Patient Controlled Epidural Analgesia (PCEA) in Adults (Non-Obstetric) Policy

POLICY

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For publication to external SFH website	**Positive confirmation received from the approving body that the content does not risk the safety of patients or the public:**		
	YES	**NO**	**N/A**
	√		
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Sponsor (Position)	Service Director for Anaesthetics, Critical Care and Pain Management		
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Lead Division/ Directorate	Planned Care & Surgery		
Lead Specialty/ Service/ Department	Anaesthetics, Critical Care and Pain Management		
Position of Person able to provide Further Guidance/Information	Clare Burton – Pain Management Nurse Consultant		

Associated Documents/ Information	**Date Associated Documents/ Information was reviewed**
1. Acute Pain Prescription Chart 2. Neuraxial Blockade Complications Management Guideline	August 2018 July 2021

3. CADD Solis Operator's Manual 4. CADD Solis Quick Guide	
Template control	June 2020

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1.0 INTRODUCTION

Epidural analgesia provides effective pain relief for acute pain following surgery and traumatic chest injury. Its use is also advocated as a method of attenuating detrimental physiological responses during the peri-operative period by decreasing the incidence of pulmonary and cardiovascular complications.

Additionally, epidural analgesia can provide a high level of patient satisfaction by reducing symptoms of pain and nausea often experienced with alternative analgesic techniques and supports improved post-operative / post injury functionality. General side effects associated with epidural infused analgesia are minimal; however, although rare, serious complications can occur and vigilance when caring for patients with this mode of analgesic technique is paramount in order to prevent harm.

2.0 POLICY STATEMENT

This policy is issued by the Anaesthetic Department at Sherwood Forest Hospitals NHS Foundation Trust. It will supersede and replace all previous guidelines/ policies.

This policy aims to establish standards for appropriate staff groups on the safe care of patients when managing epidural analgesia at SFH (Kings Mill only); this includes PCEA management and epidural top-up injections.

The policy identifies which members of staff can prescribe epidural analgesia and manage the associated equipment. In addition the policy specifies the level of training the practitioner must complete: its place is to ensure the highest standard of care delivery to patients. Failure to comply with this policy may be regarded as misconduct and dealt with in accordance with the Trust's disciplinary procedures and potentially the practitioner's regulatory body.

2.1 THIS CLINICAL POLICY APPLIES TO:

2.1.1 Staff Group(s)

- Anaesthetists, specialty doctors and trainee anaesthetists
- Pain nurse specialists
- Theatre Recovery registered nurses / ODP's (KMH only)
- Critical Care registered nurses & CCOT
- Ward 11,12,14, 31 & 32 registered nurses

2.1.2 Clinical area(s)

- Ward 11,12, 14, 31, 32, Theatre Recovery (KMH only)and ICCU

2.1.3 Patient group(s)

- ***Exclusions:***
  - Obstetric patients- (refer to Obstetric Epidural Policy).
  - Paediatric patients.
  - Palliative care.
  - Persistent non-cancer pain.
  - Patients who require continuous anti-platelet / anticoagulation therapy.
  - Patients with intolerance to levobupivacaine.

- ***Indications:***
  - Major surgery where lasting postoperative analgesia is required, including abdominal and urogenital procedures.
  - Lower extremity surgery and gynaecological surgery.
  - Multiple rib / sternal fractures.

- ***Absolute contraindications:***
  - Patient refusal.
  - Allergies to local anaesthetics.
  - Clotting defects.
  - Sepsis, local or general.

- ***Relative contraindications:***
  - Immunocompromise.
  - Hypovolemia.
  - Poor or limited cardiac function.
  - Pre-existing neurological deficits or spinal deformities.

3.0 DEFINITIONS/ ABBREVIATIONS

SFH	Sherwood Forest Hospitals	IV	Intravenous
RN	Registered nurse	SC	Subcutaneous
ODP	Operating department practitioner	PO	Per oral
CCOT	Critical Care Outreach Team	mL	Millilitre
ICCU	Integrated Critical Care Unit	L	litre
APPC	Acute Pain Prescription Chart	mg	Milligram
PCEA	Patient controlled epidural analgesia	Kg	Kilogram
PCA	Patient controlled analgesia	cm	Centimetre
ACVPU	Level of consciousness score	hr	Hour
NSAID	Non-steroidal anti-inflammatory drug	mmHg	Millimetre of mercury
MBS	Modified Bromage score	LA	Local anaesthetic
TAP	Transverse abdominis plane	O2	Oxygen
KMH	Kings Mill Hospital	VTE	Venous thromboembolism
LMWH	Low molecular weight heparin	NRFit	Non-luer connection device

4.0 ROLES AND RESPONSIBILITIES

4.1 Role and Responsibilities of Anaesthetists:

- Be conversant with this policy, access formal training and be assessed as competent in the use of the Yellow CADD Solis epidural pump and associated equipment.
- Discuss epidural analgesia with the patient to establish patient compliance, physical and mental capacity to use the system and establish sensitivity to the prescribed medicine.
- Obtain verbal informed consent from the patient and document on the Anaesthetic Chart.
- The anaesthetist who instigates the epidural analgesia will be responsible for prescribing of medicine required.
- Doctors should communicate with senior professionals, if additional advice is required.

- Ensure there will be safe provision of patient care in the ward environment when an indwelling epidural catheter is to be used; this should be checked prior to the catheter being sited.
- Ensure awareness of their patient's post-operative progress.
- Appropriately respond to untoward events with regard to epidural infusions and episodes of unmanaged regional acute pain (during daytime and unsociable hours)
- To conduct audit as required in relation to epidural care.

4.2 Role and Responsibilities of Registered Nurses/ Registered ODP's:

- Pain nurse specialists will advise and support the ward nurses in epidural analgesia care management and will respond to untoward events with regard to epidural infusions and episodes of unmanaged regional acute pain (during daytime hours).
- Responsible for ensuring that observations are completed as specified and documented.
- Responsible for caring for patient whilst epidural analgesia is provided, with support from the pain nurse specialists and the Anaesthetic Team.
- Ensure correct preparation of epidural infusion as per prescription.
- Appropriately respond to and escalate untoward events.

4.3 Role and Responsibilities of Ward Sisters/ Charge Nurses / Department Leaders:

- To act as excellent role models and be responsible and accountable for the policy implementation within their clinical areas.
- To monitor standards of best practice associated with this policy.
- To ensure that all registered practitioners within the sphere of their responsibility has access to and promptly attends the required formal training in order to develop skills and competence in caring for patients with epidural analgesia. This will include ensuring completion of associated training packages and medical equipment competency documents.
- To ensure that all registered practitioners accountable to them are aware of this policy and adhere to its statement.

4.4 Responsibilities of Pharmacists :

- To monitor prescribing and oversee the administration of medicinal therapies.
  - To alert prescribers and other health care professionals to potential or actual problems.

4.5 Responsibility of All Above:

- Report incidents or near misses relating to epidural medicines using the Trust incident reporting system (Datix).
  - To gain valid consent. Patients have the legal and ethical right to determine what happens to them. Valid consent to treatment is essential to all forms of healthcare and paramount when considering invasive techniques. Obtaining consent is also a matter of common courtesy between the healthcare professional and recipient.
  - If required, counsel the patient with regard to any fears they may have with using this regimen. Patients are occasionally fearful of opioid self-administration via PCEA due to concerns about 'having too much' or 'addiction'.

5.0 APPROVAL

Following a period of consultation with appropriate Trust stakeholders, this policy was approved and ratified by the Anaesthetic Governance Group on 31/08/2021

6.0 DOCUMENT REQUIREMENTS (POLICY NARRATIVE)

6.1 Implementation:

- Patients must give verbal informed consent for epidural analgesia pre-operatively.
- Only designated clinical areas will receive patients with epidural catheters in place; these are Wards 11, 12, 14, 31, 32, Theatre Recovery (Kings Mill only) and ICCU. This is to ensure that patients with epidural infusions are cared for by nurses competent in this practice and to prevent nurses who have not acquired these skills finding themselves in a situation which may compromise patient safety.
- Epidural analgesia **must never** be commenced on a general ward.

6.2 Insertion Procedure:

- Good technique during the epidural insertion and continuous follow up of epidural block are prerequisites for effective epidural block.
- Explain the sequence of events to the patient.
- Adhere to a full aseptic technique. Use sterile gloves, gown, mask and drapes.
- Prepare patient's skin with chlorhexidine gluconate 0.5% in 70% isopropyl alcohol spray. Allow the antiseptic to dry before the skin is palpated or punctured.
- The anaesthetist and the ODP should take great care in preventing chlorhexidine contaminating the equipment being used and then remove it from the vicinity of the

equipment. The equipment and sterile surfaces should be kept covered while the antiseptic is applied.

- Ensure that the antiseptic bottle has a date opened on it and that the bottle has not been opened for more than 7 days.
- Insert the epidural catheter at the level of the incisional dermatome.
- Ensure that all epidural catheter sites are secured. If possible, use topical skin adhesive (Liquiband®)
- Use IV 3000 (transparent/vapour permeable dressing) to cover insertion site and adhesive tape to secure the epidural catheter to the back. Additional dressings are not necessary. The insertion site must be visible.
- The position of the catheter, distance to skin and length of catheter left in the epidural space must be recorded on the Acute Pain Prescription Chart in order for catheter migration to be detected.
- An antibacterial filter **must** always be used on the infusion line. It should be placed at the junction of the epidural catheter and the infusion line (NRFit connection). The connection of the catheter and the filter should always be covered with a large transparent adhesive dressing to reduce the risk of contamination and accidental disconnection of the catheter from the filter.
- The filter and the catheter connection should be covered with a transparent adhesive dressing to avoid contamination and accidental dislodgment of catheter form the filter.

6.3 Medicines for Epidural Analgesia:

- All epidural medicines administered must be documented.
- Particular attention must be paid to the expiry date, concentration of medication and rate of infusion. At set up, bag change or rate change, a second registered practitioner must check the new settings.

- **Local anaesthetic with opioid-**
  - Levobupivacaine 1.25mg/mL with fentanyl 4 micrograms/mL in 500mL of 0.9% sodium chloride. This is a pre-filled bag available from pharmacy.
  - The volume of the infusion usually ranges between 0-10 mL/hr with an optional PCEA bolus of between 1-6 mL with 20 minutes lockout. The dose will be decided by the anaesthetist and on an individual patient basis.
  - If additional systemic opioid is required, it must be prescribed and given with the agreement of the anaesthetist.

- **Local anaesthetic only-**
  - Levobupivacaine 1.25mg/mL in 200 mL 0.9% sodium chloride. This is a prefilled bag available from pharmacy.
  - The volume of the infusion usually ranges between 0-10 mL/hr with an optional PCEA bolus of between 1-6 mL with 20 minutes lockout. The dose will be decided by the anaesthetist and on an individual patient basis.

  - If additional systemic opioid is required, it must be prescribed and given with the agreement of the anaesthetist.
- If epidural analgesia is not effective, consider TAP blocks, oral analgesia and/ or IV PCA. In the interest of patient safety, IV PCA **must not** be used concomitantly with PCEA unless in a critical care environment or in specialist circumstances only, under the strict direction of the Pain Team.
- It is **not** recommended that PCEA be used concomitantly with other local anaesthetic infusion regimens such as bupivacaine (via Dosifuser) continuous wound infiltrations, rectus sheath infusions or erector spinae infusions.

6.4 Equipment:

- The anaesthetist will decide the initial medicine prescription, infusion rate and bolus amount.
- Dedicated **yellow** Cadd Solis pump with lock box which is specifically configured for epidural use only. Check the pumps MEMD service date has not expired.
- Checking that the correct pump is selected and programmed as per prescription must be a two person procedure (doctor/ RN/ ODP).
- It is vital that the correct administration set / infusion line is selected for epidural infusions. Epidural lines have NRFit technology that will not allow IV luer connection. The Epidural line is always identified with a yellow stripe running its length and NRFit connection device to attach to the epidural catheter. A CADD Solis IV PCA administration set / infusion line will not connect to the epidural catheter.
- **The distal end of epidural infusion lines must be labelled with a yellow epidural sticker.**
- The process of priming the line and preparing the pump is carried out by staff that have had the appropriate training (i.e. Theatre Recovery, ICCU and Pain Teams).
- Resuscitation equipment and oxygen must always be available and easily accessible.

6.5 Maintenance of Epidural Infusion:

- Infusion rate (ml/hr) will depend on-
  - Position of the catheter.
  - Number of segments to be blocked.
  - Age, height and weight of the patient.
- Consider starting with 1ml/hr per segment to be blocked and increase as necessary.
- Epidural analgesia will be titrated to an adequate level during the intra-operative and immediate post-operative period.
- Wherever possible, the extent of epidural block should be determined and documented prior to discharge from Theatre Recovery.
- It is the inserting anaesthetist's responsibility to ensure the epidural provides satisfactory analgesia prior to discharge from Theatre Recovery.

- Regular specific observations must be undertaken as dictated in section 4.6.
- The pain nurse specialists will review all patients with epidural infusions during working hours Monday to Friday, Saturday mornings and Bank Holidays.
- The pain nurse specialists will hand over the care of patients with epidural infusion related issues to the first on-call anaesthetist.
- Ward nurses must contact the first on call anaesthetist for advice during evenings and weekends with epidural related issues. The anaesthetist first on call is expected to hand over any unsociable hour epidural related concerns to the pain nurse specialists the following morning.
- The decision about the duration of postoperative analgesia should be made on an individual basis.
- There is no set time limit for the duration of an epidural infusion; however, they are commonly maintained for around 2-4 days post major surgery with an ideal maximum duration of 5 days due to infection risk. Increased site and lower limb neurology observations will be required for epidural catheter placement exceeding 5 days.

6.6 Patient Monitoring:

- **Monitoring including vital signs-** Patient observations must be stringently undertaken and documented for the duration of the epidural infusion and maintained on discontinuation of the regimen.
- Monitoring must include the following 8 mandatory observations- these will be documented via Nervecentre or speciality observation charts (Theatre Recovery/ICCU)-
  - Heart rate
  - Blood pressure
  - Respiratory rate
  - Oxygen saturations
  - Temperature
  - Sedation score (ACVPU)
  - NEWS
  - Pain score
- In addition the following must also be stringently undertaken and documented via the APPC-
  - Pain score
  - Post-operative nausea & vomiting score
  - Itch/ pruritus
  - Modified Bromage Score
  - Height of block
  - Epidural site check
- All of the above observations should be undertaken-
  - Every 30 minutes for the first 2 hours, then
  - hourly for 4 hours, then
  - every 4 hours thereafter unless specified otherwise

- Observations should be undertaken more frequently with any change in the patient's condition as per Trust escalation policy.
- **Testing the epidural block -** Testing the sensory and motor block can help decide what volume of top-up is needed if the patient has inadequate pain relief. It can also aid detection of actual or potential problems with the patient including catheter migration to the subarachnoid space or an epidural haematoma or abscess.
- To test the sensory block, a cold indicator (ethyl chloride) is sprayed intermittently onto the patient's skin, on both right and left sides, starting at the clavicle and working downwards towards the pelvis.
- The dermatomal level at which the patient first perceives the absence of cold is the upper level of the block. See appendix 1 for guidance for dermatomal segments
- **Motor block** is tested using the Modified Bromage Score below-

Table 1 Description of the Modified Bromage score

Grade	Criteria	Degree of block
I	Free movement of legs and feet	Nil (0%)
II	Just able to flex knees with free movement of feet	Partial (33%)
III	Unable to flex knees, but with free movement of feet	Almost complete (66%)
IV	Unable to move legs or feet	Complete (100%)

- **Anaesthetist administered bolus-** following a concentrated bolus top up, record vital observations every 5 minutes for 30 minutes then hourly for the next 4 hours.
- **Epidural site check-** every 4 hours. Observe for signs of infection and erythema, severe back pain, excessive leakage, swelling or tenderness when palpated. Report any concerns promptly to the pain nurse specialists in the first instance or first on call anaesthetist if Pain Team unavailable.
- **Sedation score-** if ACVPU is P or U stop the infusion immediately, seek urgent medical advice and contact the pain nurse specialists or first on call anaesthetist.
- **Respiratory rate-** If the respiratory rate is less than 8 breaths per minute, stop the infusion immediately, seek medical advice and contact the pain nurse specialists or first on call .

6.7 Management of Epidural Analgesia (Neuraxial Blockade) Complications

Following neuraxial blockade, the most common complications are hypotension, inadequate analgesia and urinary retention. Although severe complications such as local anaesthetic toxicity, serious infection (meningitis), high/total neuraxial blocks and neurological damage are rare; it is imperative that all staff members follow a strict regimen of patient observations as early detection of complications will reduce or prevent serious permanent harm.

6.7.1. Management of common/ less severe complications

- **Inadequate Analgesia-**

  - Assess pain, if pain score ≥ 2, ACVPU score A or V, respiratory rate ≥ 8 and systolic blood pressure ≥ 100 mmHg, call the pain nurse specialists in the first instance or first on call anaesthetist who can give a 5 mL loading dose of the pre-mixed solution via the infusion pump.
  - Following such bolus, blood pressure, pulse and respirations must be measured and recorded every 5 minutes for 30 minutes as per section 6.6
  - Reassess pain score after 30 minutes. A further 5mL bolus may be given by the pain nurse specialist or anaesthetist via the pump if pain has not improved.
  - If the pain relief is unsatisfactory after 2 loading doses, the anaesthetist should consider a concentrated bolus of local anaesthetic.
  - Levobupivacaine 2.50mg/mL or 5mg/mL may be required as a bolus dose via the epidural catheter, if analgesia is inadequate (to be administered by the anaesthetist only).
  - Administer local anaesthetic as 1mL per segment to be blocked and position the patient appropriately.
  - Monitor vital observations as stated in section 6.6.
  - Consider repositioning patient to left or right lateral position if the ineffective block is unilateral.
  - Consider alternative analgesic plans if bolus is inefficacious as per section 6.3.

- **Hypotension-**

  - If systolic blood pressure ≤ 90mmHg is observed either during routine observations or following an epidural bolus dose, nursing staff should commence IV 0.9% sodium chloride 250mL stat and inform the on call doctor.
  - Ensure the patient is supine: Do not position the patient head down.
  - Administer O2 4L/min.
  - Remember that hypotension is not necessarily due to the epidural, blood or fluid loss as a result of the surgery must be excluded.
  - The epidural infusion should only be stopped if hypotension is not resolved following the aforementioned treatment options.

- **High Block (above T4)-**

  - Stop pump.
  - Sit patient up if symptoms / blood pressure allow
  - Administer O2 4L/min.
  - Call pain nurse specialists or first call anaesthetist.
  - Assess and treat systematically: Airway, Breathing and Circulation.

- **Excessive Motor and Sensory Block-**

  - Excessive motor block is more common with epidurals sited in the lumbar region and may result in weakness/heaviness of the legs, which the patient may find unpleasant.
  - If mobilisation is affected reduce the rate of the infusion. This may result in a poorer quality of analgesia and should be explained to the patient.
  - If Modified Bromage Score 3 or 4, stop pump and contact pain nurse specialists or first on call anaesthetist.
  - Inability to move limbs, i.e. paralysis, is a medical emergency. Contact the pain nurse specialists or first on call anaesthetist immediately.

- **Respiratory Depression / Increased Sedation-**

  - Stop Infusion Pump.
  - Contact pain nurse specialist or first on call anaesthetist.
  - If respiratory rate is less than 8 and/or ACVPU score at P or U, consider IV naloxone 200 micrograms.
  - Repeat naloxone administration of 200 micrograms at two minute intervals to a maximum dose of 800 microgram or until respiratory rate ≥10 and sedation score is A or V
  - Monitor the respiratory rate and sedation score every five minutes for 30 minutes.
  - Avoid additional IV sedatives.

- **Nausea and Vomiting-**

  - First line of treatment- ondansetron 4-8 mg IV
  - If there is no effect, give cyclizine 50mg PO 8 hourly (IV for severe vomiting only/ NG insitu).
  - Metoclopramide 10mg 8 hourly either PRN or TDS (for nausea and vomiting relating to poor bowel motility)
  - If persistent following bowel surgery contact parent Surgical Team as this may be an indication of ileus.
  - Oxygen 4L/min via face mask or 2L/ min via nasal cannula

- **Urinary Retention-**
  - Urinary retention is common after epidural analgesia. It occurs in almost 35% of patients.
  - All patients with continuous epidural infusion should have an indwelling urinary catheter if not already present.

- **Pruritus-**

  This is due to the effect of opioids acting at spinal level and can be severe in some cases. It can be relieved by:
  - Ondansetron (4mg IV)
  - Chlorpheniramine (4mg PO, 10-20mg SC)
  - Naloxone IV (1-2 micrograms/kg) in severe cases only due to reversal of analgesic effect of fentanyl
  - By removing the opioid from the epidural infusion and switching to a 'levobupivacaine only' bag (discuss with the anaesthetist)

- **Catheter Migration-**

  - Inappropriately high sensory block, or profound motor block, may be the first sign of catheter migration. If undetected, it may progress to a total spinal block.
  - Although this is a rare complication, it is important to be vigilant so that subdural/intrathecal migration is detected promptly (see 'Total Spinal Block' via hyperlink to Neuraxial Blockade Complications below)

- **Disconnection in the Epidural Circuit-**

  - Epidural in-line filters are suitable for 96 hours of use and do not routinely need to be replaced within this time.
  - Epidural line disconnection can occur in two places-
    1. Between the bag and the filter.
    2. Between the patient and the filter.
  - If the line becomes disconnected between the bag and NRFit component which connects the infusion line to the filter, clean both ends with an alcohol wipe and reattach. If the line becomes disconnected between the patient and the filter, take immediate action as described below. The procedure to follow will depend on if the event is witnessed or not-

Witnessed Event	**Not Witnessed**
• Place both ends in a sterile field. Contact pain nurse specialist or first on call anaesthetist	• Stop infusion and contact pain nurse specialist or first on call anaesthetist
• Clean the epidural catheter using an alcohol wipe to length of over 10cm	• Remove epidural catheter if it is safe to do so, in relation to the last dose of anticoagulant.
• Cut 10 cm from the end of the epidural catheter using sterile scissors.	• Consider re-siting depending on clinical status of the patient.
• Reconnect to the filter.	• Ensure alternative analgesia is prescribed.

- **Localised Infection-**

  Localised infection at the injection / epidural catheter site is not uncommon and can be treated easily; however, vigilance of this is paramount as it can be an indication of a more serious underlying complication such as an abscess. If the site looks inflamed/infected:
  - Contact the Pain Team / first on call anaesthetist.
  - Take a swab of the site for sensitivity and culture.
  - If removing an epidural catheter, send the line to microbiology for sensitivity and culture testing.
  - Observe for symptoms of new or increasing back pain.
  - Prescribe antibiotics if advised.

- **Pressure Ulceration-**

  Reduced mobility secondary to neuraxial blockade and general illness can increase the incidence of pressure damage. Infusion leakage from epidural catheters may also cause skin damage. Ensure that:

  - All patients have a pressure ulcer prevention risk assessment undertaken at point of admission.
  - Regular observation of pressure areas (in particular the sacrum and heals) are undertaken as per Trust policy.
  - Use pressure relieving equipment and make positional changes when ‘reacting to red’ skin.

6.7.2. Management of less common/ severe complications

- **This includes:**
  - Dural puncture.
  - Local anaesthetic toxicity.
  - Total spinal block.
  - Space occupying lesions including epidural abscess and haematoma.
  - Neurapraxia or severe nerve damage.
  - Severe infection / meningitis

Please click the following hyperlink Neuraxial Complications Policy for a comprehensive guide to the management of severe complications.

6.8 Cautions

- Only the patient **must** press the PCEA bolus button.
- Ensure the bolus demand button is visible at all times.

6.9 Removal of Epidural Catheter:

- Ensure adequate step-down analgesia is prescribed prior to discontinuation of the PCEA.
- Ensure all final epidural pump readings are documented, turn off the pump and disconnect the NRFit component end of the infusion line form the NRFit component of the filter. Discard the opioid bag and pump infusion line into a blue medicines bin on immediate discontinuation of the regimen. Opioid medicines must never be left in the pump unattended when disconnected from the patient.
- Wipe the pump using anti-microbial wipes and return the pump and power cable to Theatre Recovery promptly following discontinuation.
- Ensure the patient is in the position which mirrors the position at which the epidural catheter was inserted; this is usually a sitting and bending forward position or laying it the foetal position.
- Explain to the patient what the procedure will entail.
- Remove all adhesive dressings securing the catheter in place.
- Gently remove the epidural catheter in a slow pulling motion.
- Check the catheter line is intact by observing the blue tip at the end of the catheter.
- If signs of site inflammation or infectious exudate are present, place the end of the catheter in a sterile container, swab the insertion site and send to microbiology for culture and sensitivity test. Place an iodine dressing over the inflamed site.
- The pain nurse specialists will review the patient post epidural catheter removal, where verbal and written information (leaflet) will be given to take home with regard to post epidural complications.

7.0 MONITORING COMPLIANCE AND EFFECTIVENESS

WHO **is going to monitor this element (job title of person/ group responsible)**	**WHAT** **element of compliance or effectiveness within the procedural document will be monitored**	**HOW** **will this element be monitored (method used)**	**WHEN** **will this element be monitored (frequency/ how often)**	**REPORTING** **Which committee/ group will the resultant report and action plan be reported to and monitored by (report should include any areas of good practice/ organisational learning)**
Department leaders / ward sisters / charge nurses	Competency packs are complete	Appraisals, Induction	On going	Department / Ward Leaders Group
Training and Development	Training pack completion	Register of Training	On going	Divisional Governance Forums
Pain nurse consultant and Anaesthetic Clinical Governance Lead	Reported incidents	Datix	Following each incident	Anaesthetic Governance Group / Divisional Governance Forums / learning events/ Medicines Safety Group
Pain Nurse Consultant and Pain Nurse Specialists	Collection of audit data	Orion	Daily	Annual Report to Anaesthetic Governance Group and Nursing, Midwifery and AHP Board

8.0 TRAINING AND IMPLEMENTATION

- **For Anaesthetists:**
  - Be conversant with this policy and access training available via the Pain or Theatre Recovery Teams to ensure competent to use the equipment. .
  - Speciality lectures organised via the Anaesthetic Department relevant to trainees.
  - Regular meetings with the nurses/ODPs in designated clinical areas in order to address issues and promote best practice.

- **For Nurses/ODPs:**
  - To be conversant with this policy and access formal training either in the clinical environment or via a designated study session.
  - The epidural study session can be booked via the Training, Education and Development online booking system. Following attendance at the aforementioned sessions/ clinical training, nurses/ODP's must complete the epidural competency package (available via Sherwood e-academy)
  - Training to maintain knowledge and skills must be undertaken every 2 years.

9.0 IMPACT ASSESSMENTS

- This document has been subject to an Equality Impact Assessment, see completed form at Appendix 4.
- This document is not subject to an Environmental Impact Assessment.

10.0 EVIDENCE BASE (Relevant Legislation/ National Guidance) AND RELATED SFH DOCUMENTS

Evidence Base:

- Association of Anaesthetists of Great Britain and Ireland. *Management of Severe Local Anaesthetic Toxicity*. 2010.

- Association of Anaesthetists of Great Britain and Ireland. *Regional Anaesthesia and Patients with Abnormalities and Coagulation*. 2013.

- Australia and New Zealand College of Anaesthetists (ANZCA). *Acute Pain Management: Scientific Evidence*: 5th Edition. 2020: pp 316 - 333

- Cook TM, Counsell D, Wildsmith JAW, Royal College of Anaesthetists. *Major complications of central neuraxial block: report on the Third National Audit Project of the Royal College of Anaesthetists (NAP3).* Br J Anaesth. 2009 Feb; 179-90.

- Royal College of Anaesthetists. Best Practice in the Management of Epidural Analgesia in the Hospital Setting. August 2020.

- Royal College of Anaesthetists. Guidelines for the Provision of Anaesthesia Services (GAPS) Chapter 11: Guidance on the Provision of Anaesthesia Services for Inpatient Pain Management. 2019

- Smiths Medical. *CADD®-Solis 2100, 2110 Ambulatory Infusion Pumps- Operator's Manual***.** 2011.
- Smiths Medical. *Quick Guide for the CADD®-Solis*. 2009

- The Royal Marsden Hospital. *Manual of Clinical Nursing Procedures*: *10th Edition.* 2020.

Related SFHFT Documents:

- Guideline for the Management of Complications of Neuraxial Blockade

- Guidelines for Surgery and Anticoagulation.

- Policy for Consent to Examine, Treat and Care.

- Observations and Escalation Policy for Adult In-patients.

- Medicines Policy. Medical Equipment User Training Policy

- Medical Device Management Policy

11.0 KEYWORDS

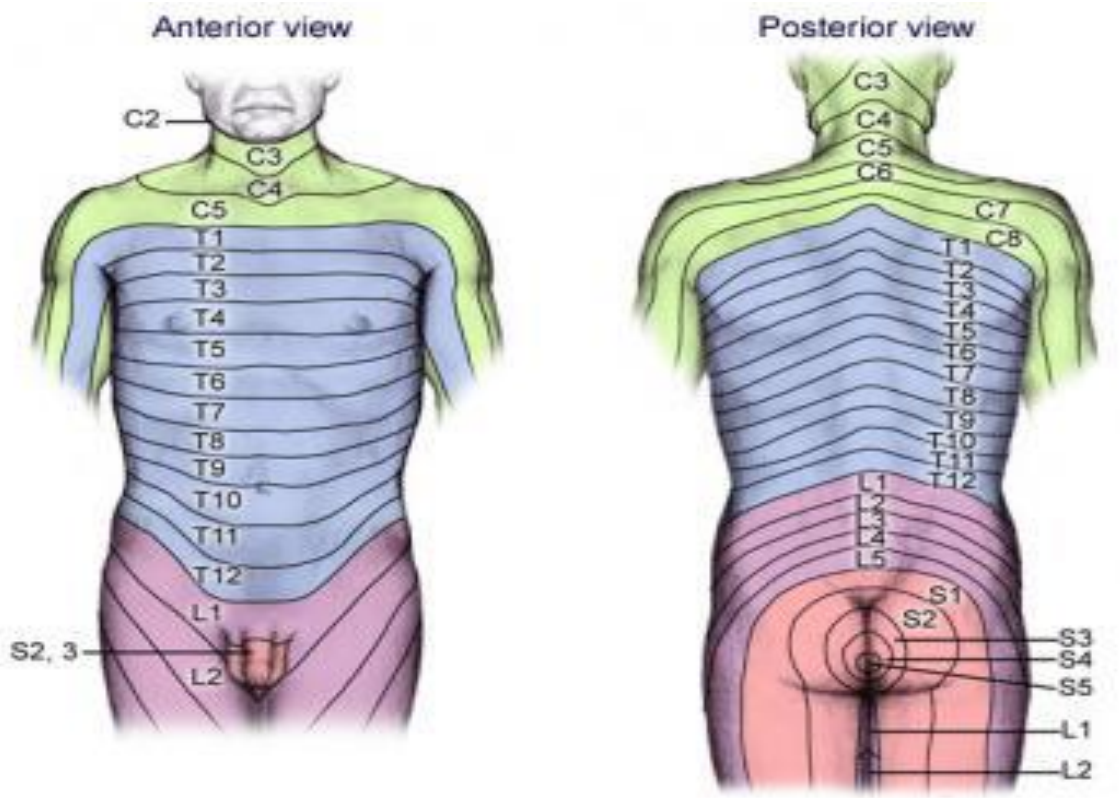
Neuraxial block, Infusion, Fentanyl, Levobupivacaine, Pain Management, peri-operative, analgesic techniques, post-operative, post injury functionality

12.0 APPENDICES

Appendix 1	Dermatomes for Testing Height of Epidural Block
Appendix 2	Anticoagulation and Epidural Analgesia
Appendix 3	AAGBI Safety Guideline – Management of Severe Local Anaesthetic Toxicity
Appendix 4	Equality Impact Assessment (EQIA) Form

Appendix 1

Dermatomes for Testing Height of Epidural Block



Appendix 2

Anticoagulants and Epidural Analgesia

Drug	Time after drug administration for epidural catheter insertion / removal	Administration of drug whilst epidural catheter in-situ	Time after epidural catheter removal for next dose of drug
Aspirin / NSAIDS	No additional precautions	Acceptable	No additional precautions
LMWH prophylaxis (Enoxaparin)	12 hrs	With caution	4 hrs
LWMH treatment (Enoxaparin)	24 hrs	Not recommended	4hrs
UFH Infusion	4 hr or normal APTTR	With caution	4 hrs
Clopidogrel & Prasugrel	7 days	Not recommended	6 hrs
Ticagrelor	5 days	Not recommended	6 hrs
Tirofiban	8 hrs	Not recommended	6 hrs
Abcimimab	48 hrs	Not recommended	6 hrs
Warfarin	INR ≤ 1.4	Not recommended	After catheter removal
Rivaroxaban/ Dabigatran/ Apixaban	48 hrs	Not recommended	6 hrs
Thrombolytic drugs	10 days	Not recommended	10 days

NB - extreme caution must be taken when considering omitting anticoagulants in high risk patients (recent VTE/ cardiac stenting / cardiac valve replacement). Consultation must be undertaken between medical specialities on an individual patient basis. In an acute emergency situation and INR ≥ 1.5, warfarin must be reversed with a prothrombin complex concentrate (PCC) rather that Vitamin K due to time of effect.

Appendix 3

AAGBI Safety Guideline

Management of Severe Local Anaesthetic Toxicity

1 Recognition

Signs of severe toxicity:

- Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic 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

2 Immediate management

- Stop injecting the LA
- Call for help
- 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

3 Treatment

IN CIRCULATORY ARREST

- 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 overleaf)

- 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

WITHOUT CIRCULATORY ARREST
Use conventional therapies to treat:

- hypotension,
- bradycardia,
- tachyarrhythmia

CONSIDER INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)

- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

4 Follow-up

- 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)
  - in the Republic of Ireland to the Irish Medicines Board (via www.imb.ie)

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

Your nearest bag of Lipid Emulsion is kept.....

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

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).

APPENDIX 4 – EQUALITY IMPACT ASSESSMENT FORM (EQIA)

Name of service/policy/procedure being reviewed: Patient Controlled Epidural Analgesia (PCEA) in Adults (Non-Obstetric) Policy			
New or existing service/policy/procedure: Existing			
Date of Assessment: 8th June 2021			
For the service/policy/procedure and its implementation answer the questions a – c below against each characteristic (if relevant consider breaking the policy or implementation down into areas)			
Protected Characteristic	**a) Using data and supporting information, what issues, needs or barriers could the protected characteristic groups' experience? For example, are there any known health inequality or access issues to consider?**	**b) What is already in place in the policy or its implementation to address any inequalities or barriers to access including under representation at clinics, screening?**	**c) Please state any barriers that still need to be addressed and any proposed actions to eliminate inequality**
The area of policy or its implementation being assessed:			
Race and Ethnicity	None	None	None
Gender	None	None	None
Age	None	None	None
Religion	None	None	None
Disability	Patients with physical disabilities affecting use of hands may not be able to operate the bolus element of this equipment. Patients who lack the mental capacity to consent to epidural analgesia or effectively use this device will not be offered this analgesic technique.	Alternative analgesic techniques / plans will be available / prescribed for patients who cannot physically operate the self-administration (bolus) button or for patients who lack the mental capacity understand or use the device.	None
Sexuality	None	None	None
Pregnancy and Maternity	None	None	None

Gender Reassignment	None	None	None
Marriage and Civil Partnership	None	None	None
Socio-Economic Factors (i.e. living in a poorer neighbourhood / social deprivation)	None	None	None

What consultation with protected characteristic groups including patient groups have you carried out?

- None

What data or information did you use in support of this EqIA?

- None

As far as you are aware are there any Human Rights issues be taken into account such as arising from surveys, questionnaires, comments, concerns, complaints or compliments?

- No

Level of impact

From the information provided above and following EQIA guidance document Guidance on how to complete an EIA (click here), please indicate the perceived level of impact:

High Level of Impact/Medium Level of Impact/***Low Level of Impact*** *(Delete as appropriate)*

For high or medium levels of impact, please forward a copy of this form to the HR Secretaries for inclusion at the next Diversity and Inclusivity meeting.

Name of Responsible Person undertaking this assessment:

Signature:
Clare Burton

Date:
21/7/21