Management of epidural and intravenous analgesic solutions

The principle of action of epidural opioids is their selective effect on pain transmission pathways in the dorsal horn of the spinal cord, but at higher dose rates plasma levels may reach the systemic analgesic range. Local anaesthetics on the other hand are non-selective and block spinal nerve pain pathways, motor pathways and sympathetic nerves. Hence the advantage of epidural opioids over local anaesthetics is analgesia without attendant motor block (numb legs) or sympathetic block (hypotension).

The Department of Anaesthesia provides a Pain Service to all patients receiving epidural or intravenous analgesia postoperatively. The departmental Pain Nurse (pager 2256) can be consulted in hours and the Anaesthetic Registrar (pager 3225) after hours.

Epidural Analgesia

An epidural catheter is placed in the high lumbar or low thoracic region pre or perioperatively. Intra-operatively local anaesthetic is used to provide regional blockade, often as an adjunct to general anaesthesia. Patients will usually therefore have some degree of motor block and leg weakness on return to the ward. This is expected to wear off within 6 hours, and prolonged block must be notified.

Infusions consist usually of either pethidine or fentanyl, initially often with bupivacaine or ropivacaine. Typical prescriptions are as follows:

- Pethidine 2-4 mg/mL or fentanyl 1-2.5 microg/ml
- Bupivacaine 0.1% or ropivacaine 0.2%

at dosage rates of 4-12 mL/hr.

PCEA is often used, patient demand boluses (15 – 30 minutely) supplementing an infusion. When local anaesthetic is added it may produce mild hypotension, but only occasionally produces some degree of motor blockade and numbness. Nevertheless, patients on infusions containing local anaesthetic should always be mobilised cautiously and if numbness or weakness is a problem, converted to opioid alone. In general, if regular bolus doses are necessary, the infusion rate should be increased and orders for alterations of infusion rate or bolus supplements will be
prescribed. On the other hand, if side effects or spread of local anaesthetic is excessive, the infusion should be decreased by 2mL/hr to a minimum rate.

If analgesia is inadequate, check that:
1. The pump is operating correctly.
2. The pump set is connected to epidural catheter filter.
3. There is no obstruction (the pump will usually alarm).
4. The epidural catheter is in situ – inspect the site of insertion, count the number of markings if visible. Consider catheter extrusion; look for signs of fluid around the catheter or in the patient’s bed.
5. The settings comply with the prescription orders for boluses and change of rate.

If analgesia remains inadequate, call the Anaesthetic Registrar (page 3227 or 3225 after hours) who may:

Give a stronger bolus of local anaesthetic to establish that:
- Catheter is in situ and working.

NB: This is not always necessary as even a misplaced catheter can deliver good pain relief if an opioid (e.g. morphine or pethidine) is administered.

If a local anaesthetic bolus is effective, then they may increase the maximum infusion rate or change to another opioid, add alternative analgesics or abandon the technique and change to another method.

Side effects of epidural opioids may include:

1. **Drowsiness** - some opioid is absorbed via epidural veins but the systemic blood level is usually subanalgesic and causes less drowsiness than, for example, intravenous opioid infusion or PCIA.

2. **Nausea and vomiting** - as with any opioid and to a similar degree to systemic opioids. Treatment is as per the KEMH Postoperative Nausea and Vomiting (PONV) protocol.

3. **Pruritus** - a not uncommon side effect but seen much less with pethidine and fentanyl than with morphine. It may be due to a localised effect in the spinal cord or in the central centres. Ondansetron should be tried first as it does not reverse analgesia.

   Antihistamines usually are ineffective. Naloxone is excellent at relieving moderate to severe itch (0.1mg IV or 0.2 mg IM) or by infusion (0.4 mg over 8 hours) if pruritus persists, but it will reverse analgesia to some degree. Propofol is also helpful, but should only be used by an Anaesthetist and will require admission to ASCU.
4. **Urinary retention** - as with narcotic given by any route. If patient is not catheterised, observe for urinary retention.

5. **Respiratory depression** - as with opioids given by other routes and is usually due to rostral spread of the opioid within the CSF. It is a well-recognised problem with epidural morphine due to hydrophilicity, but rarely seen with epidural pethidine or fentanyl, both of which are more lipophilic. During infusion, the respiratory rate must be recorded hourly. Notify the anaesthetic department as per hospital protocols (e.g. respiratory rate of less than 10/minute or excessive sedation).

**Treatment of Severe Respiratory Depression**
- Cease the epidural infusion and or PCEA
- Oxygen, ventilate if necessary
- Naloxone 0.4mg IV stat and repeat as necessary or by infusion. Give IM if there is no IV access and the situation is critical.

**Post-operative management**
After major surgery the epidural infusion is usually continued at 1 microgram for 5 days.
If the patient is comfortable and not unduly sedated, the infusion rate should not be altered, i.e. “weaning” is pointless and potentially harmful.
The Pain Service will determine when an epidural will be removed and once the epidural is removed analgesia will be given orally or by some other route if deemed necessary.

**Intravenous Patient-Controlled Analgesia (PCIA)**
Self-administration using PCA pumps connected to a dedicated IV cannula or a maintenance line with anti-reflux valve. For both PCIA and Intravenous Opioid Infusion, if analgesic is inadequate, consider:

- Infusion is not connected to the patient
- The pump is not turned on or functioning correctly
- There is an obstruction in the line (pump will usually alarm)
- The intravenous cannula is obstructed and/or the fluid is tissuing
- The dose requirement of the patient is greater than the dose available.

Opioid requirements vary up to 10-fold and individual variation is marked.

Monitoring should follow hospital protocols. Overdose will produce signs of sedation progressing to respiratory depression and unconsciousness.
Management of opioid overdose
1. Cease the infusion or disconnect the PCA.
2. Give O2 by mask, ventilate if necessary.
3. Call medical and anaesthetic staff by calling a Code Blue Medical.
4. Prepare to give naloxone intravenously (0.4mg)

REFER ANY PROBLEMS TO THE ANAESTHETIC DEPARTMENT