



Blunt Chest Pain Management

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RELATED INFORMATION	

Blunt thoracic trauma with rib fractures accounts for large proportion of trauma patients in United Kingdom. Rib fractures are commonly associated with pulmonary contusions, a significant risk factor for development of pulmonary complications. Patients over the age of 45 with more than four rib fractures are more severely injured and at increased risk of adverse outcomes. Good analgesia is essential in these patients to reduce the risk of chest infections and morbidity.

Guideline Details

In Accident and Emergency

Patients can have radiographic rib fractures or “clinical” rib fractures (significant pain consistent with rib fracture, but no radiologic abnormality). All of these patients should be evaluated in the emergency room with pain score on movement, cough evaluation, incentive spirometry and rib fracture score.

The management should aim to achieve a comfortable patient who is able to cough; move and can take deep breaths (as measured by inspiratory volume in Incentive spirometry). The type of analgesia will generally depend on the seriousness of their injury as evaluated by the rib fracture score, but all of them should receive regular analgesia before being discharged to the ward.

Other respiratory co-morbidities e.g. underlying COPD should be considered and may influence threshold for regional anaesthesia. Chronic opiate use and cardiovascular disease may also influence choice of analgesic regimen.

1. Paracetamol - iv or oral. 1g 6 hourly (less if Weight < 50 Kg)
2. Non-steroidal anti-inflammatory – especially for the younger patient(< 60 years) if they have good urine output and renal function(creatinine <130), no contra-indications.

Morphine PCA

If the cannula tissues or becomes dislodged, **resite and recommence PCA**

Standard prescription 1mg/ml 5 minute lockout, 4 hourly limit 48mg.

Please consider patient weight and renal function – may need reduced standard prescription.

If patient takes pre-operative opiates for chronic pain – may need to increase the standard prescription

Please administer adjuvant analgesia - paracetamol / NSAID (if no contra-indications)

Please administer anti-emetics for nausea, not just for vomiting.

Ondansetron 4mg 6 hourly; Cyclizine 25-50mg 8 hourly – dilute in 30 mls and administer over 15 minutes

Regional anaesthesia techniques

Patients with multiple rib fractures will benefit from regional anaesthetic techniques. Early referral to local pain management/anaesthetic teams is therefore needed. Unilateral rib fractures could benefit from Intercostal, Paravertebral or Interpleural nerve blocks. Bilateral rib fractures (Rib fracture score >10) can benefit from Epidural analgesia. Patient's cardiovascular stability should be established, abdominal visceral injury excluded and any pneumothorax or haemothorax should be drained before considering them for epidural analgesia. For further information about epidural analgesia please refer to local guidelines for acute and perioperative pain relief in adults.

Method:

1. Effective analgesia is established by the anaesthetist/surgeon with a local anaesthetic agent administered via the paravertebral or extra-pleural catheter.
2. Opioid(Morphine or Fentanyl)patient controlled analgesia (PCA) is also commenced.
3. PVB analgesia is maintained with a continuous infusion of 0.1% (1mg/ml) Bupivacaine or 0.2% (2mg/ml) Ropivacaine.
Rate for 0.1% Bupivacaine: 5-15 mls/hour; Max 0.2 mls/kg/hour
Rate for 0.2% Ropivacaine: 5-14 mls/hour; Max 0.35 mls/kg/hour
4. If the patient remains in pain following administration of the prescribed infusion rate, staff should inform the acute pain nurse or the anaesthetist.
5. Continuous PVB infusion can be continued in the post-operative period until chest drains are removed or maximum of five days (Sabanathan et al, 1998).
6. Multimodal analgesia should be commenced on the day of surgery, according to surgical protocol. Regular laxatives and anti-emetics should also be prescribed.
7. Drawing up, administering of PVB infusions and removal of the PVB catheter may be performed by the anaesthetist, the appropriate member of the surgical team, the pain management nurse or a registered nurse (band 5 or 6), who has attended a PVB teaching session.

Process:

1. The paravertebral catheter will be inserted by the anaesthetist, or a surgeon will

- insert an extra-pleural catheter via a tunnelling device in theatre during a procedure.
2. The anaesthetist will record information about the catheter insertion.
 3. The anaesthetist will confirm that the PVB infusion is running at the prescribed rate. The paravertebral/extra-pleural catheter is labelled, correctly positioned and secured.
 4. The pharmacy will provide 250ml or 500ml bags of the local anaesthetic. The LA is set up in the Gemstar pump at the prescribed hourly rate without a bolus on the yellow prescription sheet. The drug must be checked by 2 nurses as per policy.
 5. An anti-bacterial filter must be included on the end of the paravertebral catheter. 2

Patient Observation:

The nurse must call the acute pain team, surgical on-call or the anaesthetist if:
The pain score is unacceptable to the patient whilst receiving PVB infusion.
There is a sudden drop in blood pressure or heart rate.
PVB catheter occludes. Only acute pain nurse/anaesthetist may flush catheter.

Recovery/HDU/ICU:

1. Observations are recorded on the appropriate pain observation chart.
2. Frequency: 10 minutes hourly for first hour
3. ½ hourly for second hour then check hourly if stable
4. Observations: Sats+ T+ P+ RR+ BP+ Pain score at rest and deep breathing
5. Rate of infusion
6. Nausea score
7. Sedation score (when used with PCA)
8. PCA demands & total amount of drug given
9. Paravertebral infusion site check 4 hourly

Ward:

Observations should be made and recorded on the appropriate pain assessment chart.
Frequency: 4 hourly
Observations as above
Paravertebral catheter insertion site to be checked 6 hourly

Blocking of sympathetic nerves produces vasodilatation, which can result in hypotension. If the patient is hypovolaemic, the hypotension will be more pronounced.

- The paravertebral catheter is secured with a clear semi -permeable dressing.
- The infusate remains sterile and is clearly labelled (administration of drugs policy)
- Only 0.1% Bupivacaine or 0.2% Ropivacaine to be used.
- If catheter blocked, pump will alarm occlusion. It may only be flushed by acute pain team or anaesthetist using 0.9% Sodium chloride.
- The paravertebral catheter and giving set is clearly labelled.
- All patients receiving PVB infusions are encouraged to undertake physiotherapy, including deep breathing and coughing.

Checking PVB Insertion site:

Check that the catheter dressing is intact and dry. The catheter is stitched in place but can be pulled out. Maintain a good dressing over the catheter. Check that the anti-bacterial filter is safely secured to prevent disconnection.

Discontinuation of PVB use:

The infusion will be discontinued on the advice of the surgical team, acute pain team or anaesthetist after the removal of chest drains or according to patient's pain score.

Removal of PVB Catheter:

The catheter may be removed by the anaesthetist or a member of the appropriate surgical team, or a registered nurse who has attended training.

Explain the procedure to patient.

Position the patient comfortably i.e. sitting up.

Remove catheter without force; catheter should slide out easily.

Check catheter to ensure tip is complete, if it is not complete inform the pain team and save the catheter.

If there are any signs of infection such as pus or reddening at the entry site inform surgical team and send the tip off for culture and sensitivities.

Apply sterile dressing over the wound for 24 hours.

Side Effects and Complications:

Pneumothorax

A surgeon may insert the PVB catheter during a surgical procedure as the extra-pleural space can be directly viewed. However, an experienced anaesthetist can insert the catheter in an awake patient with an indirect vision technique. A complication is pneumothorax.

Symptoms: Severe, sharp pain, dyspnoea, absence of breath sounds.

Action: Chest X-ray to determine presence and size of pneumothorax.

Record observations and action to minimise patient's discomfort and anxiety.

Prepare for insertion of chest drain if pneumothorax large.

Hypotension

Caused by an extensive sympathetic nerve block especially if the patient is hypovolaemic.
Action: Colloid or crystalloid volume and if ineffective consider use of Ephedrine 3-6 mg bolus and repeat. Consider stopping until BP stable and restart at lower rate. Ask acute pain team or anaesthetist for advice.

Epidural/Spinal Block

It is possible to develop an epidural block with bilateral multi-level dermatome distribution. Even more rarely the development of a spinal block occurs with rapid onset of a dense block of all dermatomes at and below the level of injection. Occasionally, a high spinal or “total” spinal can develop, compromising respiration, and causing paralysis of the extremities, and muscles of respiration.

Haemorrhage

Symptoms: Bleeding around PVB catheter site.

Action: Apply pressure to the paravertebral catheter site.

Inform surgical team.

Local Anaesthetic Toxicity

Symptoms: Peri-oral tingling, light-headedness, metallic taste, twitching, bradycardia, arrhythmia's, and rarely convulsions.

Action: Stop infusion and call acute pain team or anaesthetist

Leakage around the site of insertion

Symptoms: Clear fluid leakage around PVB catheter site.

Action: Add additional dressing to prevent further leakage. Stop PVB infusion if patient has pain and remove catheter