



INTRODUCTION

Welcome to the Epidural Certification Course.

Please read the information provided carefully, taking special note of the learning objectives. You will not be tested on anything that is not included in these objectives.

We have endeavoured to ensure that the material enclosed is as up to date and relevant as possible. However, as we are sure you will appreciate, these modalities are subject to change and consequently will need modification from time to time, as appropriate.

You will notice that the readings are divided into two sections. The first section deals with additional information that is not covered in the Hospital Policy Document. The second section relates to the Epidural Manual. The relevant sections of this document are reproduced in their original form. This may fragment the layout of these readings for teaching purposes, however for reference purposes, it has the advantage of presenting the material in exactly the same format as found on the wards.

Finally, please feel free to direct to us any comments or suggestions you may have regarding these readings.

Chris Black
CNE Perioperative Services
Grey Hospital

Sue Newton
Consultant Anaesthetist
Grey Hospital



LEARNING OBJECTIVES

The Registered Nurse (RN) will be able to:

- a) Describe the basic anatomy relating to epidural analgesia.
- b) State his/her role in the management of a patient with an epidural infusion
 - Conduct a comprehensive assessment of patient's pain
 - Assessing dermatome assessment of patient's pain
 - Patient assessment and documentation
 - Mobilisation
 - Potential complications and the nursing intervention of these
 - Adverse effects
- c) Outline the care related to an epidural catheter including:
 - Assessment of the dressing/site and documentation
 - Potential complications and the nursing intervention of these
 - Outline the procedure for removal of the epidural catheter
 - Adverse effects
- d) Review drugs commonly used in epidural analgesia and therapeutic action associated pharmacokinetics.
 - State three drugs commonly used in epidural analgesia and their therapeutic action
 - State two useful adjuvants, and their therapeutic action
 - State two drugs used as reversal agents in epidural infusion, and their expected action, precautions
- e) Demonstrate operational competence with the epidural infusion pump
- f) Provide comprehensive patient education (refer to Appendices B, E)

ASSESSMENT CRITERIA : SURGICAL CONTEXT

For an RN /Midwife/Anaesthetic technician to be successful they must:

- Read the WCDHB Epidural Policy, Epidural Standard, Epidural Procedure and Epidural Analgesia Infusion Administration Procedure included with the learning package.
- Attain a pass of 90% in a multiple choice test on competence related to management of Epidural Infusions.
- Demonstrate competency and safety in the Practical Assessment.

Certification will be for a period of three years. RNs/Midwives/Anaesthetic Technicians will be required to care for a minimum number of Epidural Infusions per annum to maintain competence.

1. ADVERSE EFFECTS OF ACUTE PAIN

1.1 Adverse Physiological Effects of Acute Pain

Respiratory

Pain leads to muscle splinting with decreased tidal volume (TV), vital capacity (VC), Functional Residual Capacity (FRC) and alveolar ventilation. Resulting atelectasis causes venous admixture, hypoxia and hypercapnia. Inability to cough leads to retention of secretions and increased disposition to lobular collapse with resultant infection.

Cardiovascular

Pain causes sympathetic overactivity resulting in tachycardia, hypertension, increased peripheral vascular resistance, cardiac load, ↑ CO and oxygen consumption. Myocardial ischaemia and infarction may result. Regional blood flow is also altered and cerebral blood flow may be compromised.

Skeletal Muscle Spasm

Reflex activity leads to muscle spasm which will increase pain thereby setting up a vicious cycle. Immobility will potentiate the incidence of DVT and pulmonary embolus. Venous aggregation and increased platelet aggregation adds to this problem.

Gastrointestinal & Genitourinary

Increased sympathetic activity leads to increased secretions and sphincter tone. This can result in decreased intestinal motility and gastric dilation.

Hormonal

Pain is one of the factors causing hormonal response to injury. Increased ADH and aldosterone lead to sodium and water retention. Increased cortisol and Adrenaline leads to hypoglycaemia. There are many other hormonal disturbances.

1.2 Adverse Psychological Effects of Acute Pain

Unrelieved pain results in anxiety and sleeplessness. This results in another vicious cycle with anxiety resulting in increased pain. The effects of decreased anxiety have been demonstrated in many studies. Patients who have good preoperative explanations have been found to require fewer opiates in the postoperative period.

2. ASSESSING PAIN IN ADULTS

The regular assessment of pain levels is fundamental to pain management. The tool for adult pain level assessment adopted by CHC is the Numeric Rating Scale.

Numeric Rating Scale

0 = No pain
10 = Worst pain imaginable

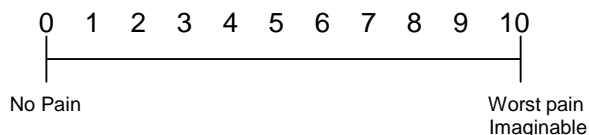


Figure One: Numeric Rating Scale

Verbal Analogue Scale is another scale that can be used.

The patient rates his/her pain according to the scale using numbers related to descriptive words denoting varying intensities of pain. The patient chooses the number that most nearly describes the pain they are experiencing. It is important that the patient scores their pain both at rest and on activity. The goal is to control the pain so that the patient can perform activities, eg Physio, comfortably within pain boundaries acceptable to them.

If this scale is used, you must identify and record on the Epidural Recording Sheet so that all nurses are assessing the pain in the same way.

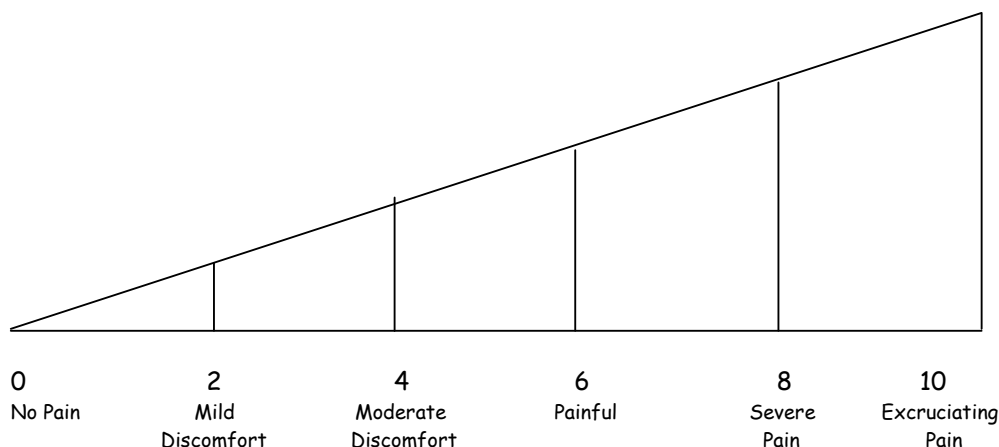


Figure Two: Verbal Analogue Scale

Present knowledge tells us of the multiplicity of mechanisms that need to be blocked to effect good analgesia. In some instances certain mechanisms can be pre-emptively blocked before pain is initiated. However, in the majority of cases there is a need to treat pain as it arises using a variety of pharmacologic and non pharmacologic, regional and non regional means in an attempt to shut each pain pathway/mechanism 'door' and so keep the pain from getting through.

Different surgical procedures require different approaches to pain management. Most can be managed using relatively simple measures. Others require more advanced techniques of analgesia.

The objective is to be comprehensive in applying the variety of approaches in a way, which is appropriate for each and every situation.

These situations refer broadly to three aspects:

1. Type and site of surgery.
2. Severity of pain.
3. Degree of rehabilitation required.

When considering the more simple, non advanced techniques we traditionally use a variety of pharmacologic agents usually considered under the categories of mild analgesia, non steroidal anti-inflammatory drugs (NSAIDS), opioid and non opioid analgesics and adjuvant agents.

These will often be used in combination to achieve multimodal/mechanism analgesia. For instance, many patients will receive regular Paracetamol as a background analgesic while receiving, and after completion of, opioids and advanced analgesia techniques. NSAIDS may also be used in this way.

3. INTRODUCTION TO EPIDURAL INFUSIONS

Epidural Infusions are used most commonly for postoperative pain and sometimes in obstetric analgesia. Less common applications are for trauma, pre-amputation and cancer pain as well as selected chronic pain states.

Agents are either:

- Combination (such as low concentration local anaesthetic (LA), opioid and Adrenaline); or
- Sole agents, eg Opioids

The preferred option is the combination infusion technique. It has been found that by using a combination of agents their concentration and side effects can be minimised while still producing excellent analgesia. Integral to this success is the placement of the catheter in the epidural space at a level as close to the mid dermatome for the surgical incision as possible.

Epidural Infusion Analgesia (EIA) for postoperative analgesia, is administered by trained staff. The AIM is to provide effective analgesia using ward-based epidural infusion in selected patients.

This is an infusion technique supplemented by PCEA boluses if necessary.



Table One: Uses of Epidural Analgesia

Acute postoperative pain	Intrathoracic surgery Abdominal surgery Lower limb orthopaedic surgery Vascular surgery Urological procedures
Chronic Pain	Terminal illness
Obstetrics	Local anaesthetic freezes sensory and motor nerves of the uterus and vagina
During operative procedures	Appropriate for individuals undergoing surgery who would not be suitable for a general anaesthetic, ie those with major cardiovascular, respiratory and metabolic problems.



4. BENEFITS OF EPIDURAL INFUSIONS

Epidural analgesia is an effective method of pain relief in a variety of situations.

- Effective analgesia
- Avoids the need for intramuscular (IM) injections
- Decreased nausea and vomiting
- More effective respiratory function
- No significant depression of conscious level
- Better compliance with dressing changes, physiotherapy and orthopaedic passive movement devices
- More rapid post operative mobilisation
- Lower deep vein thrombosis (DVT) rate
- Improved wound perfusion
- Faster return in bowel function
- Less nursing time checking controlled drugs (efficient use of nursing resource)
- Decreased length of stay, earlier discharge from hospital

5. INDICATIONS FOR USE OF EPIDURAL INFUSIONS

- For major abdominal/thoracic surgery
- Some pelvic/lower limb orthopaedic procedures
- Surgical inpatients with severe respiratory disease
- Where Patient Controlled Analgesia (PCA) may be inappropriate, or as an adjuvant to PCA

6. CONTRAINDICATIONS FOR USE OF EPIDURAL INFUSIONS

- Hypovolaemia
- Infection at the site of the insertion
- Coagulopathy
- Raised intracranial pressure
- Patient refusal
- Allergy to local anaesthetic
- Spinal deformity
- Noncompliance of patient
- Cardiovascular disease, especially aortic stenosis

7. EPIDURAL INSERTION ANALGESIA (EIA) TECHNIQUE

The epidural catheter is inserted pre-operatively by the anaesthetist, using standard techniques for both the insertion and fixation of the catheter. The special *Epidural Infusion Analgesia Prescription Sheet* will be completed and delivered to Recovery for preparation of the pump and the infusion solution. (See Appendix C) An epidural catheter may be inserted in the maternity labour ward.

Commencement of Epidural Infusion

In recovery the epidural infusion is started and base line observations recorded in the Epidural Recording Sheet. Every patient will have an effective block and stable cardiovascular parameters before leaving for the ward.

The analgesia infusion solution will be prescribed and made up. It is delivered using the specific Pain Management Pump to the epidural catheter. These pumps have the facility to deliver a bolus of drug. The system is closed apart from bag changes or technical problems (rare). The tubing should be changed every 72 hours.

The Pain Management Pump may be programmed with the prescription by the RN/Midwife/Anaesthetic Technician who has completed the Epidural Certificate. The programme must be checked by another Registered Nurse.

Changes to the prescription are only made with prior consultation with the anaesthetist. The administration of boluses/top ups will only be done by an anaesthetist unless the PCEA option can be utilised.

The anaesthetist reviews his/her patients at least once a day and monitors the ongoing infusion.

All EIA patients will be on regular Paracetamol for basal/background analgesia during and following EIA.

NB: It is particularly important that the patient receives no additional doses of opioid drugs for the duration of the infusion. Such doses/drugs should not be prescribed except after consultation with the anaesthetist



8. PHYSIOLOGY OF BRAIN AND SPINAL CORD

The vertebral column is composed of 33 vertebrae: 7 cervical (C), 12 thoracic (T), 5 lumbar (L), 5 sacral and 4 coccygeal. The spinal cord originates at the foramen magnum and terminates at L2.

- The brain and spinal cord are covered by membranes - meninges. The outer membrane - dura mater. Between the dura mater and the wall of the vertebral canal is the epidural space, which is composed of connective tissue, fat and blood vessels. It extends from the cranium to the sacrum.
- The middle membrane - arachnoid, which is very delicate and like a spider's web. Between the dura mater and the arachnoid lies the subdural space, which contains serous fluid.
- The innermost membrane - pia mater is composed of a transparent fibrous membrane attached to the brain and spinal cord.
- Between the arachnoid and the pia mater is the subarachnoid space, in which cerebrospinal fluid (CSF) circulates. (*Tortora and Anagnostakos 1994; Bruce 1992*).

Epidural cannula are inserted into the epidural space. They can be positioned anywhere between T1 and L3 depending on where the block is required. Cervical blocks can be used, but they are less common. (*Oh 1990; George et al 1991; Bruce 1992*).

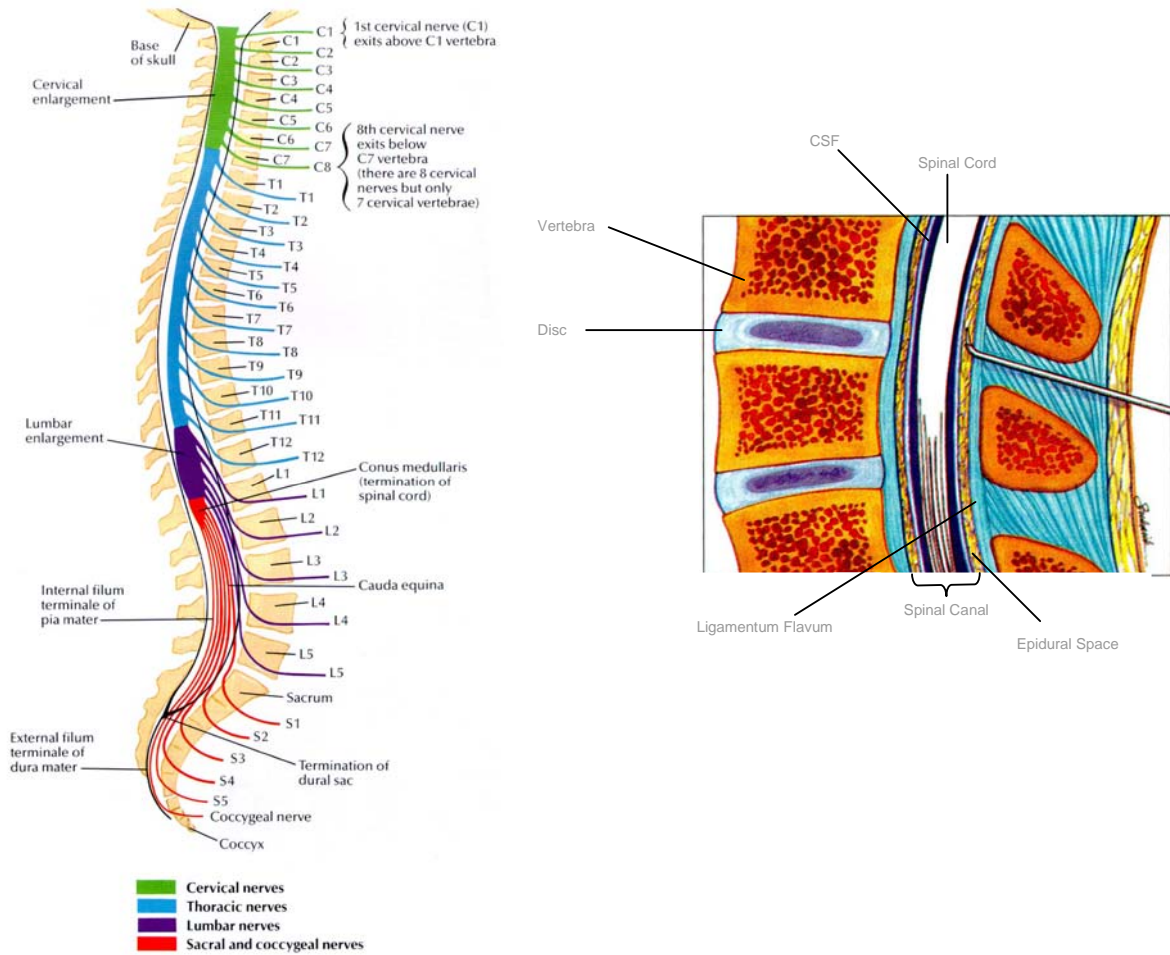


Figure Three: The meninges showing the epidural space

9. DEPTH TO SPACE MEASUREMENT OF EPIDURAL CATHETER

When the epidural is first inserted by the anaesthetist, both the depth to space measurement and the catheter mark at skin are noted and recorded under insertion details at the top of the Epidural Infusion Analgesia Prescription Sheet.

Depth to space is the distance from the skin to the epidural space.

The epidural catheter has a series of markings upon it as illustrated on Figure Four.

The "catheter mark at skin" is exactly that, ie whatever mark is nearest to the skin entry point.



The amount of catheter **within** the epidural space is calculated by subtracting the depth to space from the catheter mark at skin.

If the epidural inadvertently moves out of position, then this can be deduced by the fact that the catheter mark at skin will be different from the one recorded initially.

Also for the occasions when the anaesthetist may "pull back" or alter the length of the catheter within the epidural space, it is important to calculate the depth to space.



Key:

- 4 marks together = 20
- 3 marks together = 15
- 2 marks together = 10
- Catheter tip is coloured and blunted

Figure Four: Epidural Catheter

10. COMMON DRUGS USED IN EPIDURAL INFUSIONS

The epidural space is used because it allows drugs to be injected near to the spinal cord and the nerves surrounding it. When opioids are administered epidurally, pain relief is produced by the drug that is present in the spinal cord and not that in the plasma. The drug diffuses slowly into the subarachnoid space and then passes to opioid receptors in the dorsal horn of the spinal cord. *(Rosen and Calio 1999).*

Narcotic analgesics are thought to block the release of substance P when they bind to opioid receptors in the dorsal horn, therefore blocking the transmission of pain impulses to the cerebra cortex.

Epidural administration of narcotics has a more prolonged effect since the drug must diffuse out of the CSF into the blood, before it can be excreted via the liver and kidneys. *(Rosen and Calio 1990).*

The analgesic effect is mainly confined to segmented spread across the spinal nerves that correspond to the site of entry into the epidural space. *(McShane 1992).*

Local anesthetics block the conduction of nerve impulses while narcotics only interfere with pain impulses. *(Hosking and Welchew 1985).*

The most common drugs used in epidural analgesia are Morphine and Fentanyl. At Greymouth Hospital **Fentanyl** is usually combined with a local anaesthetic, such as **Bupivacaine** or **Ropivacaine** as this combination has been reported to produce a synergistic effect and reduce the incidence of side effects. *(Rosen and Welchew 1985).*

Morphine is not commonly used for acute pain because of it's side effects of respiratory depression, but may be useful for chronic pain. The doses of epidural Morphine, when compared to other routes, are so much less and there is no sensory or motor loss, so the patient is able to move normally. (compare 2-4 mgs epidural Morphine 24 hrly with 10 mgs IM 3-4 hrs).

10.1 Local Anaesthetic (LA)

Mechanism of Action

The generation and propagation of a nerve impulse along a nerve fibre involves the opening of sodium ions from the outside to the inside of the membrane.



The local anaesthetic drugs in common use act primarily by binding to receptor sites in the sodium channel, preventing this influx of sodium ions and thereby blocking conduction of the nerve impulse.

To do this the local anaesthetic agent must first cross the cell membrane. Local anaesthetic drugs exist in solution in two forms: a lipid-soluble base that easily crossed the nerve membrane, and the water-soluble cationic form that blocks the sodium channel from the inside of the nerve membrane by attaching to a sodium channel binding site. If the tissues into which the local anaesthetic agent is injected are more acid than normal (that is the pH is lower than normal), as will happen if the tissues are infected, there is a decrease in the amount of the lipid-soluble base that is available to cross the nerve membrane, leading to a reduction in the effectiveness of the drug.

There are a number of different types of nerve fibres which vary in size and function.

<i>Table Two: Nerve Fibre Class, Size and Function</i>		
<i>Class</i>	<i>Size</i>	<i>Function</i>
A-alpha (A*)	Largest	Motor, proprioception (position sense)
A-beta (A*)	↓	Touch/pressure, motor
A-gamma (A*)		Muscle spindle tone
A-delta (A*)		Pain/temperature
B		Preganglionic autonomic
C (unmyelinated)		Smallest

The ease with which a nerve fibre is blocked by a given concentration of local anaesthetic drug depends on its *critical blocking length* (the length that must be exposed to the drug in order for the nerve to become blocked) and on the *accessibility* of the nerve membrane binding site to the blocking agent. It has always been taught that smaller diameter nerve fibres are more easily blocked than larger diameter fibres. In fact, the actual diameter of the fibre is not itself important. However, the smaller diameter fibres have the smallest critical blocking length and are more easily accessed and blocked by local anaesthetic solutions. Nerve blockage is also *frequency dependent*, that is, active nerves fibres are more easily blocked than inactive ones.



B fibres tend to be blocked before C fibres. This is probably because C fibres are usually arranged in Remak bindles, which may hamper diffusion of the local anaesthetic solution, and/or because the critical blocking length of B fibres is quite short.

As the effect of any nerve block wears off, recovery of movement may precede recovery of sensation or sympathetic nerve function. This is of particular importance following epidural of spinal anaesthesia, when a patient may appear to have normal motor function, yet may have incomplete return of sensation and residual sympathetic block that leads to postural (orthostatic) hypotension.

Bupivacaine 0.125%

Used to effect a variable neural block, usually including sympathetic, sensory and possibly motor nerves. This differential block pattern relates to the concentration of the LA with the motor nerve block requiring a higher concentration and the sympathetic nerves the least. The ideal is to block at least the pain pathways (will mean the more sensitive sympathetic nerves are blocked as well) while leaving the motor nerves unblocked.

The effects of the various nerve blocks:

Sympathetic Nerves

Vasodilation, sweating and heat loss. Results in drop in blood pressure (BP), postural hypotension, warm dry periphery and compensatory vasoconstriction in the upper limbs.

Sensory Nerves (Have a range of sizes for the various modalities)

In order from small to larger they are *pain, temperature, touch, pressure and proprioception* requiring increasing concentration of LA to effect blockage. Again, a wide variable block of some or all of these fibres may be present.

- Pain and temperature fibres are approximately the same size, so pain fibre block can be checked by temperature testing.
- **Complete block will remove pressure sense so regular 2 hourly position changes are necessary to avoid pressure areas developing, eg blisters on heels.**

- Sensory blockage is recorded by the regular documentation of upper and lower dermatome levels.

Motor Nerves

- Results in loss of motor power within the blockage segment, if the concentration of LA is high enough, eg a thoracic block should only effect the thoracic and abdominal muscles/myotomes innervated by the thoracic nerves.
- Lumbar epidurals will effect the lower limbs more. This is very important when considering mobilisation.
- The extent of the motor block can be assessed by use of the Bromage scale for motor blockage in the lower limbs.



Bromage Scale

0	No Block	0%	Full flexion of knees and feet possible
1	Partial	33%	Just able to flex knees, still full flexion of feet possible
2	Almost complete	66%	Unable to flex knees. Still flexion of feet.
3	Complete	100%	Unable to move legs or feet

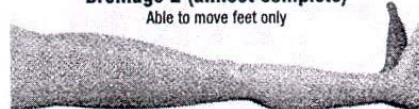
Intensity of Motor Block

Bromage Score: Any patient with a motor deficit must not be ambulated.
Any prolonged motor deficit must be communicated to an anaesthetist.
It is important to realise that the patient's sense of body orientation may be impaired due to sensory block.

Bromage 3 (complete)
Unable to move feet or knees



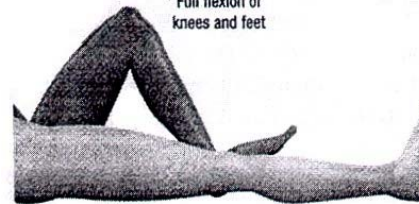
Bromage 2 (almost complete)
Able to move feet only



Bromage 1 (partial)
Just able to move knees



Bromage 0 (none)
* Full flexion of knees and feet



****Figure Five: Bromage Scale**

Ropivacaine 0.2 mg/ml

Of a similar structure and potency to Bupivacaine, Ropivacaine is a newer local anaesthetic agent, which has a similar onset and duration of action of Bupivacaine, but is less cardiotoxic. In concentrations producing comparable analgesia, it results in less motor blockage than Bupivacaine.

10.2 Opioid Agents

(for example)

Fentanyl 2µg/ml

Effect antinociception by their action at opioid receptors at nerve root, spinal cord and brain stem sites. Does not block the other modalities as described above under La block so there is no effect on BP or muscle function. However, they can cause nausea, vomiting, itch, urinary retention and respiratory depression. The risk of respiratory depression, although very rare, necessitates the regular monitoring and recording of respiratory rate and more importantly sedation levels. Fentanyl is considered to be a relatively lipid soluble opioid. As such it is taken up more readily by the neural tissues at the particular epidural level where placed. Over time it will eventually spread through the CSF towards the brain stem where the respiratory centre is located. More water soluble opioids such as morphine will spread more rapidly within the CSF because they are not absorbed so readily by neural tissue.

10.3 Alpha Agonist

(for example)

Adrenaline 0.2ml 1:1000

Has two effects:

- *Vasoconstriction* (limits the vascular uptake of agents used); and
- *Antinociception*

The latter is achieved at a local spinal cord level by neurotransmitter/receptor interaction. It augments the analgesic action of the other agents. Adrenaline containing LA is useful when giving a test or top-up dose to check if the catheter is in a vein. This will be indicated by an immediate and significant tachycardia.

NB: Adrenaline is **not** required to be added when using Ropivacaine.

Clonidine **150 μ g/ml**

Analgesia results from its action at alpha receptors in spinal cord dorsal horn. Systemic absorption can cause hypotension. Is a useful addition to the analgesic armamentarium, especially as a top up agent for resistant pain.

10.4 Opiate Antagonists

(for example)

Narcan (naloxone) **0.4 mg ampoule**

Indications:

An opioid antagonist counteracts the effects of opiates. Given alone it has no clinically useful effects. Reverses respiratory depression, but maintains some analgesia (depending on dose).

Problems/Side Effects:

- Short duration of action (< 1 hour), therefore risk of renarcotisation.
- Produces withdrawal in narcotic tolerant/dependent people.
- Can produce vomiting and emergence of delirium.

Rare Complications:

- Significant cardiovascular function with/without prior narcotisation.
- Reported include systemic hypertension
- Pulmonary oedema
- Ruptured cerebral aneurism
- Atrial and ventricular arrhythmias.

Administered as prescribed

Note: Reversal with Narcan can herald a return of patient's pain.



10.5 Vasopressors

(for example)

Ephedrine **30mg/ml**

Acts as a Vasoconstrictor and a cardiac accelerant.

Indications: Hypotension +/- bradycardia

- May be secondary to sympathetic block of epidural
- Hypovolaemia
- A vasovagal response
- Postural
- Rarely LA toxicity
- A medical complication

Treat according to the cause, eg Ephedrine 3mg IV at 3 minute intervals for hypotension from sympathetic block, volume expansion for hypovolaemia, etc.

Do not automatically assume hypotension is due to epidural block alone

EPIDURAL DRUGS (ADULTS)

Category	Drug	Recommended Dose	Route	Authorisation
Local Anaesthetic	Bupivacaine 0.125% 100ml polybag 200ml polybag	Use 200ml polybag at rate prescribed	Via Epidural line	Epidural Infusion prescription analgesia sheet
Local Anaesthetic	Ropivacaine 2mg/ml 100ml polybag 200ml polybag	Use 200ml polybag at rate prescribed	Via Epidural line	Epidural Infusion prescription analgesia sheet
Opioid Agents	Fentanyl 100mcg/2ml	2mcg/ml	Add into polybag	Epidural Infusion prescription analgesia sheet
Alpha Agonist	Adrenaline 1:1000	0.2ml	Add into polybag (bupivacaine 0.125% only) NB if using Ropivacaine, adrenaline is not required	Epidural Infusion prescription analgesia sheet
Alpha Agonist	Clonidine 150mcg/ml	75-150mg as a top up or in infusion	Via Epidural Line	Medical staff authorisation only
Opiate Antagonist	Narcan (Naloxone) 0.4mg/ml	0.1mg and repeat as necessary	Intravenously	Epidural Infusion prescription analgesia sheet
Vasopressor	Ephedrine 30mg/ml Dilute to 10ml with NaCL	1ml = 3mg and repeat as necessary	Intravenously	Epidural Infusion prescription analgesia sheet
Simple Analgesic	Paracetamol	0.5gm - 1gm (no more than 4gm/24hrs)	Orally or PR	Prescribed on regular drug chart



- 11.0 **Rescue Regime Recommended by APMS** (this applies to Christchurch but I have left it in here for your information. Nothing is given IV in Grey Hospital unless first discussed with the Anaesthetist).

Applies mainly to NON PCEA infusions, ie INTRAVENOUS opioid if On Call / Duty anaesthetist unable to come immediately and administer an Epidural Top Up.

Procedures/Guidelines to follow for break through pain when Duty / On Call anaesthetist is unable to come and perform an Epidural Top.

1. Leave epidural running.
2. Contact On Call / Duty anaesthetist asap.
3. Discuss situation, plus details of IV Opioid prescription, if charted, on IV Opioid Prescription Chart.
4. Being authorised, use the IV Opioid prescription charted on Drug Chart.
5. If there is no Opioid rescue regime charted in the IV Opioid Prescription Chart, it will need to be. Recommended guidelines for a rescue regime to be charted would be:
 - a) Appropriate dose of IV Morphine or Pethidine (Morphine is the preferred agent, unless contraindicated).
 - b) **Adult Dose**
0.5 - 2mg Morphine or 10-20mg Pethidine IV prn every 5 minutes to analgesia effective and respiratory rate > 10. After this IV opioid loading, monitor respiratory rate and sedation score at 20 minute intervals until epidural is reassessed.

NB: At the time of the epidural being assessed, if an epidural top-up is given, be aware that this may accentuate the effect of the IV opioid previously given and special vigilance is required to note respiratory depression/arrest.



12.0 PROCEDURES FOR NURSING MANAGEMENT

Refer to:

WCDHB Epidural Policy Standard and Procedures

For ease of reference, this is reproduced at the beginning of this manual.

13.0 PROMOTING MOBILISATION

Mobilisation maximises rehabilitation from surgery.

The effects of EIA relating to mobilisation are:

- The degree of motor block will depend on the extent and density of the block. A thoracic epidural effecting only the thoracic segments should not cause significant weakness in the legs.
- A lumbar epidural commonly will, as well as possibly blocking the bladder function requiring the placement of a urinary catheter.
- The sympathetic block will cause vasodilation below the block so **postural hypotension** will occur.
- Block of proprioception will result in unsteadiness through lack of position sense.
- **Postural hypotension may be confused with hypotension caused by hypovolaemia.**

Keeping the above in mind, proceed as follows:

- Check the sensory level including position sense.
- Check muscle power around the knee and ankle using the Bromage Scale (*See page 14*)



- Check there is no hypovolaemia either from overt or concealed blood loss.
- Examine the patient for evidence of sympathetic block (warm, dry feet).
- Record a supine Blood Pressure.
- If this is considered adequate proceed to gently sit the patient up and repeat the BP noting any change from that of supine.

If no postural hypotension:

Proceed any stage the patient becomes symptomatic of low BO, assume the supine position and reassess.

If there is postural hypotension:

A systolic drop of more than 20-30 mm Hg and the patient is symptomatic (weak and lightheaded, etc) then you may not be able to go on to the erect position. Return the patient supine. If there is no significant postural hypotension in the sitting position, then proceed to stand the patient and repeat the BP.

- Remember that even if there is no problem with postural hypotension, the patient may still need to be supported during mobilisation if there is a block of the proprioceptive nerve fibres and two nurses may be required for this support.

If there are any questions about mobilisation, consult the anaesthetist

14.0 PATIENT CONTROLLED EPIDURAL ANALGESIA (PCEA) : AN INTRODUCTION TO TECHNIQUES AND GUIDELINES

Philosophy

PCEA in some respects is quite different to Intravenous Patient Controlled Analgesia. With IV PCA the patient is instructed to push the button before a painful procedure occurs, eg mobilising physiotherapy, in other words in anticipation of pain occurring or becoming worse. Whereas with PCEA, the patient is instructed not to push the button unless pain is actually present. The rationale for this is we don't want the patient using the PCEA mode frequently and possibly increasing the height of the dermatome block level if it is not necessary.

Rationale

Our current pumps have a PCEA function and its introduction has been intended. This will be consistent with other centres practice, maximise the efficiency of the modality and hopefully reduce the call-out top up rate.

Patient Selection

This will be determined by the anaesthetist.

Setting Up and Monitoring

Essentially the monitoring is the same as with an EIA with the exemption that the dermatomes will be determined 2 hourly and not 4 hourly 'if the parameters have been stable.'

Noting the frequency of PCEA 'injections' (and 'attempts') as a basis for increasing the infusion rate may be necessary.

History button will reveal injections/attempts (record and document these along with Q2 hourly recordings).

Injections/attempts shift total should be 'zeroed' at the end of each eight hour shift (use reset ⇒ 1. reset shift).



15.0 ASSESSING DERMATOME SENSORY BLOCK LEVELS

The anaesthetist will have charted on the Epidural Infusion Analgesia Sheet what they deem to be an acceptable height for the dermatome block level.

This will often differ slightly from patient to patient depending usually in the type of surgery performed and the insertion level of the epidural catheter. For example patients undergoing a thoracic procedure will have a high epidural catheter insertion, whereas patients undergoing say an orthopaedic procedure will have a low epidural catheter insertion.

As a general rule of thumb, the higher the epidural catheter insertion point, the higher the sensory block will rise, although this is influenced by the rate at which the infusion is being delivered.

There are several points that are important to note about dermatome block levels and their measurement.

Firstly, always use ice to measure the sensory block level, NOT pinprick or pinch. Ice is ideal because pain and temperature fibres are approximately the same size and pain fibre block can be checked by temperature testing. There have been some cases documented in the literature where pinprick and pinch testing have resulted in severe skin damage manifesting 24-36 hours later (especially in elderly patients where skin tends to be fragile and easily bruised).

Before assessing the level of the block the patient needs to have a comparison of sensation. Press the ice against the patient's inside wrist or cheek so they will be able to determine the difference in sensation from cold to numbness.

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. This is usually caused by the epidural catheter moving off to one side, and there are some strategies we can employ to try and compensate for this. Obviously 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, however this won't always be the case.

Turn the patient onto their painful side, ie the side that is not being blocked, gravity can sometimes help spread the local anaesthetic across. Also inform the anaesthetist or duty anaesthetist, as the patient will probably need a 'top up' bolus dose to be administered.

Another strategy the anaesthetist or duty anaesthetist may employ is to pull the epidural back slightly (usually 1 or 2 cm) which may resolve the problem, however to do this necessitates taking the epidural catheter dressing down, which is not done lightly. Pulling the epidural catheter back is also of the instances where the importance of 'Depth to Space' measurement becomes relevant.

Low Sensory Block

If the sensory block is below the level of the wound, increase the epidural infusion rate (within the parameters prescribed) and notify the anaesthetist or duty anaesthetist. The patient will almost certainly need to have a 'top up' bolus dose administered.

'Patchy' Sensory Block

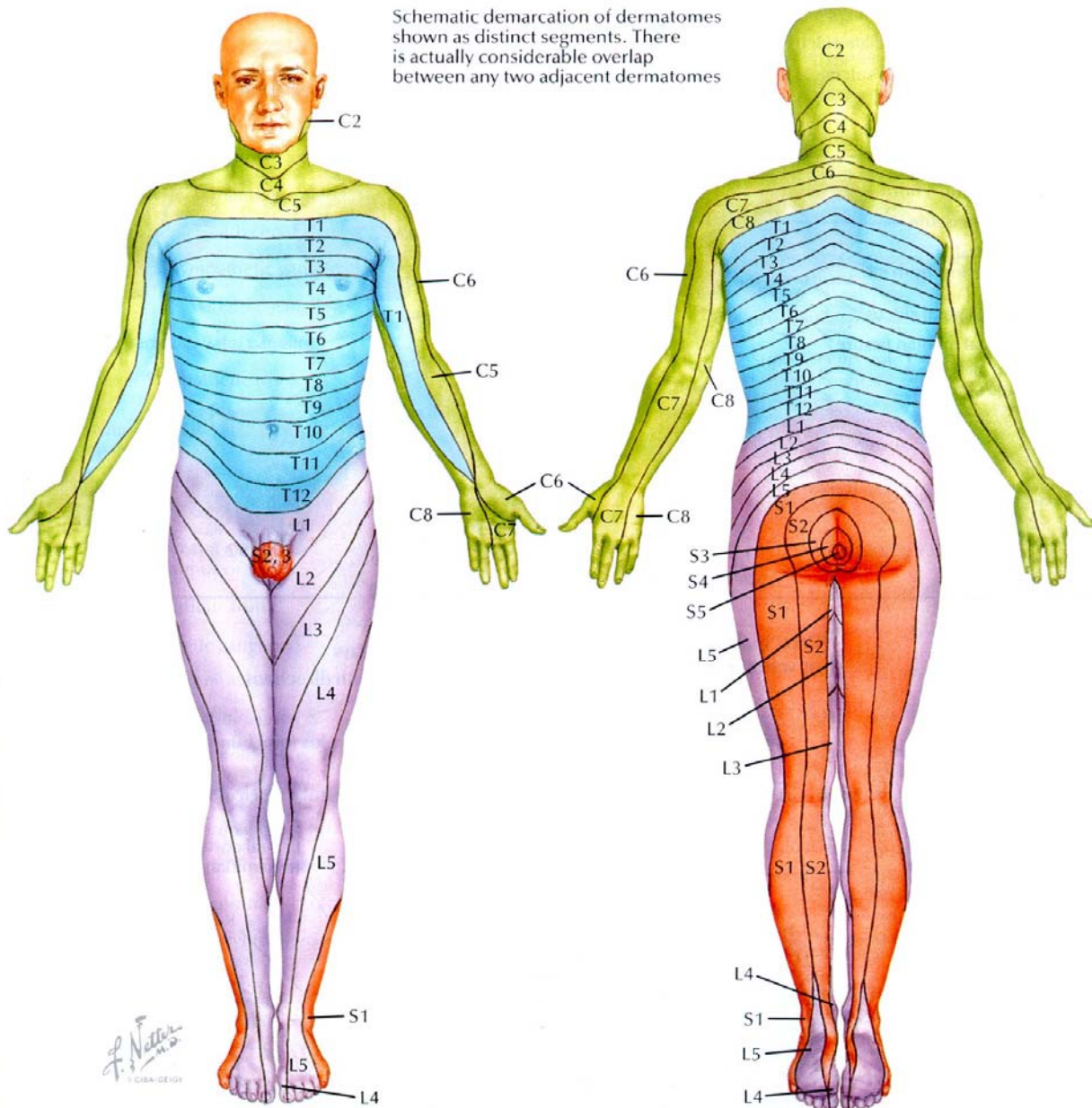
If the blocked area is becoming ill defined or 'patchy' notify the anaesthetist or duty anaesthetist. Increase the epidural infusion rate (within the parameters described). 'Patchy' blocks are nearly always an early sign that the patient is going to lose their dermatome block levels altogether and the anaesthetist usually administers a 'top up' bolus dose.

General

- Remember when measuring dermatome block levels that you are looking for an upper and lower block level (bilaterally).
- If you need to increase or decrease the epidural rate (within prescribed parameters) do so in multiples of two.
- You can nearly always discern if a patient has a good sympathetic block by feeling their feet. They will feel warm to the touch (vasodilation) and dry (sweat gland inhibition). Both of these factors are due to the action of the local anaesthetic.

- Be very careful with hot drinks, etc around patients on epidural infusion. It is easy for them to unknowingly suffer a severe burn to the blocked area. Heated wheatbags are particularly dangerous and should never be used on patients with epidural infusions.

- Some patients while having full motor power to their legs may experience block of proprioception when mobilising. This is an inability to ascertain where their feet are in relation to the ground caused by altered sensation and lack of position sense, which leads to unsteadiness. (Some patients describe the sensation as similar to trying to walk on water). It is important to assist these patients with mobilising.



Levels of principal dermatomes

- C5 Clavicles
- C5, 6, 7 Lateral parts of upper limbs
- C8, T1 Medial sides of upper limbs
- C6 Thumb
- C6, 7, 8 Hand
- C8 Ring and little fingers
- T4 Level of nipples

- T10 Level of umbilicus
- T12 Inguinal or groin regions
- L1, 2, 3, 4 Anterior and inner surfaces of lower limbs
- L4, 5, S1 Foot
- L4 Medial side of great toe
- S1, 2, L5 Posterior and outer surfaces of lower limbs
- S1 Lateral margin of foot and little toe
- S2, 3, 4 Perineum

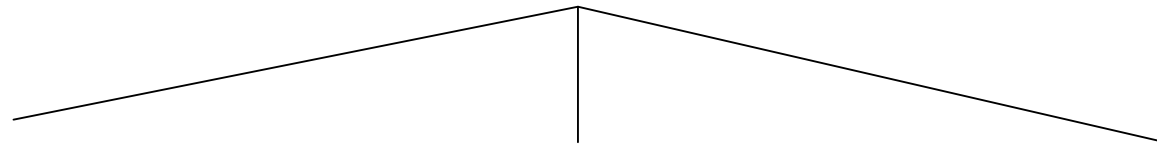
16.0 'BRIDGING' FROM THE EPIDURAL

For some patients the return of pain following cessation of the epidural can be distressing. Epidurals are usually ceased after three days of therapy.

Please refer to the 'Flow on Analgesia Post Epidural' sheet for guidance on pain management over this bridging period.



- Leave epidural catheter insitu.
- Continue to record regular pain assessments and monitoring.
- Feed and mobilise as consistent with post op progress.
- Continue with the regular Paracetamol +/- NSAID doses already instituted.
- Anticipate being able to analgese patient adequately with additional analgesics/means, unless pain levels declare themselves to be severe. Trend initially towards regular dosing moving to 'prn' as pain subsides.



FOR MILD TO MODERATE PAIN.....SEVERE PAIN.....

<p>Additional oral agents</p> <p>Codeine phosphate 15-60mg 2-4 hourly</p> <p>Morphine elixir/tablets/granules 5-20mg to Q3-4 hourly</p> <p>MST: 10-30mg bd to tds</p> <p>.....?Tramadol.....</p>	<p>IM/SC Morphine</p> <p>IM Pethidine</p> <p>IV Morphine Protocol</p>	<p>Recommence Epidural (will require Recommencement top up)</p> <p>PCA</p>
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Table Five: **FLOW ON ANALGESIA POST EIA**

References:

Aitkenhead, A.R. Rowbotham, D.J. Smith, G. (2001) *Textbook of Anaesthesia*. (4th ed) Mosby, London, ch 43

Roman, M. Cabaj, T. Epidural Analgesia. *Medsurg Nursing*, August 2005. Vol 14/No 4, P257 -259

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