# CLINICAL GUIDELINE

# Epidural Analgesia, Acute Pain Service, Queen Elizabeth University Hospital

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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| **Lead Author:** | Stephen Hickey |
| **Approval Group:** | South Sector Clinical Governance Group |

**Important Note**:

The Intranet version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

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| NHS Greater Glasgow and Clyde | **NHS GREATER GLASGOW & CLYDE POLICY**<br>**QUEEN ELIZABETH UNIVERSITY HOSPITAL** | Pages | 1-14 |
| | | Effective From | July 2023 |
| | **Acute Pain Service Guidelines (Adult / Surgical)**<br>**Epidural Analgesia** | Review Date | July 2026 |
| | | Version | 2 |
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Epidural analgesia is an invasive technique involving the administration of pain relieving drugs into the epidural space. Epidural analgesia is highly effective for controlling acute pain during labour or after surgery or trauma to the chest, abdomen, pelvis or lower limbs.

In addition, epidural analgesia has been shown to improve surgical outcome. Documented benefits include reduction of stress response, improved pulmonary function, faster return of bowel function, lower incidence of thromboembolic events, less bleeding, better tissue oxygenation and perfusion and earlier mobilisation.

Epidural analgesia is not without risk. Complications can range from trivial to life threatening or result in permanent harm. Health care professionals must have the knowledge of the factors that enhance the risk of complications hence leading to safe and effective, evidence based practice.

## 1. PATIENT SELECTION AND CONSENT.

Patient selection for epidural analgesia will be based on careful risk/benefit analysis for each patient. Specific consent should be obtained and include a discussion of the risks and potential benefits of epidural analgesia as well as the features of other options for post-operative analgesia. This will be documented on the anaesthetic record.

Written information should be provided where possible.

A leaflet entitled Epidurals for Pain Relief After Surgery is available for this purpose.

## 2. PATIENT LOCATION.

Patients receiving epidural analgesia must be nursed in a setting that allows close supervision of the patient and where the technique is employed frequently enough to ensure expertise and safety. Therefore, in QEUH, epidural infusions must only be nursed in the critical care unit.

## 3. INFUSION SOLUTIONS AND STORAGE

Where possible, ready prepared, standard solutions for epidural analgesia must be used.

Epidural infusion bags must be stored separately from other intravenous infusion solutions.

Ampoules of local anaesthetic for "top up" must be stored in a locked cupboard, separate from intravenous drugs.

Intralipid infusion bags must be available where epidural infusions are managed.

## 4. DEDICATED EQUIPMENT

The Bodyguard pump is the recognised epidural infusion pump in GG&C. Specific handbooks should be available to all users of the device.

The epidural infusion administration set must be clearly identifiable (coloured yellow) with an anti-syphon valve and bacterial filter attached (NPSA, 2007). Label the administration set "epidural" near to the bacterial filter.

## 5. PRESCRIPTION FOR EPIDURAL ANALGESIA

- The preferred prescription at QEUH would be Patient Controlled Epidural Analgesia (PCEA) using Levobupivacaine 0.125% Fentanyl 4mcg/ml.
- Other options are available depending on clinical need.

The epidural pumps have 6 pre-programmed options:

A: Levobupivicaine 0.125% Fentanyl 4mcg/ml PCEA

B: Levobupivicaine 0.125% Fentanyl 4mcg/ml CONT

C: Levobupivicaine 0.125% PCEA

D: Levobupivicaine 0.125% CONT

E: Levobupivicaine 0.125% Diamorphine PCEA

F: Levobupivicaine 0.125% Diamorphine CONT

Prescriptions for epidural analgesia should be clearly written on the epidural chart and prescribed on HEPMA.

The prescription should state the drug(s), concentrations, diluent and infusion range. Bolus dose should also be recorded on the chart.

- If PCEA box is ticked, rate of infusion is 0-10mls/hr with 5 ml bolus every 30 minutes.
- Rate of continuous infusion is 0-15mls/hr

Note: No other opioids should be prescribed while the patient is receiving opioid epidural analgesia unless the patient has had recent exposure to high doses of opioids. The Acute Pain Team/Nurse should be made aware of such a patient. Where appropriate, adjunct analgesia such as Paracetamol and NSAIDs as well as prophylactic anti-emetics should be prescribed.

## 6. PATIENT OBSERVATIONS

**The frequency and timing of patient observations will depend on the patient's condition. However, if stable, the following is recommended.**

**In Recovery :**

The patient's blood pressure, pulse rate, respiratory rate, oxygen saturation, pain, sedation and nausea scores should be recorded **every 15 minutes.**

Infusion rate, sensory block level and degree of motor block, **HOURLY.**

The patient's temperature is recorded **HOURLY.**

**In Critical Care:**

The patient's blood pressure, pulse rate, respiratory rate, oxygen saturation, pain, function, sedation and nausea scores, infusion rate and degree of motor block should be recorded **HOURLY.**

Record temperature at least 4 hourly while the epidural catheter is in situ.

Sensory block level (as detailed below) should also be checked on admission to critical care.

**After 24 hours**

Unless there is cause for concern, or the epidural infusion has required intervention such as a change of rate or "top up", 2 hourly observations are acceptable.

**Following epidural "top-up"**

Blood pressure should be checked every 5 minutes for a period of 30 minutes.

A nurse should stay with the patient and observe for this period of time. The person administering the top up will observe the patient closely during administration of the bolus dose and should remain in the vicinity for 30 minutes afterwards.

**SENSORY BLOCK LEVEL:**

Sensory level should be checked at the beginning of shift or more frequently if the patient has inadequate pain relief, is hypotensive or has an increase in motor block.

Upper and lower levels of sensory block are tested on conscious, co-operative patients by touching their skin with ice or ethyl chloride spray asking if they feel cold at the point of contact. The patient may not appreciate any temperature change at the level of the epidural block, but will appreciate cold above and below this area. The epidural chart/ dermatome laminate provides details of dermatome levels to assist with determining the sensory block height.

**MOTOR BLOCK:**

**Early recognition of neurological abnormality is critical in diagnosing spinal cord ischaemia, epidural haematoma or abscess. Treatment must be instigated without delay on the onset of symptoms in order to give the patient the best chance of recovery of neurological function.**

The degree of motor block should be assessed using the Bromage scale.

0 No motor block, normal movement, can lift legs and bend knees

1 Mild motor block, can bend knees and slide legs apart

2 Moderate motor block, can wiggle toes but cannot bend knees

3 Complete motor block, unable to move legs

Ask the patient to flex knees and ankles and rate their movement according to the Bromage scale.

It is important to check motor block prior to mobilising patient to ensure they are safe to ambulate.

Pressure areas should also be checked as, even the low concentration of local anaesthetic used in epidural infusions, may cause reduced sensation in buttocks and lower limbs.

Thoracic epidural should not cause profound leg weakness. Increasing leg weakness may be due to either the local anaesthetic infusion or a spinal cord injury. Differentiation is achieved by switching off the epidural infusion – failure to recover suggests spinal cord injury. If not diagnosed and treated promptly, this will lead to paraplegia. Switching off an epidural due to dense block or worsening block should trigger an urgent review by a Senior Anaesthetist.

**IMPORTANT : A BROMAGE SCORE OF 2 OR 3 MUST BE TREATED WITH A HIGH DEGREE OF SUSPICION AND REQUIRES URGENT ACTION.**

**Bromage 2 or 3**

**In Theatre Recovery**

The use of high concentration local anaesthetic solutions intra-operatively may lead to dense motor block in recovery, however, recovery of motor block should be expected within 4 hours.

- Bromage score of 2 or 3 should be reported to the responsible Anaesthetist and an informed decision made based upon clinical expectation.
- If motor block is attributed to recent bolus dose of epidural drugs, continue HOURLY motor block assessment and contact Anaesthetist again after 2 hours if no improvement in Bromage score (Meikle et al 2008). Do not return the patient to critical care without discussion/instructions from Senior Anaesthetist.

**Bromage 2 or 3**

**In Critical Care**

- STOP the epidural infusion, **document the time it is stopped on the epidural chart.**
- Continue to use the chart to record pain, nausea, sedation and Bromage scores.
- Contact the Acute Pain Team on 83726 or the "on call" Anaesthetist on 83464 and inform them of the issue
- Reassess motor block every 15 minutes and record Bromage scores on the chart.

IF SURGICAL PAIN RETURNS, CONSIDER ALTERNATIVE ANALGESIA WHILE WAITING FOR MOTOR BLOCK TO REGRESS

**IF BROMAGE SCORE STILL 2 OR 3 AFTER 1 HOUR OF STOPPING THE EPIDURAL INFUSION:**

Contact the Acute Pain Team who must request an urgent review by a Consultant Anaesthetist.

**OR** Out of hours or weekends:- Contact **Senior** Anaesthetist on 83465

**IF BROMAGE SCORE STILL 2 OR 3 AFTER 2nd HOUR OF STOPPING EPIDURAL – TREAT AS NEUROSURGICAL EMERGENCY**

- The patient **must** be seen by the **Senior** Anaesthetist or Consultant Anaesthetist without delay. Continue to pursue their attention even if they are busy in theatre.
- **Important:** Document in the patient's notes all TIMES, TELEPHONE CONVERSATIONS, FACE TO FACE CONVERSATIONS, STAFF NAMES AND GRADE.
- Keep the patient nil by mouth.
- With-hold any prescribed anticoagulant. A definitive diagnosis is best made with MRI rather than CT.
- Neurosurgeons must be informed of suspected neurosurgical emergency and involved in discussions.

**IV ACCESS**

IV access should be obtained prior to insertion of the epidural catheter and should be maintained for the duration of the infusion. The IV site should be checked during routine observations. IV access should also be maintained for 12 hours after cessation of the infusion in post-operative patients.

**INFUSION DEVICE MANAGEMENT**

Two qualified staff (medical staff or registered nurses) must verify the epidural infusion programme and drug label against the prescription:

- At commencement of the infusion
- At every shift change
- After any alteration of the infusion.

The epidural infusion device readings should be recorded every hour.

- Rate of infusion.
- Total volume infused and volume remaining.

Epidural infusion is classified a high risk device. The above precautions aim to minimise risk of errors during preparation, programming and maintenance of epidural infusion analgesia and early detection of faulty equipment.

## 7. EPIDURAL CATHETER CARE, LINE CARE AND DRESSINGS

The main principles in the management of the epidural catheter are; reducing the risk of infection, monitoring for signs of infection and security of the epidural catheter.

### REDUCING THE RISK OF INFECTION

Thoroughly disinfect the skin with Chlorhexidine 0.5% in 70% alcohol and allow to fully dry prior to insertion of the epidural catheter. If necessary, use clippers to remove hair prior to insertion of epidural catheter.

Use aseptic technique when manipulating the catheter, inspecting or changing the dressing and when changing the drug reservoir bag and administration set. Always use a bacterial filter and keep changes to a minimum to avoid breaking a closed system. The filter is left for the duration of the infusion.

**Duration of infusion**

It is current practice to continue most epidural infusions for a duration of 72 hours.

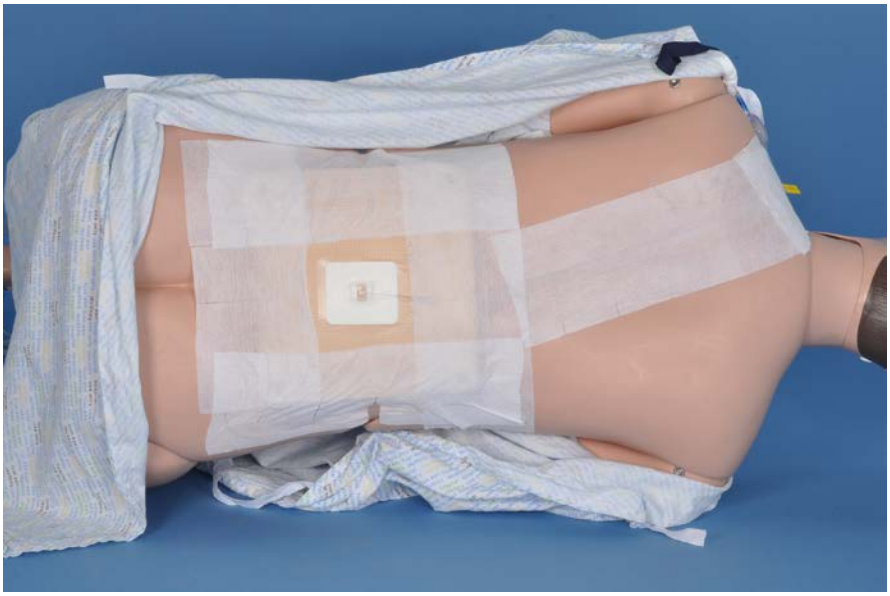
### MONITORING FOR SIGNS OF INFECTION

Examine the epidural catheter site at least once per shift to detect catheter displacement, check for leakage and observe dressing integrity and continue for 24 hours post removal of the epidural catheter. Report any signs of redness, tenderness at site, backache and leg weakness to the Acute Pain Team / on-call Anaesthetist.

### SECURITY OF THE EPIDURAL CATHETER

**See diagram below**

The dressing is required to secure the catheter in place, provide protection against microbial infection and allow clear inspection of the exit site and epidural catheter markings.



## Suggested dressing

The Lockit® epidural catheter clamp is commonly used and comes as part of the epidural catheter insertion pack. This efficiently secures the catheter to the patient at the insertion site leaving a small clear area to allow inspection of the site.

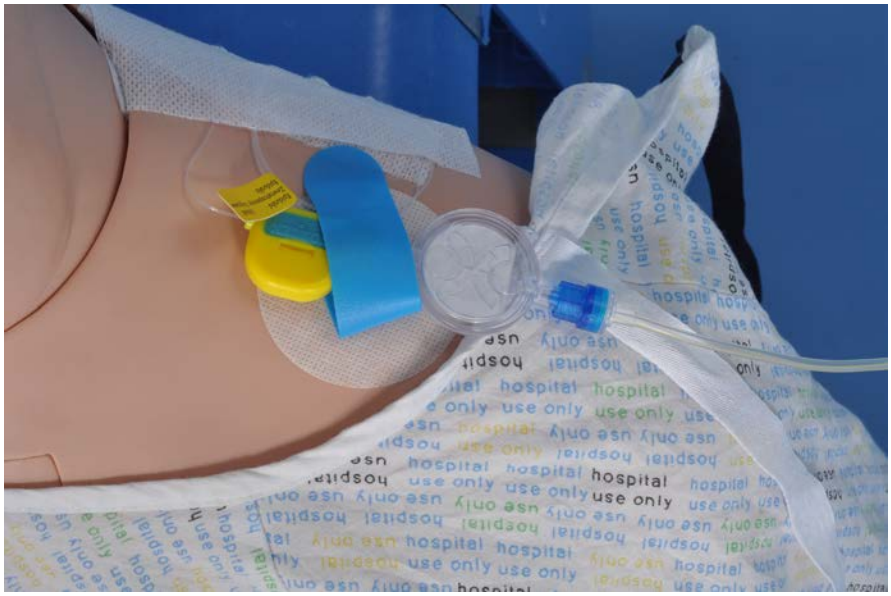
Transparent semi-permeable, polyurethane dressings (eg Tegaderm®, Opsite®) provide waterproof protection while allowing moisture from the skin to escape. This covers the Lockit clamp forming a window.

The remainder of the catheter is taped up the patients back to the shoulder using Mefix® type tape.

The epidural catheter is known to become disconnected from the yellow clamp. Apply AMBU Skin Fix dressing over the yellow clamp/filter and secure to the patient. Taping the yellow clamp/filter to the patient can reduce the risk of disconnection when the patient moves.

**Dressings should be left undisturbed unless they become contaminated, detached or the site cannot be seen clearly. In addition, it may be beneficial to use a clear dressing to secure all the potential points of disconnection.**

## 8. TROUBLESHOOTING EPIDURAL CARE.



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| **Dural puncture headache (Headache is worse on sitting or standing and improves on lying flat)** | Prescribe simple analgesia (e.g. paracetamol +/- NSAID)<br>Encourage fluids (oral or IV)<br>Refer to anaesthetist as patient may require a blood patch |
| **Witnessed Epidural catheter disconnection at yellow clamp** | Clean the end of the catheter with a pre-injection swab (allow to dry) then cut back 4-5cm with sterile scissors and reconnect to the filter.<br>Epidural filter and yellow clamp to be securely taped to patient's chest wall using SkinFix dressing. Ensure that the filter is physically checked when carrying out other observations to minimise the risk of this happening. |
| **Witnessed disconnection between Epidural filter and yellow clamp** | Clean both ends with a pre-injection swab (allow to dry) then reconnect. |
| **Leaking at epidural catheter insertion site** | The epidural may be continued if it is still providing effective analgesia<br>Monitor epidural insertion site regularly |
| **Epidural haematoma/ abscess suspected**<br>Signs and symptoms include:<br>Central back pain<br>Altered sensation<br>Increasing motor block<br>Bowel and/or bladder dysfunction | Discontinue the epidural infusion but leave the epidural catheter in-situ<br>Contact anaesthetist to review urgently<br>Urgent MRI and neurosurgical opinion<br>**All patients must be given an epidural information leaflet** explaining what they have to do if they experience signs and symptoms of rare and late complications of epidural analgesia such as back pain, leg weakness or problems passing urine. **Please ensure the patient is discharged with this leaflet.** |
| **Catheter migration**<br>Migration of the epidural catheter into the intrathecal space will usually result in rapidly increasing block height | Switch off epidural<br>Contact APS/Anaesthetist<br>Convert to alternative analgesia |
| **Nausea / Vomiting** | Administer anti-emetics as prescribed. If one anti-emetic isn't effective, a second anti-emetic may be given.<br>Consider other possible causes of nausea (e.g. ileus, pain)<br>If nausea seems related to epidural analgesia consider reducing or omitting the opioid and using a local anaesthetic bag only (Levobupivacaine 0.125% 200mls) |

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| **Pruritus (itch)** | Use ondansetron or piriton<br>Consider a small dose of IV naloxone<br>If pruritus is severe and seems related to epidural analgesia consider reducing or omitting the opioid and using a local anaesthetic bag only (Levobupivacaine 0.125% 200ml) |
| **Sedation / Respiratory depression** | Check if any other reason for sedation e.g. administration of a drug with sedating effects.<br>Ensure patient receiving oxygen<br>Sedation score = P , but respiratory rate >8/min: reduce the infusion rate<br>Sedation score = P , but respiratory rate <8/min: reduce the infusion rate and consider administration of naloxone 200mcg IV and repeat in 100mcg increments if required. Inform on call anaesthetist.<br>Sedation score = U (regardless of respiratory rate)<br>stop epidural and give naloxone 200mcg IV and repeat in 100mcg increments as required, stop epidural until patient is more awake. Consider restarting the epidural with local anaesthetic bag only (Levobupivacaine 0125% 200ml)<br>Contact on call Anaesthetist. |
| **Urinary Retention** | Catheterise |
| **Hypotension**<br><br>(BP fall > 30% from pre-op values or systolic BP <90mmHg)<br>– refer to guideline for epidural hypotension management | Look for other causes of hypotension e.g. blood loss, sepsis, cardiac event, medication.<br>Check sensory level - if higher than T3 stop epidural until level drops below T3 then recommence at a lower rate (e.g.2 mls lower than initial rate). Reassess 30mins to 1 hr after stopping.<br>If patient is hypovolaemic give 250 – 500mls of Hartmann's solution over 30 minutes then reassess.<br>Give a bolus of ephedrine as prescribed on epidural chart (6mg, up to a maximum of 3 bolus doses, 10 minutes apart)<br>If ephedrine is effective but the hypotension persists despite repeated doses then it may be necessary to give an infusion of a vasoconstrictor (see guideline for the management of epidural hypotension) regarding the administration of a metaraminol infusion |

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| **Motor Block of 3** | Check whether unilateral or bilateral<br>Check intraoperative records to see how much and what concentration of LA was given.<br>On return from theatre patients may have a motor block of 3 but this should regress to 0 or 1 within 2 hours. If not stop the pump and contact Anaesthetist.<br>Reassess motor block every 15 minutes until improves.<br>If motor block remains at 3 please stop the pump and contact the APS or Anaesthetist<br>Observe for signs and symptoms of an epidural haematoma / abscess:<br>Central back pain<br>Altered sensation<br>Increasing motor block<br>Bowel and / or bladder dysfunction |
| **Sensory level higher than T3** | Check epidural catheter to ensure that the catheter mark at skin is at the level recorded on the epidural chart<br>The catheter is marked at centimetre intervals starting at 5cms,<br>Thereafter - Double marking at 10cms<br>Triple Marking at 15cms<br>Four Marks at 20cms<br>If catheter mark at skin is greater than previously documented (now at 12cm instead of 10cm) discontinue the epidural infusion as the epidural catheter may have migrated into the subarachnoid space. Prescribe alternative analgesia.<br>If the catheter mark at skin remains the same as documented on the epidural chart - stop the epidural infusion until sensory level falls below T3. When recommencing the infusion you may need to consider reducing the rate of the epidural infusion (aim for block height to be no more than two dermatomes higher than wound) |

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| **Local Anaesthetic Toxicity**<br>Signs and symptoms below worsen with increasing blood concentration of LA:<br>Light-headedness<br>Tingling around the mouth and numbness of the tongue<br>Tinnitus, visual disturbances<br>Muscular twitching<br>Drowsiness<br>Convulsions<br>Coma<br>Respiratory arrest<br>Cardiovascular depression / arrhythmias<br>Ventricular fibrillation, cardiac arrest | • If symptoms mild:<br>Stop epidural infusion<br>Maintain oxygenation and BP<br>Consult with Pain Team or on call anaesthetist<br><br>• If symptoms severe:<br>Stop epidural infusion<br>Attach ECG and monitors<br>Phone for help immediately 2222<br>Maintain airway and give high flow oxygen<br>Hypotension will be treated with IV fluids<br>Convulsions will be treated with diazepam<br>Commence CPR if in cardiac arrest<br><br>If patient has a local anaesthetic induced cardiac arrest, collect Intralipid bag from the nearest area: Available in Recovery and each of the Critical Care wards.<br>Treatment will require intravenous Intralipid 20%.<br>Refer to The Association of Anaesthetists of Great Britain and Ireland safety guideline 'Management of Severe Local Anaesthetic Toxicity'. These are kept with the intralipid. |

## 9. WHEN TO STOP EPIDURAL ANALGESIA.

The length of time that patients require epidural analgesia varies, depending on; the type of surgery undertaken, the patient's condition and their response to pain.

The Acute Pain Team recommends a duration of 48–72 hours for post-operative pain management or pain due to trauma.

Before making the decision to stop the epidural infusion, consider the following:

- How long the epidural has been running in relation to the expected duration of the acute pain episode and the optimum duration of the epidural.
- Consider the route available for alternative analgesia and whether the patient will be able to tolerate this.
- Individual patient issues for example; opioid tolerance/dependency, renal impairment, or any previous adverse effects with analgesia.
- ANTICIPATE. Where possible make the plan for step-down analgesia the day before so that the new analgesic modality can be commenced early in the morning.

Step-down analgesia regimes vary. Refer to specific local Protocol.

Anaesthetists or members of the Acute Pain Team will advise appropriate epidural step-down analgesia. Local protocols are also available. Enquire within your own unit.

## 10. REMOVAL OF THE EPIDURAL CATHETER

The epidural catheter can be removed by registered nurses who have had instruction and demonstration. Do **NOT** remove epidural catheter without checking patients coagulation.

Please check the following prior to removal of catheter.

✓ 12 hours since last dose of Enoxaparin administered.

✓ Patient has received no other anti-coagulant drugs

✓ Check INR/PT Ratio is 1.4 or less

✘ If coagulation unavailable contact pain service for review.

Epidural catheter removal should be avoided within 12 hours of previous dose of LMWH and subsequent doses should be withheld for 4 hours.

- Check epidural catheter tip to confirm it has been removed intact
- Send tip to Bacteriology for culture and sensitivity if there are any signs of infection
- Once epidural catheter has been removed apply a simple dry dressing

**Removal of the dressing**

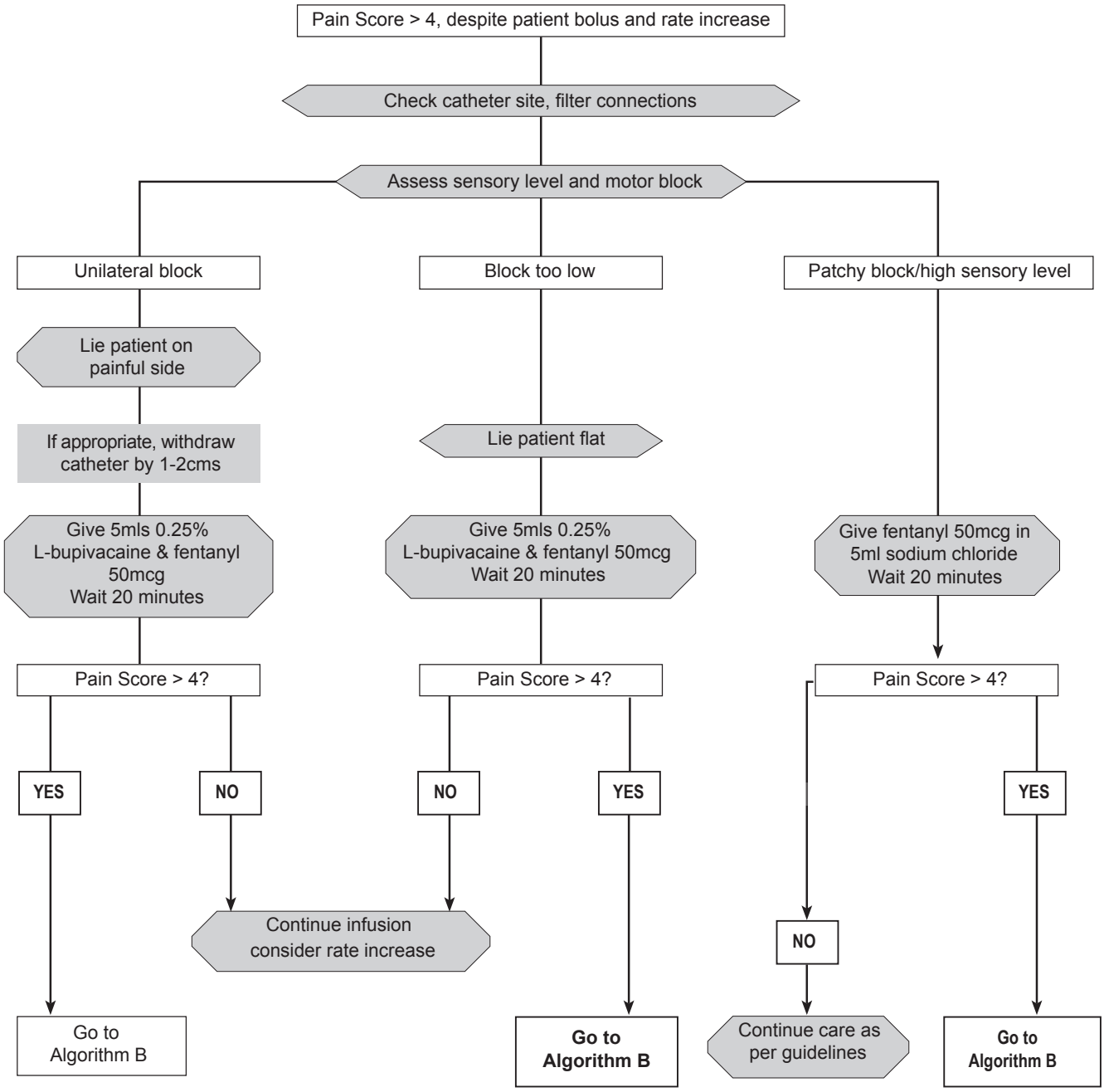
Some patients may be particularly sensitive to certain types of tape used to secure the epidural catheter. If the patient experiences excessive redness, blistering or broken areas of skin please inform the pain nurse. This will alert the Acute Pain Team to any incidence of problems related to a particular type of tape or dressing.

## 11. FURTHER READING

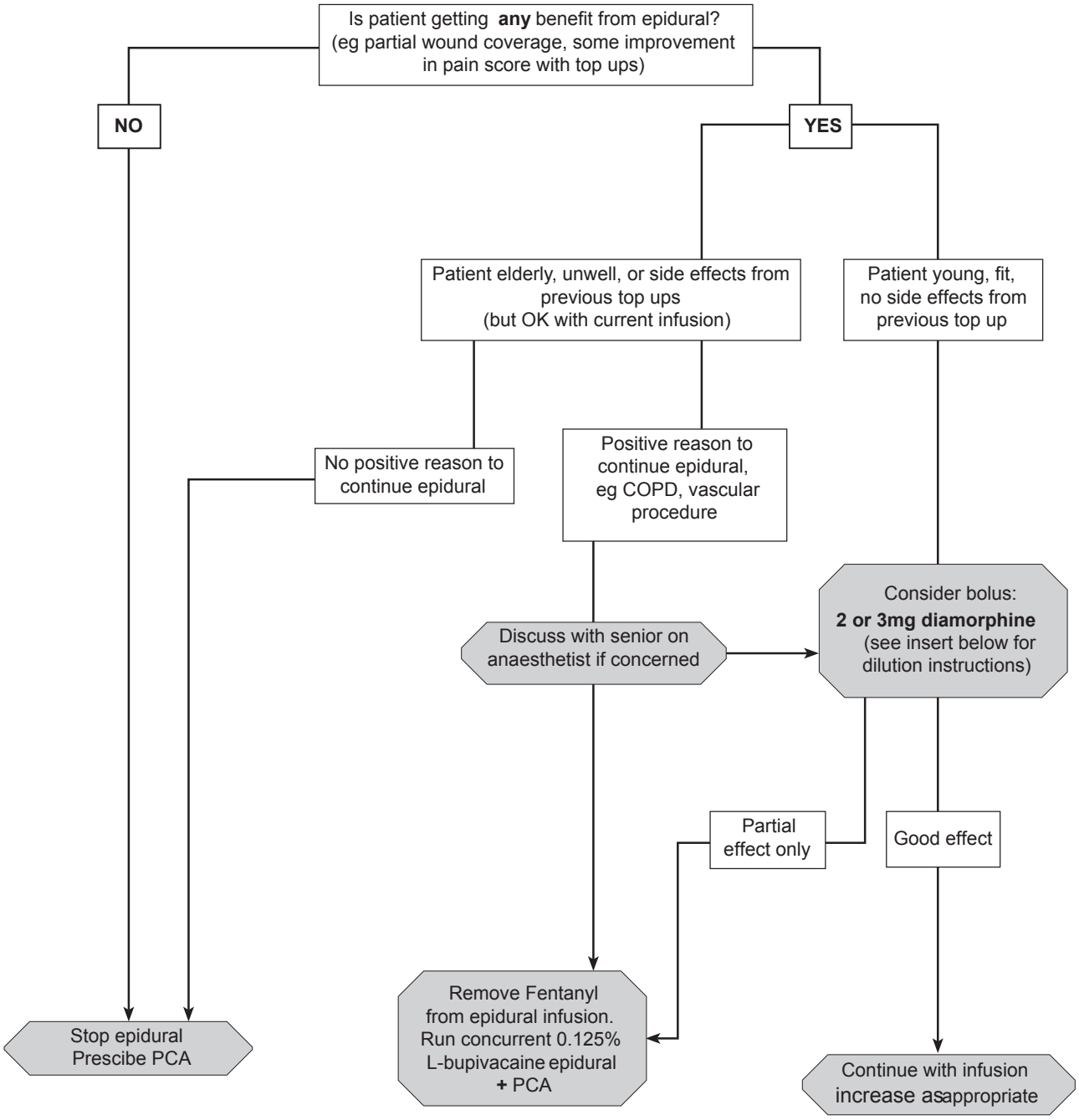
1. Australian and New Zealand College of Anaesthetists and faculty of Pain Medicine (ANCZA) 2020. Acute Pain Management: Scientific Evidence. 5th Edition.
1. The Association of Anaesthetists of Great Britain and Ireland, 2010. Guidelines for the Management of Severe Local Anaesthetic Toxicity. www.aagbi.org.
1. The Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland, 2020. Epidurals for pain relief after surgery.
1. Faculty of Pain Management, 2020.Best Practice in the Management of epidural Analgesia in the Hospital Setting.

## Epidural Top-Up Algorithm A
## for Pain Management Nurses and Anaesthetists

NHS Greater Glasgow and Clyde



# Epidural Top-Up Algorithm B
# for Pain Management Nurses and Anaesthetists




| **Dilution method for 2mg diamorphine** | **Dilution method for 3mg diamorphine** |
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| Draw up **5mg diamorphine** using 5mls sodium chloride 0.9% (concentration 1mg/1ml).<br>Discard 3mls then make up to 6mls with sodium chloride 0.9% | Draw up **5mg diamorphine** using 5mls sodium chloride 0.9% (concentration 1mg/1ml).<br>Discard 2mls then make up to 6mls with sodium chloride 0.9% |

## Notes

## Notes