Liverpool Heart and Chest Hospital NHS
NHS Foundation Trust

# Pain Management Level 2 (Post operative pain)

# Objectives



- Discuss importance of good pain relief, pain assessment and observations charts used with trust.
- Discuss LHCH analgesic ladder.
- Brief description of methods employed within:-
  - Cardiac surgery
  - Thoracic surgery
- Discussion of common complications and side-effects
- Explain monitoring requirements and required equipment.

# Why do we need good post operative pain management ?



Inadequate pain relief leads to:

Anxiety and insomnia

Delayed healing

Retained secretions, atelectasis, pneumonia

Increased myocardial work

Delayed gastric emptying

Increased cortisol and reduced insulin secretion

## LHCH pain assessment tool

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| | SCORE AT REST / ON MOVEMENT |
|---|---|
| 0 | no pain at rest |
| | no pain on movement |
| 1 | mild pain at rest |
| | mild pain on movement |
| 2 | intermittent pain at rest |
| | moderate pain on movement |
| 3 | continuous pain at rest |
| | severe pain on movement |

# LHCH Observation and Pain EPR charts

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## Pain Assessment

| Pain Assessment | | |
|---|---|---|
| At Rest | | 0 = No pain at rest |
| Movement | | 0 = No pain on moven |

## Pain Infusion/PCA

| PCA Infusion | | | |
|---|---|---|---|
| Medication | | Morphine | Morphine |
| mg | | 1 | 1 |
| minutes | | 5 | 5 |
| Bolus Demands | | 11 | 11 |
| Bolus Delivery | | 9 | 9 |
| Total PCA infused | | 9 | 9 |
| PCA Volume in bag | | 91 | |
| Prescription Check | | Prescription checked | |

## Pain Infusion/ Paravertebral

| Paravertebral Infusion | | | | | |
|---|---|---|---|---|---|
| Medication | | | | Levobupivacaine 0.25 | Levobupivacaine 0.25 |
| Rate mls/hr | | | | | 8 |
| Volume in Cassette/Syringe | | | | 487 | 504 |
| Running Total | | | | | 170 |
| RICS | | | | Site appears healthy a | Site appears healthy a |
| Prescription Check | | | | Prescription checked | Prescription checked |
| Discontinued | | | | | |
| Catheter removed and intact | | | | | |

## Body Measurements

## Pain Infusion/ Epidural

| Epidural Infusion | | | | |
|---|---|---|---|---|
| Medication | | Fentanyl 5mcg/ml Lev | | Fentanyl 5mcg/ml Lev |
| Rate mls/hr | | 12 | | 10 |
| Volume in syringe/bag | | 79 | | 594 |
| Running total | | 411 | | |
| RICS | | Site appears healthy | | Site appears healthy |
| Motor block Left | | No weakness or numl | | No weakness or numl |
| Motor block right | | No weakness or numl | | No weakness or numl |
| Prescription Check each shift | | Prescription checked | | Prescription checked |
| Discontinued | | | | |
| Catheter removed and intact | | | | |

## Regional Infusion Catheter Score

| Site appears healthy and dressing intact | 0 | No action, continue to monitor on each shift |
|---|---|---|
| Dressing bloody, rolled up or leakage under dressing | 1 | Replace dressing clean with 0.05% aqueous chlorhexidine using aseptic technique, continue to monitor |
| Erythema around site but not raised or painful | 2 | Call APNS to review<br>Check WCC and temperature, if either raised, anaesthetist or surgical team to review |
| If two or more of the following **Erythema, raised, painful at site, backache , Pyrexia or raised WCC** | 3 | **Call for urgent review from APNS, anaesthetist or surgical team**<br>**Catheter to be removed as soon as possible (check heparin time for epidural). Prescribe alternative analgesia**<br>**Send tip and site swab for C & S**<br>**Consider antibiotic therapy** |

# Pain Management
# LHCH acute pain ladder

## + Adjuvant

### NSAIDs (non-steriodal anti-inflammatory drugs)

Ketorolac IV (in theatre)

Ibuprofen oral

### Local anaesthetic

lidocaine patch

single shot paravertebral injection

Wound infiltration

Intercostal blocks

### Neuropathic agents

Gabapentin

### Ketamine

IV Infusion on POCCU/THDU only

Oral surgical wards

**Mild 1**

Paracetamol

**Moderate 2**

Dihydrocodeine

Codeine Phosphate

+ Paracetamol

**Severe 3**

Epidural (Fentanyl & Levobupivacaine)

OR

PCA/IV Morphine

+ or -paravertebral infusion

OR

Oxycodone

+ Paracetamol

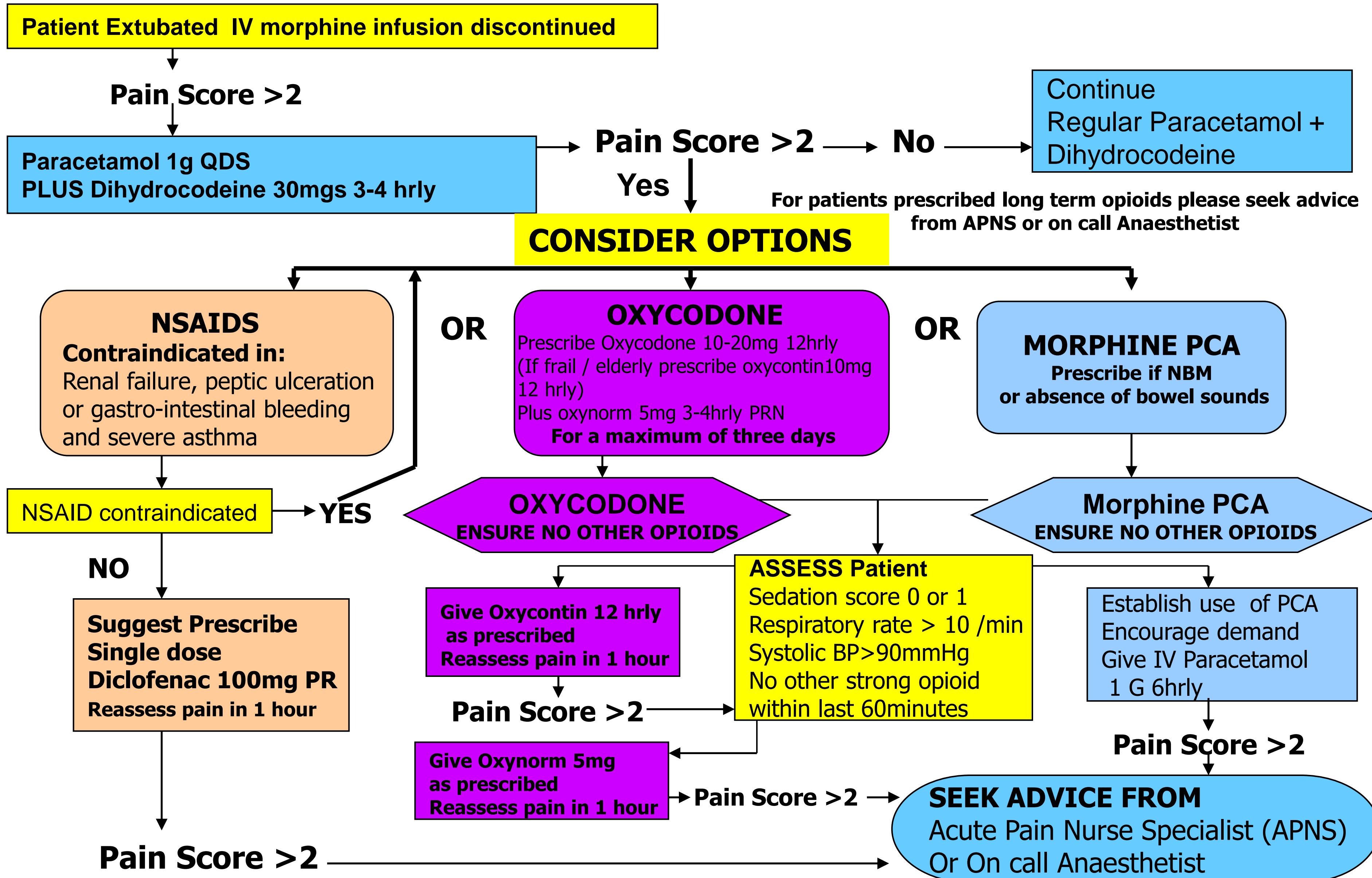
**PAIN**

# Analgesia post cardiac surgery

- Paracetamol IV/oral
- Weak opioid
- NSAID's
- Strong opioid
- PCA
- Epidural (rare)
- Local anaesthetic wound infiltration

The Cardiothoracic Centre – Liverpool NHS Trust

# GUIDELINES for Analgesia Post Cardiac Surgery




ALL PATIENTS REQUIRING REGULAR OPIOIDS SHOULD BE PRESCRIBED LAXATIVES

# Analgesia post thoracic surgery



- Paracetamol IV/oral
- NSAID's
- Oral weak opioid
- Oral strong opioid
- PCA +/- Paravertebral infusion
- Epidural infusion
- Local anaesthetic wound infiltration

# Analgesic Tecniques

**Standard Prescription**

Morphine sulphate **opiate**

Concentration **1** mg/ml

Lockout **5** minutes

syringe **50** ml

**Alternatives**

Oxycodone 1mg/ml

Fentanyl 10mcg/ml

PCA pumps can be programmed by Recovery/anaesthetic staff , critical care nurses and Hospital co-cordinators using the PCA code

## Advantages

Self administration

Controlled by patient

Avoids IM injections and saves nursing time

Lockout so unlikely to over dose

## Disadvantages

Can cause respiratory depression

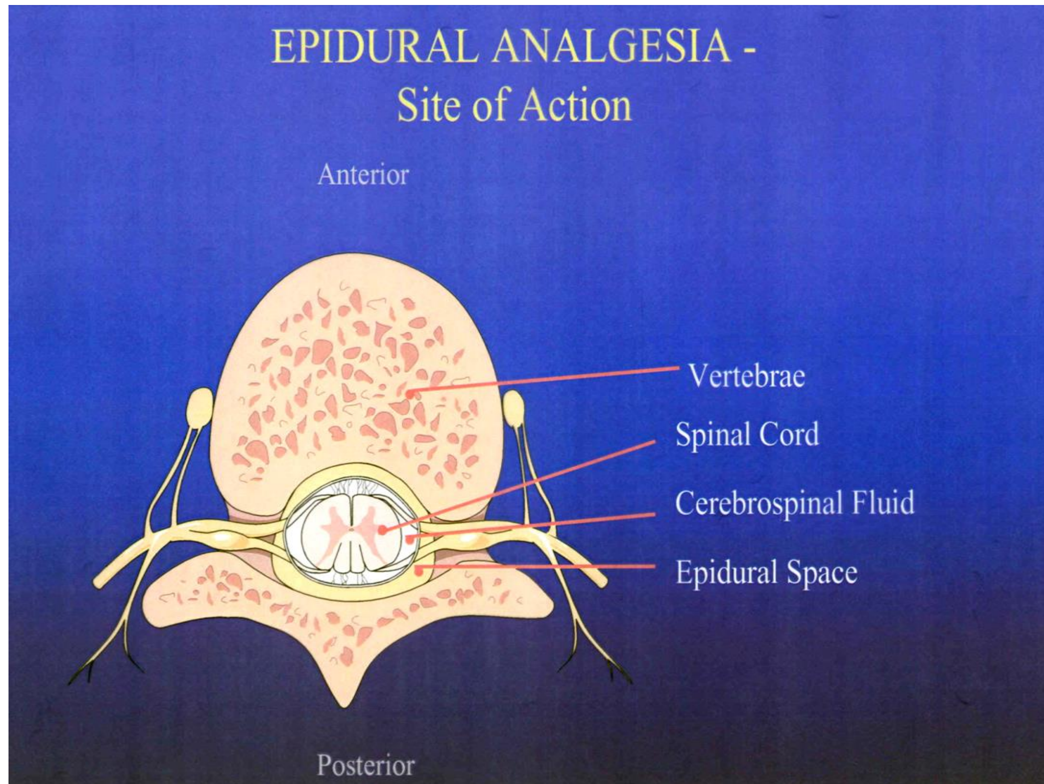
Nausea and vomiting

Sedation

Not suitable for all patients

# Epidural Analgesia






Sited using an Full Aseptic Technique

Epidural Tuohy needle is used inserted through the skin→ intervertebral space→ and into the epidural space

Usually inserted prior to surgery in the anaesthetic room

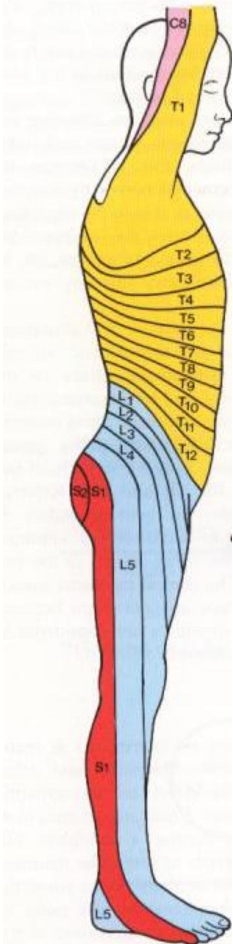
**Awake**

**Asleep**

Usually commenced during surgery for inter-operative pain management

Can continue for up to 6 days post op ( 7 days from insertion)

## Dermatome Map




Epidural catheter usually inserted

T5-6

T6-7

T8-9

T9-10

Block assessment

Using Ice, ethylchloride spray or light touch

## Epidural management

- Assess motor response
- Epidural site monitoring (RICS)
- Pain scores of two or more are unsatisfactory
- Ensure epidural is working
  - line remains in place
  - no occlusion present
- Epidural block assessment
- Determine change in patients condition
- Infection or New surgical problem
- Increase rate of epidural depending on prescription

# Epidural drugs and administration



Fentanyl – Opiate
Levobupivacaine - Local Anaesthetic

Standard Prescription
Fentanyl 4mcg/ml plus
Levobupivacaine 0.125% in saline 0.9%
500ml bag

Delivery Rate
generally 2 to 10mls/hr
Maximum of 15ml/hr

**Alternative**

**Plain Levobupivacaine 0.125% (200ml)**

**Programmed only by Anaesthetic staff or APNS**

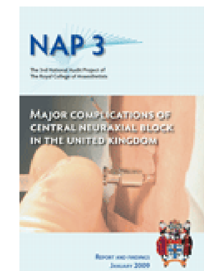
Complications of epidural analgesia

- Epidural abscess (abscess in epidural space)
- Epidural haematoma (collection of blood in epidural space)
- Spinal headache (leakage of CSF through hole in Dural membrane)
- Nerve damage
- Paraplegia
- Meningitis

**Nap 3 report from Royal College of Anaesthetist**

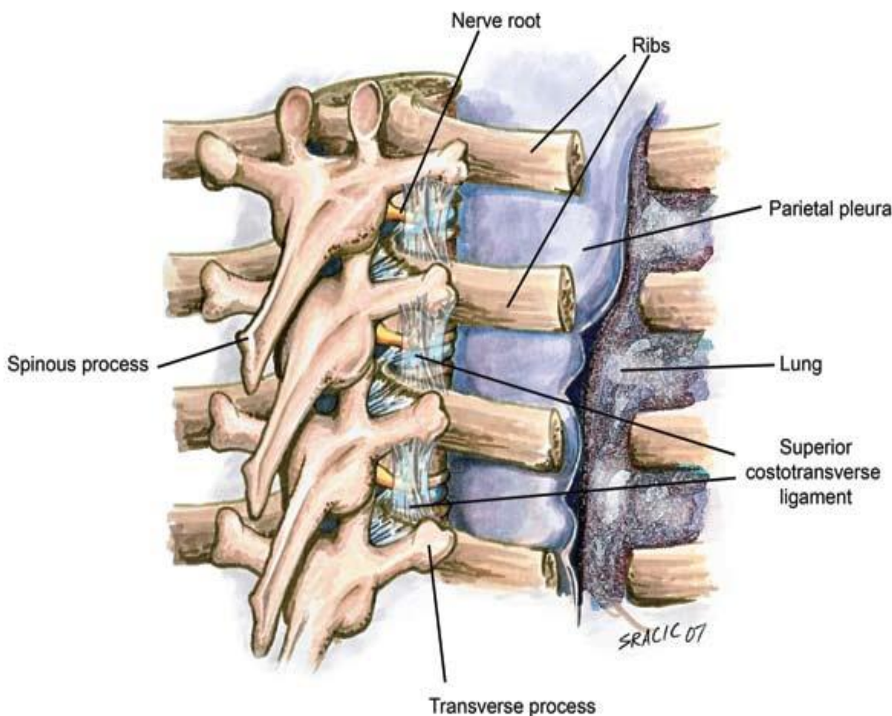
**Peri-op**

Incidence of permanent harm
1 in 5 800 to 1 in 12 000
Incomplete asepsis
Failure to follow recommendations
Catheters in unnecessarily long
Delays in diagnosis
Weak legs!!



# Paravertebral Infusion






Looks like an Epidural Completely Different

Can NOT tell difference from epidural by external inspection of patient
Essential to CHECK PRESCRIPTION
Uses local anaesthetics only

LA deposited in paravertebral gutter
Percutaneous or surgical catheter placement
Patients can have Single Bolus Injection or Continuous Infusion.
Single bolus used for VAT procedures, pleurectomies etc

Inferior analgesia to epidural
Need NSAID's +/or PCA as well
Uses startling doses of LA

Less complications than epidurals

Used as alterative to epidural analgesia or when epidural Contraindicated, refused or
Technical Failure

Paravertebral catheters normally remain in place for 2-3 days postop
Maximum up to 7 days from insertion

# Paravertebral drugs and administration

**Levobupivacaine - Local Anaesthetic**

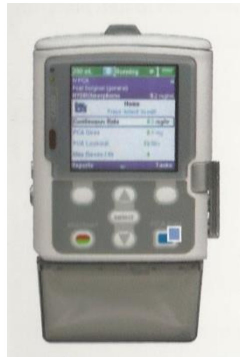
**Standard Prescription**

**Levobupivacaine 0.25%**

**250ml cassette**

**Delivery Rate**

**generally 2 to 10mls/hr**



**Maximum of 15ml/hr**

**Programmed only by Anaesthetic staff or APNS**

## Complications of paravertebral analgesia

Complications less than with epidurals

Hypotension

Local anaesthetic toxicity

Infection (site monitoring RICS)

Concern over coagulation issues and epidural haematomas do NOT apply

# Paracetamol



- Exact mechanism of action still unclear
- Reduces opioid requirement 20-30%
- Minimal side effects
- Suitable for all ages
- Available in many forms
  - IV/oral/PR
  - IV form gives greater bioavailability
- Clinical studies equate Paracetamol 1g
- to morphine 10mg IV or Diclofenac 75mg

IV dose will need to be reduce for patients less than 50kg
Caution with patients in liver failure

# Opiates



Mediated through μ receptor

Weak

Codeine / dihydrocodeine

Strong

Morphine / oxycodone/ fentanyl

Available in many forms

IV or SC

Oral (SR /liquid/sublingual )

PR

Transdermal

Side effects

- Respiratory depression
- Sedation
- Nausea and vomiting
- Constipation
- Itching
- Dysphoria /hallucinations
- Urinary retention

# NSAID's

**Mode of action** Interferes with the inflammatory response to tissue injury

Reduces prostaglandin production

**Forms** oral/ IV / PR

**Side effects**

- Gastric irritation
- Gastric Bleeding
- Increase bleeding :decrease platelet function
- Bronchospasm
- Nephrotoxicity

Patients should have a PPi

# Neuropathic agents



## Gabapentin

Used to treat epilepsy and neuropathic pain

**Mode of action** Reduces the release of neurotransmitters in the brain that are responsible for transmitting pain signals

Form Oral tablets/liquid

Side effects

- Dizziness, drowsiness, loss of balance or co-ordination
- Feeling tried, dry mouth , nausea

## Ketamine

An anaesthetic agent can be used to produce analgesia and in small doses analgesia

**Mode of action** Blocks NMDA receptors also depresses the thalamus and limbic systems preventing the nervous centres receiving or processing sensory input.

Form IV in critical care only (24-48hrs)

Oral liquid (3 days)

Side effects

- Drowsiness, hallucinations, confusion, delirium and nightmares
- Tachycardia, hypertension

# Monitoring

- All analgesic infusions containing opioid's MUST have HOURLY Respiratory rate monitored until discontinued.
- All vital signs, pain, sedation, PONV and MEWS score monitored hourly for the first 4 hours then minimum of 4 hourly if they remain within normal limits.
- Regional Infusion Catheter Score (RICS) each shift
- Infusion volume totals hourly for first 4 hours then 4 hourly.
- Prescription check on each shift by trained nurse.