



## **Our Lady's Children's Hospital, Crumlin**

### **Division of Anaesthesia/Acute Pain Management**

#### **Guidelines for Management of an Epidural Infusion in Children**

<b>DATE OF Implementation</b>	April 2008
<b>REVIEW INTERVAL</b>	Every 2 years
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## GUIDELINE FOR EPIDURAL INFUSIONS

**These guidelines should be used in conjunction with Nursing practice epidural guidelines, epidural care plans and epidural observation chart**

### 1 INTRODUCTION

- The use of advanced analgesic techniques such as epidural analgesia is a well documented approach to managing severe post-operative pain. This technique has been shown to be safe and effective in children.<sup>1-2, 4.</sup>
- This guideline details the hospitals requirements in relation to the management of epidural analgesia. It is the responsibility of relevant staff to familiarise themselves and adhere to the contents of this guideline.
- Responsibility for the epidural remains with the anaesthetist who instituted it (or supervising consultant if inserted by a trainee). Supervision of the patient can be passed on to Acute Pain Service and properly trained ward staff.<sup>13</sup>
- Nurses with specific training and skill in the supervision of epidural analgesia must be present on the ward on every shift.<sup>13</sup>

### 2 EPIDURAL ANALGESIA:

Epidural analgesia is highly effective for controlling acute pain after surgery or trauma to the chest, abdomen, pelvis or lower limbs. Epidural analgesia can provide excellent pain relief, minimal side-effects and high patient/parent satisfaction when compared to other methods of pain relief.<sup>1,4,13</sup>

Epidural analgesia usually involves the insertion of a fine-bore catheter into the epidural space, through which a local analgesic drug, alone or in combination with opioids such as fentanyl or preservative free morphine or drugs such as clonidine is introduced.<sup>2</sup>

Epidural analgesia has the potential to cause serious life-threatening complications. Complications of epidurals or adverse events are associated with side effects of the medication used, risks associated with the epidural catheter, equipment used and training and management issues.

The safe effective management of epidurals requires a co-ordinated multidisciplinary approach to care.<sup>13</sup>

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### 3 OBJECTIVE:

It is the goal of Our Lady's Children's Hospital, Crumlin, to provide the safest environment for children receiving epidural analgesia.

### 4 APPLICABLE TO:

- 4.1 This guideline applies to patients receiving epidural analgesia for post-operative pain only and not single shot steroid epidural. If an epidural is required for a child receiving palliative care, further advice should be sought from the CNS in Acute Pain.
- 4.2 Nursing staff can safely manage epidural analgesia at ward level if they have received education and training and have a good understanding of the technique and the management of complications associated with the technique.
- 4.3 Members of the nursing staff authorised to manage epidural analgesia must:
  - Attend epidural in-service training provided by the Department of Anaesthesiology/ CNS Acute Pain/Centre for Children's Nurse Education.
  - Registered nurses shall be responsible for monitoring children and notifying medical staff of effectiveness and/or of complications of this treatment.
  - The Registered nurse is competent to safely administer intravenous drugs in children.
- The Registered Nurse has documentary evidence of epidural training and education if this education has been received outside of OLCHC and is appropriate to the care of children who are non verbal.
- Also applicable to CNS Acute Pain, Department of Anaesthesia staff.

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## 5 PATIENT SELECTION

Patient selection for epidural analgesia should be based on a careful risk/benefit analysis for each child.

- Following major abdominal, thoracic surgery or orthopedic surgery
- Following major surgery in patients with complex medical histories.
- Following trauma.
- To relieve pain in severe medical/surgical conditions
- Palliative care

Risk factors that need to be taken into account prior to inserting an epidural catheter include<sup>12</sup>:

- Impairment of coagulation (pathological or therapeutic)
- infection,
- compromised immunity,
- duration of epidural catheterisation,
- cardiovascular stability
- inadequate postoperative monitoring capacity
- Parent or child refusal
- Known allergy to Local Anaesthetic agents

<b>Frequent complications of epidurals include:</b> <ul style="list-style-type: none"> <li>• Hypotension</li> <li>• Respiratory depression(opioid use)</li> <li>• Motor block</li> <li>• Urinary retention</li> <li>• Inadequate analgesia</li> <li>• Pruritus ( opioid use)</li> </ul>	<b>Infrequent but well recognised complications include:</b> <ul style="list-style-type: none"> <li>• Cardiovascular collapse</li> <li>• Reparatory arrest</li> <li>• Unexpected development of high block e.g. catheter migration, intrathecal injection, local anaesthetic toxicity</li> <li>• Post dural headache syndrome ( including subdural haematoma)</li> <li>• Drug administration errors ( especially wrong route)</li> <li>• Pressure sores</li> <li>• Superficial infections around catheter</li> <li>• Epidural haematoma or abscess</li> <li>• Meningitis</li> <li>• Permanent harm e.g. paraplegia, nerve injury</li> </ul>
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## 6 EQUIPMENT

- Regional analgesia prescription sheet, care plan, epidural observation sheet
- Epidural catheter with an in-line filter.
- A pre-manufacture epidural infusion mix. ( Levobupivacaine 0.125%) and additive if required

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- Designated **AMBER/YELLOW** epidural administration sets, Labelled **"FOR EPIDURAL USE ONLY"**<sup>3,10,13</sup>
- Designated epidural infusion devices. (CADD Solis®). Designated epidural pumps **must not** be used for intravenous infusions<sup>3,10,13</sup>
- Pulse oximeter with age appropriate size probe and apnoea alarm if child is under 6 months
- Resuscitation equipment must be readily available.

## 7 EPIDURAL SOLUTIONS

Pre-manufactured local anaesthetic infusion solutions are available from the pharmacy: Levobupivacaine 0.125%, 100ml (1.25mg/ml)

- The pre-manufactured solution will be handled in a similar manner to a controlled substance.<sup>10, 13</sup>
  - 7.1.1** Local anaesthetic pre-diluted solutions will be ordered on the controlled substance book (MDA book).
  - 7.1.2** The Local Anaesthetic solution will be stored away from all other intravenous infusion fluids or drug infusions in an MDA locked cupboard to avoid accidental IV infusion
  - 7.1.3** The local anaesthetic solution will be signed out on the MDA register by the staff preparing the solution, one of whom must be registered and familiar with the drug.
  - 7.1.4** Epidural infusion rates and infusion solutions may be changed by a member of the anaesthetist, CNS Acute Pain, or competent registered nurses.

## 8 PROCEDURE:

### **8.1 Placement of epidural catheter shall be the decision of the anaesthetist.**

- The anaesthetist will gain informed consent from the parent (s), carers and where appropriate the patient prior to insertion of the epidural catheter. A leaflet is available to reinforce verbal information given.
- Prior to initiating epidural analgesia, provision must be made for admission of the patient to an appropriate ward or ICU/HDU, where staff are familiar and competent to care for the technique.

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Currently these ward areas include:

- Our Lady's Ward (general surgical patients aged 2 years and above)
- Nephrology unit, infants and children
- St Josephs ward
- St Peters Ward
- CHC ( Peripheral infusions only)

## 8.2 CATHETER INSERTION

Epidural catheter insertion must be performed using aseptic technique. This should include hand washing, sterile gloves, sterile gown, hat, mask, appropriate skin preparation and sterile drapes around the injection site.

The epidural catheter is connected to a bacterial filter and connected to the continuous infusion pump. Covering the filter with a transparent dressing may help prevent disconnection.

The epidural infusion system between the pump and the patient must be considered as closed; there should be no injection ports. An antibacterial filter must be inserted at the junction of epidural catheter and infusion line.

## 8.3 SECURING THE CATHETER.

- ***Once in situ the catheter should be secured as follows:***
  - A clear dressing, e.g. Opsite™ over the entry site.
  - Tape, e.g. Mefix™ covering the rest of the catheter up the back to the shoulder.



- Connect infusion tubing to epidural catheter via in-line filter using dedicated epidural administration tubing coloured coded yellow.
- Ensure connections are tight and that catheter is not leaking.

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## 8.4 PATIENT MANAGEMENT AT WARD LEVEL

Before the patient returns to the ward the responsible anaesthetist should be assured that the ward is sufficiently staffed to ensure safe management of the epidural. There should be 24hour access to:

- Medical staff, trained and competent in the management of epidurals, immediately available to attend to patients
- Senior anaesthetic advice and availability
- A resuscitation team

The anaesthetist or the CNS Acute Pain will review and follow the child on the ward at least once a day, or when asked to do so at any other time by nursing staff.

## 9 PRESCRIPTION OF EPIDURAL INFUSIONS

The anaesthetist will prescribe the epidural infusion on the dedicated regional analgesia prescription form and submit the prescription chart to the recovery unit for preparation.

### Appendix 1: Regional Analgesia prescription form

#### 9.1 *STANDARD EPIDURAL REGIME:*

**100ml Levobupivacaine 0.125% (levobupivacaine 1.25mg/ml)**

##### 9.1.1 In addition, the following may be added to the Local Anaesthetic Solution bag

- Fentanyl 1- 2 microgram/ml
- Clonidine 0.8 -1 microgram/ml

##### 9.1.2 Infusion Rate:

- Neonates and Infants <5kg: 0.1 - 0.2 ml/kg/hr.
- Children>5kg: 0.1 - 0.3 ml/kg/hr
- Maximum infusion rate 15mls/hr
- **Maximum 4 hour dose** of Levobupivacaine Neonate and Infant<5kg: 1.5ml/kg
- **Maximum 4 hour dose** of Levobupivacaine: children>5kg 2ml/kg to a **max of 75mls**
- These rates are based upon Lumbar and low Thoracic epidurals, if high Thoracic Epidural has been inserted then consider reduction in rate.
- Ward staff may alter the infusion rate within prescribed limits as required.
- In the case of two simultaneous infusions a combined total of 20mls
- Ward staff may alter the infusion rate within prescribed limits

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## 9.2 BOLUS DOSE OF EPIDURAL INFUSION

Effective management of epidural analgesia may require the administration of a bolus injection of solution into the system. This must be performed using the bolus mode of the pump, thus not breaching the system. If a separate handheld syringe is used, the injection must be performed using strict aseptic technique by appropriately trained staff.

**9.2.1 Bolus Dose:** if the patient is in pain and sensory dermatome levels are low, and observations are otherwise satisfactory, a bolus dose can be given by the Anaesthetist or the CNS in acute pain as per prescription. Additional boluses should be based on a dose of: **0.1ml/kg - Max 5mls**

- **Lockout time:** 30minutes

**9.2.2 OTHER MEDICATIONS:** may be prescribed in addition to epidural regime:-

- Regular Paracetamol
- A Non-Steroidal Anti-Inflammatory Drug ( NSAID) (e.g. Ibuprofen or Diclofenac) if there are no contra-indications
- An antiemetic should be prescribed.
- Some children may require an opioid (either orally or in an infusion) in addition to the epidural infusion. This is only prescribed with the discretion of the anaesthetist/Pain service.

## 10 PREPARATION OF INFUSIONS:

- The epidural infusion will be prepared in an aseptic manner ANNT\* level 2<sup>11</sup>
- The infusion will be clearly labeled according to the medication policy
- The epidural administration set will be labelled at the proximal and distal ends with epidural stickers. **“FOR EPIDURAL USE ONLY”** 3,9,10, 13
- A registered nurse and/or anaesthetist and a second registered nurse will independently verify the solution with the prescription order and the patient's identity band prior to connecting the infusion.
- A dedicated (Cadd Solis) epidural infusion pump will be used for epidural infusions. The pump will be programmed with the prescribed rate, parameters and volume to be infused. The anaesthetist and/or a second registered nurse will independently verify pump setting.



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## 11 ADMINISTRATION TO PATIENT

- All children with an epidural infusion in situ should have the following:-
  - A urinary catheter inserted in theatre.
  - Intravenous Access by either an IV infusion or a sodium chloride 0.9% lock for the duration of the infusion and for 4 hours after discontinuation of the epidural.
- Epidural catheter cannot be used for any infusion or medications other than those ordered by an anaesthetist.
- An epidural catheter is left in situ for a **maximum of 5 days** in older children and **2 days in the case of neonates**

### 10.1. CHANGING OF EPIDURAL BAGS

- The infusion bag is changed every 24 hours if clonidine or fentanyl have been added using ANTT level 2.
- If there are no additives the infusion bag and set are changed every 48 hours
- The epidural solution can be changed by competent registered nurses, anaesthetist or recovery staff using non-touch technique.

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\* Aseptic Non Touch Technique ANTT level 2

Where the procedure involves

A) an open unhealed wound or B) break in a line or during the preparation of epidural as the addition of medication to the infusion offer a risk of bacterial contamination or C) Taking blood cultures from CVAD

Preparation involves the use of sterile gloves and a sterile field, sterile equipment and solutions

Antiseptic hand wash to above the wrist using an aseptic hand washing solution (Hydrex) technique or wash hands using soap and warm water, dry hands and follow with alcohol hand rub.

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## 12 NURSING OBSERVATIONS

- A core care plan is available for patients with an epidural
- The epidural vital signs chart must be used for all patients receiving epidural infusions.
- While the patient is in post anaesthetic recovery area, pulse, and respiratory rate and oxygen saturation level will be monitored continuously. Blood pressure will be monitored every 15 minutes for the first hour and then hourly.
- Sensory and motor block will be tested as soon as the child is awake and again before the child leaves the recovery area.

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12.1 FREQUENCY OF OBSERVATIONS AT WARD LEVEL		
OBSERVATION	FREQUENCY	COMMENT
Respiratory Rate (RR), Heart Rate (HR), oxygen saturation (SaO <sub>2</sub> ) (HR) and Blood Pressure (BP) AVPU	One hourly for 24 hours and then 2 hourly if child's condition allows	If the infusion rate is increased then observations should be recorded <b>every 15 minutes for an hour</b> to ensure the patient is stable.
Blood Pressure (BP)	One hourly x 4 hours and then 4 hourly thereafter.	Every 15minutes after a bolus x 1 hour Every 30 minutes x 1 hour after a rate increase.
Input and Output	Hourly	
Pain score at Rest and on Movement	Hourly x 4 hours then at least 2 hourly	More often if child is in pain
Temperature	As per post op observations	If a child has persistent temperature notify anaesthetist or CNS acute Pain
Itch, nausea and vomiting	4 hourly	
Epidural site and Dressing	6 hourly	More often if child in pain
Motor Block	<ul style="list-style-type: none"> <li>• In recovery,</li> <li>• At the Start of each shift</li> <li>• Prior to ambulation</li> <li>• 30 minutes after a bolus or Rate increase</li> </ul>	More often if Motor block is >1
Dermatome level (Sensory Block Level)	<ul style="list-style-type: none"> <li>• In recovery,</li> <li>• At the Start of each shift</li> <li>• Prior to ambulation</li> <li>• If the patient complains of pain</li> <li>• 30 minutes after a bolus or Rate increase</li> </ul>	Sensory block should be assessed if there are any concerns regarding whether the epidural is covering the patients pain
FOLLOWING A BOLUS OR RATE INCREASE		
<b>Every 15mins x 1 hour</b>	Heart rate, respiratory rate, oxygen saturation, Blood Pressure, pain score Hourly x 1hour, if observations are satisfactory return to previous monitoring. Check level of sensory block 30 minutes after bolus	

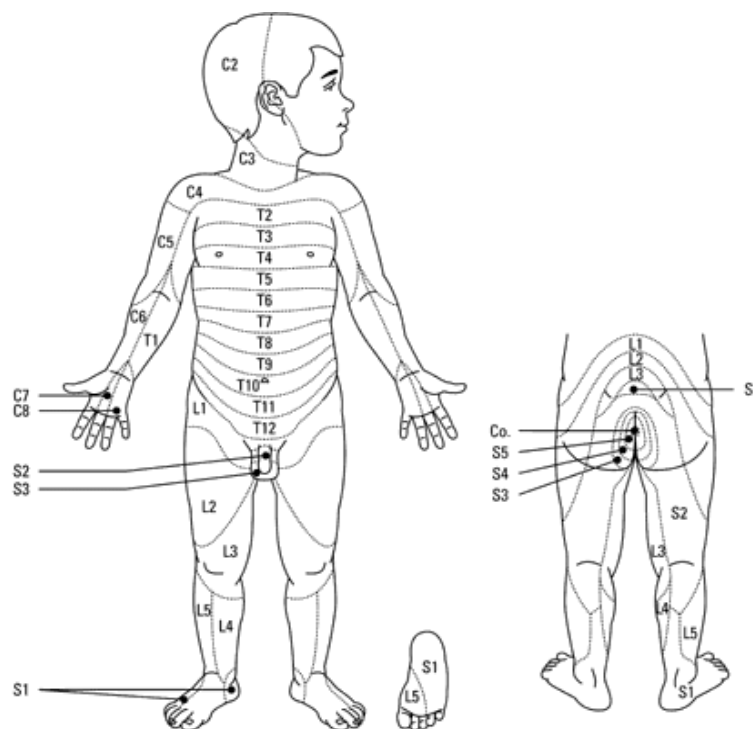
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## 12.2 TESTING THE LEVEL OF THE SENSORY BLOCK

**Sensory nerve fibres respond to pain**, temperature, touch and pressure. As pain and temperature nerve fibres are similarly affected by local anaesthetic drugs, changes in temperature perception indicate where the epidural is working.

Assessing sensory block is important to ensure the epidural is covering the patients' pain to ensure the block is not too extensive, which may increase the risk of complications.

- Ask child to close his/her eyes & place ice against skin, e.g. against the patient's inside wrist or cheek so they will be able to determine the difference in sensation from cold to numbness.
- Begin above expected level of block (approximately 5 cms above surgical wound), and work down at 2-4 cm intervals until below expected level of block.
- Repeat on opposite side of the body.



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- Ideally, the child should have an insensitive band of skin above & below the wound.

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### 12.2.1 ASSESSEMENT OF SENSORY BLOCK IN INFANTS/ NON-VERBAL CHILDREN

- It is possible to assess dermatome levels on infants and non-verbal patients by carefully observing flinching and facial expression in response to ice on presumed blocked and unblocked dermatomes.
- Another method to determine the effectiveness of the regional blockade is by observing the patient's response to movement and their response to very gentle palpation of the operative site.

### 12.2.2 UNILATERAL BLOCK

- Test both sides of the patient's body with the ice, when one side only has sensory loss, this is called a unilateral block.
- If the side that is well blocked is also the location of the surgical procedure and the patient has no pain, then the fact the block is unilateral is of no real concern.

## 12.3 TESTING THE LEVEL OF MOTOR BLOCK

Increasing leg weakness usually means the infusion rate is too high. However it may be an indication that the patient is developing an epidural haematoma. If not diagnosed and treated properly, can lead to paraplegia

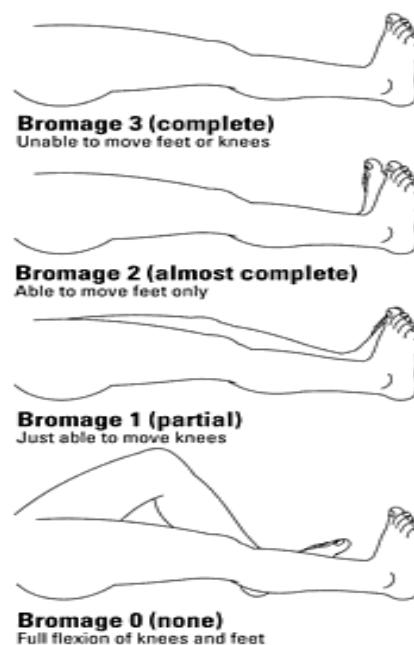
Ask the child to flex their knees and ankles.

- For younger or disabled children (who are unable to follow commands) try to elicit movement by tickling toes, or gentle knee or hip flexion.
- The Child may assist assessment by describing the extent of numbness, tingling and "heaviness".
- Assess quality of motor block
  - 0= none
  - 1=can bend knees, can slide legs apart
  - 2= can wiggle toes, cannot bend knees
  - 3= unable to move legs

**NB** for a child in a hip spica this score can be modified as follows:

- 2=No motor block (can move feet)
  - 3= Inability to move feet
- If the Bromage score > 2 reduce or stop the infusion

Call the anaesthetist or CNS Acute Pain to review the child.



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## See Appendix 3: Management of Leg weakness with epidural Infusion

### 12.4 LEVOBUPIVICAINE TOXICITY (Appendix 4)

Although Levobupivacaine toxicity is rare, it is most likely to occur in the following situations:

- If the drug is accidentally administered intravenously.
- In neonates and babies if high rates are infused for long periods.
- Patients with renal failure.

Nursing staff should observe the patient for signs of local anaesthetic toxicity, i.e.:

#### Local Anaesthetic Toxicity

This is rare and is characterised by:

- Confusion, increased anxiety, irritability, loss of consciousness
- Tingling in mouth and lips
- Blurred vision
- Decreased hearing
- Hypotension, cardiovascular collapse including bradycardia, arrhythmias, asystole.
- Seizures

If the patient is experiencing any of these symptoms the epidural should be stopped **immediately**. Contact Paediatric Registrar or anaesthetist urgently to come and review the child.

If the patient is experiencing any of these symptoms

- Stop the infusion
- Contact the anaesthetist or CNS Acute Pain.
- See Appendix for the management of Levobupivacaine toxicity

**The nurse in the following situations may stop the epidural infusion:**

- Over sedation.
- Respiratory depression or respiratory arrest.
- Disconnection from the filter.
- Pump occlusions.

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## 12.5 ANTICOAGULANT THERAPY:

Impairment of coagulation from either drugs or due to a coagulopathy may have detrimental effects in the patient having an epidural. Vertebral canal haematoma is a catastrophic complication most often associated with an epidural catheter than with any other central block. The risk is significantly increased in the presence of anticoagulants. Other risk factors include technically difficult punctures and multiple or bloody punctures.

The initial presenting complaint of a patient with a spinal haematoma is weakness outlasting the anticipated duration of the motor block of the epidural, or a new onset of lower limb weakness or numbness. Neurosurgical intervention should be sought immediately because recovery is unlikely if delayed by more than 8 hours.

## 12.6 HEPARINISATION

12.6.1 A minimum time interval of 60 minutes needs to be left between inserting the epidural and subsequent heparinisation. The removal of an indwelling catheter should be done only after the complete disappearance of remaining heparin effect i.e. the APPT needs to be normal.

### 12.6.1 CHILDREN RECEIVING LOW MOLECULAR WEIGHT HEPARIN (LMWH)<sup>6</sup>

- The starting dose can be given 12 hours before surgery or at least 4 hours after the placement of the epidural catheter which allows an epidural to be placed safely at the time of anaesthesia.
- The Epidural Catheter **removal** should occur when anticoagulation activity is low, more than 12 hours after LMWH administration and **more than 4 hours before the next dose is due**.
- Ideally LMWH should be administered in the evening to facilitate appropriate timing of the catheter removal.

### 12.6.2 IF THE CHILD IS RECEIVING UNFRACTIONATED SC HEPARIN this is not a contraindication to a neuroaxial block<sup>7</sup>.

- A platelet count should be carried out before removal of the catheter in patients receiving more than 4 days of heparin therapy<sup>7</sup>.
- The INR should be <1.4 to enable safe removal of the epidural catheter.

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### 13 MANAGEMENT OF PROBLEMS

ACTION TO BE TAKEN IF ANY OF THE FOLLOWING OCCUR	
<b>AVPU CORE P OR U</b>	<p>Assess and if necessary provide Basic life support</p> <p>Give 100% oxygen</p> <p>STOP epidural infusion</p> <p>Contact anaesthetist/, Medical staff <b>urgently</b>.</p> <p>The infusion may be recommenced once the sedation score returns to 3 or on instruction from the anaesthetist or CNS Acute Pain</p>
<b>RESPIRATORY DEPRESSION</b>	<ul style="list-style-type: none"> <li>▪ Stop infusion.</li> <li>▪ Give oxygen</li> <li>▪ Provide BLS</li> <li>▪ If fentanyl as been included in the epidural administer Naloxone</li> </ul>
<b>CHANGE IN PULSE RATE</b>	Contact anaesthetist, medical staff, or CNS in Acute Pain.
<b>HYPOTENSION</b>  <b>Hypovolaemia may be the cause of hypotension</b>	<ul style="list-style-type: none"> <li>▪ Stop epidural infusion.</li> <li>▪ Lie flat. (DO NOT lie head low)</li> <li>▪ Give Oxygen Contact 1<sup>st</sup> on call anaesthetist/doctor</li> <li>▪ May require rapid infusion fluid</li> <li>▪ Check fluid balance chart</li> </ul>
<b>DECREASED RESPIRATORY RATE</b>	<p>Stimulate patient</p> <p>Check oxygen saturation</p> <p>Consider giving oxygen</p> <p>Contact Pain Team</p>
<b>INCREASED PAIN SCORES</b>	<p>If the patient complains of pain or appears to be in pain:</p> <ul style="list-style-type: none"> <li>• Assess severity and location of pain</li> <li>• Increase the rate of the infusion, as prescribed</li> <li>• Check catheter at insertion site and all connections for disconnection and leakage.</li> <li>• Assess sensory block on both sides.</li> <li>• Evaluate For: Machine delivery problems, urinary retention, tissue ischemia, excessive anxiety or leakage from the catheter site. Remedy any of these issues.</li> <li>• Administer other analgesics e.g. paracetamol, NSAID if allowed,</li> </ul> <p>Contact Paediatric Pain Team or on call anaesthetist to review analgesia.</p> <p>Staff should be aware that increased or breakthrough pain may indicate surgical complications including the development of compartment syndromes.</p> <p>Special care should be taken when interpreting physical signs in patients who may have sustained neurological damage.</p>

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<b>NAUSEA AND VOMITING</b>	Administer an antiemetic or low dose naloxone. Contact Medical Staff if nausea and vomiting persist
<b>PRURITIS</b>	Administer Chlorphenamine (Piriton) Remove fentanyl from infusion Administer low dose Naloxone 1microgam/kg
<b>DETERIORATION IN SKIN INTEGRITY</b>	Alleviate pressure areas. Use pressure relieving device

<b>ACTION TO BE TAKEN IF ANY OF THE FOLLOWING OCCUR</b>	
<b>LEVEL OF BLOCK TOO HIGH</b> <ul style="list-style-type: none"> <li>Can result in respiratory distress, decreased SaO<sub>2</sub>, bradycardia</li> <li>Numbness or tingling of finger/arms</li> <li>Loss of hand function</li> <li>Horners sign</li> <li>Miosis, ptosis, dry/ward skin on face</li> <li>May be unilateral or bilateral</li> </ul>	<ul style="list-style-type: none"> <li>Stop infusion if concerned</li> <li>Nurse child in an upright position</li> <li>Resuscitate appropriately</li> <li>Contact the Anaesthetist, Bleep 8528 and CNS Acute Pain, bleep 8300</li> </ul>
<b>UNILATERAL BLOCK</b>	<ul style="list-style-type: none"> <li>Turn the patient onto their painful side, i.e. the side that is not being blocked, gravity can sometimes help spread the local anaesthetic across.</li> <li>Inform the anaesthetist as the patient will probably need a 'top up' bolus dose to be administered.</li> <li>The anaesthetist may pull the epidural back slightly (usually 1 or 2 cm) which may resolve the problem.</li> </ul>
<b>PATCHY BLOCK</b>	<ul style="list-style-type: none"> <li>If the blocked area is becoming ill defined or 'patchy' notify the anaesthetist</li> <li>Increase the epidural infusion rate (within the parameters described).</li> <li>'Patchy' blocks are nearly always an early sign that the patient is going to lose their dermatome block levels altogether and the anaesthetist usually administers a 'top up' bolus dose.</li> </ul>
<b>LEG WEAKNESS</b>	<ul style="list-style-type: none"> <li>See Appendix 2</li> </ul>
<b>LEAKING FROM EPIDURAL SITE</b> Leaking of the epidural solution from the entry site is common, particularly in small children	<p>If the patient is comfortable (suggesting the epidural is providing adequate analgesia), the dressing should be covered with a sterile pad and observe. Any heavy blood loss should be discussed with the CNS Acute Pain or Anaesthetist on Call, bleep 8628.</p> <p>If the patient is in pain the epidural should be removed after discussion with consultant anaesthetist and alternative analgesia commenced.</p> <p>If the dressing starts to peel off place a new one over the top, <b>DO NOT</b> remove the dressing.</p>



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<b>OCCLUSION OR KINKING</b>	<ul style="list-style-type: none"> <li>▪ Check to see if connections to filter is too tight, loosening the connection slightly may help</li> <li>▪ Check the catheter and the system</li> <li>▪ If kinked the anaesthetist may be able to correct this by pulling back the catheter by a few millimetres</li> <li>▪ The anaesthetist may try to administer a bolus</li> </ul>
<b>CATHETER DISCONNECTION FROM FILTER</b>	<ul style="list-style-type: none"> <li>• Wrap the filter and catheter in sterile paper or lint free gauze.</li> <li>• Stop the infusion.</li> <li>• Contact the 1<sup>st</sup> on call anaesthetist 8528 on call or CNS Acute Pain.</li> <li>• Do not reconnect the catheter</li> </ul>
<b>SEVERE HEADACHE</b> May be due to dural tap.	<p>Maybe due to a dural tap (incidence 1-2%). May not present until the patient mobilises.</p> <p>Lie flat</p> <p>Administer analgesia, encourage bed rest and fluids.</p> <p>If headache continues a blood patch maybe required. Inform anaesthetist on call ,bleep 8628 or CNS Acute Pain to assess the child.</p>
<b>BACK PAIN</b>	<p>Most common at insertion site. Mild back pain is common and usually transient.</p> <p>Severe, persistent and increasing back pain could be a sign of abscess/haematoma and must be investigated thoroughly. Contact on call anaesthetist to assess the child.</p> <p>An epidural abscess or haematoma can cause severe, permanent neurological damage and must be detected and treated as soon as possible. This diagnosis must be considered if excessive motor block does not resolve rapidly after stopping the epidural infusion.</p>
<b>PUMP OCCLUSION</b>	<ul style="list-style-type: none"> <li>• Check that the catheter is not kinked or trapped or that the connection to the filter is not too tight.</li> <li>• It may help to reposition the patient.</li> <li>• It may help to loosen connections between giving set and filter slightly.</li> <li>• Check whether the pump is faulty - if so it will need to be replaced and returned to biomedical engineering with a label describing the fault.</li> <li>• Restart the infusion.</li> <li>• If the pump continues to occlude contact biomedical engineering, CNS Acute Pain.</li> <li>• The catheter may need to be flushed by the anaesthetist on call</li> </ul>

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## 14 REMOVAL OF EPIDURAL CATHETER

This guideline outlines the important steps and considerations regarding the removal of temporary epidural catheters without trauma to the child.

Removal of short-term epidural catheters is within the scope of practice for registered nurses who have received theoretical instruction and supervised clinical practice. Registered nurses at Our Lady's Children's Hospital, Crumlin may independently perform this procedure if the following requirements have been met.

- The Acute Pain Service/ Anaesthetist has ordered the removal of the epidural catheter.
- The nurse has demonstrated the knowledge and skills necessary and has been assessed as competent to remove an epidural catheter.
- When alternative oral analgesia is prescribed and proven to be effective the epidural infusion may be discontinued. **DO NOT** reduce the rate of the infusion before discontinuing as the epidural may become ineffective before opioids can be administered orally or intravenously.
- Turn off the epidural infusion at least two to four hours before removal of the catheter to ensure that the child's pain can be managed without the epidural infusion.

### 14.1 EQUIPMENT: Non-sterile gloves, dressing pack, Skin cleaning agent.

#### 0.9% sodium chloride, Band-Aid, adhesive remover.

- Explain the procedure to the child/parent.
- Caution is required if a child is receiving anti-coagulant therapy (see point 12).<sup>7</sup>  
Routine coagulation testing prior to removing an epidural catheter is NOT required.
  - Children with potential bleeding problems must have a platelet count/INR check<sup>14</sup>
  - The INR should be <1.4 to enable safe removal of the epidural catheter.
- Decontaminate hands
- Position the child on his/her side of comfort or sitting upright with the insertion site exposed to facilitate removal.
- Remove the tape and dressing from the catheter insertion site using adhesive removal spray/wipes
- Clean around the catheter insertion site with 0.9% Sodium Chloride.
- Gently in one swift movement, remove the catheter. Although gentle traction is necessary to remove the catheter, it should come out easily and painlessly. If resistance is met or the child reports pain or unusual sensations (e.g., tingling or a "catch in the back"), stop the procedure and notify the anaesthetist.

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- Check that the catheter tip is intact by observing marks along the catheter.
- Apply a Band-aid and leave *in situ* for 24 hours.
- Complete epidural audit section of Regional Analgesia prescription sheet.
- Report the following problems or symptoms to the anaesthetist to enable prompt treatment of problems or adverse symptoms by medical staff.
  - Signs of catheter entry site infection.
  - Resistance noted upon catheter removal or patient reports of pain or unusual sensations during catheter removal.
  - Catheter tip marking not visualized on catheter removal.

#### **14.1.1 Note: Children with Spica in situ**

- Turn the child prone ( face down) with his/her head tilted down to make space to enable the catheter to be removed
- Check to see if there is a window in the spica.
- Remove epidural as above.
- If any difficulties are encountered contact the plaster nurse as a window may need to be cut in the spica.

## **15 Monitoring compliance and effectiveness**

<b>Element to be monitored</b>	<b>Adherence to the guideline</b>
Lead	CNS Acute Pain
Tool	The child will be reviewed daily (Monday-Friday) and adherence to the guideline will be recorded in the medical notes.  Audit form for regional analgesia will be completed for each patient.
Frequency	The pain forms will be audited on a yearly basis.
Reporting arrangements	The audit is reported back to Consultant lead for Acute Pain and Assistant Director of Nursing for CNS Acute Pain.
Acting on recommendations and Lead(s)	Acute Pain Service
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within 1 month. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders

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## Contact Number for Pain Management

Clinical Nurse Specialist, Acute Pain	Gill O' Callaghan, Bleep 8300, phone 6933
Lead Consultant Anaesthetists	Dr Jacinta McGinley
	Dr Sinead Harte
Senior Pharmacist	Maura O'Connor
Anaesthetist	Bleep 8528

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## (Appendix 1 ) REGIONAL ANAESTHETIC INFUSION ATTACHMENT

This is a specialised analgesic technique and may only be initiated by the Acute Pain Service



<b>Date:</b> _____ <b>Surgeon:</b> _____ <b>Anaesthetist:</b> _____	<b>Allergies:</b> _____  <b>Weight :</b> _____ Kg	Addressograph Label here <b>Name:</b> _____ <b>Date of Birth:</b> _____ <b>HCR Number:</b> _____
<b>Specify Region: (Tick)</b> Epidural <input type="checkbox"/> Caudal/Epidural <input type="checkbox"/> Extrapleural <input type="checkbox"/> Paravertebral <input type="checkbox"/> Intercostal <input type="checkbox"/> Femoral <input type="checkbox"/> Wound catheter <input type="checkbox"/> Other _____ <b>First Attempt::</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Problems at insertion _____ <b>Level of catheter insertion:</b> _____ <b>Catheter position at Skin:</b> _____ CM <b>Skin to space distance:</b> _____ CM <b>Maintain level of block at</b> _____ <b>and no higher than</b> _____		

### PRESCRIPTION GUIDE : Levobupivacaine 0.125%

**Neonates and Infants <5kg:** 0.1 to 0.2 mL/kg/hr. *(Do not exceed this rate)*  
**Children >5kg:** 0.1 to 0.3mL/kg/hr. *(Do not exceed this rate )* Maximum of 15mLs/hr.  
**Maximum Volume in a 4 hour period is:** ≤ 5Kg: 1.5mL/kg. ≥ 5Kg: 2mL/kg. To a Maximum of 75mLs  
**Guideline Fentanyl Additive:** Zero to 2 microgram fentanyl per mL of Levobupivacaine 0.125%  
**Guideline Clonidine Additive:** 0.8 to 1 microgram per mL of Levobupivacaine 0.125%

Levobupivacaine 0.125% (1.25mg/mL) 100ml* ( see above for prescribing guideline) <b>Additive:</b> _____ (strike through if no additive) <b>Rate:</b> _____ mL/hr <b>Start Rate:</b> _____ mL/hr <b>Bolus Dose:</b> _____ mL <b>Lockout Time:</b> 30 mins Additional boluses should be based on a dose of: <b>0.1mL/kg, to a Max of 5mLs.</b> Bolus dose to be given by Anaesthetist/CNS Acute Pain/Certified nurse. <b>Maximum 4 hour dose:</b> _____ mL <b>Connected By:</b> _____ <b>Time:</b> _____ This prescription is valid for 72 hours. *Infusions with additives must be changed every 24 hours.	Prescribers signature	Date	Prepared by (Checked by 2 people)	Date/ Time

Regional Anaesthetic Infusion Prescription

### REGIONAL BOLUS ADMINISTRATION AND/OR CHANGES TO INFUSION RATE

Increase the epidural rate by no more than 0.1mL/kg/hr. (maximum volume 15mLs/hr.)

Date & Time	Current Rate mL /hr	Revised Rate mL /hr	BOLUS			Prescribers signature (only required if bolus solution differs to prescribed solution)	Signature
			mL	Infused solution=✓ OR other concentration	Reason for Rate change or bolus		

Reasons: BP=↓BP S=Stopped D=Dense block H= High Block L=Low Block P= Pain U= Unilateral

If additional top-ups are given by the anaesthetist, record observations ½ hourly for 1 hour. Hourly x 4 hours and thereafter 4-6 hourly

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CONTACT CNS ACUTE PAIN (Bleep 8300) or ANAESTHETIST on call (Bleep 8528) in the event of any problems	
SpO2 <90% or difficulty breathing	Administer oxygen using rebreathing mask immediately. Provide PILS
RR <10 min over 5 yrs., or <20/min <5 yrs.	Administer oxygen. Seek medical help. Provide PILS
SBP <70 mmHg ( or <50mmHg infants)	Administer oxygen Check sensory levels Any doubt stop infusion immediately Consider bolus fluid 10mL/kg Do not lie head low
Temperature >38.5	Give antipyretic
Motor block Lower limbs ≥3	Stop infusion, Reassess Motor block every 15minutes. (Where motor block does not resolve see algorithm for management of persistent motor block) When motor block resolves, epidural infusion can be recommenced.
Catheter Disconnect	Stop infusion; Wrap ends in sterile non-lint gauze.
Leak around catheter	Keep infusion running Place absorbing dressing over the area <b>Do not remove catheter before consulting with consultant anaesthetist who inserted the catheter</b>
Numbness/tingling in fingers arms	Stop or Reduce infusion
Twitching/seizure	Stop infusion Administer Oxygen.
Headache	Check Temperature and CNS observations Lie child down. Administer analgesics and additional fluids
Erythema or pain at insertion site	Swab site and send catheter tip for C&S Document
Inadequate Pain Relief	Increase infusion within prescribed limits Administer supplemental analgesics
Where the infusion contains Fentanyl or Clonidine, <b>NO</b> other systemic opioids or clonidine are to be given unless specifically ordered by, or after discussion with, an Anaesthetist or CNS Acute Pain	

<b>OBSERVATIONS</b>
<b>Hourly</b> respiratory rate, heart Rate, Oxygen saturation level, sedation score x 24 hours, then 2 hourly
<b>2 hourly</b> or more often, as condition dictates: pain score at rest and on movement, B/P x 4 hours.
<b>Motor and sensory block: hourly x 4 hours, 2 hourly x 6 hours and 4-6 hourly thereafter</b> or more often as condition dictates; <b>Motor Block &amp; Sensory Block.</b> In addition sensory and motor block should be assessed in recovery room, and at start of each shift, Prior to ambulation and one hour after a bolus or rate increase, or if the child complains of pain.
<b>4 hourly:</b> B/P, temperature, Nausea & Vomiting, Pruritis. Pressure areas
<b>6 hourly : or more often if leaking:</b> regional analgesia catheter site & dressing check
<b>All assessment should be done at change of shift and if concerned about the child.</b>
<b>DISCONTINUATION ASSESSMENT</b>
Coagulation discussed (child on anticoagulant or major intra-op bleed) ( INR < 4) <input type="checkbox"/> Alternative analgesia prescribed <input type="checkbox"/>
Catheter tip intact Yes <input type="checkbox"/> No <input type="checkbox"/> Site Inflamed: Yes <input type="checkbox"/> No <input type="checkbox"/> Discharge at site: Yes <input type="checkbox"/> No <input type="checkbox"/>
If the catheter is NOT intact, inform the anaesthetist on call IMMEDIATELY on bleep 8528
If there is site inflammation or discharge, please cut catheter 3cm from tip and place in sterile container. Send for C&S ± skin swab if indicated, and notify the Anaesthetist, CNS Pain.
<b>Catheter problems</b> e.g. leak, disconnect _____
<b>Catheter removed: Time &amp; date</b> _____
<b>Signature of person removing catheter</b> _____



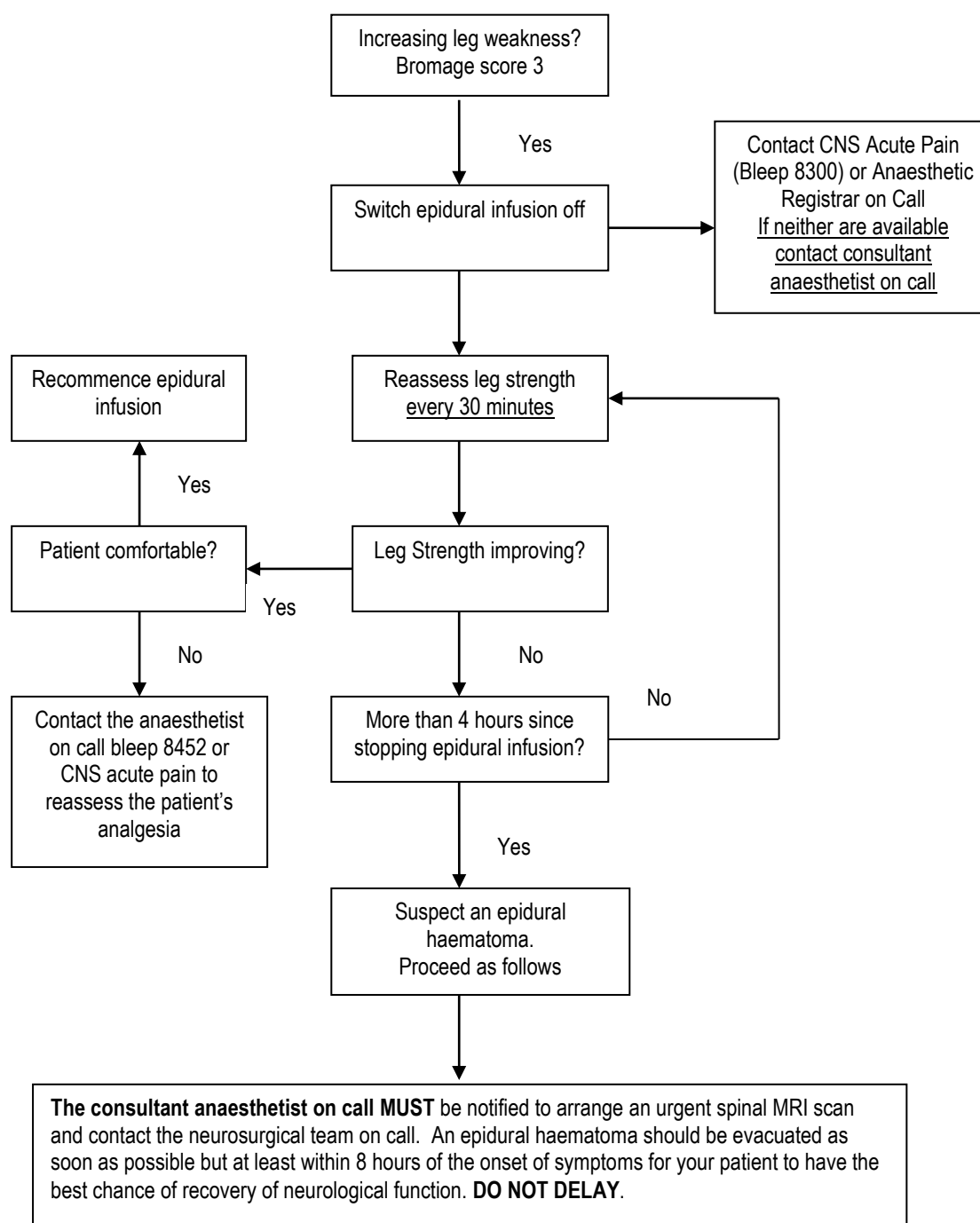
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## Appendix 2: Management of Leg weakness with epidural Infusion

### Management of Leg weakness with Epidural Analgesia

All patients receiving epidural analgesia must have leg strength assessed regularly using the "Bromage score" that appear on the epidural observation form. Thoracic epidural analgesia should not cause profound leg weakness.

Increasing leg weakness usually means that the infusion rate is too high. However it may mean that the patient is developing an epidural haematoma. If not diagnosed and treated promptly this will lead to paraplegia.



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