

Management of Acute Pain

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2. Management of acute pain

2.1 Introduction

Acute pain is very often under treated and certain studies have shown 50- 75 % of post surgical patients suffer from moderate to severe pain following surgery.

Pain causes many problems leading to increased morbidity and mortality. Hence apart from humanitarian reasons, physical and emotional morbidity could be reduced with good pain relief given to the patients following trauma, surgical operations, burns etc.

Following adverse effects can be seen if acute pain is not relieved.

1. Reduced lung function including poor cough, hypoxaemia, retention of secretions, pulmonary infections.
2. Stress response causes tachycardia hypertension, increased myocardial oxygen demand leading to ischaemia or infarction
3. Reduced gut motility will cause nausea, vomiting and delayed oral intake.
4. Salt and water retention, oliguria
5. DVT, Pulmonary embolism
6. Muscle wasting
7. Impairment of sleep and mental function
8. Delayed mobilization

GOOD PAIN will further enhance early mobilization and early discharge from the hospital.

2.2 ACUTE PAIN SERVICE

Acute pain service is considered essential in any hospital for management of acute pain, in particular post operative pain.

An acute pain service has following responsibilities.

1. Introduction and management of acute pain techniques for management of acute pain
2. Provision of information and advice about more effective use of older and more conventional methods of analgesia
3. Participation in the education of all medical and nursing staff & patients
4. Communication-among the team members
5. Quality assurance- data base, audits, studies etc.

The main medical member of the team is often an **anaesthetist because the knowledge** required and many of the techniques used are simply extensions employed in the operating room. The pain **nurse** is the other important member in the team which surgeons, pharmacists, physiotherapists are the other members.

With the present system available in our hospitals

Post graduate anaesthetists and H O O anaesthetists could provide pain relief service with consultant cover given by the consultant anaesthetist on call.

Good pain relief may lead to

1. Fewer complications in the post operative period
2. Short hospital stay
3. Reduced hospital cost
4. Satisfied, happy and co operative patient

There are many reasons why pain is not treated adequately

1. Lack of appropriate education of medical and nursing staff and patients.

Many myths are associated with pain management

- * Patients will get addicted with regular morphine

- * Risk of respiratory depression with opioids is very high
- * Patient is not complaining, so he is not in pain
- * Morphine or pethidine should not be given in less than 6 hour intervals
- * PRN is often interpreted as “give as little as possible<
- * Night dose of opioids is adequate after surgery
- * If patient is pain free while on pain medication, the drugs can be discontinued
- * Our patients think pain after surgery is normal, so they do not complain

2. Lack of knowledge of pharmacology of analgesic drugs

3. There is a **wide variability** in patient’s perception of pain and therefore in reporting of pain

4. *There is a wide variability in analgesic requirement*

2.2.1 Assessment of pain

2.2.1.1 Assessment & Documentation of INTENSITY of pain is important in the management of pain.

Pain is a highly subjective sensation. Hence it is difficult to quantify pain. Nevertheless, we need to have some methods to measure it.

Each individual patient is allowed to make his / her evaluation.

Pain score is a measure of how much pain patient is suffering from.

Prys Roberts scale -Used for acute pain assessment.

Grade	At rest	On movement (Turning from supine to a side)
I	No pain	No pain
II	No pain	Mild
III	Intermittent	Moderate
IV	Continuous	Severe

Aim should be to maintain pain score 1 to 2. This score is mainly used in adults.

Assessment of pain in children- This includes appearance of faces.

- Pain score should be measured before and after therapy & whenever necessary.
- Pain score must be made both at rest and on movement

Sedation score

Sedation is the earliest sign of overdose of opioids and sedatives. Therefore it is important to maintain a regular sedation score. This tells you how drowsy / sedated the patient is.

1. — Alert
2. — Drowsy
Patient dozes intermittently but easy to arouse
3. — Very Drowsy
Difficult to arouse
4. — S(Sleep)
Wakes up when called or disturbed

Respiratory depression is uncommon if the sedation score is < 3

2.2.2 Management of Acute Post-op Pain

- The aim of post-op pain relief should be, to provide analgesia which the patient think is sufficient.
- Complete/ zero analgesia is not realistic/ desirable with opioids, but possible with LA techniques.
- Balanced analgesia- concept of using combinations of drugs and techniques to achieve satisfactory analgesia. Each drug reduces the requirement for the others, thereby reducing the side effects due to any single agent, and also provides good quality analgesia.

2.2.2.1 Pre operative considerations

1. Education of the patients about available methods of analgesia, pain assessment scores.
2. Reassurance and maintenance of good rapport with the patient.
3. Obtain consent for- epidurals, caudals, plexus blocks, per rectal administration of any drug.
4. Check the contraindications to NSAIDs and LA techniques.
5. Treating pre-operative pain if any.
6. Prescribe pre-emptive analgesia if necessary. Eg; PCM/ NSAIDs/ epidural/ LA infiltrationetc.

2.2.2.2 Intra-operative analgesia

Selection of the most suitable analgesic technique will depend on

–

Type of surgery- minor, intermediate, major

Degree of trauma/ tissue damage

Type of post-op analgesia decided

Pre existing pain

Patient preference

Patient factors- co-morbid factors and the drugs they are on.

Provision of adequate analgesia during surgery is one of the responsibilities of the anaesthetist who anaesthetises the patient.

2.3 Methods available (post-op analgesia)

2.3.1 OPIOIDS

A. following methods can be practiced in the ward safely-

2.3.1.1 Conventional- Pethidine IM 4 hrly (1mg/kg) Peak- assessed with side effects (SE)

Trough- assessed with pain

* Erratic absorption, painful injections\

2.3.1.2 SC morphine- dose 0.1 mg/kg 4-6 hrly

* Frequency and dose should be adjusted according to the age and the severity of pain.

* Blood levels maintain well throughout ensuring good analgesia.

* Less risk of respiratory depression, safe in the ward.

*Maximum effect in 10- 20 min



Refer to the flow chart on INTERMITTENT SUBCUTANEOUS OPIOID INJECTION.

2.3.1.3 Morphine IM- 0.1- 0.15 mg/kg

- * can be given in the wards for severe pain.
- * blood levels not maintained

2.3.1.4 PCA – patient controlled analgesia

Agent- Morphine

Loading dose- 1mg bolus to reach adequate analgesia

Demand dose- 0.5- 1 mg

Lock out interval- 5- 10 min

Back ground infusion +/-

- Must have a dedicated cannula and a PCA syringe pump
- Not indicated for patients with low levels of intelligence and children <5 yrs.

(See diagram A)

Advantages of PCA-

- ❖ Patient satisfaction
- ❖ Less side effects- incident of respiratory depression is low, so no need of 1:1 monitoring.
- ❖ Total opioids used is less- so cost effective.
- ❖ IV, SC, epidural routes can be used.

2.3.1.5 Epidural / Subarachnoid morphine – (single dose lasts 24hrs)

2.3.1.6 Trans dermal- Fentanyl “patches”

2.3.1.7 Oral Morphine- MST 30- 60 mg 12 hrly (slow release).

- ** Regular anti emetic should be prescribed for all the patients on opioids.**

B. Following methods should only be practiced in ITU/ HDU/ OT recovery area –

2.3.1.8 Morphine IV boluses – 0.5- 1 mg boluses until patient is free of pain

- * Only to be given in OT/ ITU/ HDU under supervision
- * if given in recovery area, patient should leave OT 15 min after the last bolus
- * Risk of respiratory depression – need 1:1 patient: nurse ratio.

2.3.1.9 Continuous IV infusion

- * Morphine/ Pethidine/ Fentanyl can be used.
- * Morphine – 1 mg boluses to achieve analgesia, multiply the total dose into 3 and divide by 24 will give the infusion rate.
- * Risk of sedation, respiratory depression.

2.3.1.10 Pethidine IV – give boluses (1/5th of the total dose) until the patient is free of pain.

Consider smaller doses for children / elderly patients.

2.3.2 LOCAL ANAESTHETIC TECHNIQUES

Getting popular in day case surgery – “single shot” 8- 12 hrs pain relief

Drugs – Bupivacaine 8- 12 hrs
Ropivacaine longer

2.3.2.1 Available Methods \

- a) surgical wound infiltration -0.25% plain Bupivacaine
Maximum safe dose 2 mg /kg
- b) regional block – inguinal ,penile
- c) Plexus block – brachial plexus
- d) Individual nerve blocks – femoral, sciatic
- e) IC nerve block
- f) Extradural- caudal, lumbar and thoracic epidural
- g) Sub arachnoids
- h) Intraperitoneal (laparoscopic surgery)
- i) Local application – 4- 10% Lignocaine/ EMLA (eg. Circumcision)

2.3.2.2 Extra-dural

Thoracic

Lumbar

Boluses

Continuous infusion opioids

LA

LA & opioids

Steroids

PCEA

Advantages –

1. less stress response
2. less bleeding
3. better organ perfusion
4. better gut mortality
5. less DVT

Disadvantages

1. motor block
2. CVS instability

Epidural – LA + opioids is the most commonly used combination

(a) continuous infusion – 0.1% Bupivacaine + Fentanyl 1 -2 μ /ml
, 5- 10 mls / hr (the volume will depend on the site of the surgery
and the level of the epidural catheter)
needs a syringe pump and close monitoring

(b) boluses – 0.125% or 0.1% Bupivacaine + preservative free
Morphine / Fentanyl

Patients should be monitored closely for hypertension, bradycardia with each top up and clear instruction to be written for the management of such an event.

© Patient controlled epidural analgesia PCEA – commonly used combination is 0.1% Bupivacaine + Fentanyl 1-2 mic/kg

(d) Epidural morphine –
2-3 mg of preservative free Morphine diluted in 10 ml of N.
saline provides good quality analgesia up to 24 hrs

Advantages – no motor block
no sympathetic block , so maintain CVS stability
no systemic effects of opioids
But !! Late respiratory depression
** Oxygen via nasal prongs is advisable

Caudal block – commonly used for paediatric post –op analgesia.

Provide good pain relief for operations in pelvic, inguinal and lower abdominal area

Children – 0.25 % plain Bupivacaine – 0.5 ml/ kg upto L1

1ml / kg upto T10

1.15ml/ kg upto T6

Maximum safe dose 2-3 mg/ kg

Adults – 20- 30 ml 0.25% plane Bupivacaine

Adding 50µ of Fentanyl or 2- 3 mg of Morphine (preservative free) will give better quality analgesia.

2.3.3 NSAIDs

- COX 1 – active continuously, required for the maintenance of physiologically protective PG functions (gastric, renal)
- COX 2 – induced during inflammation
- NSAIDs inhibits COX 1 & 2
 - COX 1 > COX 2 - Indomethacine, piroxicam
 - COX 1 = COX 2 – Diclofenac , Ibuprofen
 - COX 1 < COX 2 – Celocoxib

2.3.3.1 Side effects

- GIT – GI bleeding , ulcer formation (PG maintains gastric mucosal barrier)
- Bleeding tendency – (platelet COX is essential for normal platelet : functions)

- Renal impairment – due to inhibition of protective prostaglandins - renal vasodilatation Risk – age > 70 yrs , massive intra-op: blood loss and hypovolaemia , diuretic treatment , pre existing renal disease

2.3.3.2 Contra indications

- Patients with renal impairment
- Patients with bleeding tendency , GI bleeding
- Patients who have aspirin sensitive asthma

Diclofenac sodium – dose 1- 1.5 mg/kg as a single dose
Maximum total daily dose by any rout – adult – 150 mg

Children -> 1 yrs 1- 3 mg / kg/ day

- * available as oral, rectal , parenteral preparations – but IV route is banned in Sri Lanka , deep IM injections could be given if other routes are not available in the most essential cases.
- * Consent should be taken for planned suppository insertion.
- * When patients start taking oral sips, oral route is preferred as there is no advantage over rectal route

Advantages – opioid sparing effect

Good for post traumatic / inflammatory / musculoskeletal pain.

Ibuprofen – dose, adult – 1.2- 1.8g/day in 3-4 divided doses

Or

800mg loading dose + 400mg 6hrly.

Children >7 kg – 20- 30 mg/kg day in divided doses.

Or

1- 2 yrs 50mg tds / qds

3- 7 yrs 100mg tds / qds

2.3.4 Other drugs

(a) **Tramadol** – dose 50-100mg 4- 6 hrly PO (upto 400mg / day)

- Good analgesia for mild to moderate pain and better analgesia for visceral pain than NSAIDs
- Side effects – similar to opioids but less sedation and respiratory depression ; some patients may develop severe nausea /vomiting / sedation
- IV/IM/suppositories available.

(b) **Paracetamol** – dose;

Adults – 500mg-1g 4- 6 hrly

Total dose <4g/ day

Children – loading dose of 15mg/kg followed by 10- 15 mg /kg 4- 6 hrly

Total dose <90mg/ kg /day

Advantages –

Easy to take, no gastric irritation, no sedation

Suppositories can be used in combination with opioids for the patients who have contra indication to NSAIDs

Disadvantages – only mild analgesic effect

Hepatotoxicity is possible with repeated doses

© **Panadeine (Paracetamol + Codeine phosphate)** – 2 tabs. 8 hrly p.o. for adults, ½ -1 tab p.o. for children

Other methods

- Physiological – Adequate explanation about the surgery and pain & regular post-op visits, proven – to reduce Morphine requirement and duration of hospital stay.

2.4 Selecting the correct method /s

- Always practice balanced analgesia
- Always communicate with anaesthetist and the acute pain team
- **All surgery** (un infected surgical wounds) – wound infiltration with LA Bupivacaine 0.25- 0.5%
Max. safe dose 2mg/ kg (not necessary if the patient has already given a spinal / epidural)
- **Minor surgery** – wound infiltration with LA + PCM +/- NSAIDs Diclofenac
- **Intermediate surgery** – wound infiltration with LA + NSAIDs + PCM
- **Major surgeries** –

Initial

Epidural – if appropriate (Abdominal, pelvic, lower thorax)

Opioids – Morphine IV infusion /SC

Pethidine IM

+ NSAIDs – Diclofenac PR

Later

Once able to take oral sips

PCM + NSAIDs or Tramadol

- Plexus / nerve blocks where appropriate eg. Brachial plexus block in upper limb surgery.
IC nerve block, Penile block inter plural

2.5 Monitoring

- Pain assessment – Prys Robert Scale
- Patients on NSAIDs
 Watch for bleeding, heart burns, bronchospasm,
 Cimetidine /Ranitidine (if NG feeds has not commenced) ,
 maintain urine output >1 ml/kg
- Patients on opioids –
 Should wake up to light tap before next dose. Chart
 respiratory rate.
 If <10/min Wake up, encourage breathing
 Inform anaesthetist.
 If < 10/ min + not arousable +
 O2 via mask + Naloxone 0.4 mg IV, inform anaesthetist
 If PONV – please refer to the Adverse Effects of Opioids.

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Assessment of pain in children – this include appearance of faces

- Pain score should be measured before and after therapy & whenever necessary.
 Pain score must be made both at rest and on movement.

2.5.1 Sedation score

Sedation is the earliest sign of overdose opioids and sedatives. Therefore it is important to maintain a regular sedation score. This tells you how drowsy / sedated the patient is

- 1- Alert
- 2- Drowsy –Patient dozes intermittently but easy to arouse.
- 3- Very drowsy – Difficult to arouse
- 4- S (Sleep) – Wakes up when called or disturbed.

Respiratory depression is uncommon if the sedation score is < 3

2.6 Management of Adverse effects of Opioids

Irrespective of the route of opioid administration, side effects are the same.

1. Nausea and Vomiting
2. Sedation
3. Respiratory depression
4. Constipation

The adverse effects of neuraxial opioids are

1. Late onset respiratory depression Fentanyl after 1 hour
Morphine after 6 hours
2. Pruritus
3. Nausea and vomiting
4. Urinary retention

2.6.1 Management of respiratory depression—

Safety precautions- ie. Monitoring of RR at least hourly
Be cautious of late onset respiratory depression with neuraxial opioids which occurs 8-10 hours after giving spinal opioids.

Monitor RR and depth

BP

Reduction of RR with good tidal volumes is the characteristic feature of opioid toxicity

Naloxone to reverse effects of opioids is essential

Oxygen and Ambu bag are essential to facilitate ventilation if necessary.

When respiration is depressed,

1. **If RR is,10 /minute**
2. Wake up the patient
3. Stop the infusion of opioids / stop giving any neuraxial administration
4. Take out the hand set if PCA has been in use
5. Patient should be given oxygen via face mask
6. Monitor the patient carefully
7. If RR drops further, inform the doctor, keep Naloxone at hand

If RR is <8 In addition to the steps mentioned above, Give naloxone (Dissolve Naloxone one vial in N saline upto 10 ml and give 1 ml at a time-40/microgramme/ml every 2 minutes)

Or slow IV infusion (1-5/micro g/kg/hr) until RR is <12
Administration of naloxone in this way will prevent respiratory depression while analgesia is maintained. ie. Add additional analgesia.

2.6.2 Nausea and Vomiting

Various anti emetic agents have proven useful.

The choice depends on availability of the drug.

1. Metoclopramide 5-10 mg slow IV or IM (Not indicated for those who are under 12 year due to extrapyramidal effects)
2. Promethazine 12.5 – 25 mg IM/IV
3. Droperidol 0.625 mg IV
4. Ondansetron 4-8 mg IV
5. Domperidone tablets-10-20 mg every 4-8 hours
suppository 30-60 mg every 4-8 hours(child BW10-15kg-

15mg. bd ; BW15-25kg- 30mg. bd; BW 35-45 kg. 30 mg
4 times a day)

2.6.3 Pruritus

The risk of severe, distressing itching is about 1 % after neuraxial administration of morphine upto 5 mg and fentanyl.

Usually localized to the face but may appear in the groin or may be generalized

Well responds to small dose of naloxone(40 microgramme) without reversing analgesia or chlorpheniramine 5-10mg.

2.6.4 Urinary Retention

This complication is noted following administration of neuraxial morphine.

Management includes

1. Urinary catheterization
Or
2. Otherwise large doses of naloxone (0.4 microg diluted to 5 ml IV bolus followed by 10 microg/kg/hr) will usually reverse the urodynamic changes at the expense of partially or completely reversed analgesia.

2.6.5 Constipation

Use of a laxative

The choice depends on availability

Bisacodyl suppository or tablets-3-4 orally nocte

Lactulose syrup 10 ml 8 hourly

Fybogel 1-2 sachets /day dissolved in water to drink

In addition plenty of water to take and increase roughage in diet.

2.7 Management of complications when LA agents are administered spinal /epidural

Hypotension/Bradycardia

1. Inform the anaesthetist
2. Give oxygen

Bradycardia—HR <40/mt

When cardiac fibers are affected - above T3 level, treat with atropine 0.3 -0.6 mg IV

Hypotension

1. Infusion of crystalloids- N saline Be careful with the elderly in administration of large volumes
2. Vasoconstrictors-
Ephedrine 5 mg IV aliquots
Metaraminol-1 mg IV at a time-Be ready with atropine to counteract bradycardia
3. Stop the epidural infusion

2.10 Management of acute post-operative pain



