GIG CYMRU NHS WALES | Bwrdd Iechyd Prifysgol Caerdydd a'r Fro | Cardiff and Vale University Health Board	**Reference Number: UHB 011** **Version Number: 3** **Date of Next Review:16/07/2018** **Previous Trust/LHB Reference Number:** **Trust 189 UHB Version 1&2**

PAIN SERVICE GUIDELINES (ADULT)

INTRODUCTION

These guidelines relate to adult acute pain management practices. They are required in order to facilitate safe practice and manage the risks associated with some of the pain relieving strategies that are utilised.

AIMS

For patients to receive safe, appropriate pain management tailored to suit the individual patients' needs.

OBJECTIVES

- To promote safe practice that is evidence based and standardised within the clinical areas.
- To provide clinical areas with appropriate information with regards to acute pain management

SCOPE

UHB wide - adult areas

Equality Impact Assessment	*An Equality Impact Assessment has been completed. The Equality Impact Assessment completed for the policy found there to be no impact.*
Documents to read alongside this Procedure	British National Formulary 69. March 2015
Approved by	Corporate Medicines Management
Accountable Executive or Clinical Board Director	Medical Director
Author(s)	*Mrs S Mogford, Senior Nurse Pain Management Service* *Dr A Turley, Associate Medical Director & Clinical Director Peri-operative Directorate* *Mr A Turk, Clinical Board Pharmacist (Surgery)*

Version Number	Date of Review Approved	Date Published	Summary of Amendments
1	25/11/2010	14/03/2011	Inclusion of information relating to oral anti-coagulant rivaroxaban and epidural catheter removal (sections 5.6 and 5.9
2	23/07/2013	17/10/2013	**NSAIDs -** Ibuprofen inow indicated as the 1st line NSAID, naproxen 2nd line and diclofenac only to be used if the rectal route is the most appropriate route of administration. **NOTED: MHRA Drug Safety Update- Diclofenac** contraindications and warnings relating to cardiovascular safety. Indicated within text and update included as appendices. **Oxynorm -**removed **Pethidine-** removed **Epidural section** - further clarification and detail around the removal of the epidural catheter and consideration relating to anti-platelet and anti-coagulant therapies. **Care plans –** Intravenous PCA, epidural, intrathecal, ketamine and peripheral infusion of local anaesthetic care plans have been indented in the relevant sections of the guidelines. These outline monitoring requirements, potential problems and how to manage them.
3	16/07/2015	26/10/2015	**Section 5:** Epidural analgesia: Changing the Gemstar epidural infusion device to the McKinley Bodyguard. Removal of epidural care plan and replaced with Epidural and Regional Local Anaesthetic Infusion Careplan **Section 12: Ketamine protocol** - ketamine to esketamine with care plan changes too. **NB** Ketamine (Ketalar ®) is no longer readily available in the UK. Ketamine is a racemic mix of two isomers and the alternative esketamine only contains the 'S' isomer of ketamine and is therefore twice as potent. **Section 12:** Regional infusion of local anaesthetic (Regional analgesia) – re-named the protocol. Removal of peripheral infusion of local anaesthetic care plan and replaced with Epidural and Regional Local Anaesthetic Infusion Care plan

Contents Page

4. PATIENT CONTROLLED ANALGESIA (PCA)

4.1 Definition

PCA in this instance refers to the self-administration of intravenous opioids for the relief of acute pain in adults. Using a device specifically designed for the purpose (electronic or disposable), the patient is able to administer a predetermined dose of painkiller at frequent intervals, allowing for the wide variation in analgesic requirements.

4.2 Indications

- For the management of acute postoperative pain.
- For the management of those patients who are unable to tolerate oral medication and require frequent intramuscular / subcutaneous injections of opioids to control their pain.
- For the management of pain associated with sickle cell crisis. (see section 11)
  NB. Caution with known opioid dependent patients (see section 10).

Inappropriate candidates for PCA are:

- Patients who are physically incapable of using the device.
- Patients who have difficulty in understanding the concept of PCA.
- Patients who appear reluctant to use the device.

4.3a Prescription

In addition to the patient's own drug chart, a dedicated PCA prescription chart should also be completed by the prescriber.
Examples of standard prescriptions for PCA would be:

Morphine 2mg/ml: 1mg bolus: 5 minute lockout
Fentanyl 25mcg/ml: 20mcg bolus: 5 minute lockout

Morphine pre-filled syringes (2mg/ml) are supplied by pharmacy for main recovery at UHW and pre-filled bottles (2mg/ml) for other areas.
The Alaris PCA infusion device has pre-programmed protocols for the use of morphine, pethidine, fentanyl, remifentanil (for use on obstetrics only) and ketamine (continuous infusion only). A 'general' protocol is available for other drugs that may be used. A paediatric protocol is also available for paediatric use (see separate paediatric guidelines).

University Hospital of Wales (UHW) site: Patients with sickle cell anaemia have individual patient profiles detailing individual analgesic requirements, copies of which are kept on the Haematology Ward (B4H), Acute Pain Service and the Emergency and Assessment Unit.

As a general rule, no other systemic opioids (strong/weak) should be prescribed whilst the patient is using PCA. However, there may be exceptions to this rule in certain patient groups e.g. patients with chronic pain, patients who are under the care of the palliative care team or patients who are opioid tolerant. To ensure that clinical risk is managed effectively, these individual cases *must* be discussed with the Acute Pain Service so that adequate provision may be made for the follow up of the patient. Naloxone and cyclizine should be prescribed to combat the potential side effects associated with the use of opioid drugs. Pre-printed labels are available in the anaesthetic rooms and recovery room of the operating theatres for use by the prescriber.

4.3b Balanced analgesia

Balanced analgesia should be considered for all patients receiving PCA. Paracetamol and an NSAID (if not contraindicated) Ibuprofen 1st line, naproxen 2nd line or diclofenac suppositories if rectal route more appropriate) should be prescribed as a *regular* prescription. Contraindications to non-steroidal anti-inflammatory drugs (NSAID's):- known allergy, renal impairment, hypotension, history of peptic ulceration, aspirin sensitive asthma and marked dehydration.
Use with *caution* in the elderly and in those patients with potential or actual coagulopathy.**N.B.MHRA advice on the use of diclofenac-June 2013 page 67.**

4.4 Equipment

The Alaris P5000 PCA infusion device is used at the UHW and University Hospital Llandough (UHL). PCA infusion pumps are stored in the main recovery room. A dedicated infusion set with an anti-reflux and anti-syphon valve must be used with all electrical pumps. When the PCA infusion device is no longer required, ward staff should contact the pump library for it to be collected, checked and cleaned prior to return to the recovery room.

4.5 Designated clinical areas & responsibilities

UHL

Patients receiving PCA may return to the following clinical areas *only***:** W3, W5, Delyth, Anwen, Bethan, HDU, ITU and Cardiff and the Vale Orthopaedic Centre (CAVOC).

UHW

Patients receiving PCA may return to the following clinical areas *only***:** Trauma wards, surgical wards, B4 Neurosurgery, T2, B4H, C5, A5, Cardiff Transplant Unit (CTU), General Critical Care, Cardiac Critical Care and Ambulatory Care.
Nursing staff within these clinical areas are familiar with the management of patients using PCA and the equipment used.
Instruction and assessment in the use of PCA infusion devices is mandatory for staff caring for patients with PCA in accordance with the Cardiff and Vale University Health Board Parenteral infusion pumps policy (2011)

4.6 Initiating treatment & monitoring patients whilst using PCA

As a general rule and in order that patients may obtain maximum benefit from PCA, they should whenever possible be instructed in its use *prior* to surgery. Patients should have access to the relevant patient information leaflet.

Setting up and programming of a PCA device is the responsibility of the anaesthetist, recovery room nurse, the Acute Pain Service and designated trained nursing staff within Critical Care Areas, in accordance with Cardiff and Vale University Health Board's Parenteral infusion pumps policy (2011). ODP's may *not* set up and programme PCA infusion devices but they may check the settings with designated staff (see above).

Following surgery, nursing staff in the recovery room will programme the device according to the doctor's prescription. The patient should be made comfortable using incremental doses of IV analgesia. PCA may then be commenced once the patient is awake and orientated. **On returning the patient to the clinical area, Recovery room staff should check the PCA infusion pump settings with the nurse accepting the patient and sign in the appropriate section of the PCA record of administration chart.**

Should PCA be initiated in the ward area, these responsibilities fall to the Acute Pain Service or Obstetric on-call anaesthetist (UHW) or Duty on-call anaesthetist (UHL).

On return to the ward a PCA care plan should be followed. For the initial 2-hour period, pulse, blood pressure, respiratory rate (recorded over a full minute), oxygen saturation, *pain on movement* and sedation levels should be assessed and recorded every 1/2 hour for 2 hours, 1 hourly for 2 hours then every 2 hours for 48 hours and 4 hourly thereafter if previous observations have been satisfactory.

In the unusual circumstance of patients receiving a concurrent background infusion with PCA, these patients require level 2 (HDU) care or above have their oxygen saturation monitored continuously. If the oxygen saturation level of the patient falls below 94%, the advice in the PCA care plan or troubleshooting guide for PCA must be followed. (The baseline oxygen saturation level of the patient should however be taken into consideration and the Acute Pain Service/on-call anaesthetist should be contacted for advice if staff have any concerns). If during the night, the patient is asleep and observations have been satisfactory, it is acceptable to record the respiratory rate only. A recording should be entered on the sedation score chart (S) to indicate that the patient was asleep at the time the observation was made.

The amount of drug used should be recorded *hourly* on a dedicated PCA record of administration chart by the nurse responsible for the patient. The infusion site should be checked for pain, swelling and leakage of fluid. The PCA infusion device settings should be checked at shift handover **and signed in the appropriate section of the PCA record of administration chart.**

As a general rule, patients receiving PCA are not nursed in side rooms/cubicles.

Patients using PCA should remain in the ward area and are not permitted to visit other areas unless accompanied by a nurse.

The Acute Pain Service / Obstetric or Duty on-call anaesthetist may be contacted if any problems are encountered.

4.7 Management of complication or side effects

Should any of the following complications or side effects occur, the PCA care plan/guidelines must be followed and the appropriate action taken.

- Inadequate pain relief.
- Respiratory depression.
- Excessive sedation.
- Nausea and vomiting.
- Itching.

See PCA care plan on following pages.

Cardiff and Vale University Health Board
Ymddiriedolaeth GIG Caerdydd a'r Fro

ADDRESSOGRAPH HERE **Patient's Name:**

Acute Pain Service - PCA Care Plan

Ward:	Consultant:	Nurse's Signature:

Date	Problem	Goal	Nursing Care
	1. Unrelieved pain.	Patient will have no more than mild pain at rest and mild to moderate pain on movement.	Ensure that the patient is educated in the use of PCA. Provide patient information leaflets plus verbal instruction prior to initiating PCA. Also provide on-going reminders to patient whilst PCA is being utilised. **If not contraindicated:** check that regular paracetamol and diclofenac have been administered in addition to PCA. (This may reduce morphine requirement.) Check that the intravenous cannula is patent. Check that PCA administration set is unclamped and connected properly. Help position patient comfortably. Advise patient to support wound when coughing/moving. **Pain assessment: Pain should be assessed and recorded on movement.** It should be assessed alongside other observations (See **3**) or more frequently if necessary. Seek advice from the Acute Pain Service (APS) if the above measures do not reduce the pain score.
	2. Potential problems surrounding the safe administration of PCA. Incorrect: a) Drug/Concentration. b) Bolus. c) Lockout time. d) Continuous infusion (used infrequently in ward area). e) PCA device and PCA administration set.	PCA is safely administered. PCA device delivers prescribed bolus with correct lockout time, +/- continuous infusion.	Ensure that controlled drugs are checked in accordance with the Cardiff and Vale NHS Trust policy. Ensure that the syringe is correctly labelled and contents agree with the prescription chart. The PCA syringe should be checked hourly by **the qualified nurse caring for the patient** and the PCA record of administration chart should be completed. Any discrepancies should be reported to the APS / On-call Anaesthetist immediately, remove PCA button from the patient and stop the continuous infusion (if one is in progress) until the problem is resolved. When changing syringe and at shift handover, 2 qualified nurses **(including the qualified nurse caring for the patient)** should check the PCA settings, *i.e.* - the bolus dose, lockout time and continuous infusion, against the prescription chart. Ensure that a PCA giving set with anti-syphon and anti-reflux valve is in use.
	3. Potential side effects	Early detection and treatment.	**Monitor BP, pulse, respiratory rate and sedation score:** ½-hourly for 2 hours when the PCA is commenced or following any alteration to PCA regimen. If satisfactory, these observations may then be recorded 2-hourly for 48 hours and thereafter 4-hourly until PCA discontinued. If during the night, the patient is asleep and observations have been satisfactory, it is acceptable to record the respiratory rate only. A sedation score of 'S' should be recorded on the observation chart to indicate that the patient was asleep at the time the observation was made. Ensure that no other opioids are given to the patient whilst receiving PCA. (Exceptions may occasionally be made, under the supervision of the APS only).

Date	Problem	Goal	Nursing Care
	3. Potential side effects (continued) Respiratory depression	Respiratory rate >12/minute.	The respiratory rate should be counted **for a full minute.** If the respiratory rate falls to 9 or 10/min, remove the PCA button from the patient, give oxygen 15L via a well fitting non-rebreather reservoir mask (ensure reservoir bag inflated) reassess every 5 minutes until respiratory rate >12/min. If respiratory rate falls to <8/min, follow actions above, (support ventilation with a pocket mask/bag valve mask where necessary) plus give IV Naloxone (*Dilute a 1ml ampoule of Naloxone 400mcg with 3mls of normal saline for injection to make a total of 4mls). Give in 50 mcg (0.5ml) increments until respiratory rate >12/min. Monitor O2 saturation continuously, ensure alarms set and audible. Contact the APS /On-call Anaesthetist.
	Sedation score: 2 or 3.	Sedation score: 0 - 1.	If the sedation score is 2, remove PCA button, give oxygen 15L via a non-rebreather reservoir mask and monitor sedation level and respiratory rate. Record every 15 minutes. If the sedation score is 3, give oxygen 15L via a non-rebreather reservoir mask and administer Naloxone as above until sedation score is 0 - 1. Monitor O2 saturation continuously, ensure alarms are set and audible. Contact the APS / On-call Anaesthetist.
	Oxygen saturation: <94%.	O2 saturation: >94%.	If O2 saturation <94%, give oxygen 15L via a non-rebreather reservoir mask. If no improvement after 5 minutes, seek advice from the APS / On-call Anaesthetist. (Consider preoperative oxygen saturation level, contact APS / On-call Anaesthetist if concerned only).
	Nausea and vomiting.	Early detection of nausea and prevention of vomiting.	Assess for and record nausea and vomiting (y/n) 2-hourly on observation chart. Give prescribed anti-emetic p.r.n. when patient is nauseated. Give anti-emetic regularly, rather than p.r.n., if nausea / vomiting is a persistent problem. Record effect and/or side effects of anti-emetic. Change anti-emetic if ineffective as per protocol for postoperative nausea and vomiting (Acute Pain Service Adult Guidelines - Appendix 1.) If patient is nauseated shortly after pressing the PCA button and anti-emetic treatment ineffective, seek advice from the APS / On-call Anaesthetist. Make use of diversional therapies *e.g.* relaxation, reading, TV.
	Pruritis (itching)	Early detection and treatment	a) Assess and record any signs of itching. If the itching is distressing the patient: b) Administer IV Naloxone 50 mcg with caution. It will reverse the side effect of opioids without reversing analgesia c) If the problem remains unresolved, seek advice, as the opioid may need to be changed.
	4. Potential problem of inadequate analgesia when PCA discontinued.	Pain will be managed by alternative appropriate analgesia.	Consider the pain score of the patient. Check the amount of PCA drug used in last 24 hours. If the patient is tolerating free fluids, remove PCA button administer an initial dose of oral analgesia. Monitor effect **BEFORE** discontinuing PCA. If the patient is nil by mouth, but unable to use PCA device, consider the pain score, seek advice from APS / On-call Anaesthetist if necessary.

In accordance with the Cardiff and Vale Trust Infusion Device Policy Training and assessment in the use of P5000 Infusion Devices is mandatory for ANY nurse caring for a patient with PCA

University Hospital Llandough:

Acute Pain Service: bleep 4560. Out of hours, On-call Anaesthetist: bleep 4800 should be contacted.

University Hospital of Wales:

Acute Pain Service: bleep 5414. Out of hours, the Obstetric On-call Anaesthetist: bleep 5101 should be contacted.

GB/APS/April 2010

4.8 Discontinuing PCA

The length of time for which patients require PCA is variable. Before deciding to stop PCA, the following points should be considered: -

- Level of pain.
- The amount of drug used in the previous 12 hours.
- The patient's ability to use PCA.
- Patients' wishes.
- Ability to tolerate free fluids and to absorb alternative prescribed analgesia.

Most patients will require an alternative form of analgesia once the PCA has been discontinued. An initial dose should be given and its effect monitored prior to the PCA being discontinued.

If in doubt as to whether a patient should continue PCA, please contact: -

UHW

Acute Pain Service - Bleep 5414

Obstetric on call anaesthetist (out of hours) - Bleep 5101

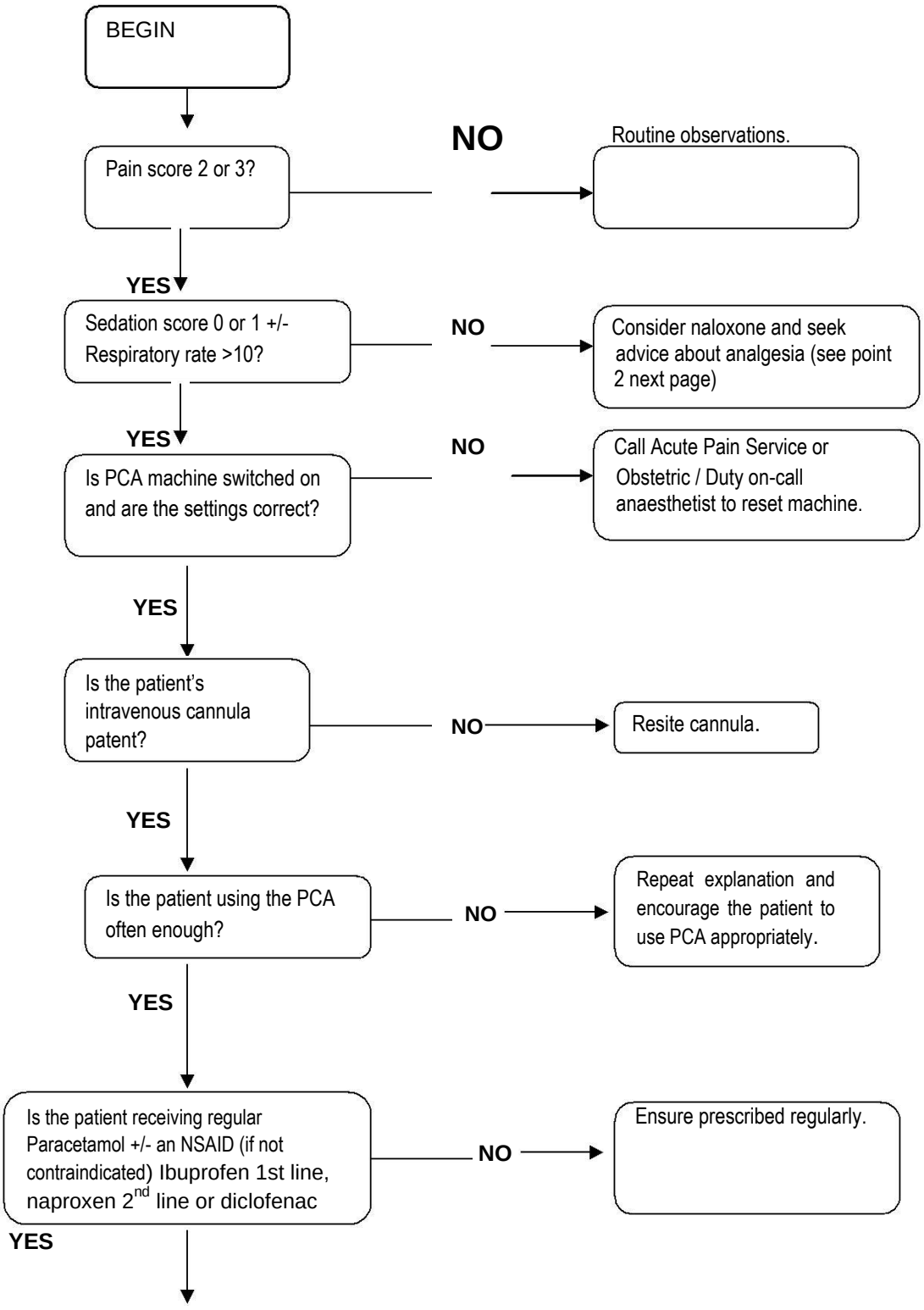
UHL

Acute Pain Service - Bleep 4560

Duty on-call anaesthetist (out of hours) - Bleep 4800

4.10 PROBLEMS WITH PCA - A trouble-shooting guide for medical & nursing staff

1. What to do if analgesia is inadequate



Seek advice from the Acute Pain Team or Obstetric / Duty on-call anaesthetist**.**

2. Respiratory depression or excessive sedation

- If the respiratory rate drops to 9/10 per minute, remove PCA button from the patient, give oxygen 15L via a well fitting oxygen mask
  (ensure reservoir bag inflated) and reassess every 5 minutes until respiratory rate is over 12 per minute.

- If the respiratory rate drops to ≤8 per minute or the sedation score is 3, remove PCA button, give oxygen 15L via oxygen mask. Support ventilation with a pocket mask/bag valve mask where necessary. Give naloxone in 50mcgs increments* until respiratory rate is 12 or over and sedation level is 0-1. Monitor continuously. Seek advice from the Acute Pain Service or on-call Anaesthetist.

- If patient is not immediately post operative and the sedation score has increased to 2-3 give naloxone in 50mcgs* increments until sedation level is 0-1. Seek advice from the Acute Pain Service or on-call
  Anaesthetist and inform the surgical team.

If SaO_2 falls below 94%, give oxygen 15L via an oxygen mask, if there is no improvement after 5 minutes and this is thought to be related to PCA seek advice from the Acute Pain Service or on-call anaesthetist.

*****1ml ampoules of naloxone contain 400mcg
Dilute with 3mls of Normal Saline to make a total of 4mls.
Administer in 50mcg (0.5ml) intravenous increments
- until respiratory rate increases to ≥ 12 / min
- And sedation score is 0-1.

NOTE: naloxone has a short duration of action. Therefore, the patient should be monitored closely for 2 hrs following its administration.
Contact Acute Pain Service or on-call anaesthetist if naloxone is given for respiratory depression.

3. Itching

Occasionally opioid drugs may cause itching, particularly of the face. If this distresses the patient it can be treated by:

- IV naloxone 50mcg will reverse this side effect of opioids without reversing analgesia.

- Changing the opioid drug from morphine to fentanyl or vice versa often solves the problem. Seek advice from the Acute Pain Service.

4. Nausea or vomiting

If using PCA causes nausea:

- *Do not* stop or discourage use of PCA - pain can also cause nausea.

- Give regular anti-emetic medication (postoperative nausea and vomiting (PONV) protocol, appendix 1) ; *Do not* wait until the patient actually vomits.

- If anti-emetic treatment fails, changing from morphine to fentanyl or vice versa may reduce or eliminate nausea.

- Give regular paracetamol plus regular non steroidal anti-inflammatory drug (NSAID) eg. ibuprofen if not contraindicated. This may have an opioid sparing effect.

ANTI-EMETICS & DOSE REGIMEN

See attached postoperative nausea and vomiting protocol Appendix 1and also in Cardiff & Vale University Health Board - Good prescribing guidelines

5. Hallucinations

These may occur as a side effect of opioids. If the patient is distressed by this problem, seek advice from the Acute Pain Service.

BIBLIOGRAPHY

Ashburn MA, Love G, Pace NL. (1994). Respiratory-related critical events with intravenous patient-controlled analgesia. *Clinical Journal of Pain.* **10**: 52-56

Australian and New Zealand College of Anaesthetics and Faculty of Pain Medicine. (2005). *Acute Pain Management: Scientific Evidence, 2nd edition.* NHMRC, Australian Government: 102-133

Chumbley GM, Hall GM, Salmon P. (1998). Patient Controlled Analgesia: what information does the patient want? *Nursing*. **39**: 459-71

ECRI. (1996). Over infusion caused gravity free-flow from a damaged prefilled syringe. *Health Devices.* **31**: 342-46

ECRI. (2002). Medication safety: PCA pump programming errors continue to cause fatal infusion. *Health Devices*. **31**: 342-46

Etches RC. (1994). Respiratory depression associated patient controlled analgesia: a review of eight cases. *Can Journal of Anaesthesia*. **41**: 125-32

Harmer M. (1994). Over dosage during patient controlled analgesia. Follow manufacturer's instructions. *BMJ.* 309: 1583

Hyllested M, Jones S, Pedersen JL et al. (2002). Comparative effect of Paracetamol, NSAID's or their combination in post-operative pain management: a qualitative review. *British Journal of Anaesthesia*. **90**: 166-72

Kjellberg F, Tramer MR. (2001). Pharmacological control of opioid induced pruritis: a quantitative systematic review of randomised trials. *Eur Journal Anaesthesiology.* **18**: 346-57

Macintyre PE. (2001). Safety and efficacy of patient-controlled analgesia. *British Journal of Anaesthesia*. **87**: 36-46

Macintyre PE, Ready LB. (1996). Acute Pain Management. A Practical Guide. W.B Saunders Company, London: 75-98

Owen H, Plummer JL, Armstrong I et al. (1989). Variables of patient-controlled analgesia 1. Bolus size. *Anaesthesia.* **44**: 7-10

Park G, Fulton B, Senthuran S. (2000). *The Management of Acute Pain (2nd edn)* University Press, Oxford: 80-95

RCA. (1998). *Guidelines for the use of Non-steroidal Anti-inflammatory Drugs in the peri-operative period.* Oxford: Royal College of Anaesthetists

Ready LB, Oden R, Chadwick HS et al. (1988). Development of an Anesthesiology-based post-operative pain management service. *Anesthesiology.* **68**: 100-06

Romsing J, Moiniche S, Dahl JB. (2002). Rectal and parenteral Paracetamol, and Paracetamol in combination with NSAID's for post-operative analgesia. *British Journal of Anaesthesia.* **88**: 215-26

Rutherford J, Patri M. (2004). Failure of antireflux valve in a Vygon PCA set. *Anaesthesia*. **59**:511

Schug SA, Sidebottom DA, Mcguinnety M et al. (1998). Acetaminphen as an adjunct to morphine by patient-controlled analgesia in the management of acute post-operative pain. *Anesth Analg.* **87**: 368-72

Tramer MR, Walder B. (1999). Efficacy and adverse effects of prophylactic antiemetics during patient-controlled analgesia therapy: A quantitative systematic review. *Anesth Analg.* **88**: 1354-61

Tsui SL, Irwinmg, Wong CM et al. (1997). An audit of the safety of an acute pain service. *Anaesthesia*. **52**: 1042-47

5. EPIDURAL ANALGESIA

5.1 Definition

A low concentration of local anaesthetic usually with an opioid, infused into the epidural space to provide pain relief, without loss of motor function.

5.2 Indications

- Acute postoperative pain.
- Fractured ribs.
- Non spinal trauma

Absolute contraindications

- Coagulopathy APTT ratio or INR >1.4
- Platelet count < 100
- Low molecular weight heparin (e.g. Enoxaparin, Clexane) given within last 12 hours if on prophylactic dose (20 or 40mg) or within last 24 hours if on therapeutic dosing (>40mg)
- Clopidogrel given within the last 7 days
- Local sepsis
- Allergy to amide local anaesthetics.

Relative contraindication

- If APTT ratio or INR 1.2-1.4.

5.3 Prescription

Epidural analgesia should be prescribed either as a continuous infusion or as Patient Controlled Epidural Analgesia (PCEA). In addition to the patient's own drug chart, the prescriber should also complete a dedicated epidural prescription chart.

The following pre-filled bags of epidural analgesia solution are available for use:

Bupivacaine 0.1% with fentanyl 2micrograms per ml and
Bupivacaine 0.1% only

No other systemic opioids (strong/weak) should be prescribed whilst the patient is receiving epidural analgesia containing fentanyl. However, there may be exceptions to this rule in certain patient groups e.g. patients with chronic pain, patients who are under the care of the palliative care team or patients who are opioid tolerant. Some patients may receive a local anaesthetic only epidural with a concurrent prescription of an opioid via an alternative route. To ensure that clinical risk is managed effectively, these individual cases **must** be discussed with the Acute Pain Service so that adequate provision is made to review the patient.

Naloxone and **cyclizine** should be co-prescribed to combat the potential side effects associated with the use of opioid drugs. Pre-printed labels are available in the anaesthetic rooms and the recovery rooms for use by the prescriber.

The bags of epidural solution should be clearly labelled, indicating that they are for epidural use only.

Storage of bags of epidural solution. - This differs between UHL and UHW.
Please see section 14.0 for specific storage instructions of solution bags.

No bags of epidural analgesia solution should be stored in the operating theatres.

5.4 Equipment

The McKinley Bodyguard epidural infusion device with dedicated infusion line is used for the delivery of epidural analgesia in designated clinical areas across the University Health Board

A bacterial filter must always be used and the patient must have patent intravenous access whilst receiving epidural analgesia.

When the McKinley Bodyguard epidural infusion device is no longer required, ward staff should contact the Pump library for it to be collected. It will be checked and cleaned prior to return to the Recovery room.

5.5 Designated clinical areas & responsibilities

Adult patients receiving epidural analgesia are able to return to the following wards only:

UHL- W5**,**, Anwen, HDU, ITU and CAVOC.

UHW - A3L, surgical wards (except A5 Head and neck and T4 and B4 neurosurgery), CTU, C1,C5, A5 Urology, PACU, General Critical Care and Cardiac Critical Care.

The Acute Pain Service will provide education for nursing staff related to the care of patients receiving epidural analgesia.

Staff should have received the appropriate training and assessment for the use of the specific high-risk infusion device in accordance with Cardiff and Vale University Health Board's policy for the Use of Parenteral Infusion Devices (2011). Qualified nursing staff are responsible for changing the infusion rate, infusion bags etc. and for removing the epidural catheter once treatment has been discontinued. There may be occasions when the Acute Pain Service / Obstetric on call anaesthetist will be asked for assistance with these tasks.

If a patient is located on any other ward pre-operatively and if epidural analgesia is considered to be the most appropriate analgesia, then arrangements **must** be made for the patient to be transferred to one of the designated clinical areas. Patient Access should be contacted to assist in managing these arrangements.

5.6 Initiating treatment and monitoring patients receiving epidural analgesia

Epidural catheters should ideally be inserted in the Recovery room or Anaesthetic room. It may sometimes be necessary to perform this technique in Critical Care. (A urinary catheter should also routinely be inserted except in orthopaedic patients where this decision will be made at the discretion of the team).

Setting up and programming epidural infusion devices is the responsibility of the Recovery room nurse, Acute Pain Service or appropriately trained anaesthetist in accordance with the Cardiff and Vale University Health Board Parenteral infusion pumps policy (2011). ODPs may **not** set up and programme the infusion device but they may check the settings with designated staff.

In the immediate postoperative period, if the patient is complaining of moderate to severe pain, nursing staff in the Recovery room should contact the appropriate anaesthetist or a member of the Acute Pain Service as a bolus of epidural analgesia solution or local anaesthetic may be necessary to settle the patient.

Following appropriate training, nursing staff in the Recovery room and General Critical Care areas will be able to give prescribed boluses (see Section 5.11a and b).

On returning the patient to the clinical area, recovery room staff should check the epidural infusion pump settings with the nurse accepting the patient and sign the appropriate section of the epidural record of administration chart.

On return to the ward area the epidural care plan should be followed carefully. Observations of pulse, blood pressure, respiration and oxygen saturation level should be initiated at ½ hourly intervals for 2 hours, 1 hourly for 2 hours and then 2 hourly until the epidural analgesia is discontinued. Patients receiving epidural analgesia should have their oxygen saturation levels monitored at the same time as their other observations. If the oxygen saturation level falls below 94%, oxygen should be administered at 15L via an oxygen mask. If there is no improvement after 5 minutes and the respiratory depression is thought to be caused by the epidural analgesia, seek advice from the Acute Pain Service or Obstetric/Duty on-call anaesthetist. (The baseline oxygen saturation level of the patient should be taken into consideration).

Pain on movement and sedation scores should be assessed and recorded on the observation chart. The patient should also be asked to 'straight leg raise' each leg 2 hourly to monitor the possible development of motor block. This should be recorded on the observation chart. If the patient is unable to straight leg raise either one or both legs, the Acute Pain Service/On call anaesthetist should be contacted for advice.

The epidural catheter insertion site should be covered with an IV 3000 dressing and should be inspected every 8 hours for presence of pus, inflammation, swelling, tenderness or leakage. . The epidural catheter insertion site must be completely visible and **no** other dressings should be used e.g. gauze, blue sponge.
To indicate that a check has been undertaken a tick should be recorded on the observation chart ESC (epidural site check) and the condition of the epidural insertion site should be documented in the nursing notes.
The patient's temperature should be recorded 4 hourly to aid detection of infection. If the epidural catheter insertion site displays any signs of infection, the site is exposed or the filter becomes disconnected, the epidural catheter should be removed (see section 5.9 / 5.10) and advice on the epidural care plan followed

The amount of epidural drug infused should be recorded *hourly* on the appropriate chart as per Parenteral infusion pumps policy (2011) by the nurse responsible for that patient.
A member of the Acute Pain Service will visit the patient on the day of epidural insertion and daily thereafter until treatment is discontinued. Patients will be visited more frequently if necessary.

Following insertion of epidural catheter – low molecular weight heparin (LMWH) eg. Enoxaparin or unfractionated heparin should not be administered for 4 hours. Rivaroxaban or apixaban should not be given for 6 hours.

5.7 Skin preparation prior to epidural insertion

Patient
Explain procedure to patient and position patient

Anaesthetic Assistant

Wear mask
Wash hands thoroughly
Wash procedure trolley with soap and water
Clean trolleys with alcohol wipes and allow to dry before placing pack on trolley Open all packs and solutions using aseptic technique

Equipment and drugs required for technique

Sterile pack
Sterile gown
Sterile gloves (2 pairs)
Theatre hat and mask
Pink chlorhexidine in 70% alcohol delivered by a pump-squirt bottle
Local anaesthetics – Sterile wrapped lignocaine 1% or 2% Sterile wrapped 0.9% Saline
Portex minipack plus required needles and syringes IV 3000 dressing
4 inch Mefix. (Sleek should not be used)
Steri strips

Anaesthetist

Wear theatre hat and mask
Identify the anatomy **prior** to skin preparation
Surgical scrub, then wear sterile gown and '**double' sterile glove**.
Assistant to spray back with pink chlorhexidine in 70% alcohol, including the area on the upper back where epidural catheter is to be taped to skin.
Rub the back for ~30 seconds using foam sticks or forceps and sterile swabs, in a circular motion from the centre to the periphery.
Anaesthetist then removes outermost pair of sterile gloves prior to drawing up solutions.
Assistant to spray area again with pink chlorhexidine in 70% alcohol solution.

Skin must be allowed to dry for **2 minutes** before commencing the procedure.

Use sterile drapes
Following insertion, cover with a sterile, transparent, occlusive dressing. The epidural catheter insertion site must be completely visible and **no** other dressings should be used e.g. gauze, blue sponge
Use 4 inch Mefix to make a window around the dressing and secure epidural catheter up the back
Ensure that the filter is secured to the patient's chest (over gauze and with large Tegaderm covering)
Dispose of sharps safely

5.8 Management of complications or side effects in ward area – please Epidural and Regional Local Anaesthetic Infusion Care Plan on the following page. N.B. This is incorporated in the prescription

Cardiff and Vale University Health Board
Ymddiriedolaeth GIG Caerdydd a'r Fro

Epidural and Regional Local Anaesthetic Infusion Care Plan

Problem	Goal	Nursing Care
1 **Unrelieved pain.**	Patient will have no more than mild pain at rest or on movement.	**Record 2 hourly pain assessment.** Check **epidural or local anaesthetic** infusion catheter connections and insertion sites for leakage. If there is a unilateral block (epidural) that is not covering the site of pain, lie patient on the painful side. If connections are secure, increase infusion rate within prescribed limits. If PCEA or PCRA is being used check patient compliance and ask them to press the demand button. Check level of block. **If not contraindicated, give regular Paracetamol +/- Diclofenac.** **If pain persists despite epidural or local anaesthetic infusion running at maximum prescribed rate, seek advice from the Acute Pain Service (APS) / On-call Anaesthetist** Do not routinely administer another opioid if the epidural solution contains Fentanyl.
2 **Potential problems surrounding the safe administration of analgesia**	Administer epidural or regional local anaesthetic infusion safely as prescribed	Follow Cardiff & Vale UHB Controlled Drug Policy when Fentanyl is being administered epidurally. Follow Cardiff & Vale UHB drug administration policy, including 2 person initial check of epidural and regional local analgesia solution against prescription. Ensure that the giving set is labelled: "**NOT FOR IV CONNECTION**" Check infusion device settings hourly and complete infusion record of administration chart hourly. At shift handover - 2 qualified nurses check the infusion device, its programme and the amount remaining in the infusing bag to ensure all correspond with the prescription and record of administration charts. **These tasks should be completed by the qualified nurse caring for the patient and if this Nurse has not yet undergone infusion device training then a suitably competent Nurse should oversee this process.** Any discrepancies should be reported to the APS / On-call Anaesthetist immediately.
3 **Potential side effects / complications:** ▪ Hypotension ▪ Respiratory rate 9/10 per min. or sedation score 2. ▪ Respiratory rate <8 per min. or sedation score 3. ▪ SaO2<94%.	Early detection and treatment.	Assess and record 2-hourly sedation, nausea score, respiratory rate, pulse, B/P and straight leg raise (SLR – **epidural only**)). Record temperature 4-hourly and assess epidural or regional local anaesthetic infusion insertion site 8 hourly. Ensure patient has patent IV access. Check for signs of hypovolaemia. Increase IV infusion rate if necessary and as prescribed. If appropriate encourage intake of oral fluids. Call APS / On-call Anaesthetist. Ensure Ephedrine is available. Give oxygen 15L via a face mask; check oxygen saturation and monitor closely. Record respiratory rate and sedation level every 15 minutes until respiratory rate is >12/min and sedation score is 0-1. **Contact APS / On-call Anaesthetist for advice.** Switch off epidural infusion if it contains fentanyl, give oxygen 15L via a face mask and if necessary support ventilation with a pocket mask and rebreathing bag; Check oxygen saturation and give IV naloxone in 50mcg increments until sedation score 0-1 and respiratory rate >12/min. Monitor continuously. **Contact APS / On-call Anaesthetist for advice.** Inform medical team caring for patient. If appropriate give oxygen 15L via face mask. **If oxygen saturation does not improve and is thought to be related to epidural analgesia, seek advice from the APS / On- call Anaesthetist.** If opioid induced give IV Naloxone 50mcg, repeat as necessary. If problem persists, seek advice from APS/ On-call Anaesthetist as the epidural prescription may need changing i.e to 0.1% bupivacaine only.

▪ Opioid-induced pruritus. ▪ Nausea and vomiting. • Potential displacement of epidural or local anaesthetic infusion catheter. ▪ Local anaesthetic toxicity ▪ Decreased or loss of motor function in legs (caused by local anaesthetic blockade, **epidural space** - potentially haematoma /abscess)		Assess for nausea / vomiting every 2 hours and record on observation chart. Administer anti-emetic (see Acute Pain Service Adult Guidelines Nausea and Vomiting Protocol - Appendix 1). Insertion site should be covered with a transparent IV 3000, with the dressing's edges secured with Mefix tape. The infusion catheter should be secured with Mefix tape. The filter should be secured to the front of the patient over gauze swabs. Ensure the filter is in situ and all connections are secure. If they are not, **seek immediate advice from the APS/ On-call Anaesthetist.** If catheter becomes displaced from filter - do not reconnect filter. Stop infusion and wrap end of catheter in sterile gauze. Contact APS / On-call Anaesthetist who will connect new filter until line can safely be removed (re coag). Observe patient for circumoral numbness, dizziness, light-headedness, fitting, twitching, drowsiness, ringing in the ears (tinnitus), respiratory arrest, un-consciousness. **Guidance regarding local anaesthetic toxicity can be found in Section 5.12 of the Acute Pain Management guidelines.** **Epidural only** -every 2 hours ask the patient to straight leg raise (SLR) both legs. Record on observation chart. If patient unable to SLR either leg and pain is well controlled, reduce epidural analgesia infusion rate slightly. **If problem persists or if pain is inadequately controlled following reduction of epidural infusion rate, call APS / On-call Anaesthetist.** Check pressure areas.
Problem	**Goal**	**Nursing Care**
3 (contd) **Potential side effects / complications (continued):** • Epidural / regional local anaesthetic site / space infection.	Early detection and treatment.	**All epidural and regional local anaesthetic** catheters must be removed within 5 days of insertion unless the Acute Pain Service indicate otherwise. If the transparent dressing becomes loose or fluid pools beneath it, the insertion site must be redressed. **Use an aseptic technique and carefully clean the site using forceps, sterile swabs and sterile saline, rubbing in a circular motion from the centre to the periphery.** Change infusion bags using aseptic technique. Check insertion site (ESC) 8-hourly for pus, inflammation, tenderness or leakage and record on observation chart and in nursing care evaluation. If any signs of infection, contact the APS / On-call Anaesthetist to review. **If the epidural or regional local anaesthetic catheter is to be removed - Use aseptic technique. Clean the insertion site with sterile normal saline and apply a transparent IV 3000 dressing. Guidance outlined under Problem 4 within this care plan should also be followed when removing epidural catheters.** **If an epidural site infection** is suspected, send tip and swab from site for MC+S. Vancomycin (or Teicoplanin) plus Ceftriaxone should be started. Please consult Microbiology if there is concern about antibiotic allergies. This treatment should be reviewed when the MC+S results are available. **If an epidural** site infection is confirmed clinically, antibiotic treatment should continued and be tailored as per Microbiology Department advice. The patient will be reviewed regularly by the APS until the problem has resolved. If the insertion site becomes exposed, **please contact the APS / On-call Anaesthetist to review** as the infusion catheter will probably need to be removed as outlined above. Once removed the **epidural** insertion site should be observed for 3 days for signs of infection. If patient is discharged before the end of this 3 day period, the discharging nurse must ensure that either a Community Nurse conducts a day 3 check, or if appropriate the patient/carer is educated to check the **epidural** site. Ensure the patient has been provided with a epidural analgesia patient information leaflet and understands the steps to be taken if a problem occurs.

4 **Potentially unsafe removal of epidural catheter, resulting in epidural space haematoma > lower limb paralysis**	Haematoma within epidural space and potential sequlae are avoided.	**PRIOR TO REMOVAL OF EPIDURAL:** Check current FBC and clotting results prior to epidural catheter removal Platelets must be > 100 and APTT ratio must be < 1.4 and PT must be <24 **Seek advice from Acute Pain Team or On-call Anaesthetist if any of these blood results are abnormal.** **AND** When the decision is made to remove the epidural catheter, consider the prescribed anticoagulant medication in conjunction with the timings below as to when it is safe to remove the epidural catheter: **Enoxaparin:** **Prophylactic dosage: ≤40mg once daily - 12 hours should elapse following last dose** **40mg twice daily - Omit next prescribed dose and ensure 12 hours has elapsed since last dose given** **Treatment dosage: >40mg once daily - 24 hours should elapse following last dose** **40mg twice daily - Omit next prescribed dose and ensure 24 hours has elapsed since last dose given** **Minihep - At least 4 hours should elapse between last dose of Mini-hep and epidural catheter removal.** **WAIT 4 HOURS FOLLOWING EPIDURAL CATHETER REMOVAL BEFORE GIVING NEXT DOSE OF ENOXAPARIN OR MINI-HEP**
		Rivaroxaban: - **18 hours should elapse between the last dose and removal of the epidural catheter** - **WAIT 6 HOURS FOLLOWING EPIDURAL CATHETER REMOVAL BEFORE GIVING NEXT DOSE OF RIVAROXABAN**
		Heparin infusion:- Contact APS/On-call Anaesthetist for advice. See Acute Pain Service Pain Management Guidelines - Section 5. There needs to be close liaison between Surgical team and APS to optimise patient's treatment.
	Safe and easy removal of epidural catheter.	**Anticoagulation treatments e.g. Warfarin / Antiplatelets e.g. Clopidrogel, Prasugrel or Ticagrelor:** - **Treatment doses should NOT be administered whilst a patient is receiving epidural analgesia** If the patient is newly prescribed any of these treatments following a cardiovascular event whilst receiving epidural analgesia, contact the On-call Consultant Anaesthetist urgently for advice BEFORE giving the new treatment (epidural catheter will need to be removed prior to commencing new anticoagulant and alternative analgesia will need prescribing). **If patient is prescribed any anti-platelet / anti-coagulation drug not indicated above please contact APS for advice.**

5.9 Discontinuing Epidural Analgesia

Epidural catheters should be removed within 5 days because of the risk of infection. However, in exceptional circumstances it may be necessary to delay removal. This should be managed on an individual patient basis and the
PainTeam and Anaesthetist who inserted the epidural catheter must be involved. Before removing the catheter, the following points should be considered and the Acute Pain Service informed.

- Level of pain & infusion rate.
- **Ability to tolerate analgesia via alternative routes.**
- **At least 12 hours should elapse between the removal of the epidural catheter and the last prophylactic dose of Low Molecular Weight Heparin (e.g. enoxaparin 20mg or 40mg) or 4 hours if unfractionated heparin is being used.**
- **If the patient is receiving a therapeutic dose of LMWH (e.g. enoxaparin >40mg daily) then 24 hours should elapse between the last dose given and the time that the epidural catheter is removed.**
- **The next dose of LMWH (eg enoxaparin, and unfractionated should not be administered for at least 4 hours following the removal of the epidural catheter.**
- **At least 18 hours should elapse between the removal of the epidural catheter and the last dose of rivaroxaban or apixaban.**
- **The next dose of rivaroxaban or apixaban should not be administered for at least 6 hours following the removal of the epidural catheter.**
- **If the patient is receiving any anti-platelet/anti-coagulant drug not indicated above please contact APS for advice**
- If the patient has a coagulopathy or is receiving an intravenous heparin infusion, seek advice from the Acute Pain Service. See 5.10.
- The epidural catheter should not be removed if the platelet count is less than 100. However, if there is a high risk of epidural related infection, specific advice should be sought from the Consultant Obstetric Anaesthetist on-call.
- Prior to removal of the epidural catheter the epidural infusion should be stopped for approximately 4 hours, alternative analgesia should be prescribed and administered and its efficacy assessed. If the patient is comfortable, the epidural catheter may then be removed.
- Consideration may be given to the removal of the patient's urinary catheter once the epidural catheter has been removed.

The nurse caring for the patient should check the epidural site every day for 3 days and assess and document patient's ability to Straight Leg Raise every 4 hours for 24 hours post removal of the epidural catheter. The Acute Pain Service should be contacted regarding any concerns.
If the patient is discharged before this time, it is the responsibility of the discharging nurse to ensure that either the district nurse conducts this check or the patient / carer is educated to check the epidural site and seek medical advice if necessary. If the patient experiences any new back pain, altered sensation or weakness to lower limbs or unexpected bowel or bladder problems then they should contact the Acute Pain Service or Obstetric Anaesthetist on duty via the hospital switch board. A patient information leaflet regarding epidural analgesia and containing this advice will be provided by the Acute Pain Service to all patients receiving epidural analgesia.

5.10 REMOVAL OF EPIDURAL CATHETER IN PATIENT RECEIVING CONCURRENT INTRAVENOUS HEPARIN INFUSION

- Liaise with the surgical team regarding the proposed removal of the epidural catheter and the management plan for anticoagulation.
- Stop intravenous heparin for 2 hours.
- Obtain blood samples for APTT ratio, PT and for platelet count
- APTT ratio should be 1.4 or less. If APTT ratio is greater than 1.4 send further sample for repeat APTT in 1 hour. (Keep heparin switched off).
- If APTT ratio is 1.4 or less, PT is less than 24 and platelet count greater than 100, remove epidural line as per guidelines.
- Restart heparin 2 hours following the removal of the epidural catheter.

Antiplatelets (e.g.clopidogrel, ticagrelor) or oral anticoagulants (e.g. warfarin, rivaroxaban, apixaban, dabigatran) should not be commenced whilst a patient is receiving epidural analgesia.

Any queries contact Acute Pain Service:

UHW

Acute Pain Service - Bleep 5414

Obstetric on call anaesthetist (out of hours) - Bleep 5101

UHL

Acute Pain Service - Bleep 4560

Duty on-call anaesthetist (out of hours) - Bleep 4800

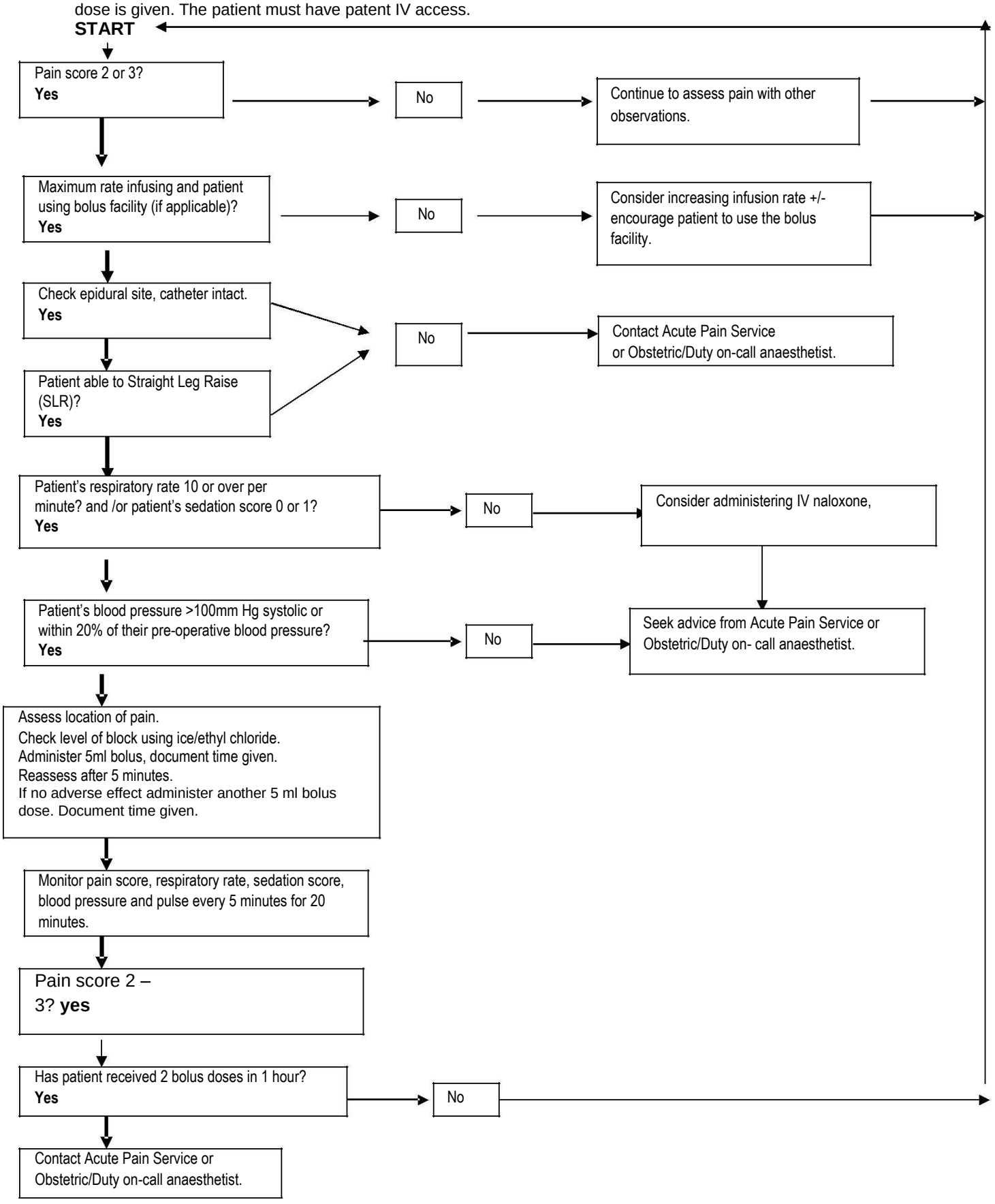
5.11a Epidural bolus dose (Anaesthetic staff)

Anaesthetic staff administering epidural boluses in the clinical areas should observe the following points:

- The patient should have patent venous access and be lying on a bed/trolley
- A test dose should be administered initially.
- 0.1% Bupivacaine plus fentanyl from the infusion pump should be used initially and particularly if the reason for pain is secondary to inadequate spread of LA.
- 0.25% Bupivacaine solution should only be used if the above has not worked and the patient describes breakthrough pain despite adequate spread of LA.
- The epidural bolus should be documented in the patient's medical notes and on the prescription chart.
- **The anaesthetist should stay on the ward for at least 15 minutes following the administration of a top-up to manage any subsequent hypotension.**
  If it is necessary to leave to attend an emergency, please ensure that the ward nursing staff have the correct bleep number and also that of the duty anaesthetist, in case further help or assistance is required.

5.11b FLOW CHART FOR THE ADMINISTRATION OF AN EPIDURAL BOLUS DOSE

Bolus doses may be given by Acute Pain Services nurses, and nurses who have received specific training and been assessed as competent by the Acute Pain Service. The patient should be in bed when a bolus dose is given. The patient must have patent IV access.



5.12 Guidelines for the Management of severe local anaesthetic toxicity

5.12a Signs of severe toxicity:

- Sudden loss of consciousness, with or without tonic-clonic convulsions
- Cardiovascular collAcute Pain Servicee: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmia's may also occur
- Local anaesthetic (LA) toxicity may occur some time after the initial injection

5.12b Immediate management plan:

- Stop injecting the LA / or stop the infusion
- **Call for help and also request urgent senior anaesthetic assitance**
- Maintain the airway and, if necessary, secure it with a tracheal tube
- Give oxygen 15L via a mask and ensure adequate lung ventilation (hyperventilation may help by increasing 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

5.12c Management of cardiac arrest associated with LA injection:

- Start cardiopulmonary resuscitation (CPR) using standard protocols
- Manage arrhythmias using the same protocols, recognising that the patient might be refractory to treatment
- Prolonged resuscitation may be necessary; it may be appropriate to consider other options:
- **Consider the use of cardiopulmonary bypass if available**
- **Consider treatment with lipid emulsion.**

5.12d Intralipid 20% is available in the following clinical areas: UHW:

MAIN THEATRE RECOVERY (2 x 500ml bags)
SURGICAL SHORT STAY UNIT, RECOVERY (2 x 500 ml bags)
EMERGENCY UNIT, RESUS AREA (2 x 500 ml bags) DELIVERY SUITE,
THEATRE 1 & 2 (1 bag each) OPHTHALMIC THEATRE, THEATRE SUITE 1
(2 x 500 ml bags)

UHL:

CAVOC THATRES, RECOVERY AREA (2 bags)
GYNAECOLOGY THEATRE, RECOVERY AREA (2 bags)
THEATRES GROUND FLOOR, RECOVERY AREA (1 bag)
THEATRES 1ST FLOOR, RECOVERY AREA (1bag)

5.12e Treatment of cardiac arrest with lipid emulsion:

- Give an intravenous bolus injection of Intralipid ® 20% 1.5 ml per kg given over 1 min
- Continue CPR
- Start intravenous infusion of Intralipid ® 20% at 0.25 ml per kg per min
- Repeat the bolus injection twice at 5 minute intervals if an adequate circulation has not been restored
- After another 5 minutes, increase the rate to 0.5 ml per kg per min if an adequate circulation has not been restored
- Continue infusion until a stable and adequate circulation has been restored

5.12f Remember

- Continue CPR throughout treatment with lipid emulsion
- Recovery from LA-induced cardiac arrest may take > 1 hour
- Propofol is not a suitable substitute for Intralipid ®
- Replace your supply of Intralipid ® 20% after use

5.12g Follow up action:

- Report cases to the National Patient Safety Agency (via www.npsa.nhs.uk).
- If possible, take blood samples into a plain tube and a heparinised tube before and after lipid emulsion administration and at 1 hourly interval afterwards. Ask the laboratory to measure LA and triglyceride levels (these have not been reported in a human case of LA intoxication treated with lipid).
- Please read the following notes.

5.12h Notes

- Intralipid ® 20% has been shown to reverse LA-induced cardiac arrest in animal models and in human case reports and its use has been reported in the treatment of life-threatening toxicity without cardiac arrest. Its therapeutic potential has been highlighted by National Patient Safety Agency.
- Intralipid ® 20% 1000 ml should be immediately available in all areas where potentially cardiotoxic doses of local anaesthetics are given, along with guidelines for its use.
- The use of Intralipid ® in this way is relatively novel. Therefore, future laboratory and clinical experiences are likely to dictate further refinement of the method.
- The guideline document will be reviewed regularly and updated when necessary. Updated versions will be available on http://www.aagbi.org and http://lipidrescue.org.
- Further educational matter is available at http://lipidrescue.org.

Bibliography

American Pain Society. (1995). Pain: the fifth vital sign. Available at: www.ampainsoc/advocacy/fifth.htm (accessed 04/11/05)

Association of Anaesthesia of Great Britain and Ireland. Guidelines for the Management of Severe Local Anaesthetic Toxicity. AAGBI London (2007) www.aagbi.org

Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. (2005). *Acute Pain Management: Scientific Evidence (2nd ed)*. Australia: National Health and Medical Research Council

Ayliffe GAJ, Fraise AP, Geddes AM et al. (2000). *Control of Infection – A Practical Handbook (4th ed)*. London: Arnold

British National Formulary. (2004). *BNF 47*. London: British Medical Association and the Royal Pharmaceutical Society of Great Britain

Cox F. (2002). Making Sense of Epidural Analgesia. *Nursing Times*, **98** (32), 56-58

Dawson P. (1995). Post-operative epidural analgesia. *Current Anaesthesia and Critical Care*. **6**: 69-75
DoH. (2001). Standard principles for preventing hospital acquired infections. *Journal of Hospital Infection*. **47** (supp) S 21-S37

DoH. (2001). Guidelines for preventing infections associated with the insertion and maintenance of central venous catheters. *Journal of Hospital Infection.* **47** (suppl) S21-S37

Gedney J, Lui E. (1998). Side effects of epidural infusions of opioid bupivacaine mixtures. *Anaesthesia*. **53**: 1148-55

Hosein IK. (Director of Infection Prevention and Control and Associate Medical Director, Cardiff and Vale NHS University Health Board) (2005). *Personal Communication by letter to I. Bowler (Consultant Anaesthetist, Cardiff and Vale NHS University Health Board)*

Howell M. (2002). Pulse oximetry: an audit of nursing and medical staff understanding. *British Journal of Nursing.* **11** (3), 191-197

Keay S. (2008). *Policy for Parenteral Infusion Pumps*. Cardiff and Vale NHS University Health Board. Unpublished

MacKintyre PE, Reddy LB. (1996). *Acute Pain Management; A Practical Guide.* London: WB Saunders Company Limited

McCaffery M, Pasero C. (2002). Monitoring Sedation. *American Journal of Nursing.* **102** (2) 67-68

Middleton C. (2006). *Epidural Analgesia in Acute Pain Management.* England: John Wiley and Sons Ltd

Morin AM, Kerwat KM, Klotz M et al. (2005). Risk factors for bacterial colonization in regional anaesthesia. *BMC Anesthesiology.* **5** (1) 1471-2253

Murdoch J. (2005). Ensuring Prompt Diagnosis and Treatment of Epidural Abscess. *Nursing Times*. **101** (20) 36-38

NICE. (2003). *Infection Control: Prevention of Healthcare Associated Infection in Primary and Community Care (Clinical Guidelines 2).* London: NICE

Phillips JMG, Stedford JC, Hartsilver E et al. (2002). Epidural abscess complicating insertion of epidural catheters. *British Journal of Anaesthesia.* **89** (5), 778-782

Resuscitation Council (UK) Cardiac arrest or cardiovascular collAcute Pain Servicee caused by local anaesthetic (2008). www.resus.org.uk/pages/caLocalA.htm

Royal College of Anaesthetists, Royal College of Nursing, the Association of Anaesthetists of Great Britain and Ireland, the British Pain Society and the European Society of Regional Anaesthesia and Pain Therapy. (2004). *Good Practice in the Management of Continuous Epidural Analgesia in the Hospital Setting.* London: RCA

Smith & Nephew. (2001). IV 3000* Product Range. Available at: http://wound.smith-nephew.com/UK/node.asp?NodeId=3269 (accessed 01/02/2006)

South Wales Pain Nurses' Forum (SWPNF) and Welsh Acute Pain Interest Group (WAPIG). (2002). Epidural Analgesia in Adult Acute Pain Management: Best Practice Guidelines for the region of South Wales. Unpublished

Williams B, Wheatley R. (2000). Epidural Analgesia for Postoperative Pain Relief. *Bulletin 2 (Continuing Medical Education Core Topic), The Royal College of Anaesthetists.* 67-71

6. HOURLY ADMINISTRATION OF OPIOID ANALGESICS

6.1 Definition

The safe administration of intramuscular / subcutaneous / oral opioid analgesics on an hourly p.r.n. basis, using an algorithm driven by information derived from pain assessment and recorded observations of pulse, blood pressure, respiration and level of sedation.

Please use morphine as first choice.

6.2 Indications

- For the management of severe acute pain, in particular for those patients where PCA or epidural analgesia is not suitable.

6.3a Prescription

Morphine or Oxycodone should be prescribed 1hourly p.r.n. according to the patient's weight, age and physical condition. For example:

Oral morphine: **Sevredol / Oramorph** starting dose: 5-10mg

IM / SC morphine	
Pt weight	Dose
40-65kg	7.5mg
66-100kg	10mg
(Use 10mgs/1ml concentration)	

If the patient's weight falls outside these limits, advice should be sought from the Acute Pain Service:

UHL Bleep 4560 **UHW:** Bleep 5414

Naloxone and cyclizine must also be prescribed to combat the potential side effects associated with the use of opioids. Pre-printed labels for the prescription of IM/SC analgesia are available on the surgical wards and in the Recovery room for the prescriber. The route via which these drugs are administered must *not* be altered on the prescription chart.

6.3b Balanced analgesia

Balanced analgesia should be considered for all patients receiving intramuscular /subcutaneous and oral opioid analgesia. Paracetamol and an NSAID (if not contraindicated) Ibuprofen 1st line, naproxen 2nd line or diclofenac suppositories (if rectal route more appropriate) should be prescribed as a *regular* prescription.
Contraindications to NSAID's:- known allergy, renal impairment, hypotension, history of gastric ulceration, aspirin sensitive asthma and marked dehydration. Use with *caution* in the elderly and in those patients with potential or actual coagulopathy.

6.4 Equipment

Every patient receiving strong opioid analgesia **must have an intravenous cannula in situ** through which to administer naloxone if it is required.
Should the patient require frequent injections, a subcutaneous needle (e.g. 21/23 gauge 'Butterfly') may be inserted into the subcutaneous tissue over the deltoid muscle to avoid repeated needle stabs. Please refer to Section 6.8.

6.5 Designated clinical areas & responsibilities

The algorithm (Section 6.9) may be used on surgical wards where staff have been instructed in its safe use. It is the nursing staff's responsibility to make the appropriate observations, assessments and recordings on the observation chart before administering each dose of opioid. Nursing staff should not use the algorithm if they have not received appropriate instruction.

6.6 Initiating treatment & monitoring of patients receiving hourly opioids

The prescriber may prescribe hourly intramuscular/subcutaneous/oral opioids. If a subcutaneous needle is thought to be of benefit, a trained nurse who has received instruction may insert it.

Observations of blood pressure, respiratory rate (respirations should be counted for a full minute) and sedation levels should be made and **recorded** together with pain assessment before each dose of opioid is given. Pain and sedation assessments should be maintained 2 hourly whilst the algorithm (Section 6.9) is being used.

If the patient complains of severe pain despite repeated hourly doses of opioids, check that balanced analgesia (Paracetamol and an NSAID, if not contraindicated) have been prescribed and are being administered regularly.

6.7 Management of complications or side effects

Should the patient develop hypotension, respiratory depression or have a sedation score of 2 or over, the instructions on the algorithm (section 6.9) should be followed.

Seek advice from the Acute Pain Service or Obstetric / Duty on-call anaesthetist if these measures do not resolve the problem.

6.8 Opioid analgesia via in-dwelling subcutaneous 'butterfly' needle

If a patient is requiring frequent intramuscular opioid injections, it may be more appropriate to switch to subcutaneous injections using either a 21/23G Butterfly needle in order to avoid frequent needle stabs. This should be sited in the subcutaneous tissue over the deltoid muscle of the arm. It should be secured with a transparent dressing so that the skin entry site can be seen. A label "Subcutaneous needle" should be attached to avoid any confusion with an IV cannula.
Procedure for administration of analgesia via sub-cutaneous needle:

1. Draw up the appropriate dose of morphine (10mgs/1ml) and label clearly.
   Only morphine should be administered via this route.

2. In a separate 1ml syringe draw up normal saline.

3. Attach the morphine syringe to the tubing of the 'Butterfly needle' and inject drug very slowly.

4. Exchange the empty morphine syringe for the syringe containing saline. Slowly flush the cannula then replace and re-secure the blind hub.

If the injection site becomes inflamed, the butterfly needle should be resited.

Instruction regarding subcutaneous needle insertion or administration of morphine via this route can be obtained from.

Acute Pain Service

UHW

Acute Pain Service - Bleep 5414

Obstetric on call anaesthetist (out of hours) - Bleep 5101

UHLAcute Pain Service - Bleep 4560

Duty on-call anaesthetist (out of hours) - Bleep 4800

The Acute Pain Service algorithm for the hourly administration of intra-muscular/subcutaneous/oral opioids should be followed to ensure safe administration.

6.9 Intramuscular / subcutaneous / oral opioid analgesia Algorithm - Guidelines for safe administration

It is recommended that patients receiving strong opioid analgesics have an intravenous cannula in situ

Pulse, blood pressure, respiratory rate, sedation and pain scores should be assessed/recorded before administration of strong opioid and maintained 2 hourly whilst algorithm in use.

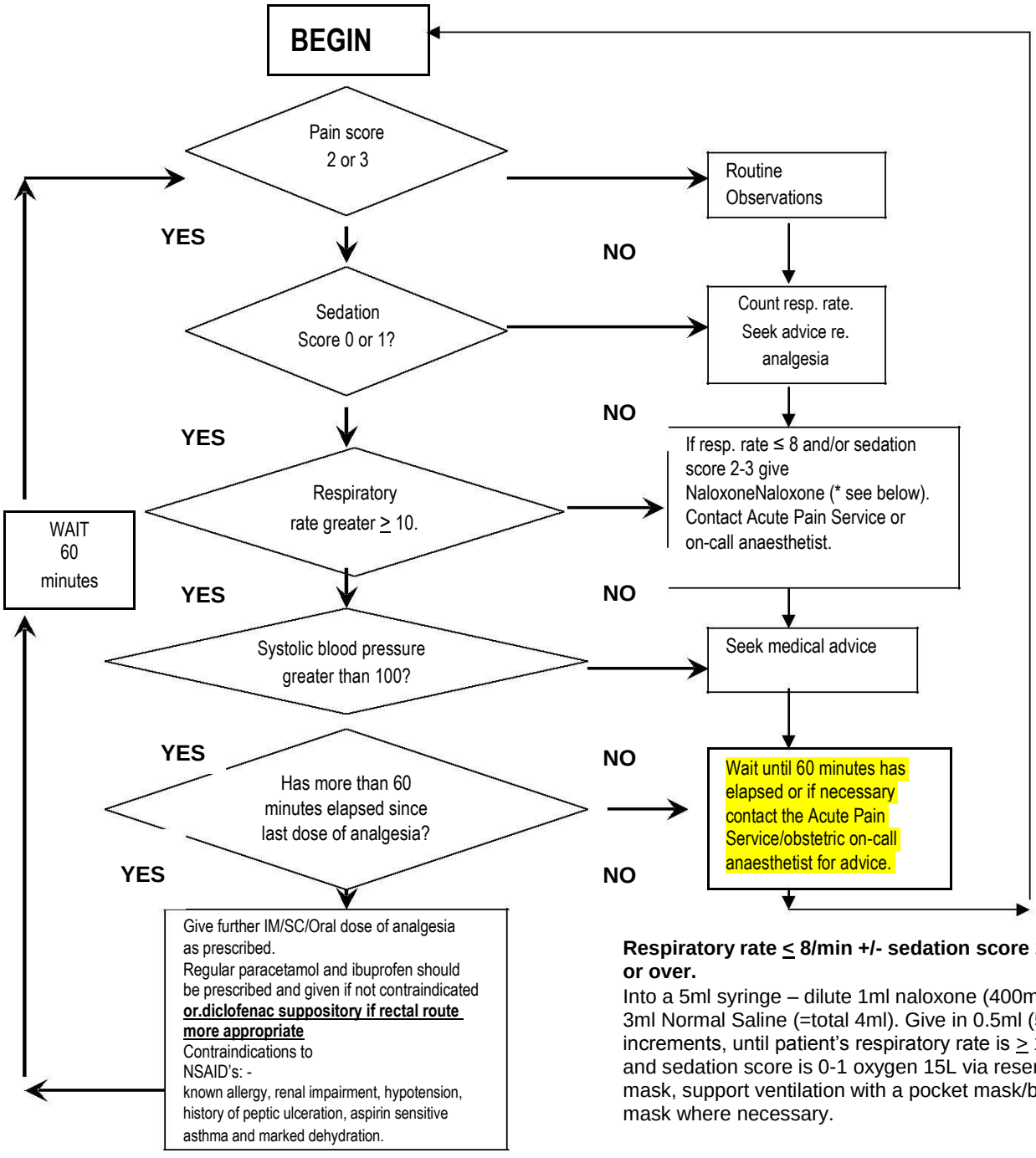
Please use morphine as first choice

(Seek advice if patient weighs less than 40kg or more than 100kg)

Oral morphine **hourly** (Sevredol / Oramorph) starting dose 5-10mgs

IM/SC morphine **hourly** dose

Weight	**Dose**
40-65 kg	7.5 mg
66-100 kg	10 mg



Respiratory rate ≤ 8/min +/- sedation score 2 or over.

Into a 5ml syringe – dilute 1ml naloxone (400mcg) with 3ml Normal Saline (=total 4ml). Give in 0.5ml (50mcg) increments, until patient's respiratory rate is ≥ 12/min and sedation score is 0-1 oxygen 15L via reservoir mask, support ventilation with a pocket mask/bag valve mask where necessary.

Bibliography

Gould TH, Crosby DL, Harmer J, Lloyd SM, Lunn JN, Rees GAD, Roberts DE, Webster JA. (1992) Policy for controlling pain after surgery: effect of sequential changes in management. *BMJ*. **305**: 1187-93

Harmer M, Davies KA. (1998). The effect of education, assessment and standardised prescription on post-operative pain management. *Anaesthesia*. **53**: 424-430

Macintyre PE, Ready B. (2001). Acute Pain Management: a practical guide. 2nd edition

7. GUIDELINES FOR THE ADMINISTRATION OF INTRAVENOUS MORPHINE

7.1 Definition

The safe administration of intravenous morphine using an algorithm driven by information derived from documented pain score, sedation score, respiratory rate, pulse, blood pressure, nausea score and oxygen saturation levels.

7.2 Indications

For the management of severe acute pain in patients who are unable to tolerate oral analgesia.

7.3 Prescription

The dose of morphine should be prescribed according to the patient's age and clinical condition. Naloxone and cyclizine must also be prescribed to combat the potential side effects associated with the use of opioids.

Examples of suitable prescriptions are:
morphine 1mg – 5mg every 2 ½ minutes. Maximum 10mg in 30 minutes.

There may be exceptional circumstances where larger IV morphine doses are required, i.e. in opioid dependent patients. In the Emergency Unit separate guidance exists for these patients.

7.4 Balanced analgesia

Balanced analgesia should be considered for all patients receiving intravenous opioid analgesia. Paracetamol and an NSAID (if not contraindicated) Ibuprofen 1st line, naproxen 2nd line or diclofenac suppositories (if rectal route more appropriate) should be prescribed as a *regular* prescription. Suppositories are available for paracetamol and diclofenac if the rectal route is more appropriate.
Intravenous paracetamol may be considered only if oral route not appropriate.

Contraindications to NSAID's:- known allergy, renal impairment, hypotension, history of gastric ulceration, clotting disorder, aspirin sensitive asthma and marked dehydration.

7.4 Equipment

Every patient receiving IV morphine must have an intravenous cannula in situ – not only for the administration of the opioid, but also for administration of naloxone or an anti-emetic if necessary.

7.5 Designated clinical areas & responsibilities

Intravenous morphine may be administered in the Recovery room, Critical Care Unit, Emergency Unit, and Coronary Care Unit. Staff should have been instructed in the safe administration of intravenous strong opioids.

7.6 Initiating treatment & monitoring of patients receiving intravenous morphine

The doctor may prescribe the appropriate dose of intravenous morphine analgesia and the trained nurse may administer it adhering to the *IV morphine administration* algorithm (Section 7.10).

7.7 It is the responsibility of the nursing staff to monitor and document pain assessment, respiratory rate (respiratory rate should be recorded for a full minute), sedation score, pulse, blood pressure, oxygen saturation and nausea and vomiting level prior to administering each dose of morphine. These observations and recordings should continue at 5 minute intervals for 10 minutes after each morphine dose or for longer if the patient's condition dictates.

7.8 Management of complications or side effects

.

The Acute Pain Service algorithm (Section 7.10) should be followed to ensure the safe administration of intravenous morphine.

Should the patient develop hypotension, respiratory depression or have a sedation score of 2 or more, the instructions on the algorithm should be followed immediately

7.9 Procedure for drawing up intravenous morphine:

- In a 10ml syringe
- Draw up morphine 10mg/10ml (= 1mg/ml)
- Label clearly

Contact numbers for Acute Pain Service and out of hours cover:

UHW

Acute Pain Service - Bleep 5414

Obstetric on call anaesthetist (out of hours) - Bleep 5101

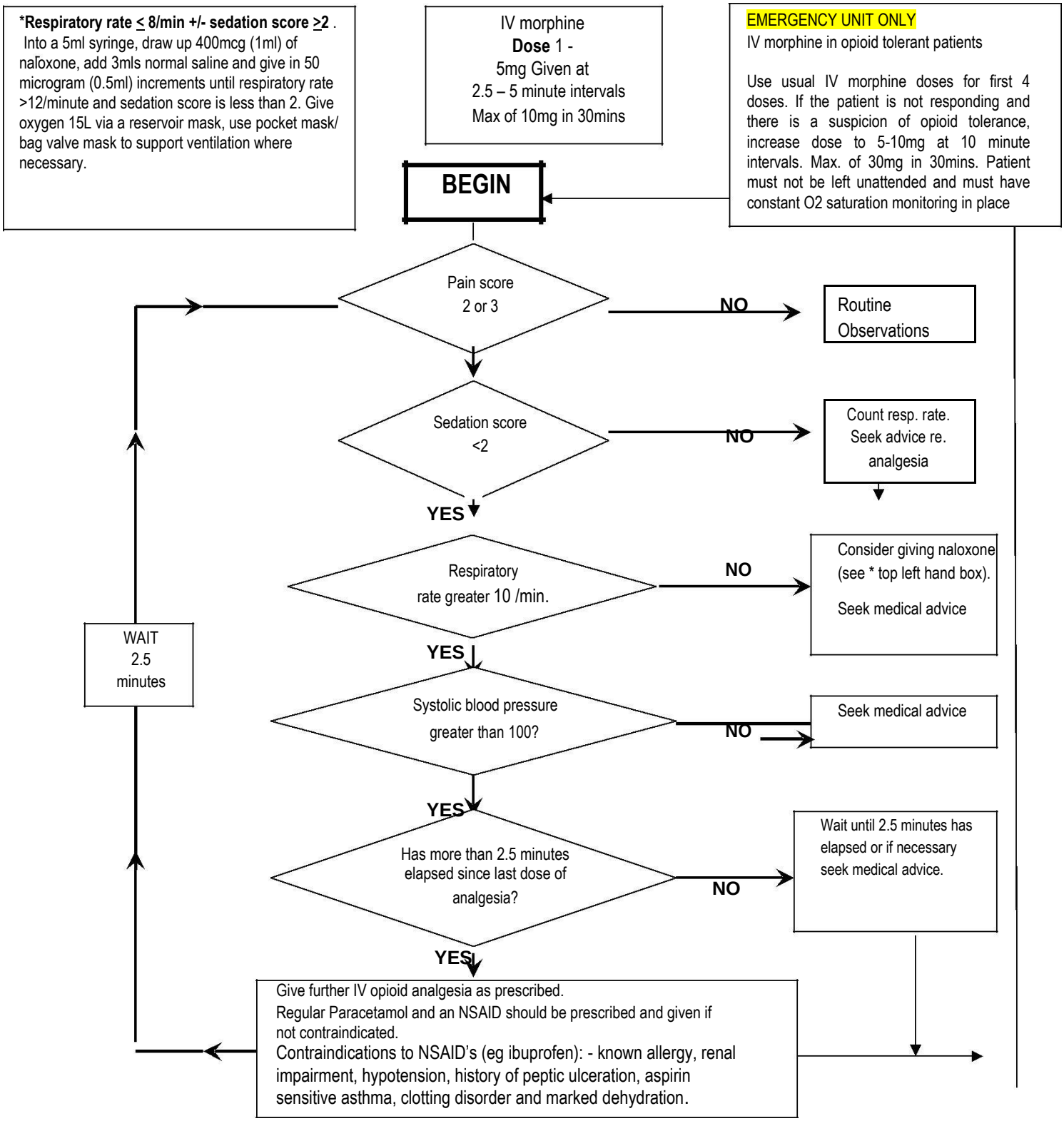
UHL

Acute Pain Service - Bleep 4560

Duty on-call anaesthetist (out of hours) - Bleep 4800

7.10 Intravenous morphine administration algorithm

(Seek advice if weight less than 40kg or more than 100kg)



Monitoring patients while receiving intravenous morphine

Respiration rate, sedation and pain scores, pulse and blood pressure should be recorded *before* administration of morphine and at 5 minute intervals for 10 minutes following administration. A patient should remain in the area where the IV morphine has been administered for 30 minutes following the last dose administered.

8. ENTONOX

8.1 Definition

Entonox consists of 50% oxygen: 50% nitrous oxide. It is a powerful painkilling gas that can be self-administered by the patient through a special demand apparatus. With a rapid onset of action and short duration, Entonox is an extremely safe method of pain relief with minimal side effects.

8.2 Indications

Short painful procedures e.g.

- Removal of surgical drain.
- Removal or insertion of wound packs.
- Physiotherapy.
- Painful examination/treatment.

Contraindications

- Impaired conscious level / head injury.
- Pneumothorax.
- Suspected intestinal obstruction.
- Decompression sickness.
- Chronic lung disease.
- Maxillo facial injuries.

8.3 Prescription

It is not necessary for Entonox to be prescribed by a doctor. However, Entonox may only be used by a qualified nurse who has received training and is competent in its administration.

8.4 Equipment

UHL: Entonox demand apparatus is stored on W2. Other areas that require Entonox should complete the appropriate lending book and ensure the safe return of the cylinder. A nurse or porter should transport the cylinder.
UHW: Entonox is available in the treatment room of most surgical wards.
Most patients prefer to use a mouthpiece rather than a facemask. These are available from CSSD; a sterile mouthpiece should be used for each patient. A disposable, single use bacterial filter should be used with the Ohmeda or Oxylitre demand valve and the Sabre Ease equipment to prevent cross infection. These are a non-stock item available from Procurement. After use the Sabre Ease demand valve parts should be dismantled and washed according to the manufacturer's instructions. The hose can be cleaned if necessary with soap and water. The black anti-static tubing of the Ohmeda system should be cleaned regularly and /or washed immediately if visibly contaminated.

8.5 Designated clinical areas & responsibilities

Entonox may be used anywhere within the hospital if there are suitably trained qualified nurses to supervise its administration. As Entonox is a form of patient- controlled analgesia, it is the nurse's responsibility to instruct the patient in its use.

8.6 Initiating treatment & monitoring of patients

If Entonox is thought to be of benefit, treatment may be initiated by a qualified nurse, particularly in those situations indicated above. No specific observations are required, as side effects are minimal. However, it is extremely important that the patient, rather than the nurse, hold the facemask or mouthpiece during administration of the gas. If excessive sedation does occur, the patient will drop the mask or mouthpiece and immediately breathe room air.

The patient may drive home 30 minutes after receiving Entonox, provided they are deemed fit and well enough to do so. Care is needed if other medication has been taken.

Please refer to the Entonox data sheet for more information should Entonox be required for any situation other than those indicated above.

Bibliography

Erkola O (1994). Nitrous oxide: Laparoscopic surgery, bowel function and PONV. *Acta Anaesthiol Scand.* **38**: 767-68

Forbers GM, Collins BJ (2000). Nitrous oxide for colonoscopy. A randomised controlled trial. *Gastrointestinal Endoscopy*. **51 (3)**: 271-77

Gillman MA, Lichtigfeld FJ (1998). Clinical role and mechanism of action of analgesic Nitrous Oxide. *International Journal of Neurosciences*. **93 (1-2)**: 55-62

Krogh B, Jorn Jenson P, Henneberg SW et al (1994). Nitrous oxide does not influence operating conditions or post-operative course in colonic surgery. *British Journal of Anaesthesia*. **72**: 55-7

Latto IP, Molloy MJ, Rosen M (1973). Arterial concentration of nitrous oxide during intermittent patient controlled inhalation of 50% nitrous oxide in oxygen (Entonox) during the first stage of labour. *British Journal of Anaesthesia*. **45**: 1029-34

Lindblom A, Janson O, Jeppson B et al (1994). Nitrous oxide for colonoscopy discomfort: A randomised double-blind study. *Endoscopy*. **26**: 283-86

Maze M, Fujinaga M (2000). Recent advances in understanding the actions and toxicity of nitrous oxide. *Anaesthesia*. **55**: 311-14

Nunn JF, Chanarin I, Tanner AG et al (1986). Megaloblastic bone marrow changes after repeated nitrous oxide anaesthesia. Reversal with folinic acid. *British Journal of Anaesthesia*. **58**: 1469-70

Pederson FM (1993). The influence of Nitrous Oxide on recovery of bowel function after abdominal hysterectomy. *Acta Anaesthiol Scand*. **37**: 692-96

Stewart RD (1985). Nitrous Oxide sedation/analgesia in emergency medicine. *Annuals of Emergency Medicine*. **14 (2)**: 139-48

Triner WR, Bartfield JM, Birdwell M et al (1999). Nitrous Oxide for treatment of migraine headache. *American Journal of Emergency Medicine*. **17 (3)**: 252-54

9. INTRATHECAL MORPHINE / DIAMORPHINE.

9.1 Definition

Intrathecal morphine/diamorphine (spinal morphine/diamorphine) is given into the cerebro-spinal fluid (CSF).

9.2 Indications

- Patients likely to experience moderate to severe postoperative pain following surgery under sub-arachnoid anaesthesia;
- Patients able to tolerate oral analgesia 18-24 hours postoperatively following sub-arachnoid anaesthesia and intrathecal morphine / diamorphine.

9.3 Prescription

The dose of intrathecal opioid given will depend on age, weight and procedure, at the discretion of the anaesthetist.

Morphine 100 -750mcg or diamorphine 500mcg – 1mg (used more frequently at UHL)

- The intrathecal morphine / diamorphine *must* be the sterile solution prepared by the University Health Board Pharmacy.
- Each ampoule should be double wrapped and only used as a single dose.

The anaesthetist must place a sticker on the patient's drug chart to indicate that the patient has received spinal morphine / diamorphine.

The following should also be prescribed:

An NSAID eg ibuprofen 400mg tds po 48 hours as a **regular prescription.**

Contraindications to NSAIDs are:

- Known allergy
- Renal impairment
- History of peptic ulceration
- Asthma which is sensitive to Aspirin/NSAID's (asthmatics who have previously taken NSAID's without exacerbation of their asthma may have an NSAID)
- Patients who are markedly dehydrated (e.g. decreased urine output +/- decreased blood pressure).

N.B. NSAIDs should be used with **caution** in the elderly and in those patients with potential or actual coagulopathy.

Paracetamol 1g QDS (at 06.00, 12.00, 18.00, 22.00), po/pr/iv as a regular prescription.

Oral tramadol 50-100mg 4-6 hourly prn for rescue analgesia with a maximum dose of 400 mg in 24 hours indicated.

9.4 Designated clinical areas and responsibilities

Patients who have received intrathecal opioids may return to:
UHW - **All trauma and surgical wards,** Short Stay Surgical Unit (SSSU) and critical care areas.
UHLL - **D**elyth ward, Anwen ward, Bethan ward, W3, W5, ITU, HDU and CAVOC.

Patients should not be returned to any other clinical area.

The patient must have an intravenous cannula in situ for the 24 hours following the administration of intrathecal morphine/diamorphine.

N.B. Separate guidelines exist for patients who have undergone Caesarean section.

9.5 Monitoring of patients

On return to the ward area, observations of pulse, blood pressure, pain, sedation, nausea scores, respiratory rate and oxygen saturation level should be initiated **½ hourly** for 2 hours, 1 hourly for 2 hours and then 2 hourly thereafter for 24 hours as per intrathecal analgesia care plan.

9.6 Thromboprophylaxis

Following intrathecal anaesthesia/analgesia wait at least 6 hours before administering the **first** rivaroxaban or apixaban dose.

4 hours should elapse following intrathecal anaesthesia/analgesia before administering low molecular weight heparin (enoxaparin), fondaparinux or unfractionated heparin.

9.7 Management of complications and side effects within 18 hours of receiving intrathecal morphine / diamorphine.

See intrathecal care plan following page

Intrathecal (spinal) opioids and subsequent administration of other strong opioids.

*Patients can develop respiratory depression up to 18 hours after receiving intrathecal morphine/diamorphine.

** Refer to Section 4.10.2 re: administration of naloxone for respiratory depression / sedation.

ADDRESSOGRAPH HERE
Patient's Name:

Acute Pain Service - Intrathecal Analgesia Care Plan

Cardiff and Vale University Health Board
Ymddiriedolaeth GIG Caerdydd a'r Fro

Ward:	Consultant:	Nurse's Signature:

Date	Problem	Goal	Nursing Care
	1. Unrelieved pain.	Patient will have no more than mild pain at rest and mild to moderate pain on movement.	Assess and document pain scores 2-hourly, or more frequently, if necessary. Administer prescribed Paracetamol / Diclofenac (if not contraindicated). Give Tramadol 50-100mg, 4 to 6-hourly, if necessary. If this is ineffective, a prescription for Oramorph or PCA may be required. **Contact the Acute Pain Service (APS) / On-call Anaesthetist.**
	2. Potential side effects.	Early detection and treatment.	For 24 hours, assess and document 2-hourly sedation and nausea / vomiting scores, respiratory rate, pulse, B/P and oxygen saturation.
	a) Respiratory rate <8/min +/- sedation score 2-3. -	Respiratory rate >12/min sedation score 0-1.	Give oxygen 15 litres/min, monitor oxygen saturation levels and give IV Naloxone in 50mcg increments until sedation score 0-1 and respiratory rate >12/min. **Call APS / On-call Anaesthetist.**
	b) Oxygen saturations <94%.	Oxygen saturations >94%.	Give oxygen 15 litres/min. If oxygen saturation has not improved after 5 min, **seek advice from APS / On-call Anaesthetist.**
	c) Nausea and vomiting.	Early detection of nausea and prevention of vomiting.	Administer Cyclizine 50mg IM/IV and monitor effect. If ineffective, change anti-emetic to IM Stemetil 12.5mg as per protocol for postoperative nausea and vomiting (See Acute Pain Service Guidelines - Appendix 1). **If nausea persists, contact APS / On-call Anaesthetist.**
	d) Itching.		Assess patient for itching. If troublesome, administer IV Naloxone 50mcg, repeat if necessary. **If problem persists, contact APS / On-call Anaesthetist.**
	e) Urinary retention.		Record urine output on fluid balance chart. If patient has not passed urine for 12 hours postoperatively and is experiencing pelvic discomfort, contact medical staff. Urethral catheterization may be necessary.

Llandough Hospital: Acute Pain Service: bleep 4560. Out of hours, On-call Anaesthetist: bleep 4800 should be contacted.

University Hospital of Wales: Acute Pain Service: bleep 5414. Out of hours, the Obstetric On-call Anaesthetist: bleep 5101 should be contacted.

Bibliography

Bowrey S, Hamer J, Bowler I, Symonds C, Hall JE. (2005). A Comparison of 0.2 and 0.5mg intrathecal morphine for post-operative analgesia after total knee replacement. *Anaesthesia*. **60 (5)**: 449-52

Cole PJ, Craske DA, Wheatley RG. (2000). Efficacy and respiratory effects of low-dose spinal morphine for post-operative analgesia following knee arthroplasty. *British Journal of Anaesthesia*. **B85 (2)**: 233-7

Kong SK, Onsiong SM, Chiu WK, Li MK. (2002). Use of intrathecal morphine for post-operative pain relief after elective laparoscopic colorectal surgery. *Anaesthesia*. **57 (12)**: 1168-73

Ko S, Goldstein DH, Vandenkerkhof EG. (2003). Definitions of “respiratory depression” with intrathecal morphine post-operative analgesia: a review of the literature. *Canadian Journal of Anaesthesia.* **50 (7)**: 679-88

Motamed C, Bouaziz H, Franco D, benhamou D. (2000). Analagesic effect of low-dose intrathecal morphine and Bupivacaine in laparoscopic cholecystectomy. *Anaesthesia*. **55 (2)**: 118-24

Paterson K, Kuehne J. (2003). Intrathecal morphine –v- psoas compartment block for hip surgery. *Canadian Journal of Anaesthesia*. **50 (6)**: 574-9

Sakai T, Use T, Shimamoto H, Fukano T, Sumikawa K. (2003).Mini-dose (0.05mg) intrathecal morphine provides effective analgesia after transurethral resection of the prostate. *Canadian Journal of Anaesthesia*. **50 (10)**: 1027-30

Souron V, Delaunay L, Schifrine P. (2004). Intrathecal morphine provides better post-operative analgesia than psoas compartment block after primary hip arthroplasty. *Canadian Journal of Anaesthesia*. **50 (6)**:574-9

10. ANALGESIA IN OPIOID TOLERANT PATIENTS (using prescribed or illicit opioids). See Guidelines for the management of opioid-dependent individuals admitted to UHW and Llandough hospitals (2009).

Patients who are taking prescribed or using illicit opioids bring added complexities to the management of pain. These patients however have the same rights and requirements to optimal pain relief as any other patient.

Patients receiving opioids for chronic painful conditions should continue to receive their medication in a suitable format and advice should be sought from the Acute Pain Service regarding the best way of managing this and any acute pain they are experiencing. If prescribed opioids are being used prior to pain relieving surgery it may be possible/necessary to reduce the dose post-operatively.

For patients taking illicit opioids, the principles are the same, except there may be a need for an initial period of titration and conversion to 'standard opioids'. Please contact the Acute Pain Service who will liaise with the Substance Misuse Liaison Nurse and the Community Drug and Alcohol team regarding the management of these patients.

If regional or other local anaesthetic techniques are used, it is important to remember that these techniques can obliterate pain and in patients taking large dose opioids, respiratory depression and sedation may then occur. Careful observation is therefore necessary. See Section 4.10.2 for treatment of these side-effects,

Bibliography

ANZCA. (2005). *Acute Pain Management: Scientific Evidence (2nd edn).* Melbourne: National Health and Medical Research Council

deLeon-Casasola OA, Lema MJ. (1994) Epidural Bupivacaine/Sufentanil therapy for postoperative pain control in patients tolerant to opioid and unresponsive to epidural Bupivacaine/morphine. *Anesthesiology.* **80**: 303-09

deLeon-Casasola OA. (1996). Post-operative pain management in opioid tolerant patients. *Regional Anaesthesia.* **21** (6): 114-116

Jage J, Bey T. (2000). Post-operative analgesia in patients with substance use disorders (part 1). *Acute Pain*. **3**: 141-56

Macintyre PE, Ready LB. (2001). Acute Pain Management. A Practice Guide. (2nd edn). London: WB Saunders

Mitra S, Sinatra RS. (2004). Peri-operative management of acute pain in the opioid dependent patient. *Anaesthesiology.* **101:** 212-27

Rapp SE, Ready BL, Nessly ML. (1995). Acute pain management in patients with prior opioid consumption: a case controlled retrospective review. *Pain*. **61**: 195-201

11. MANAGEMENT OF SICKLE CELL CRISIS WITH PATIENT CONTROLLED ANALGESIA (PCA)

11.1 Definition

PCA in this instance refers to the self-administration of intravenous opioids for the relief of pain during sickle cell crisis. Using an infusion device specifically designed for the purpose, the patient is able to administer a predetermined dose of painkiller at frequent intervals, whilst in some circumstances simultaneously receiving a background infusion.

11.2 Indications

- For the management of pain associated with sickle cell crisis.

11.3a Prescription

Patients who have been previously admitted to UHW with sickle cell crisis have individual protocols for their pain management. Copies of these are kept on B4H, Emergency Unit, Assessment Unit and by the Acute Pain Service.

Not all patients with sickle cell crisis require PCA.

On admission, the Acute Pain Service or Obstetric on-call anaesthetist should be contacted to prescribe and set up the PCA machine.
In addition to the patient's own drug chart, a dedicated Sickle Cell PCA prescription chart should also be completed. Only a member of the Acute Pain Service or the On-call anaesthetist should make amendments to the PCA prescription or the settings of the PCA infusion device. Naloxone and cyclizine should also be prescribed to combat the potential side effects associated with the use of opioid drugs.

11.3b Balanced analgesia

Balanced analgesia should be considered for all patients receiving PCA. Paracetamol and an NSAID should be prescribed (if not contraindicated) as a *regular* prescription. Contraindications to NSAID's: - known allergy, renal impairment, hypotension, history of peptic ulceration, aspirin sensitive asthma and marked dehydration. Use with **caution** in the elderly and in those patients with actual or potential coagulopathy.

11.4 Equipment

The P5000 PCA infusion devices are kept in the Recovery room. A dedicated infusion set with an anti-reflux and anti-syphon valve must be used. Morphine pre-filled syringes or 50ml vials (2mg/ml) are available from Pharmacy The P5000 PCA infusion device has pre-programmed protocols for the use of morphine, fentanyl, remifentanil (for use on obstetrics only) and esketamine (continuous infusion only). A 'general' protocol is available for other drugs that may be used. A paediatric protocol is also available for paediatric use (see separate paediatric guidelines). When the PCA infusion device is no longer required, the Pump library staff will collect, check and clean it prior to return to the Recovery room.

11.5 Designated clinical areas & responsibilities

Patients admitted with sickle cell crisis should ideally be nursed on B4 Haematology. If PCA is required then nursing staff on this ward are familiar with the management of patients using PCA and the equipment used. Instruction and assessment in the use of PCA infusion devices is mandatory for staff caring for patients with PCA in accordance with the Cardiff and Vale University Health
Board Infusion Device Policy 2008. Only staff who have received appropriate training in the use of the PCA infusion device may change syringes. There may be times when the Acute Pain Service/On-call anaesthetist may be asked to perform this task.
(If PCA is required and a bed is unavailable on B4H then the patient may be admitted to the following clinical areas *only:* - Trauma wards, Surgical wards, General Critical Care and Cardiac Critical Care).

11.6 Initiating treatment & monitoring of patient using PCA

Patients admitted with sickle cell crisis requiring PCA should be referred to the Acute Pain Service or the Obstetric on-call anaesthetist who will prescribe and set up the PCA. For optimal benefit to be obtained from the PCA, instruction in its use must be provided and reiterated intermittently.
A sickle cell care pathway document should also have been commenced.

Oxygen therapy should be prescribed and commenced.
Pulse, blood pressure, respiratory rate (respirations counted for a full minute) oxygen saturation, pain, sedation and nausea levels should be monitored and recorded 1/2 hourly initially and then 1 hourly.
Once stable, respiratory rate, oxygen saturation levels, pain, sedation and nausea scores, should be recorded 2 hourly in addition to any other necessary observations.

If during the night, the patient is asleep and observations have been satisfactory, it is acceptable to record the respiratory rate only. A recording should be entered on the sedation score chart (S) to indicate that the patient was asleep at the time the observation was made

In patients receiving a concurrent intravenous opioid background infusion with PCA, oxygen saturation levels should be monitored continuously. If their oxygen saturation level falls below 94%, the advice in the PCA care plan or Section 4.10.2 of these guidelines should be followed. (The baseline oxygen saturation level of the patient should however be taken into consideration, before the Acute Pain Service / Obstetrics on-call anaesthetist is contacted for advice).

It is very important that these patients are observed closely as some patients will be receiving very high doses of opioids.

Patients using PCA should remain in the ward area and are not permitted to visit other areas unless accompanied by a nurse.

The amount of drug used should be recorded hourly on a dedicated PCA record of administration chart by the nurse responsible for the patient. The infusion site should be checked for pain, swelling and leakage of fluid. The PCA infusion device settings should be checked at shift handover **and signed in the appropriate section of the PCA record of administration chart.**

Following the commencement of PCA, patients will be visited regularly by a member of the Acute Pain Service. However, the Acute Pain Service / Obstetrics Anaesthetist may also be contacted if any problems are encountered.

11.7 Management of complications or side effects

Should any of the following complications or side effects occur, the guidelines provided in the PCA care plan must be followed and the appropriate action taken.

- Inadequate pain relief.
- Respiratory depression.
- Excessive sedation.
- Nausea and vomiting.

11.8 PCA Careplan:

See PCA care plan on following page.

Cardiff and Vale NHS Trust
Ymddiriedolaeth GIG Caerdydd a'r Fro

ADDRESSOGRAPH HERE
Patient's Name:

Acute Pain Service - PCA Care Plan

Ward:	**Consultant:**	**Nurse's Signature:**

Date	Problem	Goal	Nursing Care
	1. Unrelieved pain.	Patient will have no more than mild pain at rest and mild to moderate pain on movement.	Ensure that the patient is educated in the use of PCA. Provide patient information leaflets plus verbal instruction prior to initiating PCA. Also provide on-going reminders to patient whilst PCA is being utilised. **If not contraindicated:** check that regular paracetamol and diclofenac have been administered in addition to PCA. (This may reduce morphine requirement.) Check that the intravenous cannula is patent. Check that PCA administration set is unclamped and connected properly. Help position patient comfortably. Advise patient to support wound when coughing/moving. **Pain assessment: Pain should be assessed and recorded on movement.** It should be assessed alongside other observations (See **3**) or more frequently if necessary. Seek advice from the Acute Pain Service (APS) if the above measures do not reduce the pain score.
	2. Potential problems surrounding the safe administration of PCA. Incorrect: a) Drug/Concentration. b) Bolus. c) Lockout time. d) Continuous infusion (used infrequently in ward area). e) PCA device and PCA administration set.	PCA is safely administered. PCA device delivers prescribed bolus with correct lockout time, +/- continuous infusion.	Ensure that controlled drugs are checked in accordance with the Cardiff and Vale NHS Trust policy. Ensure that the syringe is correctly labelled and contents agree with the prescription chart. The PCA syringe should be checked hourly by **the qualified nurse caring for the patient** and the PCA record of administration chart should be completed. Any discrepancies should be reported to the APS / On-call Anaesthetist immediately, remove PCA button from the patient and stop the continuous infusion (if one is in progress) until the problem is resolved. When changing syringe and at shift handover, 2 qualified nurses **(including the qualified nurse caring for the patient)** should check the PCA settings, *i.e.* - the bolus dose, lockout time and continuous infusion, against the prescription chart. Ensure that a PCA giving set with anti-syphon and anti-reflux valve is in use.
	3. Potential side effects	Early detection and treatment.	**Monitor BP, pulse, respiratory rate and sedation score:** ½-hourly for 2 hours when the PCA is commenced or following any alteration to PCA regimen. If satisfactory, these observations may then be recorded 2-hourly for 48 hours and thereafter 4-hourly until PCA discontinued. If during the night, the patient is asleep and observations have been satisfactory, it is acceptable to record the respiratory rate only. A sedation score of 'S' should be recorded on the observation chart to indicate that the patient was asleep at the time the observation was made. Ensure that no other opioids are given to the patient whilst receiving PCA. (Exceptions may occasionally be made, under the supervision of the APS only).

P.T.O.

Date	Problem	Goal	Nursing Care
	3. Potential side effects (continued) Respiratory depression	Respiratory rate >12/minute.	The respiratory rate should be counted **for a full minute.** If the respiratory rate falls to 9 or 10/min, remove the PCA button from the patient, give oxygen 15L via a well fitting non-rebreather reservoir mask (ensure reservoir bag inflated) reassess every 5 minutes until respiratory rate >12/min. If respiratory rate falls to <8/min, follow actions above, (support ventilation with a pocket mask/bag valve mask where necessary) plus give IV Naloxone (*Dilute a 1ml ampoule of Naloxone 400mcg with 3mls of normal saline for injection to make a total of 4mls). Give in 50 mcg (0.5ml) increments until respiratory rate >12/min. Monitor O2 saturation continuously, ensure alarms set and audible. Contact the APS /On-call Anaesthetist.
	Sedation score: 2 or 3.	Sedation score: 0 - 1.	If the sedation score is 2, remove PCA button, give oxygen 15L via a non-rebreather reservoir mask and monitor sedation level and respiratory rate. Record every 15 minutes. If the sedation score is 3, give oxygen 15L via a non-rebreather reservoir mask and administer Naloxone as above until sedation score is 0 - 1. Monitor O2 saturation continuously, ensure alarms are set and audible. Contact the APS / On-call Anaesthetist.
	Oxygen saturation: <94%.	O2 saturation: >94%.	If O2 saturation <94%, give oxygen 15L via a non-rebreather reservoir mask. If no improvement after 5 minutes, seek advice from the APS / On-call Anaesthetist. (Consider preoperative oxygen saturation level, contact APS / On-call Anaesthetist if concerned only).
	Nausea and vomiting.	Early detection of nausea and prevention of vomiting.	Assess for and record nausea and vomiting (y/n) 2-hourly on observation chart. Give prescribed anti-emetic p.r.n. when patient is nauseated. Give anti-emetic regularly, rather than p.r.n., if nausea / vomiting is a persistent problem. Record effect and/or side effects of anti-emetic. Change anti-emetic if ineffective as per protocol for postoperative nausea and vomiting (Acute Pain Service Adult Guidelines - Appendix 1.) If patient is nauseated shortly after pressing the PCA button and anti-emetic treatment ineffective, seek advice from the APS / On-call Anaesthetist. Make use of diversional therapies *e.g.* relaxation, reading, TV.
	Pruritis (itching)	Early detection and treatment	a) Assess and record any signs of itching. If the itching is distressing the patient: b) Administer IV Naloxone 50 mcg with caution. It will reverse the side effect of opioids without reversing analgesia c) If the problem remains unresolved, seek advice, as the opioid may need to be changed.
	4. Potential problem of inadequate analgesia when PCA discontinued.	Pain will be managed by alternative appropriate analgesia.	Consider the pain score of the patient. Check the amount of PCA drug used in last 24 hours. If the patient is tolerating free fluids, remove PCA button administer an initial dose of oral analgesia. Monitor effect **BEFORE** discontinuing PCA. If the patient is nil by mouth, but unable to use PCA device, consider the pain score, seek advice from APS / On-call Anaesthetist if necessary.

In accordance with the Cardiff and Vale Trust Infusion Device Policy Training and assessment in the use of P5000 Infusion Devices is mandatory for ANY nurse caring for a patient with PCA

University Hospital Llandough:

Acute Pain Service: bleep 4560. Out of hours, On-call Anaesthetist: bleep 4800 should be contacted.

University Hospital of Wales:

Acute Pain Service: bleep 5414. Out of hours, the Obstetric On-call Anaesthetist: bleep 5101 should be contacted.

GB/APS/April 2010

11.9 Discontinuing PCA

The length of time patients require PCA is variable. The following points should be considered when discontinuing PCA: -

- The patient's level of pain.
- The amount of opioid used via the PCA within the previous 12 hours.
- The patient's ability to use PCA
- The oatient's wishes.
- The patient's ability to tolerate and absorb alternative prescribed analgesia.

Most patients will require an alternative form of analgesia once the PCA has been discontinued. An initial dose should be given and its effect monitored prior to the PCA being discontinued.

Bibliography

Dorman K. (2005). Sickle cell crisis! Managing the pain. *Registered Nurse.* **68** (12): 33-6

Elander J, Marczewska M, Amos R, Thomas A, Tangayi S. (2006). Factors affecting hospital staff judgments about sickle cell disease pain. *Journal of Behavioural Medicine*

Girot R. (2005). Current developments on sickle cell disease. *Bulletin de l Acadamie Nationale de Medicine.* **188** (3): 491-565

Greer M and Schotland D.(1962). Abnormal haemoglobin as a cause of neurologic disease. Neurology **12**: 114-123

Hassell KL, Eckman JR, Lane PA. (1994). Acute muti-organ failure syndrome: a potentially catastrophic complication of severe sickle cell pain episodes. *American Journal of Medicine.* **96** (2): 155-62

Klapper JA.(1995). Toward a standard drug formulary for the treatment of headache. Headache . 35:225

Labbe E, Herbert D, Haynes J. (2005). Physicians' attitude and practices in sickle cell disease pain management. *Journal of Palliative Care.* **21** (4): 246-51

Pari G, et al. (1996). Headache and scalp edema in sickle cell disease. Can J Neurol Sci. Aug; **23** (3): 224-6

Portnoy BA and Heroin JC.(1972). Neurologic manifestations in sickle-cell disease. Ann. Intern. Med. **76**: 643-652

Powars D, Adams RJ, Thomas C. et al. (1990). Delayed intracranial haemorrhage following cerebral cerebral infarction in sickle cell anaemia. J. Assoc. Acad. Minority Phys. **1**: 79-82

Preul MC, Cendes F, Just N, Mohr G.(1998). Intracranial aneurysms and sickle cell anaemia: multiplicity and propensity for the vertebrobasilar territory. Neurosurgery. May; **42** (5): 971-7; discussion 977-8

Resar LM, et al.(1996). Skull infarction and epidural hematomas in a patient with sickle cell anemia. J Pediatr Hematol Oncol. Nov; **18** (4): 413-5

Sampson I, Pratila M, Pratilas V. (1982). Anesthetic management of cerebral aneurysmectomy in a sickle cell anemia patient. Mount Sinai J. Med. **49**: 326-328

Sarnaik SA, Lusher JM.(1982). Neurological complications of sickle cell anaemia. Amer. J. Pediatr. Hemat./Oncol. **4**:386-394

Silberstein SD. (1997). Preventative treatment of migraine. Cephalgia. 17:67

Wertham F, Mitchell N, Angrist A.(1942). The brain in sickle cell anaemia. Arch. Neuro. Psych. **47**: 752-767

Cardiff and Vale University Local Health Boar

12. Intravenous Esketamine protocol: An adjuvant for short term use in acute pain

INTRODUCTION

NB Ketamine (Ketalar ®) is no longer routinely available in the UK. Ketamine is a racemic mix of two isomers and the alternative esketamine only contains the 'S' isomer of ketamine and is therefore twice as potent.
Esketamine is an anaesthetic drug which when used in sub anaesthetic doses has analgesic properties. Opioids when used alone in large doses for a prolonged period of time may induce tolerance which can potentially lead to increased pain. As with ketamine esketamine also prevents the development of tolerance and hyperalgesia by reducing the incidence of 'wind up'.

Esketamine injection 5mg in 1ml is therapeutically equivalent to 10mg in 1ml of the original ketamine product and therefore doses should be suitably reduced.

1a. Summary of Evidence on Ketamine analgesia in Acute Pain

Level 1 (*Evidence obtained from a systematic review (or meta-analysis) of all the relevant RCTs)*:

- Ketamine is most effective as a continuous low-dose infusion for acute pain management.
- Ketamine has "preventive" but not "pre-emptive" analgesic effects.

Level II *(Evidence obtained from at least one properly designed RCT)*:

- Ketamine is most effective as an "antihyperalgesic", "antiallodynic", or "tolerance-protective" treatment.
- Ketamine is effective as a "rescue analgesic" for acute pain unresponsive to opioids.
- Ketamine reduces acute wound hyperalgesia and allodynia.
- Ketamine may reduce the incidence of chronic post surgical pain following laparotomy, thoracotomy and mastectomy.
- Ketamine reduces lower-limb ischaemic rest pain, peripheral neuropathic pain, and spinal cord injury pain.

Level III *(Evidence obtained from non-randomised controlled trials)*;

- Ketamine may reduce severe chronic phantom limb pain.

Level IV *(Evidence obtained from case series)*:

- Ketamine improves analgesia in Opioid-tolerant patients

(*Source*: Adapted from: National Health and Medical Research Council (NHMRC). How to use the evidence; assessment and application of scientific evidence. 2000).

2. AIM

The protocol is to aid the safe and effective administration of esketamine as a continuous intravenous infusion. This protocol is for short term use in adult patients (over the age of 16 years) who have intractable acute pain.

3. OBJECTIVES

- To promote safe practice that is evidence based and standardised within the clinical areas
- To provide clinical areas with appropriate education and information with regards to this mode of analgesia.

4. ESKETAMINE AS AN ADJUVANT ANALGESIC TO OPIOIDS' IN ACUTE PAIN.

4.1 Definition

This protocol is defined as a continuous intravenous infusion of esketamine.

4.2. Indications

- Severe ischaemic pain,
- Postoperative amputation,
- Opioid tolerant patients
- Pain that is not opioid responsive
- Neuropathic pain

4.3 Contraindications

- Hypertension
- Severe cardiac disease,
- Stroke
- Raised intracranial pressure,
- Head trauma,
- Pre-eclampsia and eclampsia.
- Epilepsy

4.4 Caution

- Renal failure
- Liver failure
- Predisposition to hallucinations or nightmares

- Pregnancy
- Alcoholism
- Confirmed or suspected drug abuse.

4.5 Prescription

Esketamine must be prescribed using the pre-printed label and fixed on the as required side of the drug chart.
A standard prescription for the esketamine infusion is:

- 100 mg esketamine up to 50 mls of Normal Saline.
- Concentration: 2 mg/ml
- Continuous rate range 1-4 mgs/hr (0.5-2 mls/hr).
- Maximum limit of 16 mg in 4 hours.

The Alaris P5000 infusion device has a pre-programmed protocol for a esketamine infusion, which can be titrated according to effect and tolerance

The esketamine infusion should not exceed 5 days.

4.6 Balanced Analgesia.

Esketamine infusion will be used as an adjunct to opioids. Paracetamol, strong or weak opioids, non-steroidal anti-inflammatory drugs, (if appropriate) and local anaesthetics will be used concurrently with the esketamine infusion.

Esketamine has an opioid sparing effect and the opioid dose may therefore need to be decreased in order to avoid over sedation or respiratory depression.

.

5. RESOURCES & EQUIPMENT

- The Alaris P5000 infusion device must be used in order that unauthorised access to esketamine is prevented, The P5000 infusion device has a pre-programmed intravenous esketamine. protocol
- An anti-syphon infusion administration set must be used.
- Staff **must** have received training and have been assessed in the use of this specific device.
  (Cardiff & Vale NHS Trust, Infusion Device Policy, 2003).

6. RESPONSIBILITIES & TRAINING

- Patients who require IV esketamine must be cared for on surgical wards where nursing staff have received education in regards to the use of intravenous esketamine via the Alaris P5000 infusion device.

Unless there are extenuating circumstances patients should not be returned to any other clinical area and they should not be nursed in single rooms.

7. ASPECTS OF TREATMENT

7.1 General Principles

- The setting up and programming of the intravenous esketamine infusion via the Alaris P5000 infusion device is the responsibility of the Acute Pain Service or an appropriately trained anaesthetist in accordance with the Cardiff and Vale Trust Infusion Device Policy 2003.

7.2 Nursing Management

- Following connection of the Alaris P5000, the person responsible for setting up the device should check the infusion device against the prescription with the qualified nurse caring for the patient.
- On commencing the esketamine infusion the esketamine care plan should be followed. In the initial 2 hours following the commencement of the infusion: pulse, blood pressure, respiratory rate (recorded for a full minute) oxygen saturations, **pain on movement** and sedation levels should be assessed and recorded every ½ hour, then hourly until the esketamine has been discontinued.
- The patient will be reviewed at least once a day by a member of the Acute Pain Service until the esketamine infusion has been discontinued.
- Any confusion that is observed in the patient should be documented and reported to the Acute Pain Service/ Obstetric Anaesthetist.

- The infusion rate and the amount left in the syringe should be recorded hourly on a dedicated infusion chart by the nurse responsible for the patient.
- The infusion site should be checked for pain swelling and leakage of fluid.
- The P5000 infusion device settings should be checked at shift handover and on changing the syringe and signed on the infusion chart.
- Patients are not permitted to leave the ward with an esketamine infusion.

7.3 Management of Complications and Side Effects

Problem	Action
Inadequate analgesia	• Check infusion device, catheter site and connections for leakage • Administer prescribed analgesics e.g. Paracetamol, NSAID, weak/strong opioid if not contra-indicated • Has the infusion been increased? • Seek advice if pain persists
Over sedation or suspected respiratory depression	• **Stop the esketamine infusion. Contact Acute Pain Service (APS)/ Obstetric anaesthetist or Duty on-call anaesthetist for advice.** • Stop all other medication that could be contributing to the sedation • Attempt to rouse the patient • If apnoeic: call the arrest team on 2222, administer bag and mask ventilation with 100% oxygen • If breathing; maintain airway, monitor oxygen saturations and administer oxygen via face mask at 8L/min • Check circulation. If pulseless: call the arrest team on 2222 and resuscitate as per CPR guidelines. • Administer Naloxone if Opioid toxicity is suspected and the patient is receiving concurrent Opioids. • Call APS /Obstetric Anaesthetist for urgent review.

Dysphoria problematic or distressing	• Reduce esketamine infusion rate • Contact APS/obstetric anaesthetist to review

7.4 Potential Side effects

- Changes in sensory perception
- Increased confusion.
- Hypertension
- Nausea and Vomiting**.**

7.5 Discontinuing the esketamine infusion

- The decision to cease the esketamine infusion should be made in consultation with the Acute Pain Team/ Obstetric Anaesthetist.
- When esketamine is used the order in which the analgesia is being weaned must be discussed with the Acute Pain Team.
- When the infusion has been discontinued the esketamine must be disposed of according to the Health Board infusion policy.

8. IMPLEMENTATION

This protocol will be incorporated into the acute pain service guidelines. Instruction for the protocol will be included at appropriate educational sessions. This protocol will be utilised by the whole multidisciplinary team involved in the delivery of care for patients receiving this method of analgesia.

9. EQUALITY

An equality impact assessment has been undertaken to assess the relevance of this policy to equality and potential impact on different groups, specifically in relation to the General Duty of the Race Relations (Amendment) Act 2000 and the Disability Discrimination Act 2005 and including other equality legislation. The assessment identified that the policy presented a low risk to the Health Board.

10. AUDIT

Compliance with this protocol will be audited by the Acute Pain Service.

11. DISTRIBUTION

This procedure will be distributed to each appropriate clinical area and Department throughout the Health Board via the Clinical Portal Intranet system.

12. REFERENCES

Bell RF (1999) Low dose subcutaneous Ketamine infusion and morphine tolerance. *Pain* 83: 101-103.

Craven R. (2007) Ketamine. *Anaesthesia.* 62, Supplement 1: 48-53

Hocking G and Cousins MJ (2003) Ketamine in Chronic Pain Management: An Evidence-Based Review. *Anesth Analg*, 97: 1730-1739.

Hoking G, Visser EJV, Schug SA and Cousins MJ (2007) Ketamine; Does life Begin at 40? *Pain,* 15 (3); 1-6 (accessed online on 22 April 2008).

National Health and medical Research Council (NHMRC) (2000). How to use the evidence: assessment and application of scientific evidence. AusInfo, Canberra, Australia.

Neil MJE (2008) Survey on the use of Ketamine infusions in Scottish Hospitals *The British Pain Society Pain News, Summer*: 36-37

Subramaniam K, Subramaniam B and Steinbrook RA (2004) Ketamine as Adjuvant Analgesic to Opioids': A Quantitative and Qualitative Systematic Review. *Anesth Analg*, 99: 482-495.

Intravenous Esketamine for Adults:

An adjuvant for short term use in acute pain

Problem	Goal	Nursing Care
1. Unrelieved pain	Patient will have no m than moderate pain at rest and on movemen	Check that the intravenous catheter is patent. Check that the administration set is unclamped and connected properly. Administer prescribed analgesics e.g. Paracetamol, NSAID, weak/strong Opioid. If pain score remains 2, call Acute Pain Service (APS) or Obstetric on call anaesthetist. Record and document 1 hourly pain assessment alongside other observations (See section 3). Has the Esketamine infusion been increased to the maximum tolerable dose?
2. Potential problems with administration.	Esketamine is safely administered.	The Esketamine infusion should be checked hourly by the qualified nurse caring for the patient and a record of administration chart should be completed. Any discrepancies should be reported to the APS/ On-call anaesthetist immediately, stop the continuous infusion until the problem is resolved. Ensure that the Esketamine is infused as a continuous infusion via a locked Alaris P5000 device. When changing syringe and at shift handover, 2 qualified nurses (including the Qualified nurse caring for the patient) shou check the Esketamine prescription against the AlarisP5000 settings and ensure that the syringe is correctly labeled and contents agree with the prescription chart. Check and record pump checks hourly including handover/ syringe changes. Ensure that a giving set with an anti-syphon and anti-reflux valve is in use.

3. Potential side effect a) respiratory depression/arrest	Early detection and treatment. Respiratory rate > 12/minute	Initially for the first 2 hours following commencement of the infusion, respiratory rate, pulse, B/P and O_2 saturation and nausea/vomiting should be monitored every 30 mins, and following this hourly for the duration of the esketamine infusion. The respiratory rate should be counted for a full minute. If the respiratory rate falls to 9 or 10/min, stop the Esketamine infusion, withhold Opioid analgesia, give oxygen 15 litres/min via a non-rebreathable face mask, reassess every 5 minutes until respiratory rate > 12/min. If respiratory rate falls to ≤ 8/min, follow actions above, in addition give IV Naloxone as respiratory depression may be associated with the Opioid analgesia, (* Dilute a 1 ml ampoule of Naloxone 400 mcg with 3 mls of normal saline for injection to make a total of 4 mls). Give in 50 mcg (0.5ml) increments until respiratory rate > 12/min. Monitor respiratory rate and oxygen saturation continuously until patient is stable. **Contact Acute Pain Service or Obstetric on call anaesthetist immediately.**

		If patient has respiratory arrest. Stop the Esketamine infusion. Stop all other medications which could be contributing to the sedation. **Call the arrest team on 2222**, and resuscitate as per CPR guidelines. Administer 15litres of oxygen via a bag-valve mask or pocket mask, and administer Naloxone as above if Opioid toxicity is suspected. If breathing, maintain airway, monitor respiratory rate and oxygen saturations And give 15 litres of oxygen per minute via a non-rebreather mask. Check circulation. **If pulseless: call the arrest team on 2222** and resuscitate as per CPR guidelines. **Contact Acute Pain Service or Obstetric on call anaesthetist.**
b) Sedation score: 2 or 3	Sedation score: 0-1.	If the sedation score is 2, stop Esketamine infusion, and withhold Opioid analgesia, give Oxygen 4l/min and monitor sedation level and respiratory rate. Record every 15 minutes. If the sedation score is 3, give oxygen 15l/min, via a non-rebreathable mask, administer Naloxone (if sedation is thought to be due to Opioid analgesia) as stated in section 3b until sedation score is 0-1. Monitor O2 saturations continuously and check and record respiratory rate every 5 minutes.
c) Oxygen saturations :<94%	O2 saturations: > 94%	Contact the APS/ On-call Anaesthetist. If O2 saturations <94%, give oxygen 15l/min. If no improvement after 5 minutes, seek advice from APS/ On-call Anaesthetist (Consider patients baseline oxygen saturation level prior to commencing Esketamine/Opioids. Contact APS/On-Call Anaesthetist if concerned only).

d)	Dysphoria problematic or distressing	Early detection and prevention	The esketamine infusion should not be stopped abruptly as this could cause Undesirable side effects. Please seek advice from the Acute pain team/on call anaesthetist prior to discontinuing the esketamine infusion.
4.	Potential problem with discontinuing esketamine infusio	Safe weaning and discontinuation of th esketamine infusion	The esketamine infusion should not exceed 5 days unless the Acute Pain Service stipulate otherwise. The esketamine infusion needs to be slowly titrated down prior to discontinuing in order to prevent undesirable side effects.

In accordance with the Cardiff and Vale Trust Infusion Device Policy (2006)-Training and assessment in the use of the P5000 Infusion Devices is mandatory for ANY nurse caring for a patient with a Esketamine infusion.

Llandough hospital: Acute Pain Service: bleep 4560. Out of hours, On-Call Anaesthetist: bleep 800 should be contacted.

University Hospital of Wales: Acute Pain Service: bleep 5414. Out of hours, the Obstetric On-Call Anaesthetist: bleep 5101 should be contacted.

13. REGIONAL INFUSION OF LOCAL ANAESTHETIC (Regional Analgesia)

13.1 Introduction

The administration of a Regional infusion of Local Anaesthetic into an area of the body.

Epidural infusions are not included within this Section.

Local anaesthetics exert their effect as analgesics by blocking sodium channels and impeding neuronal excitation and/or conduction.

This procedure is required in order to facilitate safe practice and manage risks associated with this pain relieving strategy.

13.2 Aim

For adult patients (over the age of 16 years) to receive a safe and effective regional infusion of local anaesthetic for the relief of acute postoperative pain or pain following trauma.

13.3 Objectives

- To promote safe practice that is evidence based and standardised within the clinical areas
- To provide clinical areas with appropriate education and information with regards to this mode of analgesia.

13.4 Definition

A continuous infusion of local anaesthetic (LA) into an area of the body (excluding epidural infusion).

13.5 Indications

- Acute postoperative pain
- Acute pain following trauma
- Adult patients over the age of 16 years

Absolute contraindications

- Patient refusal
- Local sepsis
- Allergy to local anaesthetics

Relative contraindications

- Coagulopathy (including thrombocytopaenia)

13.6 Prescription

- A pre-printed label will be available to affix to the "prn" side of the medication chart
- Additional analgesia and anti-emetics should be prescribed
- Any specific monitoring other than routine observations as described in section 4.6 must be specified
- Infusion rate will be prescribed by an Anaesthetist

13.7 Resources & equipment

- A dedicated infusion device must be used (McKinley Bodyguard). Staff *must* have received training for this specific device
- If a disposable device is used, it must be primed by Pharmacy and made available by local arrangement with Pharmacy.
- The use of either an epidural type catheter or a Soaker Catheter are acceptable for the delivery of local anaesthetic
- An intravenous cannula must be in situ and patent at all times whilst the patient is receiving Regional analgesia.

13.8 Responsibilities & training

Adult patients receiving continuous Regional analgesia should return *only* to wards where staff have been appropriately trained. It is a mandatory requirement within Cardiff & Vale University Health Board that any personnel using infusion devices must undergo training and competency assessment (please refer to Policy for the Use of Parenteral Infusion Devices 2011). Training is available via Clinical Engineering (UHW, Ext. 45678).

Pain study days are provided by the Acute Pain Service for Registered Nurses. Training opportunities for Health Care Support Workers are also provided.

13.9 General principles

- Due consideration must be given to the practice of obtaining consent and ascertaining the mental capacity of the patient prior to the procedure.

  Information on consent and Mental Capacity Act toolkits are available on the University Health Board intranet system and within relevant policies

- The Regional analgesia catheter will be inserted under aseptic conditions
- If a disposable device is used, the priming of the pump will be carried out by Pharmacy in accordance with the Medicines and Healthcare products Regulatory Agency recommendations (MHRA, 2007).
- The Regional analgesia catheter insertion site must be covered with an IV 3000 dressing unless the wound dressing is covering the site.
- The anaesthetist or surgeon is responsible for attaching the infusion device to the catheter.

13.10 Nursing management

- On returning the patient to the clinical area, Recovery room staff must check the infusion device against the prescription with the nurse accepting the patient and sign in the appropriate section of the record of administration chart. Check that alternative analgesia and anti-emetics have been prescribed.

- On return to the ward area, the care plan for the delivery of Regional analgesia must be followed carefully. Observations of pulse, blood pressure, respiration and oxygen saturation level should be undertaken at ½ hourly intervals for 2 hours and then 4 hourly until the Regional analgesia is discontinued. Other observations must be monitored and documented as required by the clinical condition of the patient. Temperature monitoring requirements are described below.

- *Pain on movement* and sedation levels should also be assessed and recorded on the postoperative observation chart.

- The Regional analgesia catheter insertion site should be inspected 4 hourly and at each shift change for presence of pus, inflammation, tenderness and leakage.
  The condition of the site must be recorded on the patient's observation chart and documented in the patient's medical records. Any concerns must be reported to an appropriate member staff in order that action can be taken.

- The patient's temperature must also be recorded 4 hourly to aid detection of infection. If the Regional analgesia catheter insertion site presents any signs of infection, or the catheter becomes disconnected from the infusion device at any time, the LA catheter should be removed.

- A member of the Acute Pain Service will usually visit the patient on the day the Regional analgesia is commenced and daily thereafter. Patients will be visited more frequently if necessary.

- Any clinical concerns about the Regional analgesia catheter or insertion site must be reported to an appropriate member of staff in order that action can be taken at the earliest opportunity

13.11 Management of complications or side effects in ward area See Epidural

and Regional Local Anaesthetic Infusion Care Plan on following page

Cardiff and Vale University Health Board

Epidural and Regional Local Anaesthetic Infusion Care Plan

Ymddiriedolaeth GIG Caerdydd a'r Fro

Problem	Goal	Nursing Care
1 **Unrelieved pain.**	Patient will have no more than mild pain at rest or on movement.	**Record 2 hourly pain assessment.** Check **epidural or local anaesthetic** infusion catheter connections and insertion sites for leakage. If there is a unilateral block (epidural) that is not covering the site of pain, lie patient on the painful side. If connections are secure, increase infusion rate within prescribed limits. If PCEA or PCRA is being used check patient compliance and ask them to press the demand button. Check level of block. **If not contraindicated, give regular Paracetamol +/- Diclofenac.** **If pain persists despite epidural or local anaesthetic infusion running at maximum prescribed rate, seek advice from the Acute Pain Service (APS) / On-call Anaesthetist** Do not routinely administer another opioid if the epidural solution contains Fentanyl.
2 **Potential problems surrounding the safe administration of analgesia**	Administer epidural or regional local anaesthetic infusion safely as prescribed	Follow Cardiff & Vale UHB Controlled Drug Policy when Fentanyl is being administered epidurally. Follow Cardiff & Vale UHB drug administration policy, including 2 person initial check of epidural and regional local analgesia solution against prescription. Ensure that the giving set is labelled: "**NOT FOR IV CONNECTION**" Check infusion device settings hourly and complete infusion record of administration chart hourly. At shift handover - 2 qualified nurses check the infusion device, its programme and the amount remaining in the infusing bag to ensure all correspond with the prescription and record of administration charts. **These tasks should be completed by the qualified nurse caring for the patient and if this Nurse has not yet undergone infusion device training then a suitably competent Nurse should oversee this process.** Any discrepancies should be reported to the APS / On-call Anaesthetist immediately.
3 **Potential side effects / complications:** ▪ Hypotension ▪ Respiratory rate 9/10 per min. or sedation score 2. ▪ Respiratory rate <8 per min. or sedation score 3.	Early detection and treatment.	Assess and record 2-hourly sedation, nausea score, respiratory rate, pulse, B/P and straight leg raise (SLR – **epidural only**)). Record temperature 4-hourly and assess epidural or regional local anaesthetic infusion insertion site 8 hourly. Ensure patient has patent IV access. Check for signs of hypovolaemia. Increase IV infusion rate if necessary and as prescribed. If appropriate encourage intake of oral fluids. Call APS / On-call Anaesthetist. Ensure Ephedrine is available. Give oxygen 15L via a face mask; check oxygen saturation and monitor closely. Record respiratory rate and sedation level every 15 minutes until respiratory rate is >12/min and sedation score is 0-1. **Contact APS / On-call Anaesthetist for advice.** Switch off epidural infusion if it contains fentanyl, give oxygen 15L via a face mask and if necessary support ventilation with a pocket mask and rebreathing bag; Check oxygen saturation and give IV naloxone in 50mcg increments until sedation score 0-1 and respiratory rate >12/min. Monitor continuously. **Contact APS / On-call Anaesthetist for advice.**

▪ SaO2<94%. ▪ Opioid-induced pruritus. ▪ Nausea and vomiting. • Potential displacement of epidural or local anaesthetic infusion catheter. ▪ Local anaesthetic toxicity ▪ Decreased or loss of motor function in legs (caused by local anaesthetic blockade, **epidural space** -potentially haematoma /abscess)		Inform medical team caring for patient. If appropriate give oxygen 15L via face mask. **If oxygen saturation does not improve and is thought to be related to epidural analgesia, seek advice from the APS / On- call Anaesthetist.** If opioid induced give IV Naloxone 50mcg, repeat as necessary. If problem persists, seek advice from APS/ On-call Anaesthetist as the epidural prescription may need changing i.e to 0.1% bupivacaine only. Assess for nausea / vomiting every 2 hours and record on observation chart. Administer anti-emetic (see Acute Pain Service Adult Guidelines Nausea and Vomiting Protocol - Appendix 1). Insertion site should be covered with a transparent IV 3000, with the dressing's edges secured with Mefix tape. The infusion catheter should be secured with Mefix tape. The filter should be secured to the front of the patient over gauze swabs. Ensure the filter is in situ and all connections are secure. If they are not, **seek immediate advice from the APS/ On-call Anaesthetist.** If catheter becomes displaced from filter - do not reconnect filter. Stop infusion and wrap end of catheter in sterile gauze. Contact APS / On-call Anaesthetist who will connect new filter until line can safely be removed (re coag). Observe patient for circumoral numbness, dizziness, light-headedness, fitting, twitching, drowsiness, ringing in the ears (tinnitus), respiratory arrest, un-consciousness. **Guidance regarding local anaesthetic toxicity can be found in Section 5.12 of the Acute Pain Management guidelines.** **Epidural only** -every 2 hours ask the patient to straight leg raise (SLR) both legs. Record on observation chart. If patient unable to SLR either leg and pain is well controlled, reduce epidural analgesia infusion rate slightly. **If problem persists or if pain is inadequately controlled following reduction of epidural infusion rate, call APS / On-call Anaesthetist.** Check pressure areas.
Problem	**Goal**	**Nursing Care**
3 (contd) **Potential side effects / complications (continued):** • Epidural / regional local anaesthetic site / space infection.	Early detection and treatment.	**All epidural and regional local anaesthetic** catheters must be removed within 5 days of insertion unless the Acute Pain Service indicate otherwise. If the transparent dressing becomes loose or fluid pools beneath it, the insertion site must be redressed. **Use an aseptic technique and carefully clean the site using forceps, sterile swabs and sterile saline, rubbing in a circular motion from the centre to the periphery.** Change infusion bags using aseptic technique. Check insertion site (ESC) 8-hourly for pus, inflammation, tenderness or leakage and record on observation chart and in nursing care evaluation. If any signs of infection, contact the APS / On-call Anaesthetist to review. **If the epidural or regional local anaesthetic catheter is to be removed - Use aseptic technique. Clean the insertion site with sterile normal saline and apply a transparent IV 3000 dressing. Guidance outlined under Problem 4 within this care plan should also be followed when removing epidural catheters.** **If an epidural site infection** is suspected, send tip and swab from site for MC+S. Vancomycin (or Teicoplanin) plus Ceftriaxone should be started. Please consult Microbiology if there is concern about antibiotic allergies. This treatment should be reviewed when the MC+S results are available. **If an epidural** site infection is confirmed clinically, antibiotic treatment should continued and be tailored as per Microbiology Department advice. The patient will be reviewed regularly by the APS until the problem has resolved.

		If the insertion site becomes exposed, **please contact the APS / On-call Anaesthetist to review** as the infusion catheter will probably need to be removed as outlined above. Once removed the **epidural** insertion site should be observed for 3 days for signs of infection. If patient is discharged before the end of this 3 day period, the discharging nurse must ensure that either a Community Nurse conducts a day 3 check, or if appropriate the patient/carer is educated to check the **epidural** site. Ensure the patient has been provided with a epidural analgesia patient information leaflet and understands the steps to be taken if a problem occurs.
4 **Potentially unsafe removal of epidural catheter, resulting in epidural space haematoma > lower limb paralysis**	Haematoma within epidural space and potential sequlae are avoided.	**PRIOR TO REMOVAL OF EPIDURAL:** Check current FBC and clotting results prior to epidural catheter removal Platelets must be > 100 and APTT ratio must be < 1.4 and PT must be <24 **Seek advice from Acute Pain Team or On-call Anaesthetist if any of these blood results are abnormal.** **AND** When the decision is made to remove the epidural catheter, consider the prescribed anticoagulant medication in conjunction with the timings below as to when it is safe to remove the epidural catheter: **Enoxaparin:** **Prophylactic dosage: ≤40mg once daily - 12 hours should elapse following last dose** **40mg twice daily - Omit next prescribed dose and ensure 12 hours has elapsed since last dose given** **Treatment dosage: >40mg once daily - 24 hours should elapse following last dose** **40mg twice daily - Omit next prescribed dose and ensure 24 hours has elapsed since last dose given** **Minihep - At least 4 hours should elapse between last dose of Mini-hep and epidural catheter removal.** **WAIT 4 HOURS FOLLOWING EPIDURAL CATHETER REMOVAL BEFORE GIVING NEXT DOSE OF ENOXAPARIN OR MINI-HEP**
		Rivaroxaban: - **18 hours should elapse between the last dose and removal of the epidural catheter** - **WAIT 6 HOURS FOLLOWING EPIDURAL CATHETER REMOVAL BEFORE GIVING NEXT DOSE OF RIVAROXABAN**
		Heparin infusion:- Contact APS/On-call Anaesthetist for advice. See Acute Pain Service Pain Management Guidelines - Section 5. There needs to be close liaison between Surgical team and APS to optimise patient's treatment.
	Safe and easy removal of epidural catheter.	**Anticoagulation treatments e.g. Warfarin / Antiplatelets e.g. Clopidrogel, Prasugrel or Ticagrelor:** - **Treatment doses should NOT be administered whilst a patient is receiving epidural analgesia** If the patient is newly prescribed any of these treatments following a cardiovascular event whilst receiving epidural analgesia, contact the On-call Consultant Anaesthetist urgently for advice BEFORE giving the new treatment (epidural catheter will need to be removed prior to commencing new anticoagulant and alternative analgesia will need prescribing). **If patient is prescribed any anti-platelet / anti-coagulation drug not indicated above please contact APS for advice.**

13.12 Discontinuing Regional analgesia

- Regional Analgesia catheters should be removed on instruction from an Anaesthetist or Acute Pain Service
- Inform the patient that the return of normal sensation may take several hours
- Ensure the patient has appropriate analgesia to maintain adequate pain relief following removal of the catheter
- Remove the catheter under strict aseptic conditions and apply an IV 3000 dressing
- Ensure that the coloured tip of the Regional analgesia catheter is present when the catheter is removed. This indicates complete removal. If this is not visible the acute pain service or on-call anaesthetist must be informed immediately.
  Document removal in the medical records

References

Medicines and Healthcare products Regulatory Agency. (2007). *Making Regulatory Decisions about Medicines & Medical Devices.* MHRA

Bibliography

Allen HW, Liu SS, Ware PD et al. (1998). Peripheral nerve blocks improve analgesia after total knee replacement surgery. *Anaesth. Analg.* : 87, 93-97

Barrett J, Harmon D, Loughane F, Finucane B, Shorten G. (2005). *Peripheral Nerve Blocks* Saunders Elseiver Limited. www.elseiverhealth.com

Blumenthal S, Dullenkopf A, Rentsch K et al. (2005). Continuous infusion of rovipacaine for pain relief after iliac crest bone grafting for shoulder surgery. *Anaesthesiology.* 102 : 392-397

Gottschalk A, Burmeister MA, Radtke P, Kreig M, Farokhzad F, Kreissl S, Strauss M, Standl T. (2003).Continuous Wound Infiltration with Robivacaine
Reduces Pain and Analgesic Requirement after Shoulder Surgery. *Anaesth. Analg.* : 97 1086-1091.

Grant SA, Nielson KC, Greengrass RA et al. (2001). Continuous peripheral nerve block for ambulatory surgery. *Reg. Anaesth. Pain Med.* 26 : 209-214

Hoenecke HR, jr, Pulido PA, Morris BA et al. (2002). The efficacy of continuous bupivicaine infiltration following anterior cruciate ligament reconstruction. *Arthroscopy.* 18 : 854-858

Horn EP, Schroeder F et al. (1999). Wound infiltration and drain lavage with Ropivacaine after major shoulder surgery. *Anaesth. Analg.* **89** 1461-1466

Klein SM, Bergh A, Steele SM et al. (2000). Thoracic paravertebral block for breast surgery. *Anaesth Analog.* 90 : 1402-1405

Klein SM, Grant SA, Greengrass SA et al. (2000). Interscaline brachial plexus block with a continuous catheter insertion system and a disposable infusion pump. *Anaesth Analog.* 91 : 1473-1478

Leong WM, Lo WK, Chiu JW. (2002). Analgesic efficacy of continuous delivery of bupivicaine by an elastomeric balloon infusor after abdominal hysterectomy : a prospective randomised controlled trial. *Aust N Z J Obstet Gynaecol.* 42 : 515-518

Morau D, Lopez S, Bidoulet P et al. (2003). Comparison of continuous 3 in 1 and fascia illiaca compartment blocks for postoperative analgesia : feasibility, catheter migration, distribution of sensory block, and analgesic efficacy. *Reg Anaesth Pain Med.* 28 : 309-315

Williams BA. (2006). Anaesthsia and Pain Management in Peripheral Orthopaedic Surgery-New Considerations, and a call for Partnership Between Physicians and Hospital Administrators.*Business Briefing : US Orthopaedics Review.* 60-64

Zohar E, Fredman B, Phillipov A et al. (2001). The analgesic efficacy of patient-controlled bupivicaine wound instillation after total abdominal hysterectomy with bilateral salpingo-oophrectomy. *Anaesth Analg* : 93 482-487

Liu SS et al.(2006). Efficacy of continuous wound catheters delivering local anaesthetic for postoperative analgesia: A quantitative and qualitative systematic review of randomized control trials. J Am Coll Surg. Vol 203 (6) 914-932

14. STORAGE OF SOLUTIONS FOR EPIDURAL AND REGIONAL LOCAL ANAESTHETIC INFUSIONS

University Hospital of Wales

WARD AREA	RECOVERY
FENTANYL 2 micrograms/ml with 0.1% BUPIVACAINE • Solution bags to be stored in a dedicated CD cupboard	**FENTANYL 2 micrograms/ml with 0.1% BUPIVACAINE** • Solution bags to be stored in a dedicated CD cupboard
0.1% BUPIVACAINE only (for epidural use only) • Solution bags NOT to be stored on the ward • Solution bags available day and night from the Recovery room	**0.1% BUPIVACAINE (for epidural use only)** • Solution bags to be stored in a clearly labelled, dedicated, secure cupboard • Not to be stored in Anaesthetic rooms or Theatres
0.125% / 0.25%BUPIVACAINE (for peripheral nerve block infusions only) • Solution bags NOT to be stored on the ward. Except C5 keep the bags in a clearly labelled dedicated secure cupboard. All other wards requiring an additional bag must order from pharmacy on an individual named patient basis. • If an additional bag of solution is required in the ward area this must be ordered from pharmacy on a named patient basis • To minimise the risk of wrong route error the solution bag must be used immediately when it arrives on the ward.	**0.125% / 0.25%BUPIVACAINE (for peripheral nerve block infusions only)** • Solution bags to be stored in a clearly labelled, dedicated, secure cupboard • Not to be stored in anaesthetic rooms or theatres

University Hospital of Llandough

WARD AREA	RECOVERY
FENTANYL 2 micrograms/ml with 0.1% BUPIVACAINE • Solution bags to be stored in a dedicated CD cupboard	**FENTANYL 2 micrograms/ml with 0.1% BUPIVACAINE** • Solution bags to be stored in a dedicated CD cupboard
0.1%BUPIVACAINE (for epidural use only) • Solution bags NOT to be stored on the ward. • Solution bags available from the recovery area during day time • Out of hours please contact site practitioner to retrieve bag from Emergency cupboard.	**0.1% BUPIVACAINE (for epidural use only)** • Solution bags to be stored in a clearly labelled, dedicated, secure cupboard • Not to be stored in anaesthetic rooms or theatres
0.125% / 0.25%BUPIVACAINE (for peripheral nerve block infusion only) • Solution bags NOT to be stored on the ward. • If an additional bag of solution is required in the ward area this must be ordered from pharmacy on a named patient basis • To minimise the risk of wrong route error the solution bag must be used immediately when it arrives on the ward. • Out of hours please contact site practitioner to retrieve bag from Emergency cupboard.	**0.125% / 0.25%BUPIVACAINE (for peripheral nerve block infusions only)** • Solution bags to be stored in a clearly labelled, dedicated, secure cupboard • Not to be stored in anaesthetic rooms or theatres

NO BAGS OF SOLUTION CONTAINING LOCAL ANAESTHETIC SHOULD BE STORED IN THE OPERATING THEATRES OR ANAESTHETIC ROOMS

15. RESOURCES

- Administrative time
- Infusion devices – pump library, maintenance, upgrading and consumables

16. TRAINING

It is a mandatory requirement within Cardiff & Vale University Health Board that any personnel using infusion devices, including PCA and PCEA, undergo training and competency assessment (please refer to Policy for the Use of Parenteral Infusion Devices). Training is available through Clinical Engineering (UHW 45678).

Pain Study Days are provided by the Acute Pain Team primarily for Registered Nurses however these can be multi professional if required. Study days are also provided for Health Care Support Workers.

17. IMPLEMENTATION

These guidelines are an update to previous guidelines. Throughout the training days reference is made to the document. These guidelines are written for the multidisciplinary team.

18. EQUALITY IMPACT AND ASSESSMENT

An equality impact assessment has been undertaken to assess the relevance of this policy to equality and potential impact on different groups, specifically in relation to the General Duty of the Race Relations (Amendment) Act 2000 and the Disability Discrimination Act 2005 and including other equality legislation. The assessment identified that the policy presented a low risk to Cardiff and Vale University Health Board.

19. FURTHER INFORMATION

For any further information or clarification in relation to Acute Pain Service Guidelines (Adult) Pain management practices please contact Susan Mogford Senior Nurse Pain Management Services extension 45449 or the Acute Pain Team on Bleep 5414.

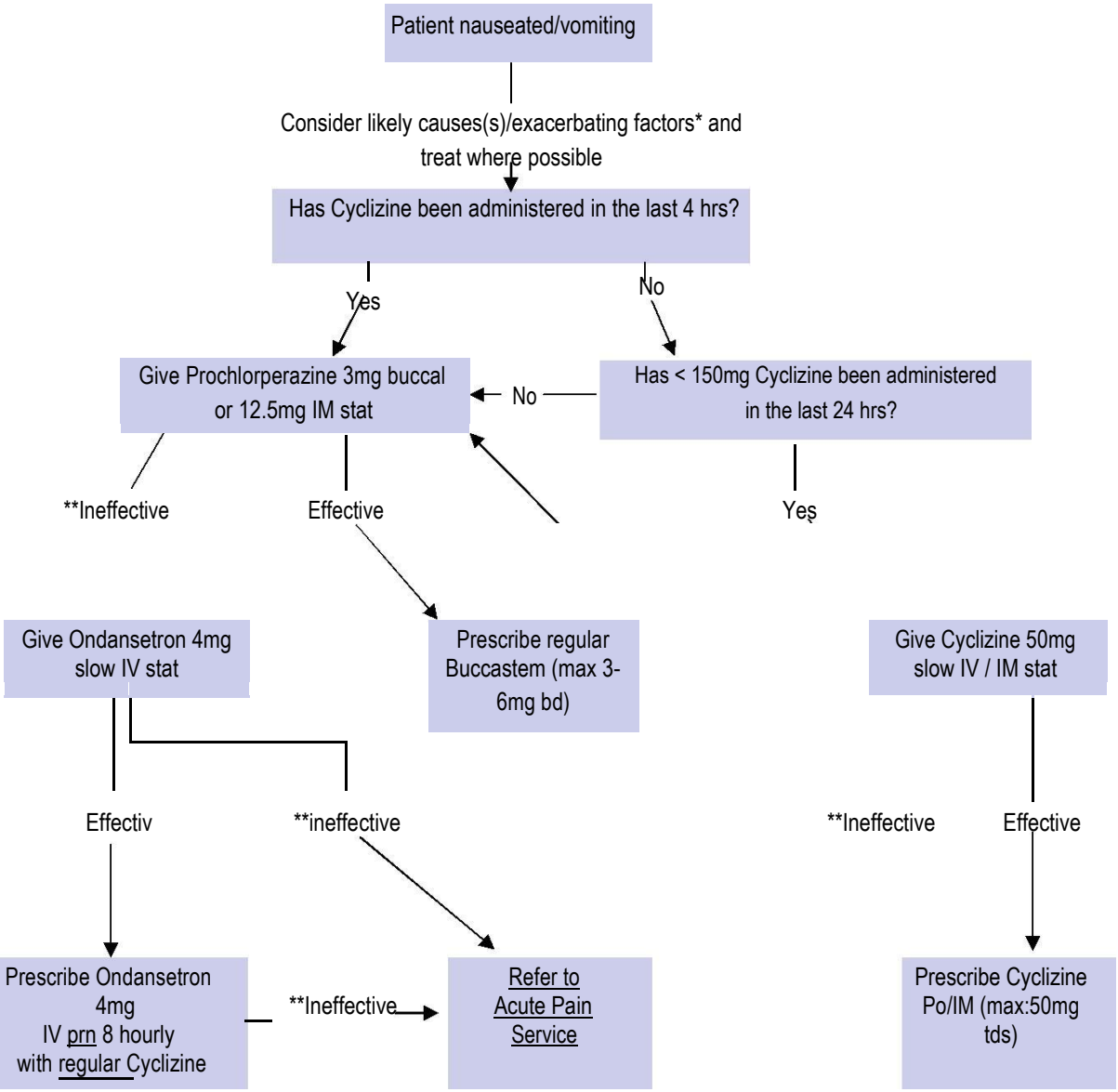
20. AUDIT

Compliance with these guidelines will be audited continuously using a database.
Findings of the audit will be discussed with each relevant Directorate.

21. DISTRIBUTION

These guidelines will be available on the Cardiff and Vale Health Board Intranet.

APPENDIX 1 Treatment of PONV in adults

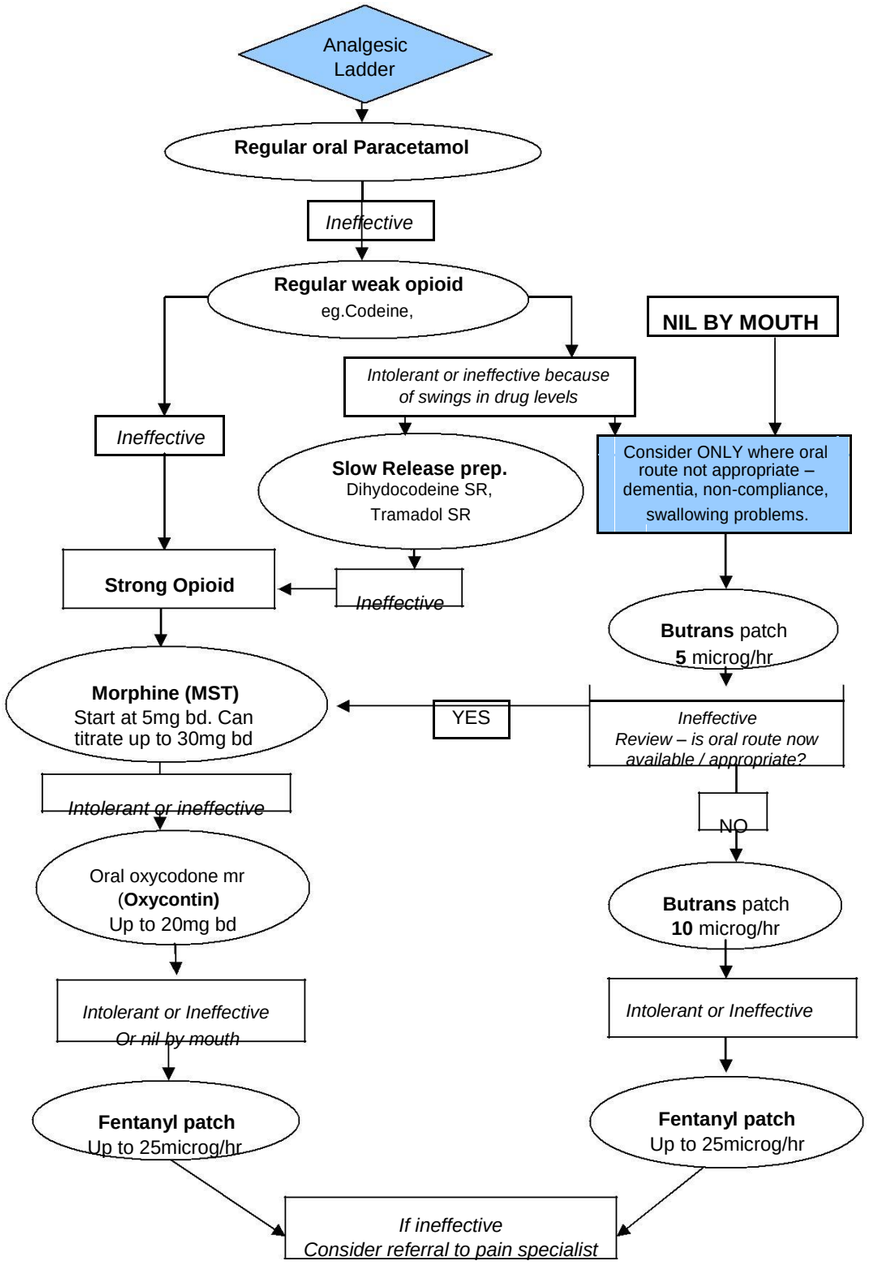


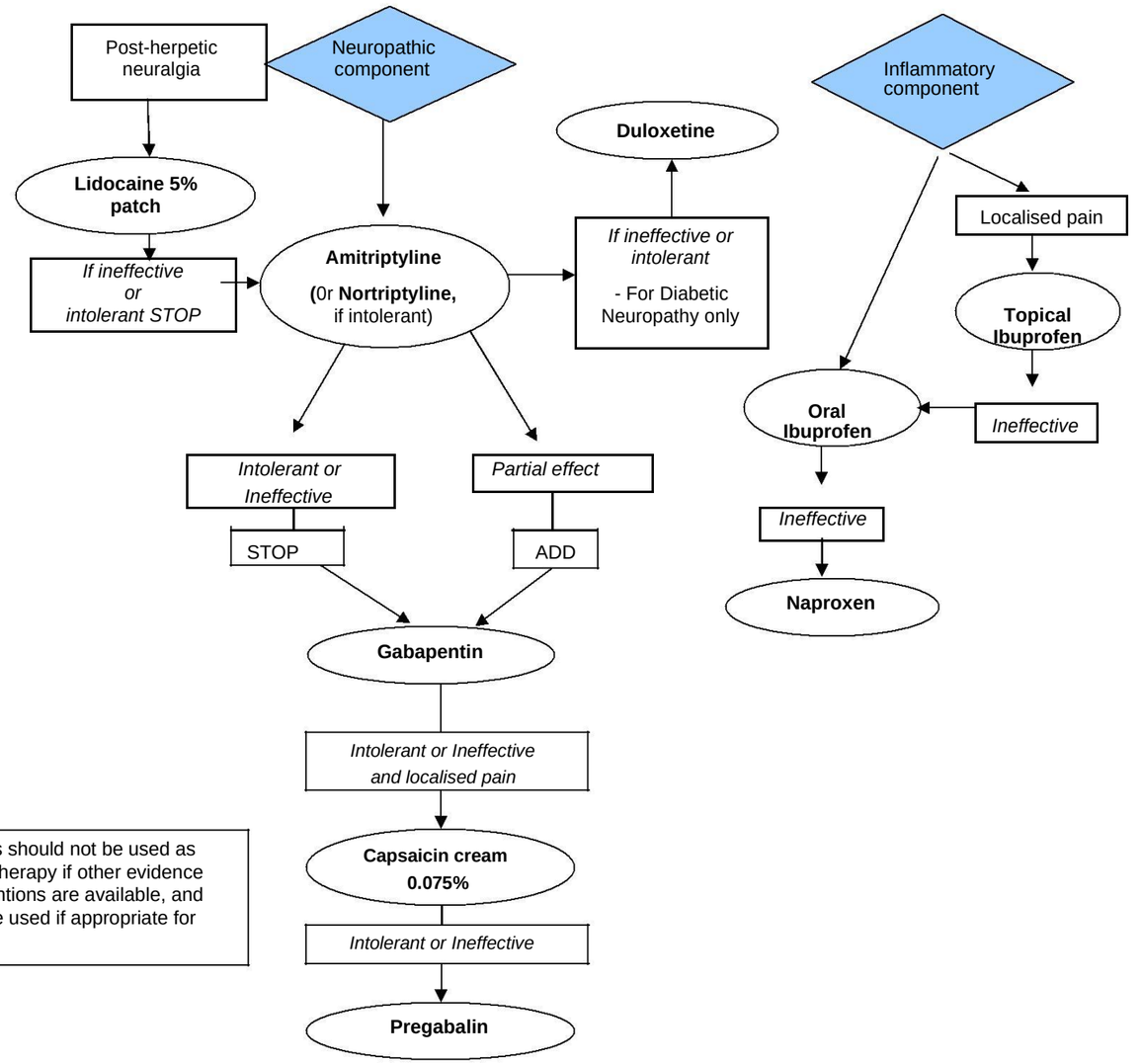
***Potential causes of nausea:**

Dehydration	Pain
Low/high blood glucose	Anxiety
U&E imbalance	Hypotension
Morphine sensitivity (contact acute pain service)	Hypoxia
Antibiotic/drug therapy	Paralytic ileus

****Please allow a minimum of 1 hour to establish treatment failure. Regular assessment of treatment is essential.**
N.B PONV should only affect the patient for around 72 hours post op.

Appendix 2





Strong opioids should not be used as first line pain therapy if other evidence based interventions are available, and should only be used if appropriate for the patient.

APPENDIX 3 – Algorithm for chronic pain management

Appendix 3 – Algorithm for Chronic Pain Management

ALGORITHM

Management of Chronic Non-malignant Pain
Practice Tips (to supplement algorithm)
General notes

1. The goal of therapy should be to reduce symptoms sufficiently to support improvement in physical, social and emotional functioning.
2. Ensure a pain assessment tool is used (eg Brief Pain Inventory). The same tool used at the patient's initial assessment should be used throughout to ensure consistency.
3. Patients with chronic pain should be fully involved with their treatment. Patients should be provided with advice and information to promote self-management. Non pharmacological methods should *always* be considered alongside the algorithm.
4. Patients with chronic pain should be prescribed *regular* pain control. Strong opioids should only be used in slow release form. Immediate release opioids for breakthrough pain are only required, if at all, when moving from one step to another.
5. When moving from one step to the next, ensure an adequate trial of at least 5 days at an appropriate dose. This will allow transient side effects to diminish and the effectiveness of the step to be assessed.
6. Only one change at a time should be made to the drug regimen. This allows each change to be assessed appropriately.
7. Some patients find paracetamol ineffective for chronic pain and would rather not be taking up to 8 extra tablets each day. In such circumstances, it would be reasonable to stop and re-assess pain after at least 5 days.
8. For full prescribing information, refer to the individual SPCs for each drug. http://www.medicines.org.uk/emc/

Opioids

9. Opioids are useful in decreasing chronic pain to manageable levels. Complete pain relief is rarely achieved.
10. Strong opioids should not be used as first line pain therapy if other evidence based interventions are available, and should only be used if appropriate for the patient.
11. The following are common side effects of opioids:
    - Nausea: this is usually short term and a regular anti-emetic, such as cyclizine, could be prescribed for the first few days
    - Constipation: consideration should be given to prescribing a laxative (a stimulant & softener) to be taken on a regular basis
    - Drowsiness: this is usually short term and the patient should be re-assured (and educated re. driving)

    Continue opioids for adequate time to allow transient side effects to diminish.
12. Caution must be exercised when rotating from one strong opioid to another (see dose equivalence chart). As some patients may find one opioid more effective than another, it is usual to start below the equivalent dose and titrate slowly until effective or until maximum recommended dose is reached.
13. Opioid doses in chronic non-malignant pain should not be escalated beyond doses suggested within the dose equivalence table. These are much smaller doses than those associated with malignancy. If a patient does not achieve useful relief of pain at maximal doses of opioids within the pathway, they should be referred to a specialist pain service.

(For further guidance see: “Opioids for Persistent Pain - Good Practice”
- British Pain Society http://www.britishpainsociety.org/book_opioid_main.pdf)

Neuropathic pain

14. When prescribing amitriptyline or nortriptyline, advise patient to take at 1900 -2000hrs to avoid hangover effect.
15. In some patients side effects may be less profound with amitriptyline, nortriptyline, gabapentin and pregabalin if dose titration is slower. This is more likely to improve patient compliance in persevering with the line of treatment to optimal effect**.** Printed schedules for slow titration are available.
16. CAcute Pain Serviceaicin may require up to 4 – 6 weeks regular application to achieve an effect. If allodynia is present, the patient will also require initial analgesic cover with a local anaesthetic cream such as EMLA or Ametop.
17. Lidocaine patches may be prescribed for Post Herpetic Neuralgia ONLY. Patches should be applied to unbroken skin for “12 hours on, 12 hours off” at the site of local pain. If more than one site is involved the patch can be cut. In rare circumstances more than one patch may be required.

NSAIDs

18. As many patients may be at risk of adverse events associated with NSAIDs, such as acute renal failure, gastro-intestinal toxicity, and an increased risk of cardiovascular events, the topical route could be considered ahead of the oral route for localised pain of an inflammatory nature.
19. All NSAIDs are associated with serious and fatal GI events, particularly in long term use. In patients over 45 years, these should be co-prescribed with a PPI.

APPENDIX 4 - Abbreviations and acronyms

ACUTE PAIN SERVICE	Acute Pain Service
APTT	activated partial thromboplastin time
CAVOC	Cardiff and Vale Orthopaedic Centre
CSF	cerebrospinal fluid
GRM	gram
HO	House Officer ? FP1
IM	intramuscular
INR	international normalised ratio
IV	intravenous
KG	kilogram
LA	local anaesthetic
LMWH	low molecular weight heparin
Mcg	microgram
Mg	milligram
Min	minute
Ml	millilitre
NSAID	non-steroidal anti-inflammatory drug
ODP	operating department practitioner
PCA	patient-controlled analgesia
PCEA	patient-controlled epidural analgesia
PO	oral route
PONV	postoperative nausea and vomiting
PR	rectal route
Prn	as needed
QDS	four times daily
SC	subcutaneous
SLR	straight leg raise
TDS	three times daily
UHL	University Hospital Llandough
UHW	University Hospital of Wales

Safety warnings, alerts and recalls
General safety information and advice
How we monitor the safety of products
Reporting safety problems
Information for healthcare professional specialties
Drug Safety Update
Drug Safety Update PDF edition
Medicines information
Risk communications

Help viewing PDFs:

Help viewing PDF files
Download Acrobat Reader for free
Adobe text conversion tools

Drug Safety Update

Diclofenac: new contraindications and warnings after a Europe-wide review of cardiovascular safety

Article date: June 2013

Summary

Available data indicate that the cardiovascular risk with diclofenac is similar to that of the selective COX-2 inhibitors. Consistent with COX-2 inhibitors, diclofenac is now contraindicated in those with: ischaemic heart disease; peripheral arterial disease; cerebrovascular disease; or established congestive heart failure (New York Heart Association [NYHA] classification II–IV). The new treatment advice applies to systemic formulations (ie, tablets, capsules, suppositories, and injection available both on prescription and via a pharmacy, P); it does not apply to topical (ie, gel or cream) formulations of diclofenac

An increased risk of heart attack and stroke with some non-selective non-steroidal anti-inflammatory drugs (NSAIDs)—such as diclofenac—is well recognised, particularly with long- term use of high doses and in patients who are already at high risk. Warnings for healthcare professionals and patients have been included in the product information and in the British National Formulary for some years.

The European Medicines Agency's Pharmacovigilance Risk Assessment Committee has recently recommended updates to the treatment advice for diclofenac in light of the findings of a Europe-wide review of the cardiovascular safety of NSAIDs. The review found further evidence that the arterial thrombotic risk with diclofenac is similar to that for the selective COX-2 inhibitors.

The new treatment advice applies to systemic formulations (ie, tablets, capsules, suppositories, and injection available both on prescription and via a pharmacy, P); it does not apply to topical (ie, gel or cream) formulations of diclofenac.

A recently published meta- analysis [1] of clinical trial data provides further evidence that the arterial thrombotic risk with diclofenac is similar to that of COX- 2 inhibitors. This analysis found that of 1000 patients allocated to diclofenac for a year, three more had major vascular events, compared with placebo.

Advice for healthcare professionals:

New advice for diclofenac:

- Diclofenac is now contraindicated in patients with established:
  - ischaemic heart disease
  - peripheral arterial disease
  - cerebrovascular disease
  - congestive heart failure (New York Heart Association [NYHA] classification II–IV)

  Patients with these conditions should be switched to an alternative treatment at their next routine appointment
- Diclofenac treatment should only be initiated after careful consideration for patients with significant risk factors for cardiovascular events (eg, hypertension, hyperlipidaemia, diabetes mellitus, smoking)

Reminder of existing advice for all NSAIDs:

- The decision to prescribe an NSAID should be based on an assessment of a patient's individual risk factors, including any history of cardiovascular and gastrointestinal illness
- Naproxen and low-dose ibuprofen are considered to have the most favourable thrombotic cardiovascular safety profiles of all non-selective NSAIDs
- The lowest effective dose should be used for the shortest duration necessary to control symptoms. A patient's need for symptomatic relief and response to treatment should be re-evaluated periodically

Additional advice for pharmacists:

Non-prescription availablility of diclofenac:

Diclofenac is available to buy in a pharmacy without a prescription at low doses (up to 75 mg/day) for short-term use (3 days). Pharmacists are asked to take the following steps when supplying diclofenac without prescription:

- Ask questions to exclude supply for use by people with established cardiovascular disease and people with significant risk factors for cardiovascular events
- Advise patients to take diclofenac only for 3 days before seeking medical advice
- Advise patients to take only one NSAID at a time

This information will be circulated via the NHS Central Alerting System in early July.

Further information:

New advice:

- Message sent via the NHS Central Alerting System, including material to pass on to patients.

- European Medicines Agency statement

References