QIS, 2004).

Please refer to the assessment chapter in NHS Tayside Pain Management Guidelines describing alternative pain assessment tools for those patients unable to communicate, for example language barriers, learning disabilities, patients with dementia, Refer to “This is me” / “All about me” documents for patients with dementia and learning disabilities.

Using the pain tool on the epidural chart, assessment of pain should be made:
• At rest – patients own verbal assessment.
• On movement – ask the patient to reach across to the opposite side of the bed.
• On deep breathing/coughing and the worst score should be recorded.

Rationale: Pain is not always reflected in the patient’s vital signs (McCaffery and Pasero, 1999). The epidural infusion may need some adjustments to obtain optimum analgesia.

Following cessation of the epidural infusion:
Pain assessment should be carried out HOURLY for 8 hours following discontinuation of the epidural infusion in order to quickly identify analgesic gaps during the transition from one analgesic modality to another. NHS Tayside Pain Assessment Chart THB(MR268) should be used to document evaluation of epidural step-down analgesia and patients’ ability to achieve activity goals.
In addition, pain assessment should continue to be carried out and documented, along with routine observations of temperature, pulse and blood pressure and recorded on SEWS.

Rationale: Epidural step-down audit has demonstrated that problems with pain management following discontinuation of epidural infusion commonly occur within 8 hours. Increased accuracy in the documentation of pain and symptom control has been shown to improve overall patient satisfaction with pain management (Bouvette et al, 2002)

Continue to administer Paracetamol and NSAID’s if appropriate.

Rationale:
Multi-modal or balanced analgesia is advocated in order to enhance analgesia while minimising side effects and reducing opiate requirement. (Kehlet and Werner, 2003).
Troubleshooting Pain Management: Refer to treatment protocol 2, p25

SEDATION SCORE AND RESPIRATORY RATE.

The frequency of these observations was described previously. Routine observations should continue following cessation of the epidural infusion.

Rationale: Respiratory rate.
Administration of opioid into the epidural space in the thoracic region or intrathecal administration appears to increase the risk of respiratory depression. The most likely cause is that a reservoir of less lipid soluble opioids remains in the CSF and may be distributed to higher centres. For example with Morphine, respiratory depression may occur up to 24 hours after administration and up to 12 hours with Diamorphine (Park et al, 2000).

Rationale: Sedation score.
Monitoring sedation score is the key to preventing respiratory depression as sedation almost always precedes respiratory depression (McCaffery and Paser 1999, Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine, 2010).

Epidural catheter migration
The epidural catheter may enter a blood vessel in the epidural space. Epidural opioids may be absorbed systemically resulting in increased sedation and respiratory depression. Signs of local anaesthetic toxicity may also emerge as described previously (Chapman, 2001).

Troubleshooting Over-Sedation and Respiratory depression: - Refer to treatment protocol 5, p 28.

SENSORY BLOCK LEVEL:

Upper and lower levels of sensory block are tested on conscious, co-operative patients by touching their skin with a block of ice and asking if they feel cold at the point of contact. The patient will not appreciate any temperature change at the level of the epidural block but will appreciate cold above and below this area. The epidural chart provides details of dermatome levels to assist with determining the sensory block height.

Note: Ethyl Chloride spray is recognised for use in testing regional blocks, however, beware of hazards associated with it. For example, flammable – it is heavier than air and vapour may hug the ground making distant ignition possible. Even static discharge can spark a fire. Ethyl chloride spray in glass containers has been withdrawn from use in NHS Tayside as the glass container can shatter when exposed to direct sunlight. Cryogesic has the same active ingredient but its presentation in an aerosol can allows it to be stored at temperatures up to 50°C. (See packaging for storage and handling details).

Use ice where available and practical.

Rationale: Increasing sensory block or an inappropriately high sensory block can indicate epidural catheter migration into the subarachnoid space. Sympathetic blockade, T1 – T4 may result in significant hypotension and bradycardia (Park et al, 2000).

Trouble shooting sensory block: - Refer to treatment protocol 7, p30
MOTOR BLOCK:

Early recognition of neurological abnormality is critical in diagnosing spinal cord ischaemia, epidural haematoma or abscess. Treatment must be instigated without delay on the onset of symptoms in order to give the patient the best chance of recovery of neurological function (Williams and Wheatley 2000, Meikle et al 2008, The Royal College of Anaesthetists 2009).

The degree of motor block should be assessed using the Bromage scale (Bromage 1978).

Score 0 = No motor block. Full flexion of knees and feet
Score 1 = Inability to raise extended leg, just able to move knee
Score 2 = Inability to flex knee, able to move feet only
Score 3 = Unable to move feet or knees

Ask the patient to flex knees and ankles and rate their movement according to the Bromage scale.

It is important to check motor block prior to mobilising patient to ensure they are safe to ambulate.

Pressure areas should also be checked as even although low concentration of local anaesthetic is used in epidural infusion analgesia, patients might experience reduced sensation in buttocks and lower limbs.

Thoracic epidural should not cause profound leg weakness. Increasing leg weakness may be due to either the local anaesthetic infusion or a spinal cord injury. Differentiation is achieved by switching off the epidural infusion – failure to recover suggests spinal cord injury. If not diagnosed and treated promptly, this will lead to paraplegia. Switching off an epidural due to dense block or worsening block should trigger an urgent review by a Senior Anaesthetist (Senior Trainee PRI, Senior Registrar Ninewells) or Consultant Anaesthetist.

Trouble shooting motor block:- Refer to treatment protocol 6, p29

IMPORTANT : A BROMAGE SCORE OF 2 OR 3 MUST BE TREATED WITH A HIGH DEGREE OF SUSPICION AND REQUIRES URGENT ACTION. PROTOCOL 7 MUST BE INSTIGATED IMMEDIATELY.

Bromage 2 or 3
Ward/ HDU/ICU

Instigate treatment protocol 6.

• STOP the epidural infusion, documenting the time it is stopped on the epidural chart.
• Continue to use the chart to record pain, nausea, sedation and Bromage scores.
• Contact the Acute Pain Team or the “on call” Anaesthetist and inform them of the situation
• Reassess motor block every 15 minutes and record Bromage scores on the chart.

IF SURGICAL PAIN RETURNS, CONSIDER ALTERNATIVE ANALGESIA WHILE WAITING FOR MOTOR BLOCK TO REGRESS FOR EXAMPLE IV MORPHINE BOLUS.
IF BROMAGE SCORE STILL 2 OR 3 AFTER 1 HOUR OF STOPPING THE EPIDURAL INFUSION:
Contact the Acute Pain Team who must request an urgent review by a Consultant Anaesthetist.

OR
Out of hours or weekends:- Contact Senior Anaesthetist (Senior Trainee or Registrar) or Consultant Anaesthetist, via switchboard, for urgent review of the patient.

IF BROMAGE SCORE STILL 2 OR 3 AFTER 2nd HOUR OF STOPPING EPIDURAL – TREAT AS NEUROSURGICAL EMERGENCY.

- The patient must be seen by the Senior Anaesthetist or Consultant Anaesthetist without delay. Continue to pursue their attention even if they are busy in theatre.
- **Important:** Document in the patients notes all TIMES, TELEPHONE CONVERSATIONS, FACE TO FACE CONVERSATIONS, STAFF NAMES AND GRADE.
- Keep the patient nil by mouth.
- With-hold any prescribed anticoagulant eg Fragmin.

A definitive diagnosis is best made with MRI rather than CT (Meikle et al 2009; The Royal college of Anaesthetists 2009). This is not always available out of hours in Tayside.

- The Consultant Anaesthetist must contact on call radiologist and request an URGENT MRI at this point.
- Neurosurgeons must be informed of suspected neurosurgical emergency and involved in discussions.

**Bromage 2 or 3**
**In Theatre Recovery.**
The use of high concentration local anaesthetic solutions intra-operatively may lead to dense motor block in recovery, however, recovery of motor block should be expected within 4 hours (The Royal College of Anaesthetists, 2009).

- Bromage score of 2 or 3 should be reported to the responsible Anaesthetist and an informed decision made based upon clinical expectation.

**If the block is denser than expected, instigate protocol 7. Keep patient in recovery.**

- If motor block is attributed to recent bolus dose of epidural drugs, continue HOURLY motor block assessment and Contact Anaesthetist again after 2 hours if no improvement in Bromage score (Meikle et al 2008). Do not return the patient to the ward/HDU without discussion/instructions from Senior Anaesthetist.

**Regression of motor block**
If motor block has regressed to Bromage score 0 or 1, Contact the Acute Pain Team or the Anaesthetist for instruction. It is usually suitable for the epidural infusion to go back on at half the previous rate. This can then be re-titrated to achieve analgesia.
Catheter migration into the subarachnoid space can result in a very dense and persistent block that is often unilateral. However, unilateral block is not exclusively caused by catheter migration and may be as a result of epidural haematoma. If a subarachnoid block is suspected, it is unwise to restart the epidural infusion (The Royal College of Anaesthetists, 2009).
ANAESTHETIC RECORD

Keep the anaesthetic sheet by the patient’s bedside for the first 24 hours of the epidural infusion eg.in the patient’s folder.

RATIONALE

Valuable information can be found on the anaesthetic sheet to assist when troubleshooting epidural infusion analgesia. For example, depth and ease/difficulty of catheter insertion, how well the epidural infusion worked during surgery, drugs and the doses administered via the epidural catheter etc.

IV ACCESS.

IV access should be obtained prior to insertion of the epidural catheter and should be maintained for the duration of the infusion (NHS QIS, 2004). The IV site should be checked during routine observations. IV access should also be maintained for 12 hours after cessation of the infusion in post-operative patients.

Rationale: To allow drugs and fluids to be administered to promptly treat any side-effects of epidural analgesia and step-down analgesia.

URINARY CATHETERISATION.

Urinary catheterisation is routine for most patients receiving epidural analgesia. Patients who are not catheterised routinely must be monitored for urinary retention.

If epidural analgesia is the only indication for urinary catheterisation, the urinary catheter should be removed within 4 hours of removing the epidural catheter. The patient should subsequently be observed for urinary retention.

If the patient does not pass urine for 6 hours following removal of the urinary catheter, appropriate action should be taken.

Rationale: Post-operative urinary retention is common and both local anaesthetics and opioids may contribute to this. If left untreated, it can cause permanent detrusor muscle damage (Rosseland et al, 2002).

INFUSION DEVICE MANAGEMENT.

Staff must also refer to NHS Tayside Patient Equipment Management Policy, 2011.

Two qualified staff (medical staff or registered nurses) must verify the epidural infusion programme and drug label against the prescription:

- At commencement of the infusion
- At every shift change
- After any alteration of the infusion.

The epidural infusion device readings should be recorded every hour (NHS Tayside 2011).

- Rate of infusion.
- Total volume infused.

2. EPIDURAL CATHETER CARE, LINE CARE AND DRESSINGS.

The main principles in the management of the epidural catheter are; reducing the risk of infection, monitoring for signs of infection and security of the epidural catheter.

REDUCING THE RISK OF INFECTION.

Thoroughly disinfect the skin with Chlorhexidine 0.5% in 70% alcohol and allow to fully dry prior to insertion of the epidural catheter.

Use aseptic technique when manipulating the catheter, inspecting or changing the dressing and when changing the drug reservoir bag and administration set.

**Rationale:** Alcohol based Chlorhexidine antiseptic solutions significantly reduce the likelihood of catheter and site colonisation when compared to other solutions (Hebl, 2006). Microbes are more likely to gain access to the epidural space from the skin through the catheter insertion site (Kindler et al, 1998, Christie and McCabe 2007). Effective hand decontamination results in significant reductions in the carriage of potential pathogens on the hands and logically decreases the incidence of preventable hospital acquired infection (Pratt et al, 2001).

Always use a bacterial filter and keep changes to a minimum to avoid breaking a closed system. The filter is left for the duration of the infusion. In the palliative care environment an additional filter is applied to the epidural line by the Anaesthetist.

**Rationale:** The catheter hub is regarded as one of the main points of entry for microorganisms. The bacterial filter acts as a barrier for bacteria present in the infusing solution and prevents particulate material from reaching the epidural space. Frequent changing of filters carries an increased risk of introducing catheter hub contamination (DeCicco et al, 1995, Mercadente 1999). Sims Portex Ltd., unpublished data 1998, recommends that the filter is effective for 96 days. DeCicco et al, 1995 tested the portex bacterial filter and found it maintained antimicrobial function for a period of 60 days.

**Duration of infusion.**

It is current practice to continue epidural infusions for the minimum duration of 48 hours. The risks/benefits of continuing epidural analgesia should be considered daily and documented in the patient’s notes. From day 5 and beyond consider the risks/benefits of re-siting the epidural. Clearly document the reason for continuing the existing epidural infusion.

Patients must be given written information indicating which symptoms might develop signifying epidural abscess. Patient information Leaflet LN0442

**Rationale:** The association between the duration of epidural catheterisation and risk of epidural abscess is presumed but not proven (Grewal, Hocking and Wildsmith 2006, NAP3 2009). A low incidence of infection rate is quoted where epidural catheterisation duration is maximum 48 hours (The Royal college of Anaesthetists, 2009). Symptoms of epidural abscess may appear between 1 and 60 days with a mean incidence at 5 days (Breivik, 1998). An abscess may not present until after discharge from hospital, even up to 4 months after epidural catheterisation (The Royal College of Anaesthetists, 2009).

Change the infusion bag every **24 hours.** (Ready made bags supplied by manufacturer)
Rationale: Medicines that have undergone reconstitution, dilution or addition may have limited stability and therefore administration may require to be completed within a specific timescale (CRAG, 2002).

Palliative care.
Recommendations by CRAG, 2002, states Infusion bags prepared in near-patient areas, must be administered immediately to reduce risk of infection and infused within 12 hours

Local policy, supported by risk assessment states, infusion bags can be replaced every 24 hours, to minimise the frequency of breaks in the closed system.

MONITORING FOR SIGNS OF INFECTION.

Examine the epidural catheter site at least once per shift and continue for 24 hours post removal of the epidural catheter. Use epidural catheter removal chart to record.

Continue motor block assessment 4 hourly for 24 hours after removal of the epidural catheter.

Report any signs of redness, tenderness at site, backache and leg weakness to the Acute Pain Team / on-call Anaesthetist.

Detect catheter displacement, check for leakage and observe dressing integrity.


SECURITY OF THE EPIDURAL CATHETER.

The Dressing
The dressing is required to secure the catheter in place, provide protection against microbial infection and allow clear inspection of the exit site and epidural catheter markings.

Suggested dressing
The Lockit® epidural catheter clamp is commonly used and comes as part of the epidural catheter insertion pack (SIMS Portex Limited). This efficiently secures the catheter to the patient at the insertion site leaving a small clear area to allow inspection of the site.

Transparent semi-permeable, polyurethane dressings (eg Tegaderm®, Opsite®) provide waterproof protection while allowing moisture from the skin to escape. This covers the Lockit clamp forming a window.

The remainder of the catheter is taped up the patient’s back to the shoulder using Mefix® type tape

The epidural catheter is known to easily disconnect from the bacterial filter. Any loose tubing is carefully coiled and taped to the patient’s upper chest. A gauze swab may be used as padding between the filter and the patient for comfort. Taping the filter to the patient can reduce the risk of disconnection when the patient moves.
Dressings should be left undisturbed unless they become contaminated, detached or the site cannot be seen clearly.

Rationale: Minimal disturbance of the dressing will reduce the risk of infection (Pratt et al, 2001). This will also reduce the risk of catheter displacement.

3. TROUBLESHOOTING EPIDURAL CATHETER CARE.

LEAKING EPIDURAL.

1. If the patient is comfortable – this would suggest that the epidural is still working. The dressing should be reinforced with sterile gauze and the leakage observed.
2. If the patient is experiencing pain – Contact the Acute Pain Team.

ACCIDENTAL DISCONNECTION FROM THE BACTERIAL FILTER.

Above all, try to avoid catheter disconnection from the bacterial filter by ensuring that the filter is secured to the patient prior to movement.

When disconnection is noted:
- Suspend the infusion
- Wrap the ends in sterile gauze.
- Contact the Acute Pain Team /on-call Anaesthetist immediately

The following options will be considered by the Anaesthetist.

Option One
Re-connect the epidural catheter to the bacterial filter.

Rationale: There may be an area distal to the disconnected end of an epidural catheter where its interior remains sterile for at least 8 hours. Such an area exists only when the fluid in the catheter remains static (Langevin et al, 1996). Alternative analgesia may be inappropriate at this time.

This process is described in procedural guideline number 2, p 37.

Option two
Remove the epidural catheter

Rationale: It may be safer to discontinue the epidural infusion to avoid risk of introducing infection into the epidural space. Alternative analgesia must be discussed with the anaesthetist.

Note: The epidural catheter may not be able to be removed immediately due to the timing of doses of low molecular weight heparin eg Fragmin. (see section 4, p 24, removal of the epidural catheter). In which case to “close” the system again, the epidural catheter can be reconnected to the filter and a cap attached to the end. See procedural guideline number 2, p 37.
4. WHEN TO STOP EPIDURAL ANALGESIA.

The length of time that patients require epidural analgesia may vary, depending on, the type of surgery performed, the patient’s condition and their response to pain.

The Acute Pain Team recommends a minimum duration of 48 hours for post-operative pain or pain due to trauma.

**Rationale:** 24 - 48 hours is recommended to attenuate the stress response (Holte and Kehlet, 2002).

At a period of less than 48 hours, the risks of epidural catheter insertion, are considered by the Acute Pain Team, to outweigh the short-term benefit of epidural infusion analgesia.

Before making the decision to stop the epidural infusion, consider the following:

- How long the epidural has been running in relation to the expected duration of acute pain episode and the optimum duration of the epidural.
- Consider the route available for alternative analgesia and whether the patient will be able to tolerate this.
- Individual patient issues for example, opiate tolerance/dependency, renal impairment, previous side-effects with analgesia.
- **ANTICIPATE.** Where possible make the plan for step-down the day before so that the new analgesic modality can be commenced early in the morning.

Step-down analgesia regimes vary and can be speciality specific for example, Maternity, colorectal surgery, orthopaedics or based on individual patient needs such as with opioid tolerant patients.

*Anaesthetists or members of the Acute Pain Team will advise appropriate epidural step-down analgesia. Local protocols are also available. Enquire within your own ward/unit.*

**Patient Controlled Analgesia**

If PCA is selected for step-down, the PCA must be set up prior to stopping the epidural infusion. Morphine IV bolus up to 10mg should be prescribed for breakthrough in anticipation. Staff should respond quickly to the patient’s report of uncontrolled pain.

**Oral analgesia**

Oral analgesia should be administered one hour prior to stopping the epidural infusion. Suitable breakthrough analgesia should also be prescribed in anticipation.

**Analgesia gaps.**

The patient, as well as the staff caring for the patient should be made aware that an analgesia gap can occur at an unpredictable time following epidural infusion cessation. Regular pain assessment is therefore continued for 8 hours following cessation of the epidural infusion (see page 12).

A response plan (breakthrough analgesia) should be discussed with both the patient and ward staff to ensure prompt treatment of acute pain (Vikers et al, 2009).

Refer to NHS Tayside Pain Management Guidelines and analgesic ladder.
5. REMOVAL OF THE EPIDURAL CATHETER.

Refer to procedural guideline number 1, p 36.

The epidural catheter can be removed by Registered nurses/midwives on the ward who have had instruction and demonstration using the above procedural guideline.

**Timing**

The epidural catheter must not be removed until a safe period of time has elapsed since the administration of an anti-coagulant (See treatment protocol 1, p 24).

**Rationale:** Neurological complications are rare (Giebler et al, 1997). However, risk of epidural haematoma is increased in patients with disturbed coagulation. Patients receiving epidural infusion analgesia are frequently on low molecular weight heparin, eg Fragmin, for thromboprophylaxis. Epidural catheter removal should be avoided within 12 hours of previous dose of LMWH and subsequent doses should be withheld for 2 hours (SIGN Guideline 122 2010, Horlocker et al, 2010)

**Removal of the dressing**

Some patients may be particularly sensitive to certain types of tape used to secure the epidural catheter. If the patient experiences excessive redness, blistering or broken areas of skin please inform the pain nurse. This will alert the Acute Pain Team to any incidence of problems related to a particular type of tape or dressing.

**Following discontinuation of epidural infusion** – motor block assessment should continue along with routine observations for 24 hours following removal of the epidural catheter. Commence an epidural catheter removal observation chart once the epidural infusion has been stopped.

**Rationale:** Epidural abscess or haematoma can manifest after removal of the epidural catheter (Breivik, 1998, The Royal College of Anaesthetists, 2009).

10. POST EPIDURAL HEADACHE.

Headache can be one of the most disabling complications after epidural analgesia or spinal block. In spinal block the dura is punctured deliberately with a very fine needle to inject local anaesthetic into the cerebro-spinal fluid but in epidural analgesia the dura may be punctured accidentally (with a larger needle) allowing cerebro-spinal fluid to leak out. The headache usually gets better when the patient lies down and worse when the patient sits up and may be associated with sickness, neck pain and a dislike of bright lights or noise.

Young patients and women having spinal/epidural anaesthesia during childbirth are especially susceptible to post-dural puncture headache. Epidural headache typically occurs between 1 and 7 days but there is one report of 12 days (Reamy, 2009).

The dural puncture will usually mend itself in a few days or weeks.

Patients who are discharged from hospital early after epidural analgesia, for example from maternity, or who get a post-dural headache should be provided with written information. Patient information leaflet LN0896

Refer to treatment protocol number 9, p32
SECTION 3

**PAEDIATRIC EPIDURAL PROTOCOL**

1) **Patient selection and Consent**

Epidural analgesia should be based on risk /benefit analysis for each patient, with discussion in detail with parents (and the child), and summarised in case notes. Indications for epidural analgesia are major orthopaedic surgery (e.g – Cerebral palsy) and major intra abdominal surgeries.

**Risks:**

- **Common (1:10 – 1:100):** Local anaesthesia leak, catheter blockage, catheter displacement, lower limb weakness, urine retention (urinary catheter should be strongly considered)
- **Relatively uncommon (1:100 - 1:1000):** Headache = 1:200
- **Rare (1:1000 - 1:100000):** Epidural infection, epidural haematoma, permanent neurological injury.

2) **Staffing and Monitoring**

All patients will require Paediatric HDU and joint anaesthetic and paediatric medical care. Twice daily review of patients by consultant paediatric anaesthetist or by acute pain team. Details of the patient to be left on notice board in anaesthetic department coffee room. SR on call informed to allow night time continuity of care. HDU nurses to seek advice, if in doubt about any aspect of epidural care. These patients should be monitored hourly for pump readings, pain score, sedation scores and PEWS. And 4 hourly monitoring of sensory levels, modified bromage score (see appendix) and upper body motor function (Arm strength). Monitoring should be continued in HDU for 6 hours after discontinuation of epidural.

3) **Drugs for Epidural Analgesia**

- **Levobupivacaine (0.125%) @ 0.2-0.4ml/kg/hr = 0.25-0.5mg/kg/hr (<6 m half the infusion rate)
- **Levobupivacaine (0.1%) with Fentanyl 2mcg/ml @ 0.1-0.4 ml/kg/hr**
- **Top ups for pain: Levobupivacaine (0.25%) 0.1-0.3 ml/kg in fractionated doses**
- **Maximum dose for Levobupivacaine in 4 hours is 2mg/kg including top-ups**

**Adjunct Drugs for Epidural (Also for muscle spasm)**

- **Clonidine epidural bolus 1-2mcg/kg (and/or by epidural infusion with plain Levobupivacaine add 150mcg (1ml) of Clonidine in a 200ml bag of Levobupivacaine (0.75mcgs/ml))**
- **Diazepam 0.1mg/kg 6 hourly (orally).**
- **Midazolam intravenous infusion of 0.025mg/kg/hr.**
- **Baclofen starting dose is 0.1mg/kg/8 hourly (Orally). Increased slowly by 5% to 15% once in 24 hours until desired effect is achieved.**

**Children on Plain Levobupivacaine can receive opioids by any other route including PCA and NCA.**

**(sample settings Morphine bolus 20mcgs/kg, lockout time 20 min and infusion 20mcg/kg/hr)**
a) **Modified Bromage Score (For Motor Block)**

- 0  Near normal flexion of knee & foot
- 1  Just able to move knee
- 2  Able to move foot only (action, slow, stop, review)
- 3  Unable to move foot or knee (action, slow, stop, review)

b) **Upper body Motor Function (Arm strength)**

If the patient can curl and extend fingers to grasp both of your hands and squeeze; the test is passed. If they cannot do this then check sensory levels and proceed bearing in mind age and cooperation of the child.

c) **Local Anaesthetic Toxicity management**

A laminated sheet of AAGBI guideline for management of local anaesthetic toxicity is available in Paediatric theatre and Paediatric HDU. Intralipid is available in these two locations (In CD cupboard).

d) **Paediatric Anaesthesia contact details.**

Anaesthetic registrar on call – Bleep 4017 (who will pass on to SR on call at night and / or Paediatric Anaesthetist on call during the day / night). Anaesthetic Office Extension– 32175.
SECTION 4

NHS TAYSIDE EPIDURAL TREATMENT PROTOCOLS

Number 1

Epidural Catheter Removal in relation to Thromboprophylaxis.

1. **Low Molecular Weight Heparin (eg Fragmin 2,500 and 5,000 units.)**

   Removal of the epidural catheter may be carried out **12 hours after** the last dose was administered or **2 hours before** the next dose.

   Fragmin can be administered **2 hours after** epidural catheter removal.

   **Fragmin doses greater than 5,000 units**—Remove the epidural catheter **24 hours after** last dose. The next dose of Fragmin is therefore delayed by **2 hours** (administered 2 hours after catheter removal)

2. **Rivaroxaban 10mg tablets (Xarelto)®**

   Rivaroxaban is indicated for prevention of venous thromboembolism in patients undergoing elective hip or knee replacement surgery only. The 1st dose is given 6 – 10 hours post op, ie 18.00h or 22.00h on the day of surgery. On day 2, the epidural catheter is not to be removed earlier than **18 hours after** the last dose of Rivaroxaban. The next dose of Rivaroxaban can be given **6 hours** later.

**Full anticoagulation is an absolute contra-indication to spinal or epidural block. It is recommended that the INR be 1.5 or lower for institution of a block or removal of an epidural catheter.**

**Following removal of the epidural catheter, the patient must be observed closely for the following for a minimum of 24 hours:**

- Significant motor block
- Back or leg pain
- Urinary retention

The Acute Pain Team must be alerted immediately should any of the above arise as these symptoms may be related to epidural haematoma formation.

Ref. SIGN Guideline 122, 2010; American Society of Regional Anaesthesia and Pain Medicine guidelines on the risk of regional anaesthesia in the anticoagulated patient.(Horlocker et al, 2010)

---

Protocol 1
NHS TAYSIDE EPIDURAL TREATMENT PROTOCOLS

Number 2

Providing Effective Analgesia

Complete pain assessment
Ask patient to deep breathe, cough, touch the opposite side of the bed with their hand.

Pain Score = 0

No

Assess Pain as per policy

Yes

Pain Score = 1

No

Is the pain acceptable to the patient? Can he/she deep breathe, cough and move around?

Yes

Increase epidural by 2ml per hour.
Instruct patient to use PCEA if prescribed.
Reassess in 1 hour.
Return to start of flow chart.

No

Increase epidural infusion by 4ml per hour.
Instruct patient to use PCEA if prescribed.
Reassess in 1 hour.
Return to start of flow chart.

Pain Score = 2

Yes

Pain Score = 3

Yes

Inform Acute Pain Team. Prepare patient for epidural top-up.
Monitor effect. Liaise with anaesthetist re – increase in infusion rate following top-up.
Reassess hourly and start at the top of the flow chart.

Pain Continues?

Yes

No

Reassess hourly.
Return to start of flow chart.

Always check first:
- Is the pump working?
- Is the epidural catheter in place?
- Check all connections in the system
- Is the epidural catheter kinked or leaking?

Consider adjuncts:
Regular Paracetamol – PO/IV
NSAID’s – PO/PR

Pain Score:
0 No pain at rest or movement
1 Slight pain on movement
2 Moderate pain on movement
3 Severe pain on movement

Protocol 2
Management of Bradycardia.

NB: Hypotension is often associated with bradycardia therefore refer to protocol 5 also.

Bradycardia
Pulse 45 - 60

Yes

Associated with hypotension

Yes

No

• Compare with pre-operative pulse rate.
• Check block level, consider T1 – T4 as cause, if so, decrease the infusion rate by 2 – 4ml per hour.

Any signs of haemodynamic compromise?

Yes

See Protocol 5 Hypotension

Yes

No

Monitor and observe patient. Reassess hourly

Bradycardia
Pulse < 45

Yes

Contact ward doctor and Acute Pain Team Anaesthetist

STOP epidural infusion
• Prepare Glycopyrrolate 200 micrograms IV for administration
• Repeat if necessary up to 400 micrograms.
• (IV Atropine 300 – 600 micrograms if Glycopyrrolate is unavailable)
• Continue to observe patient until stable
• Reassess hourly
• Re-commence the epidural infusion as soon as possible.

Associated with hypotension?
Hypotension: BP < 90 systolic or > 25% reduction from patients pre-op baseline

Yes

Is the patient hypovolaemic?
Check CVP, urine output, fluid balance, drains. Check capillary refill.

No

Patient still hypotensive?

Yes

Contact Acute Pain Team / Anaesthetist
• Prepare Ephedrine for IV administration in 3mg increments
• Repeat every 3 - 4 minutes to a maximum of 30mg.
• Monitor BP at 2 – 3 minute intervals

No

Inform FY2. FY2 reassess patient.
Consider administration of IV fluid

Continue to monitor and observe patient. Reassess hourly.

Is the patient bradycardic?

No

Continue to observe patient until stable. Reassess hourly. Re-commence the epidural infusion as soon as possible.

Yes

SEE PROTOCOL 3
Bradycardia

NB: Bradycardia may be associated with hypotension. Refer also to protocol 3.
Management of over-sedation / respiratory depression.
If no opiate in epidural infusion inform doctor

Assess sedation score and respiratory rate hourly
Ensure patient is receiving oxygen therapy.

Respiratory rate
> 10
Sedation score
0, 1 or 2
Yes

Respiratory rate < 8
Sedation score 3
Yes

- STOP epidural infusion
- Prepare Naloxone IV 400 micrograms in 10ml water for injection.
- Administer in 1ml (40mcg) increments.
Contact Acute Pain Team / Anaesthetist.

APNOEA
Respiratory arrest.
- Call 2222
- Institute BLS with airway adjuncts and oxygen therapy.
- Stop Epidural infusion
- Prepare intubation tray
- Do not tilt patient head down.

Continue to assess patient hourly.

Warning: Change in level of sedation precedes opiate induced respiratory depression.

If patient becomes increasingly drowsy, reduce epidural infusion rate and give adjuvant analgesia such as Paracetamol or NSAID’S if appropriate.
Opiate may need to be removed from the epidural infusion.
Discuss with the Acute Pain Team / Anaesthetist.

Protocol 5
Management of increasing motor block
Early recognition of neurological abnormality is critical in diagnosing spinal cord ischaemia, epidural haematoma or abscess. Treatment must be instigated without delay in order to give the patient the best chance of recovery of neurological function (Williams and Wheatley 2000, Meikle et al 2008, The Royal College of Anaesthetists 2009).

**Bromage Score**

- Score = 0  No Motor block. Full flexion of knees and feet
- Score = 1 Inability to raise extended leg, just able to move knee
- Score = 2 Inability to flex knee, able to move feet only
- Score = 3 Unable to move feet or knees.

**Protocol 6**

- The patient has increased risk of developing pressure sores while on epidural infusion analgesia.

---

Assess motor block HOURLY (2 hourly at night if stable).

**Titrate infusion up or down to achieve analgesia with minimal leg weakness**

- BROMAGE 2 OR 3

  **SWITCH OFF INFUSION.**
  Contact the Pain Team or Anaesthetist.
  Reassess Bromage score every 15 minutes.
  Refer to pages 14-15 of epidural policy

- Leg strength improving?
  - YES
  - NO

  **If no improvement after 1 hour:**
  Suspect space occupying lesion.
  Contact Senior Registrar or Consultant Anaesthetist.

  **If no improvement after 2nd hour:**
  Contact Senior Anaesthetist again
  **Patient must be seen.**
  URGENT ; MRI must be arranged. On call radiologist and neurosurgeon must be informed immediately.

**PAIN MANAGEMENT**

Consider IV Morphine titration if the patient experiences pain while waiting for motor block to regress.

**YES**

Patient comfortable?

- YES
  - Contact Pain Team to reassess analgesia
- NO

**NO**

Inform Acute Pain Team or Anaesthetist prior to re-commencing epidural infusion at half previous rate
NHS TAYSIDE EPIDURAL TREATMENT PROTOCOLS

Number 7

Management of increasing sensory block level

Be aware that increasing sensory block level or level above T4 may lead to hypotension and bradycardia. (See protocols 4 and 5). This may be indicative of epidural catheter migration.

Monitor sensory block level HOURLY
(2 hourly overnight if stable)

Sensory block T4 or above with no compromise in BP or Heart Rate?

- STOP the infusion.
- Nurse the patient upright.
- Continue to observe BP and Heart Rate.

Reassess in 1 hour and return to start of flow chart.

Sensory block > T4
Hypotension +/- Bradycardia?

- STOP the infusion
- Contact Acute Pain Anaesthetist
- Refer to protocols 4 and 5

Sensory block > T4
Signs of respiratory distress or hypoxia?

Give oxygen therapy

APNOEA

Respiratory Arrest
Call 2222
Institute BLS with airway adjuncts and oxygen therapy.
STOP epidural infusion.
Prepare intubation tray.
DO NOT put patient in head-down tilt.

Observe for respiratory distress.
Continue to observe BP and Heart Rate.
Assess sensory block HOURLY and return to the start of the flow chart.

Protocol 7
Management of opioid induced pruritis.

Patient complaining of an itch?

Yes

The itch is unlikely to be related to the epidural infusion. Treat cause.

Yes

Consider the cause for the itch.

Does the patient have a rash/skin complaint?

Is the patient receiving antibiotic therapy?

Is the rash localised?

No

Is the itch generalised?

Yes

Check that the epidural solution contains opioids.

If so, probably opiate-induced itch related to epidural infusion.

Take 400mcg of Naloxone and dilute with 10ml ampoule of sterile water to make a concentration of 40 mcg per ml. Administer in 1 ml increments every 5 minutes until the patient tells you the itch has gone away. As this dose is small, it should not reverse the analgesia.

Consider Chlorpheniramine

Oral – 4mg, 4 – 6 hourly max 24mg in 24 hours.

IV over 1 minute - 10mg repeated up to 4 times in 24 hours.

IM route can also be used if necessary. See BNF
Post-dural headache

Post-dural headache is due to leakage of cerebral spinal fluid from the dura. This can happen following spinal anaesthetic or accidental dural puncture with epidural Tuohy needle. The headache is made worse by sitting upright.

Protocol 9

Patient complaining of headache?

Yes

Is the headache worse when sitting upright, coughing, vomiting or bright lights?

No

Administer simple analgesia as prescribed.

Yes

Check if the epidural insertion was difficult or if spinal tap occurred. Allow patient to lie down. Ensure adequate hydration – either oral fluids or IV fluids. Administer regular simple analgesia as prescribed eg Paracetamol. Administer anti-emetics if nausea is problematic.

Contact Acute Pain Team or, if available the anaesthetist who inserted the epidural. (severe post-dural puncture may require a blood patch)
NHS TAYSIDE EPIDURAL TREATMENT PROTOCOL - FOR MATERNITY

Management of hypotension

NB: Bradycardia may be associated with hypotension.

Hypotension: BP < 100 systolic or > 30% reduction from pre-block mean arterial pressure

Yes

Is the mother hypovolaemic?
Consider blood loss Abruption, APH

No

Mother still hypotensive?

Yes

Summon Anaesthetic/obstetric help
Lie patient down on left side
Give oxygen
Increase IV fluids
Observe mother and foetal heart rate
Consider suspending epidural analgesia

No

Continue to observe mother until stable.
Re-assess hourly.
Re-commence/continue the epidural infusion.

Is the mother or baby bradycardic?

No

Continue to monitor and observe mother until stable.

Yes

Summon anaesthetic/obstetric help.
Prepare Glycopyrrolate

Maternity protocol
# TREATMENT FOR LOCAL ANAESTHETIC–INDUCED CARDIAC ARREST

## AAGBI Safety Guideline

### Management of Severe Local Anaesthetic Toxicity

<table>
<thead>
<tr>
<th>1</th>
<th>Recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signs of severe toxicity:</strong></td>
<td></td>
</tr>
<tr>
<td>• Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic convulsions</td>
<td></td>
</tr>
<tr>
<td>• Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur</td>
<td></td>
</tr>
<tr>
<td>• Local anaesthetic (LA) toxicity may occur some time after an initial injection</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Immediate management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Stop injecting the LA</td>
<td></td>
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<tr>
<td>• Call for help</td>
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<tr>
<td>• Maintain the airway and, if necessary, secure it with a tracheal tube</td>
<td></td>
</tr>
<tr>
<td>• Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis)</td>
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<tr>
<td>• Confirm or establish intravenous access</td>
<td></td>
</tr>
<tr>
<td>• Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses</td>
<td></td>
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<tr>
<td>• Assess cardiovascular status throughout</td>
<td></td>
</tr>
<tr>
<td>• Consider drawing blood for analysis, but do not delay definitive treatment to do this</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN CIRCULATORY ARREST</strong></td>
<td>Use conventional therapies to treat:</td>
</tr>
<tr>
<td>• Start cardiopulmonary resuscitation (CPR) using standard protocols</td>
<td>• hypotension,</td>
</tr>
<tr>
<td>• Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment</td>
<td>• bradycardia,</td>
</tr>
<tr>
<td>• Consider the use of cardiopulmonary bypass if available</td>
<td>• tachyarrhythmia</td>
</tr>
</tbody>
</table>

**GIVE INTRAVENOUS LIPID EMULSION** (following the regimen overleaf)

<table>
<thead>
<tr>
<th>WITHOUT CIRCULATORY ARREST</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Propofol is not a suitable substitute for lipid emulsion</td>
<td></td>
</tr>
<tr>
<td>• Lidocaine should not be used as an anti-arrhythmic therapy</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved</td>
<td></td>
</tr>
<tr>
<td>• Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days</td>
<td></td>
</tr>
<tr>
<td>• Report cases as follows:</td>
<td></td>
</tr>
<tr>
<td>in the United Kingdom to the National Patient Safety Agency (via <a href="http://www.npsa.nhs.uk">www.npsa.nhs.uk</a>)</td>
<td></td>
</tr>
<tr>
<td>in the Republic of Ireland to the Irish Medicines Board (via <a href="http://www.imb.ie">www.imb.ie</a>)</td>
<td></td>
</tr>
<tr>
<td>If Lipid has been given, please also report its use to the international registry at <a href="http://www.lipidregistry.org">www.lipidregistry.org</a>. Details may also be posted at <a href="http://www.lipidrescue.org">www.lipidrescue.org</a></td>
<td></td>
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</table>

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*Your nearest bag of Lipid Emulsion is kept*

---

This guideline 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.

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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
- 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
- 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*

---

This AAGBI Safety Guideline was produced by a Working Party that comprised:

Grant Cave, Will Harrop-Griffiths (Chair), Martyn Harvey, Tim Meek, John Picard, Tim Short and Guy Weinberg.

This Safety Guideline is endorsed by the Australian and New Zealand College of Anaesthetists (ANZCA).
Section 5.

NHS TAYSIDE EPIDURAL PROCEDURAL GUIDELINE
Number 1.

Removal of The Epidural Catheter.

Considerations before removal of the epidural catheter.

- If the patient is on anticoagulant therapy, check first of all, the correct timing for removal of the epidural catheter. In some cases further blood clotting studies are required before removal of the catheter. See treatment protocol 1, p 24.
- Ensure step-down analgesia has been established and that pain is under control.
- Explain the procedure to the patient.

Procedure.

1. Wash hands, apply apron and gloves.
2. Removal of the epidural catheter is facilitated when the patient assumes a position where the back is flexed ie. Lying on one side, knees bent up and head bent forward towards chest or sitting bet forward.
3. Remove all the sticky tape from the patient’s back and the clear window dressing.
4. Although gentle traction is necessary to remove the catheter, it should come out easily and painlessly. If resistance is met, ask the patient to flex back or “curl up” more.
5. After the catheter is removed, check that the tip is intact – there should be a blue end. If there is no blue tip, you should contact an anaesthetist.
6. The entry site can be cleaned with saline if necessary and allow to dry. Apply a transparent occlusive dressing to allow continued site inspection. This can be removed in 24 hours.
7. Inform the anaesthetist of any signs of infection ie tenderness, redness, signs of pus at the exit site. Also, If these signs are present, send the tip to microbiology for culture and sensitivity.
8. Document in the nursing notes the time of catheter removal and that the tip was intact.
9. Report any excessive redness, blistering or areas of broken skin associated with the dressing used to secure the epidural catheter to the Acute Pain nurse.
10. Continue to observe the exit site once per shift and motor block along with routine observations of vital signs for 24 hours after removal of the epidural catheter. Record this in the epidural catheter removal observation chart.
Reconnection of the epidural catheter to the bacterial filter.

1. Wash hands.
2. Remove sterile gauze from the epidural catheter tip.
3. Wipe 5cm of the epidural catheter with 70% isopropyl alcohol wipe and allow to dry.
4. Using sterile scissors, cut 2cm off the end of the catheter.
5. To re-attach the catheter to the bacterial filter, gently unscrew and loosen the bottom of the blue section (they don’t completely separate). Insert the catheter through the hole and screw to tighten. Pull gently to check the catheter is secure.
6. The system is now “closed” until the catheter can be removed. The infusion can be recommenced only if instructed by the anaesthetist to do so.
## Appendix 1

### 1. Rapid Impact Checklist (RIC)

Each policy must include a completed and signed template of assessment.

### Which groups of the population do you think will be affected by this proposal?

- minority ethnic people (incl. gypsy/travellers, refugees & asylum seekers) √
- women and men √
- people in religious/faith groups √
- disabled people √
- older people, children and young people √
- lesbian, gay, bisexual and transgender people √
- people of low income √
- people with mental health problems √
- homeless people √
- people involved in criminal justice system X
- staff √

**N.B.** The word proposal is used below as shorthand for any policy, procedure, strategy or proposal that might be assessed.

### What positive and negative impacts do you think there may be?

#### Which groups will be affected by these impacts?

- Positive impacts for patients as far as diet, nutrition, exercise and physical activities are concerned. These benefits are described on page 3 of the policy.
- Negative impact for staff who have to undergo additional training and take on additional responsibility and extend their role. Positive impact also as being able to provide the service is satisfying.

#### Will the proposal have any impact on lifestyles? For example, will the changes affect:

- Diet and nutrition?
- Exercise and physical activity?
- Substance use: tobacco, alcohol or drugs?
- Risk taking behaviour?
- Education and learning, or skills?

- No adverse impact.

#### Will the proposal have any impact on the social environment? Things that might be affected include

- Social status
- Employment (paid or unpaid)
- Social/family support
- Stress
- Income

- No adverse impact.

#### Will the proposal have any impact on

- Discrimination?
- Equality of opportunity?
- Relations between groups?

- Working conditions: The policy outlines the frequency of particular nursing interventions which can be perceived as additional nursing workload – negative impact. However, nursing staff agree that the quality of analgesia provided by epidural infusion reduces the nursing workload in other ways.
- Accidental injuries – risks of accidental injuries are addressed and actions to take by staff are outlined in order to minimise or prevent accidental injury associated with epidural analgesia.

#### Will the proposal affect access to and experience of services? For example,

- Health care
- Transport
- Social services
- Housing services

- Epidural analgesia has a positive impact on healthcare. Epidural can provide good quality analgesia thus improving the experience for patients. Relatives will also be relieved to see their loved ones are not in pain for example after major surgery. The benefits to patient recovery are outlined on page 3 of the document.
### Rapid Impact Checklist (RIC): Summary Sheet

Each policy must include a completed and signed template of assessment

<table>
<thead>
<tr>
<th>1. <strong>Positive Impacts (Note the groups affected)</strong></th>
<th>2. <strong>Negative Impacts (Note the groups affected)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient groups</strong></td>
<td><strong>Patient groups</strong></td>
</tr>
<tr>
<td>Patients receiving epidural analgesia benefit in many ways as outlined in this policy. The policy contains recommendations for practice which provides nurses, midwives and medical staff with the ability to make correct decisions about the care of patients receiving epidural analgesia.</td>
<td>There are risks associated with epidural analgesia for patients. However, this policy addresses the risks, risk management and prevention</td>
</tr>
<tr>
<td><strong>Staff groups</strong></td>
<td><strong>Staff groups</strong></td>
</tr>
<tr>
<td>Job satisfaction, training, knowledge and skills for staff.</td>
<td>Staff training is required – resources to relieve staff for training. Adjustments to staffing levels required in designated wards while staff undergo training and gain experience.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. <strong>Additional Information and Evidence Required</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Training programmes for staff are well established. The Acute Pain Nurse provides daily review of patients receiving epidural infusion analgesia Mon – Fri, 08.30-16.30h. Telephone advice is available 24 hours from Anaesthetists via Acute Pain Rota or switchboard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. <strong>Recommendations</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5. <strong>From the outcome of the RIC, have negative impacts been identified for race or other equality groups? Has a full EQIA process been recommended? If not, why not?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No negative impacts identified. In accordance with routine clinical practice, patients will be informed of the procedure and verbal consent obtained. Patients who are unable to speak English, this must be done through an interpreter.</td>
</tr>
</tbody>
</table>

Manager’s Signature: ........................................... Date: .................................
Appendix 2  NHS TAYSIDE - POLICY APPROVAL CHECKLIST

This checklist must be completed and forwarded with policy to the appropriate forum/committee for approval.

POLICY AREA: (See Intranet Framework)  CLINICAL
POLICY TITLE: EPIDURAL INFUSION ANALGESIA
LEAD OFFICER: VALERIE SHEPHERD, ACUTE PAIN SPECIALIST NURSE

<table>
<thead>
<tr>
<th>Why has this policy been developed?</th>
<th>To provide Nurses, Midwives and Medical staff with the ability to make correct decisions when caring for patients receiving epidural infusion analgesia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the policy been developed in accordance with or related to legislation? – Please give details of applicable legislation.</td>
<td>National Patient Safety Agency 2007</td>
</tr>
<tr>
<td>Has a risk control plan been developed? Who is the owner of the risk?</td>
<td>YES. The Acute Pain Team</td>
</tr>
<tr>
<td>Who has been involved/consulted in the development of the policy?</td>
<td>Multidisciplinary health care professionals who currently care for patients receiving epidural analgesia.</td>
</tr>
<tr>
<td>Has the policy been assessed for Equality and diversity in relation to:-</td>
<td>Has the policy been assessed For Equality and Diversity not to disadvantage the following groups:-</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Gender</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Age</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Religion/Faith</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Disability</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Minority Ethnic Communities (includes Gypsy/Travellers, Refugees &amp; Asylum Seekers)</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Women and Men</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Religious &amp; Faith Groups</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Disabled People</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Children and Young People</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Lesbian, Gay, Bisexual &amp; Transgender Community</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Does the policy contain evidence of the Equality &amp; Diversity Impact Assessment Process?</td>
<td>YES ☒ NO ☐</td>
</tr>
<tr>
<td>Is there an implementation plan?</td>
<td>YES ☒ NO ☐</td>
</tr>
<tr>
<td>Which officers are responsible for implementation?</td>
<td>Acute Pain Teams, Perth and Dundee. Mrs M. Gibson, Mrs B Little, Mrs V Shepherd, Mrs E Colquhoun, Mrs Gillian Smethurst</td>
</tr>
<tr>
<td>When will the policy take effect?</td>
<td>Immediately</td>
</tr>
<tr>
<td>Who must comply with the policy?</td>
<td>Registered Nurses, Midwives, Medical staff and Pharmacists.</td>
</tr>
<tr>
<td>How will they be informed of their responsibilities?</td>
<td>Managers</td>
</tr>
<tr>
<td>Is any training required?</td>
<td>YES ☒ NO ☐</td>
</tr>
<tr>
<td>If yes, has any been arranged?</td>
<td>YES ☒ NO ☐</td>
</tr>
<tr>
<td>Are there any cost implications?</td>
<td>YES ☐ NO ☒</td>
</tr>
<tr>
<td>If yes, please detail costs and note source of funding</td>
<td>Extra staffing where nurses are training</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Who is responsible for auditing the implementation of the policy?</td>
<td>Acute Pain Team members PRI and Ninewells</td>
</tr>
<tr>
<td>What is the audit interval?</td>
<td>12 weeks initially. Annually thereafter</td>
</tr>
<tr>
<td>Who will receive the audit reports?</td>
<td>Perth and Dundee Acute Pain Teams</td>
</tr>
<tr>
<td>When will the policy be reviewed and by whom? (please give designation)</td>
<td>Epidural group members as outlined in the policy Biannually. Contact SCN Val Shepherd bleep 4311</td>
</tr>
</tbody>
</table>

Name: Valerie Shepherd  Date: reviewed 03/02/2012
Appendix 3
KEY CONTACTS.

NINEWELLS HOSPITAL

Val Shepherd  Pain Management Nurse Specialist  Bleep 4311
Liz Colquhoun  Pain Management Nurse  Bleep 4311
Gillian Smethurst  Pain Management Nurse  Bleep 4311
Judith Rafferty  Lead Nurse, Pain Services, Tayside  Ext. 40299
Dr Mike Neil  Consultant Anaesthetist  Bleep 4006

PERTH ROYAL INFIRMARY

Moira Gibson  Pain Management Nurse Specialist  Bleep 5163
Betty Little  Pain Management Nurse Specialist  Bleep 5180
Dr Ewan Ritchie  Consultant Anaesthetist  Bleep 5161

5. POLICY DEVELOPMENT GROUP MEMBERS

Dr Fiona Cameron  Consultant Anaesthetist, Ninewells Hospital
Dr Lyn Walton  Associate Specialist in Anaesthesia, Ninewells Hospital
Val Shepherd  Pain Nurse Specialist, Ninewells Hospital
Dr Ewan Ritchie  Consultant Anaesthetist, Perth Royal Infirmary
Moira Gibson  Pain Nurse Specialist, Perth Royal Infirmary
Betty Little  Pain Nurse Specialist, Perth Royal Infirmary
Lesley Esslemont  Senior Midwife, Ninewells Hospital
Jess Malcolm  SCN, Ward 7, Ninewells Hospital
Sandra Larkin  SCN, Ward 10/SHDU, Ninewells Hospital
Roy Gillespie  Pharmacist, Ninewells Hospital
Iain Rennie  Clinical Educator, Ninewells Hospital

POLICY REVIEW GROUP and Contributors 2012
(Ninewells and PRI Pain Team members as above)

Fiona McIntyre  Principal Clinical Pharmacist, Surgery, Orthopaedics and Critical Care, Ninewells Hospital
Shaun McLeod  Consultant Anaesthetist, Surgical HDU, Ninewells Hospital

Maternity Considerations
Lesley Esslemont  Senior Midwife, Ninewells Hospital
Pamela Johnston  Consultant Anaesthetist, Ninewells Hospital

Paediatric Epidural Management
Suzie Byer  SCN, Ward 30/ Paediatric Pain Liaison
Dr Grant Rodney  Consultant Anaesthetist, Paediatric Anaesthesia, Ninewells
Dr Rafi Khan  ST6 Anaesthetics, Ninewells
Claire O’Brien  Principal Clinical Pharmacist, Women and Child Health

Date Developed: April 2005  Date for review: 2014  Reviewed 2012
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THE ROYAL COLLEGE OF ANAESTHETISTS, ROYAL COLLEGE OF NURSING, THE ASSOCIATION OF ANAESTHETISTS OF GREAT BRITAIN AND IRELAND, THE BRITISH

