PURPOSE:
Surgical and trauma patients in Fraser Health receiving epidural analgesia will receive safe, evidence based care by skilled registered nurses, physicians and pharmacists using the FHA approved protocols and procedures. Continuous epidural analgesia for maternity patients is addressed in the FHA Clinical Protocol: Labour Epidural Analgesia.

1. BACKGROUND
Epidural analgesia provides excellent pain relief after surgery or trauma to the chest, abdomen, pelvis or lower limbs and reduces the risk of post-operative complications (Weetman & Allison, 2006). Although rare, epidural analgesia can cause extremely serious complications that can be a life threatening consequence, therefore professionals looking after patients with epidural analgesia need to have the knowledge and skills necessary to recognize complications or side effects related to epidural analgesia (Weetman, 2006; Royal College of Anesthetists et al. 2004).

2. DEFINITIONS

a. Competency:
The knowledge, skill, attitude and judgment required to provide safe, compassionate and ethical care and includes consideration of the context in which the care is provided (FHA Clinical Practice Guideline Central Venous Catheter Care and Maintenance, Adult, 2011). Competence will be initially validated after orientation or initial epidural education session and on an ongoing periodic basis.

b. Expected Duration of Action
The expected length of time a medication may remain active in the body, which may result in analgesic and/or potential side effects. For epidural or spinal duration of action:
- Fentanyl infusions/boluses epidurally or spinally have an expected duration of action of 2 hours.
- Morphine or Hydromorphone infusions/boluses epidurally or spinally have an expected duration of action of 18 to 24 hours.

c. Epidural Anesthesia/Analgesia
The injection or infusion of local anesthetic and/or opioid into the epidural space.

d. Independent Double Check:
“The process whereby a second health care provider (HCP) verifies the calculation or procedure of the first HCP without any communication regarding the anticipated outcome. In order to make the independent double checking of medications an effective strategy for error reduction, the most critical aspect to observe is ensuring independence with each step.”(FHA Clinical Protocol: Medication Practice –Medication prescribing, directive/order processing, administration and documentation, 2012).

e. Local Anesthetics
Reduce pain by blocking the sodium channels in nerve fibers to reduce the nerve conduction and successive transmission of the pain signal from the nerve fiber. Local anesthetics provide a reversible regional loss of sensation and/or motor function (Gmyrek, & Dahdah, 2009).
f. **Regional Anaesthesia:**
The temporary interruption of nerve conduction to a particular area of the body by the delivery of local anesthetic agents resulting in partial or full interruption of autonomic, sensory and motor function.

g. **Regional Analgesia**
The temporary interruption of nerve fibers conducting pain stimuli, from a particular area of the body.

3. **RELATED RESOURCES**
- Mosby Procedures
- CRNBC scope of practice
- FHA Surgical Program Epidural/ Spinal Analgesia Self learning Package
- Preprinted orders
- Flowsheet

4. **APPLICATION PARAMETERS**

**General Safety Standards**
- A Registered Nurse may perform the skills, and monitoring related to the care and maintenance of epidural infusions. The Registered Nurse will receive education and be competency assessed prior to performing skills or monitoring related to epidural infusions. (See Appendix A for competency requirements). Other nursing professionals (LPNs, RPNS, ESNs and student nurses) may assist with care of patients with epidural infusions; however the monitoring and skills for the ongoing maintenance of epidural infusions require a Registered Nurse scope of practice.

- Epidurals will be preferentially inserted while the patient is in the OR or PACU. Once the patient is determined to be stable as per FHA Regional PACU Discharge Criteria, the patient may be transferred to a surgical/ medical area that is staffed with RNs who have been competency assessed for epidural management.

- The Department of Anesthesiology and/or Acute Pain Service is responsible for the epidural management. Only Anesthesiology will order opioids and sedatives while a patient has an epidural insitu and for the expected duration of the drug effects post epidural removal. (Merchant, et al., 2011).

- Patients will have intravenous access that is maintained for the duration of the epidural infusion and for the expected duration of the drug effects post epidural removal; saline lock or maintenance infusion is acceptable (Merchant, et al., 2011).

- Patients receiving continuous epidural analgesia will be admitted into a hospital room equipped with oxygen and suction. Resuscitation medication and equipment will be immediately available (Royal College of Anaesthetists, 2010).
• Patients with epidurals will only be admitted to areas that are adequately staffed with RNs who have demonstrated epidural competency to assess and manage patients receiving epidural analgesia (Merchant, et al., 2011; Royal College of Anaesthetists, 2010).

• Patients may be transferred to an area of the hospital that does not provide epidural monitoring after removal of the epidural, provided that there is no sensory, autonomic or motor block. It is the responsibility of the transferring RN to inform the accepting nurse of any continuation of monitoring as per this clinical protocol.

• Patients must remain in hospital after an epidural catheter is removed until the following minimum criteria have been met:
  o motor, sensory and autonomic function has returned to baseline
  o 2 hours since patient last received an epidural solution containing fentanyl.
  o 24 hours since patient last received an epidural solution containing morphine or hydromorphone. (This reflects timing of a bolus or discontinuation of an infusion – does not refer to when the epidural catheter was removed).

• Patients will receive education regarding the possible signs/ symptoms of an epidural complication and when to access help

• Epidural catheter dressings will allow for examination and assessment of insertion site for catheter movement or site infection (Merchant, et al., 2011).

• Evidence regarding prevention of infection through the use of epidural filter for short term continuous infusions is unclear (American Society of Anesthesiology Task Force, 2010). Use of filters will be individual anesthesiology preference.

• There is insufficient published evidence to evaluate whether removal of an accidentally disconnected catheter is associated with reduced frequency of infectious complications. Therefore decisions regarding accidental disconnections will be made by the individual anaesthesiologist, based upon patient specific factors. However the published guidelines do recommend that in most instances an unwitnessed accidentally disconnected catheter should be removed (American Society of Anesthesiology Task Force, 2010).

**Infusion System Safety** (Merchant et al., 2011, Royal College of Anaesthetists, 2010; American Society of)

• Epidural infusion tubing is yellow striped non-ported and attaches to the epidural catheter via a secure connection

• Epidural infusions are maintained using dedicated, locked, labeled, yellow FHA approved epidural infusion pump

• All epidural catheters are clearly labeled with a fluorescent epidural label (FHA stores #254233).

• All epidural solutions are labeled with the composition of the solution, expiration date and intended route of administration.
• All epidural solutions will be prepared by Pharmacy (or commercially obtained by pharmacy). No additions will be made to epidural bags outside of pharmacy.

• All initial programming and changes to the pump programming or infusion system will be done by an Anaesthesiologist or competency assessed Registered Nurse and verified through an independent double check completed by a competency assessed RN.

Responsibilities

Anesthesiology responsibilities are to:
• Inform patient of potential benefits and risks of procedure.
• Insert and manipulate the epidural catheter.
• Ensure that the fluorescent epidural label is attached to the epidural catheter after insertion.
• Apply and/or change the epidural dressing.
• Communicate to appropriate RN intention to administer top-up of local anesthetic and/or opioid to ensure nursing staffing available for monitoring period.
• Stay with the patient for 5 minutes post any epidural bolus and be readily available (as defined by each specific site anesthesiology department) for at least 30min after an epidural bolus containing a local anesthetic.
• Administer bolus doses of local anesthetic and/or opioids via the epidural catheter.
• Administer initial dose of epidural analgesia/ anesthesia.
• Complete and sign the appropriate pre-printed epidural orders.
• Will order an FHA standard epidural solution unless clinically indicated.
• Communicate directly with a pharmacist if there is a clinical indication for a non standard epidural solution required.
• Provide medical coverage for reportable and emergency situations (Merchant, et al., 2011; Royal College of Anesthetists, 2010).
• Order the removal of the epidural catheter

Pharmacy Responsibilities
• Provide pre mixed infusion bags clearly labeled for route of administration.
• Communicate to anaesthesiology/ acute pain service if any patients with indwelling epidural catheters have anticoagulants ordered other than:
  o Low Molecular Weight Heparin at prophylaxis dosing once a day or
  o Unfractionated Heparin twice daily dosing
• Ensure the Epidural Solution will appear on the pharmacy generated medication administration record.
• Ensure storage of epidural products is segregated from all other medication/ solutions in the refrigerator.

Nursing Responsibilities
Competency Assessed RNs:
• Will maintain and self assess epidural pump competency as per accreditation standards on a yearly basis (see Appendix B: FHA Competency Checklist for Epidural Pumps)
• Assist the anesthesiologist during insertion and manipulation of an epidural catheter.
• Maintain the epidural infusion system.
- Assess patients as per monitoring parameters and protocol
- Adjust the infusion as required based on patient assessment and orders from anesthesiology.
- Verify all pump programming (initial and changes) and infusion system changes and have it checked through an independent double check by a competency assessed Registered Nurse.
- Change the epidural tubing q96h.
- In fully monitored areas **ONLY**: Nurses may provide an epidural bolus through a pump via a clinician bolus as per anaesthesiology order provided that:
  - The nurse has been educated and competency tested for epidural bolus skills
  - The nurse is able to provide 1 to 1 monitoring for 30 minutes post bolus
- Change epidural solution/ bag as required (Head & Ennking, 2008).
- Reinforce dressings, but not change epidural dressings.
- Assess and follow management guidelines regarding possible complications and side effects.
- Discontinue an infusion and cap epidural catheter with a dead end cap.
- With an anaesthesiology order, remove an epidural catheter as ensuring the correct timing of the removal and review INR and PTT as per FHA Surgical Program Procedure: Removal of an Epidural Catheter. (See Appendix D: FHA Surgical Program Procedure: Removal of an Epidural Catheter).
- Ensure that the following equipment is in working order and readily available:
  - Airway adjuncts
  - Resuscitation bag and mask
  - Oral airway
  - Oxygen equipment
  - Suction
  - Naloxone ampoules
5. ASSESSMENT & CONDITION/DISORDER DIAGNOSIS
All of the monitoring standards are minimum guidelines. Patient status may indicate a need for more frequent monitoring (American Society of Anesthesiologists Task Force, 2009; Meikle, Bird, Nightingale & White, 2008; Horlocker, et al., 2003).

<table>
<thead>
<tr>
<th>ASSESSMENT</th>
<th>FREQUENCY</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedation scale &amp; respiratory: rate, rhythm &amp; quality</td>
<td>q1h X 12hrs; then q2h X 12 hours; then q4h with VS <strong>Continue monitoring for 24 hours after infusion with MORphine or HYDROmorphone stopped.</strong></td>
<td>Notify anaesthesiology/APS for low blood pressure as per orders. Ensure other possible causes of hypotension (fluid status, bleeding etc) are assessed</td>
</tr>
<tr>
<td>BP &amp; pulse</td>
<td>q30 min X 2 hrs (in PACU); q1h X 1 after any increase in infusion; then q4h Postural BP, pulse &amp; ensure full motor control of lower limbs prior to first ambulation</td>
<td>See Appendix F dealing with motor block and/or increasing lower body sensory loss.</td>
</tr>
<tr>
<td>Motor Block and assess for any changes in sensation to abdomen/legs</td>
<td>q4h</td>
<td>See Appendix I for further details.</td>
</tr>
<tr>
<td>Assessment prior to first ambulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Postural blood pressure</td>
<td></td>
<td>Before 1st time ambulating and prior to ambulating post any epidural bolus or increase in infusion rate.</td>
</tr>
<tr>
<td>• Motor block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sensory block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ability to safely stand at bedside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See Appendix I for more details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermatome &amp; assess for local anesthetic toxicity</td>
<td>q8h</td>
<td>Contact APS/ anesthesiology: -if sensory block above T4 (nipple line). Stop epidural infusion O2 by mask Contact APS/ Anesthesiology</td>
</tr>
<tr>
<td>Post removal assessment</td>
<td></td>
<td>Notify APS or anesthesiologist if any back pain, increasing or new onset of loss of sensation or motor block.</td>
</tr>
<tr>
<td>Pain assessment with pain scale</td>
<td>q4h while awake and more frequently if pain not well controlled and/or above patient’s pain goal</td>
<td>Titrate epidural as per orders Contact APS/ anaesthesia if pain not improving.</td>
</tr>
<tr>
<td>Specific considerations</td>
<td></td>
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<tr>
<td>• Maintain IV access (saline lock or infusion) through out epidural infusion and continue for expected duration of action (2hrs for FENTANYL; 24hrs for HYDROMORPHINE or MORphine)</td>
<td></td>
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<tr>
<td>• Assess system integrity q shift</td>
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<tr>
<td>• Assess insertion site/dressing q shift</td>
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<tr>
<td>• Ensure resuscitation equipment is readily available and in working order</td>
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<tr>
<td>Post epidural boluses with local anesthetic, monitor VS:</td>
<td></td>
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<tr>
<td>• q5min X 3</td>
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<tr>
<td>• q15min X 1</td>
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<tr>
<td>• q30min X 1</td>
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<tr>
<td>• BP 60 minutes post increase in epidural rate</td>
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6. INTERVENTIONS

Appendix A: Epidural Competency Requirements for Registered Nurses
Appendix B: FHA Competency Checklist for Epidural Pumps
Appendix C: Assisting with Insertion and Initiating a Continuous Epidural Infusion:
Appendix D: Care of an accidental disconnected epidural catheter
Appendix E: Removing an Epidural Catheter
Appendix F: Management of leg weakness in a patient receiving epidural analgesia
Appendix G: Potential complications related to opioids
Appendix H: Potential complications related to local anesthetics
Appendix I: FHA Surgical Procedure: Pre ambulation assessment for patients with continuous epidurals.

7. CLIENT EDUCATION/DISCHARGE INFORMATION

- All patients who receive epidural analgesia are provided with written information about symptoms of epidural abscess or hematoma and when to seek medical help (Cook, Counsell & Wildsmith, 2009; Kindler, Seeberger, & Staender, 1998; Moen, Dahlgren, & Irestedt 2004; Wang, Hauerberg, & Schmidt, 1999).
- All patients will receive information and education about epidural infusions, pain assessment and pain management.

8. DOCUMENTATION

- Document assessments, standards etc.
- Co-signing all independent double checks
  i) Initial programming and set up of an epidural infusion will be documented and signed for on the Pre Printed Surgical Epidural Orders.
  ii) All changes in rate will be cosigned (initialed by 2 RNs) on the Acute pain flowsheet
  iii) All bag changes or new infusions will be cosigned by 2 RNs on the MAR (Medication Administration Record).

9. CLINICAL OUTCOMES

- Patient reports his/her pain is at an acceptable level
- Patients receive competent safe care of epidural
- All complications or potential complications of epidural care are promptly reported to anesthesiology and dealt with in a timely manner.
- Patients will receive education about epidural infusions, pain management and potential complications to be aware of.
10. REFERENCES


Royal College of Anaesthetists. Guidance on the provision of anaesthetic services for postoperative care[Internet]. In Guidelines for the provision of anaesthetic services. London: Royal College of Anaesthetists; 2009 from http://www.rcoa.ac.uk/docs/GPAS-Post.pdf


11. APPENDICES

Appendix A: Epidural Competency Requirements for Registered Nurses
Appendix B: FHA Competency Checklist for Epidural Pumps
Appendix C: Assisting with Insertion and Initiating a Continuous Epidural Infusion:
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Appendix I: FHA Surgical Procedure: Pre ambulation assessment for patients with continuous epidurals.
Appendix A: Epidural Competency Requirements for Registered Nurses

Name: ____________________ Date: _________________________

<table>
<thead>
<tr>
<th>Objective:</th>
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<tr>
<td>♦ To safely care for a patient with a continuous epidural infusion using the Clinical Protocol: Epidural Analgesia for Adult Surgical or Trauma Patients.</td>
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<thead>
<tr>
<th>Competency</th>
<th>Clinical Performance</th>
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<tr>
<td><strong>Epidural pump competency</strong></td>
<td><strong>See pump competency</strong></td>
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<tr>
<td>Assess for a sensory block and explain what the assessment findings mean.</td>
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<tr>
<td>Assess for a motor block and explain what the assessment findings mean</td>
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<tr>
<td>Discontinue an epidural catheter</td>
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**Educational Requirements:**
1) Read FHA self learning package for pain physiology & assessment, patient controlled analgesia, epidural and spinal analgesia and nerve block catheters.

2) Attend the Surgical unit orientation or epidural education session that includes an educational component on epidurals, pcas, regional nerve blocks.
Appendix B: FHA Competency Checklist for Epidural Pumps

Pump Operations and Programming
Demonstrates:

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<th>UNMET</th>
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If applicable to area of practice
8. Demonstrates setting PCEA dose and limits  N/A ☐  ☐  ☐
9. Views and records PCEA given and dose request  ☐  ☐  ☐
10. Demonstrates giving a bolus dose via the pump  ☐  ☐  ☐

Alarms

11. Identifies and resolves alarm conditions:

☐ Low battery
☐ Reservoir volume low
☐ Upstream occlusion
☐ Downstream occlusion
☐ Battery depleted

Pump Reports

10. Demonstrates viewing and/or clearing pump reports  ☐  ☐  ☐

Following orientation to the pump via a Clinical Nurse Educator or delegate the nurse will demonstrate the above procedures. The nurse is then responsible on a yearly base to review this epidural pump competency checklist and ensure ongoing competency or seek additional instruction if determined by this review.

_______________________Nurses name & signature  Date: ______________
_______________________CNE or delegate signature

Yearly date reviewed ________/ _________ / _________/ __________/ ________
Appendix C: FHA Surgical Program Procedure: Assisting with Insertion and Initiating a Continuous Epidural Infusion

Competencies:
The following procedure will be carried out by RNs who have received education and been competency assessed in safe epidural management.

Procedure:

1. Verify correct patient using two identifiers (e.g. Name, PHN).
2. Before the procedure:
   o Ensure patient is aware of and understands the procedure.
   o Ensure the patency of IV lines prior to epidural catheter insertion.
   o Obtain a baseline set of Vital Signs
   o Perform hand hygiene and apply non-sterile gloves, gown, and mask.
3. Ensure that the patient is in position for catheter placement. Assist with holding the patient in position (lateral recumbent knee to chest or leaning over the bedside table)
4. After the epidural catheter is inserted, assist as needed with the application of an occlusive dressing.
5. Assist with attaching Epidural fluorescent label as needed.
7. Obtain orders for intended epidural solution infusion using the Pre Printed Anaesthesiology Epidural Order Set.
8. Obtain and identify the correct medication by utilizing the seven rights of medication administration safety – medication to be independently verified by a 2\textsuperscript{nd} competency assessed RN.
9. Initiate therapy: (all programming to be independently verified by a 2\textsuperscript{nd} competency assessed RN)
10. Discard used supplies, remove personal protective equipment, and perform hand hygiene.
11. Label line for change date.
12. Document the patient’ tolerance of procedure, assessments, and any medication given as per FHA documentation policy.
Appendix D: FHA Surgical Program Procedure: Removal of an Epidural Catheter

Competencies:
The following procedure will be carried out by RNs who have received education and been competency assessed in safe epidural management.

Procedure:
1. Ensure that an order from an anesthesiologist is in place to remove the epidural catheter.
2. Check that a recent INR and PTT (within 2 days) are available. Notify APS or anaesthesiologist on call if INR or PTT is not in the normal range.
3. Ensure the timing of the epidural removal regarding anticoagulation medications
   a. Timing of removal
   i. UNFRACTIONATED HEPARIN bid SC - is 2 hours prior to next dose (10 hours after last dose)
   ii. LMWH (i.e. DALTEPARIN) once a day dose SC is 2 hours prior to next dose (22 hours after last dose)
   Contact anesthesiologist/ APS if patient is receiving any other anticoagulation medication/dosing or frequency.
4. Position the patient side lying with the knees, head and shoulders flexed towards the chest in the fetal position to open the intervertebral spaces, or position patient sitting at bedside with back and shoulders hunched forward.
5. Remove the tape securing the catheter and epidural dressing.
6. Inspect the insertion site for signs and symptoms of infection. If indicated, send a swab for culture and sensitivity.
7. Apply sterile gauze over the insertion site.
8. Grasp the epidural catheter at the insertion site and withdraw, using a slow, steady pull. Minimum resistance should be felt. If significant resistance is encountered, assist the patient into a more flexed position and attempt the removal again. If resistance is still felt; stop the procedure. Cover the gauze with tape and notify APS or anaesthesiologist on call.
9. Apply pressure to the insertion site until any oozing stops. Contact anesthesiologist or APS if oozing is excessive.
10. Apply a Band-Aid to the insertion site.
11. Inspect the catheter to ensure that the black tip is round, smooth and intact. Notify the Anaesthesiologist if the catheter is not intact.
12. Continue monitoring as per the FHA Clinical Protocol: Epidural Analgesia for surgical and trauma patients.
13. Document removal, date and time, catheter intactness, ease or difficulty of removal procedure, bleeding at the site, redness or swelling.
14. Continue monitoring as per Clinical Protocol: Epidural Analgesia for Adult Surgical or Trauma Patients (page 6 for further details).
Appendix E: FHA Surgical Program Procedure: Care of an accidentally disconnected epidural catheter.

This procedure is for providing care to patients who have an epidural catheter insitu, but the infusion system has been accidently disconnected.

Competencies:
The following procedure will be carried out by RNs who have received education and been competency assessed in safe epidural management.

Procedure:
1. Cover the exposed end of the epidural catheter with sterile gauze – tape gauze securely around catheter to maintain as much sterility as possible.
2. Assess the epidural site to see if the epidural catheter is still insitu.
3. Notify APS/ anesthesiologist and discuss plan of care.
   - Decisions regarding accidental disconnections will be made by the individual anaesthesiologist, based upon patient specific factors, such as infection risk, coagulation status, and pain control. The published guidelines do recommend that in most instances that an unwitnessed accidentally disconnected catheter should be removed (American Society of Anaesthesiology Task Force, 2010).
4. Document how long the catheter and filter were disconnected (if known). Document any orders obtained from the anesthesiologist/ APS as per FHA documentation standards.
5. If the epidural infusion is to be continued, change the tubing to ensure the line is sterile.
6. If the epidural is to be discontinued, see FHA surgical program procedure: Removal of an epidural catheter.
Appendix F: Management of leg weakness and/or change of sensation algorithm

Management of leg weakness

Pre ambulation assess motor, sensation and BP
See Appendix I

No Motor block

<table>
<thead>
<tr>
<th>No Motor block</th>
<th>Motor block of 1 (pt can’t straight leg lift but able to bend knees)</th>
<th>Motor block of 2 or more (pt can’t bend knees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titrate epidural infusion to achieve analgesia (as per epidural orders)</td>
<td>Decrease epidural rate by 2ml/hr. Reassess in 1 hour.</td>
<td>Turn epidural off. Provide alternate (PO/SC/IV opioids) analgesia as ordered.</td>
</tr>
</tbody>
</table>

Leg Strength or sensation improving?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO change or increasing weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>If patient is comfortable continue epidural at current rate.</td>
<td>If patient is uncomfortable contact APS or on call anaesthesiologist</td>
</tr>
</tbody>
</table>

Turn epidural off and reassess leg strength and sensation in 1 hour

<table>
<thead>
<tr>
<th>YES</th>
<th>NO change or increasing weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restart epidural at lower rate and continue routine epidural monitoring. If motor block resumes contact anaesthesiologist to confirm epidural placement or solution change.</td>
<td>Has epidural been off for 2 hours?</td>
</tr>
</tbody>
</table>

Leg strength and sensation returning?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No change or increasing weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resume epidural at lower rate.</td>
<td>Contact APS/anaesthesiologist</td>
</tr>
</tbody>
</table>

NO change or increasing weakness

<table>
<thead>
<tr>
<th>YES</th>
<th>NO change or increasing weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact APS or anaesthesiologist on call STAT and indicate suspected epidural</td>
<td>Contact APS or anaesthesiologist</td>
</tr>
</tbody>
</table>

Has epidural been off for 2 hours?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO change or increasing weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact APS or anaesthesiologist on call STAT and indicate suspected epidural</td>
<td>Contact APS or anaesthesiologist</td>
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</table>

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### APPENDIX G: POTENTIAL OPIOID RELATED COMPLICATIONS

<table>
<thead>
<tr>
<th>Complication</th>
<th>Rationale</th>
<th>Intervention</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Depression</strong></td>
<td>• Increased SEDATION is an indicator of impending respiratory compromise</td>
<td>• Assess and record sedation scale</td>
<td>• Note: the duration of the opioid is GREATER than NALOXONE</td>
</tr>
<tr>
<td></td>
<td>• Less opioid is required to produce sedation than respiratory depression, therefore patients will be</td>
<td>• Assess rate, rhythm, and quality of respirations</td>
<td>• The onset of naloxone is 30 sec – 2 min and wears off in 30 min</td>
</tr>
<tr>
<td></td>
<td>sedated before they will show signs of respiratory depression</td>
<td>Ensure safety equipment at bedside</td>
<td>• Close monitoring is essential due to the risk of re-narcotization</td>
</tr>
<tr>
<td></td>
<td>• Use a sedation scale if administering opioids (Pasero, C., 2009)</td>
<td>• If RR less than 10 and/or sedation scale greater than 3 - STOP PCA or Epidural infusion and:</td>
<td>• If patients’ VS stable, try to use small, incremental doses of naloxone to reverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Administer O₂ as necessary</td>
<td>respiratory depression and to prevent rebound pain</td>
</tr>
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<td></td>
<td></td>
<td>o If apneic, call code blue</td>
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<td></td>
<td></td>
<td>o Give NALOXONE as ordered STAT</td>
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<tr>
<td></td>
<td></td>
<td>o Call anesthetist STAT and identify call as respiratory depression</td>
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<tr>
<td></td>
<td></td>
<td>o Continue to monitor</td>
<td></td>
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</tr>
<tr>
<td><strong>Nausea and Vomiting</strong></td>
<td>• Very common side effect and most disturbing to patients</td>
<td>• Provide antiemetic promptly and regularly</td>
<td>• Less nausea &amp; vomiting with epidural administration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Antiemetics can be found on the pre printed orders</td>
<td>• Nausea can be as distressing as pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If attempts to control nausea and vomiting are unresolved, contact APS or anesthesia</td>
<td></td>
</tr>
<tr>
<td><strong>Pruritus</strong></td>
<td>• Some opioids cause the release of histamine from the mast cells, resulting in local or generalized</td>
<td>• Orders to initiate treatment are found on the pre printed orders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>itching</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urinary Retention</strong></td>
<td>• Opioids increase smooth muscle tone</td>
<td>• Assess for urinary retention q4h and PRN</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Perform in &amp; out catheter prn</td>
<td></td>
</tr>
<tr>
<td><strong>Decreased gastric motility</strong></td>
<td>• Opioids delay gastric emptying, slow bowel emptying and decrease peristalsis</td>
<td>• Assess and record bowel movements on your nurses’ notes or daily flow sheet</td>
<td>• Most common opioid side effect</td>
</tr>
<tr>
<td>(constipation)</td>
<td></td>
<td>• Assess for bowel sounds</td>
<td>• Can progress to severe GI dysfunction including ileus, fecal impaction or obstruction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provide bowel protocol as ordered</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• If none ordered, inform physician and obtain orders</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX H: POTENTIAL COMPLICATIONS RELATED TO LOCAL ANESTHETICS

<table>
<thead>
<tr>
<th>Complication</th>
<th>Rationale</th>
<th>Interventions</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Hypotension                   | • Caused by the local anesthetic blocking the sympathetic nerve fibres causing vasodilatation | • Lower patients head of bed, provide O₂ if necessary  
  • Assess volume status  
  • Notify anesthesia, anticipate IV fluid bolus, and/or blood  
  • Stop epidural if necessary - if resistive to the above interventions, the anesthetist may give ephedrine to induce vasoconstriction  
  • VS must be monitored Q5min until stable - only a physician or critical care nurse may give ephedrine  
  • The physician needs to remain until patient stable | • Ensure other possible causes of hypotension (fluid status, bleeding etc) are assessed  
  • Keep accurate intake and output  
  • Assess lab work such as hemoglobin regularly post op |
| High Block                    | • A high block is one that has ascended to T₃, (axilla) and is an undesired level of sensory and/or motor anesthesia | • Contact anaesthesiology/APS if sensory block is above T₄. In rare situations a T₃ block may be appropriate (high thoracic surgery/ or high rib fracture).  
  • Most times a block above T₄ is too high and will require a reduction in the rate of the epidural.  
  • Monitor patient closely for respiratory compromise, and ability to maintain their airway, if any difficulty noted, TURN OFF infusion, provide O₂ as necessary and notify APS or anesthesia STAT | • Some patients may experience bradycardia with high block, treated usually with atropine |
| Urinary Retention             | • Occurs due to a blockade of sensory fibers that innervate the bladder | • Monitor and assess for urinary retention q4h  
  • Catheterize if necessary | • Patients may lose the ability to sense if their bladder is full |
| Nausea                        | • A result of parasympathetic over activity | • Provide antiemetic promptly and regularly as per pre printed orders  
  • Orders to initiate treatment are found on the pre printed order set | • Nausea can be as distressing as pain |
| Local Anesthetic Toxidity     | • More likely with epidural administration than spinal because of the highly vascular nature of the epidural space  
  • Occurs when the LA is absorbed and circulated systemically | • Occurs when a local anesthetic is given systemically (i.e. IV).  
  • **Early signs:** perioral numbness, tinnitus, and dizziness  
  **Stop the epidural infusion immediately and notify APS or Anesthesia**  
  • **Later signs:** hypotension, bradycardia, heart block, blurred vision, shaking, excitement, confusion, sedation convulsions and loss of consciousness  
  **Provide resuscitative measures as needed, call anesthesia STAT, call code if needed** | • Rarely, but can occur as a result of an epidural catheter migrating into a blood vessel in the epidural space |
APPENDIX I: FHA Surgical Procedure: Preambulation Assessment for Patients with Continuous Epidurals.

The following criteria must be met for the patient to ambulate:

- A minimum of 1 hour has passed since initial epidural bolus and all manual boluses administered by anaesthesiologist
- Difference in resting systolic blood pressure (SBP) and sitting with legs dangling SBP is less than 20 mmHg
- Patient tolerates sitting to standing position without dizziness when assisted by registered nurse
- No motor block
- Sensory block no lower than L1-L2 (Normal sensation below upper thighs).
- Demonstrates ability to stand at bedside and flex knees to 90 degrees or greater.

A. Procedure: Assessing for a sensory block:

<table>
<thead>
<tr>
<th>Prepare</th>
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<tbody>
<tr>
<td>♦ Apply ice to an unaffected area (e.g. a facial cheek) so that the patient can identify the cold sensation.</td>
</tr>
<tr>
<td>♦ Ask the patient to indicate the level at which sensation loss occurs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test the Sensory Level on One Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Start at the upper anterior chest and work downwards until the patient states that it does NOT feel as cold – this is the top dermatome level</td>
</tr>
<tr>
<td>♦ Continue downwards until the patients states it feels cold again -the bottom dermatome level is the last place if didn’t feel cold.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test the Other Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Repeat the procedure on the other side of the body</td>
</tr>
</tbody>
</table>

**Documentation**

Document the top and bottom level of dermatome at which the patient could not identify the cold sensation

**Dermatome Level**

<table>
<thead>
<tr>
<th>Dermatome Level</th>
<th>Anatomical Landmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>Nipple line</td>
</tr>
<tr>
<td>T6</td>
<td>Xiphisternum</td>
</tr>
<tr>
<td>T8</td>
<td>Subcostal margin</td>
</tr>
<tr>
<td>T10</td>
<td>Umbilicus</td>
</tr>
<tr>
<td>T12</td>
<td>Suprapubic Level</td>
</tr>
<tr>
<td>L2</td>
<td>Anterior thigh *** if sensory block at this level do not ambulate – contact APS/Anaesthesiologist.</td>
</tr>
</tbody>
</table>

B. Procedure: Assessing for a Motor Block

Assess both legs prior to ambulating, using motor block scale. If any motor block present, notify APS/Anaesthesiology and do not ambulate without further direction

<table>
<thead>
<tr>
<th>Motor Block Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>