

Provincial Clinical Knowledge Topic
Anesthesia – Anesthesia Management of Obstetrical
Analgesia, Adult – Inpatient.
Version 1.1

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Document History

Version	Date	Description of Revision	Completed By / Revised By
1.0	March 2018	Topic Creation and Dissemination	Dr Leyla Baghirzada
1.1	April 2018	- Grammatical fixes - Amendment to acetaminophen extra strength dosing statement - Amendment to Appendix A, Respiratory Depression; when to initiate naloxone order set	Dr Leyla Baghirzada Candice Healey

Important Information Before you Begin

The recommendations contained in this knowledge topic have been provincially adjudicated and are based on best practice and available evidence. Clinicians applying these recommendations should, in consultation with the patient, use independent medical judgment in the context of individual clinical circumstances to direct care. This knowledge topic will be reviewed periodically and updated as best practice evidence and practice change.

The information in this topic strives to adhere to Institute for Safe Medication Practices (ISMP) safety standards and align with Quality and Safety initiatives and accreditation requirements such as the Required Organizational Practices. Some examples of these initiatives or groups are: Health Quality Council Alberta (HQCA), Choosing Wisely campaign, Safer Healthcare Now campaign etc.

This topic is based on the following guideline(s):

[Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force](#)

[Guidelines to the practice of anesthesia - revised edition 2017](#)

Rationale

The purpose of the Anesthesia Management of the Obstetrical Analgesia Clinical Knowledge Topic is to enhance the quality of anesthetic care for obstetric patients, improve patient safety by reducing the incidence and severity of anesthesia related complications, and increase patient satisfaction.

The Anesthesia Management of Obstetrical Analgesia Clinical Knowledge Topic aims at reducing variability in practice of anesthesia in obstetric patients across the province and provides an updated resource for clinicians by incorporating information on evolving labour analgesia techniques.

Goals of Management

Obstetrical care providers should initiate a discussion for pain management in labour during the prenatal period, well before the onset of labour. Risk discussion should include what is known about the effects of various modalities on the progress of labour, risk of instrumental and cesarean delivery, effects on the newborn, and possible breastfeeding effects.

The choice of an analgesic technique depends on the medical status of the patient, progress of labour and resources at the facility. When sufficient resources (e.g. anesthesia and nursing staff) are available, neuraxial catheter techniques should be one of the analgesic options offered. The choice of a specific neuraxial technique should be individualized and based on anesthetic risk factors, obstetric risk factors, patient preferences, progress of labour, and resources at the facility.

The goals of management are to include the following:

1. The well-being of the woman and the fetus are the focus of care.

2. Treatment and care should take into account the women's individual needs and preferences.
3. Treatment and care is culturally appropriate.
4. All women are offered information about the risks and benefits associated with labour analgesia options and anesthesia options for operative delivery.
5. Arrangements and support for pain relief options are discussed.

Not all women require anesthetic during labour or delivery. For women who request pain relief for labour and/or delivery, there are different pharmacologic and non-pharmacologic analgesic techniques available. **Maternal request represents sufficient justification for pain relief.** In addition, maternal medical and obstetric conditions may warrant the provision of neuraxial techniques to improve maternal and neonatal outcome. When neuraxial techniques are used for analgesia during labour or vaginal delivery, the primary goal is to provide adequate maternal analgesia with minimal motor block (e.g. achieved with the administration of local anesthetics at low concentrations with or without opioids).

Clinical Decision Support

Alert:

If a patient has the Invasive Anesthetic Technique has been performed order and anticoagulation therapy is ordered, the clinician needs to be alerted. The alert should read: Invasive Anesthetic Technique Performed – This patient recently underwent an invasive anesthetic procedure.

Decision Making

In the rural setting, there may be limited resources available to treat the side effects of the medication therapy suggested in this topic, thus, consideration should be made to which therapy is best practice for the patient in such a setting.

Perianesthetic evaluation and preparation topics include:

1. A focused history and a physical examination. This should include, but not limited to:
 - Maternal health and anesthetic history
 - Relevant obstetric history
 - Baseline blood pressure measurement, heart rate and oxygen saturation
 - Airway, heart, and lung examination and examination of the spine
2. A communication system should be in place to encourage early and ongoing contact between obstetric providers, anesthesiologists, and other members of the multidisciplinary team.
3. Fetal heart rate should be monitored before and after administration of neuraxial analgesia for labour.

Key priorities to consider in decision making and patient care relevant to Labour Analgesia, Cesarean Section Analgesia, and Postpartum Analgesia are outlined below.

Labour Analgesia

Pharmacological Options Administered by Anesthesiologist during Labour:

- Patient Controlled Analgesia (PCA)
- Neuraxial analgesia

Patient Controlled Analgesia

Fentanyl PCA

Table 1: Overview of Fentanyl PCA use for Labour

Indications	Contraindications	Maternal Side Effects	Fetal Side Effects	Patient Preparation	Criteria for Use
Inability to safely place an epidural Patient refusal of epidural analgesia Patient request	Allergy to opioid medication Inability to provide continuous patient monitoring by nursing staff Uncorrected hypotension or hypovolemia Respiratory compromise	Sedation Respiratory depression Pruritus Nausea and vomiting Hypotension Bradycardia	Decreased fetal heart rate Decreased variability	Provide information of fentanyl PCA benefits and side effects Provide patient education regarding fentanyl PCA use Ensure patient exclusively controls fentanyl PCA dose	Do not administer other narcotics. PCA infusion through port less administration infusion set dedicated to infusion for PCA. Access to naloxone and neonatal resuscitation equipment.

The principle advantages of PCA for patients are:

- Clinically effective though not complete analgesia,
- Autonomy,
- Elimination of delay in decisions to medicate for pain,
- Freedom from painful intramuscular injections.

The quality of analgesia with PCA has consistently been reported as superior or equal to that with intramuscular opioids.

Fentanyl is an opioid with a profile that is suitable for use during labour.

Evidence for Fentanyl PCA Use in Labour

During the mid to late 1990s, a group of investigators in Canada undertook a multidisciplinary, multicentre study entitled “Multicentre Trial on the Effects of Analgesia on the Progress of Labour” (MEAPOL). The purpose of the investigation was to determine the effect, if any, of epidural analgesia on the progress of labour in nulliparous parturients. The study was designed to use PCA fentanyl labour analgesia for the control group and permitted the PCA parameters (bolus and lockout intervals) to be adjusted to meet parturient- determined requirements. Labour analgesia was initiated with a modest intravenous loading dose of 1 to 2 mcg/kg (100 to 150 mcg) of fentanyl followed by PCIA fentanyl (Bolus: 50 mcg; Lockout: 10 minutes; No 4 hour limit; No Continuous Infusion). Concerns regarding significant adverse maternal effects (e.g. respiratory depression, excessive sedation, etc.) of fentanyl were unfounded as neither respiratory depression nor clinically significant maternal sedation requiring intervention were observed and only 23% of women required treatment of nausea. We can say that recommended single bolus dose should not exceed 100 mcg regardless the body mass.

Temporary analgesia and mild sedation was apparent after administration of 50 to 100 mcg

Transient decrease in fetal heart rate variability was noted after fentanyl administration

No adverse effects of in utero exposure to fentanyl were noted on neonatal examination, however, a retrospective chart review comparing intravenous PCA with remifentanil vs fentanyl suggested that neonates receiving in utero fentanyl had higher need for resuscitation¹.

Remifentanil PCA

Table 2: Overview of Remifentanil PCA use for Labour

Indications	Contraindications	Maternal Side Effects	Fetal Side Effects	Patient Preparation	Criteria for Use
Inability to safely place an epidural Patient refusal of epidural analgesia Patient request	Allergy to opioid medication Inability to provide continuous patient monitoring by nursing staff Uncorrected hypotension or hypovolemia Respiratory compromise	Sedation Respiratory depression Pruritus Nausea and vomiting Hypotension Bradycardia	Decreased fetal heart rate Decreased variability	Provide information of remifentanil PCA benefits and side effects Provide patient education regarding remifentanil PCA use Ensure patient exclusively controls remifentanil PCA dose	Continuous patient monitoring Continuous SpO ₂ monitoring during infusion Continuous oxygen therapy via nasal cannula at 2 liters/minute Do not administer other narcotics PCA infusion through port

Remifentanil is a short acting opioid that provides clinically effective though not complete labour analgesia within 1 to 2 minutes via PCA administration.

- Risk of maternal respiratory depression can occur because of the potency of remifentanil. For this reason, patients receiving remifentanil must be provided one-to-one nursing care and maintain continuous oxygen saturation monitoring and provide oxygen therapy.

The dose of remifentanil suggested for labour analgesia does not have a clinically significant neonatal depressant effect despite freely crossing the placenta. However, most studies did not include preterm pregnancies within the study population, thus there is limited data of the effect of remifentanil in preterm pregnancies.

Remifentanil provides an option for analgesia in labour when epidural analgesia is contraindicated or declined by the patient.

- Remifentanil PCA provides clinically effective (though not complete) analgesia:
- Has a rapid onset and offset
- Is non-cumulative with few maternal and neonatal side-effects, which decreases the potential of respiratory depression for the neonate.

Caution for Remifentanil Use:

Intrauterine growth restriction

Gestation less than 37 weeks

Criteria for Remifentanil Use:

Patients receiving pain relief with a Remifentanil PCA infusion should be continuously monitored for complications by nursing staff while in labour.

Establish SpO₂ monitoring prior to initiating Remifentanil PCA with continuous monitoring during infusion.

Maintain dedicated intravenous infusion line for Remifentanil PCA. Do not administer any other medications through the Remifentanil PCA infusion line.

Oxygen therapy to be administered via nasal cannula at 2 liters/minute during Remifentanil PCA to maintain maternal oxygen saturation above 93% as there is potential for desaturation during infusion.

Neuraxial Labour Analgesia

Common neuraxial options include epidural and combined spinal epidural (CSE). No significant differences were found in fetal heart rate patterns, Apgar scores or umbilical artery and vein acid-base status between traditional epidural and CSE².

Based on Cochrane review, CSE was more favorable COMPARED TO TRADITIONAL EPIDURALS in relation to speed of onset of analgesia from time of injection, as well as a reduced incidence for rescue analgesia, urinary retention and rate of instrumental delivery. No differences between CSE and traditional epidural were identified for mobilization in labour, the need for labour augmentation, the rate of cesarean birth, incidence of post dural puncture headache, maternal hypotension, neonatal Apgar scores or umbilical arterial pH.

For CSE versus low-dose epidurals, three outcomes were statistically significant:

- Two of these reflected a faster onset of effective analgesia from time of injection with CSE and the third was of more pruritus with CSE compared to low-dose epidural.
- There was no significant difference in maternal satisfaction.

No differences between CSE and low-dose epidural were identified for need of rescue analgesia, mobilization in labour, incidence of post dural puncture headache, known dural tap, blood patch for post dural headache, urinary retention, nausea/vomiting, hypotension, headache, the need for labour augmentation, mode of delivery, umbilical pH. Apgar score or admissions to the neonatal unit, neonatal Apgar scores or umbilical arterial pH³.

It is suggested to consider a low concentration bupivacaine epidural. Evidence does not support a specific bupivacaine concentration, however, common concentrations used are in the range of 0.5 to 0.8 mg/mL to decrease the risk of motor block⁴.

Timing of the Epidural Catheter

Patients in **early labour** (i.e. less than 5 cm dilation) should be offered the option of neuraxial analgesia when this service is available.

Neuraxial analgesia should be offered on an individualized basis regardless of cervical dilation.

Neuraxial analgesia does not affect the duration of the first stage of labour (i.e. time until complete cervical dilation).

The use of neuraxial analgesia does not increase the incidence of cesarean delivery.

The patient should be assessed by an anesthesiologist prior to epidural placement to determine suitability for epidural analgesia in labour.

Consent for epidural placement should be obtained by the anesthesiologist including risks, benefits and options. Relevant contraindications/indications should be reviewed.

Anesthesiologists should use appropriate aseptic technique and equipment.

Indications for Offering Early Placement of Epidural (Prior to Onset of Labour or Patient Request)

Trial of Labour after previous Cesarean Section

Twin Gestation

Preeclampsia

Anticipated Difficult Airway

Maternal Obesity

Patient specific comorbidity conditions

Epidural Maintenance

At present, in Alberta, the provincial standard for labour epidural is EITHER Patient Controlled Epidural Analgesia or Intermittent Epidural Bolus Analgesia

Patient Controlled Epidural Analgesia (PCEA)

PCEA may be used to provide an effective and flexible approach for the maintenance of labour analgesia. The use of PCEA may be preferable to fixed-rate

PCEA may be used with or without a background continuous epidural infusion.

Epidural medication delivered continuously via programmable infusion pump. Additional epidural medication is delivered upon patient demand through hand held PCEA administration. Limits/timing intervals are prescribed by the anesthesiologist.

Continuous Epidural Infusion (CEI)

Patients who receive PCEA are less likely to require anesthetic interventions, require lower doses of local anesthetic and have less motor block than those who receive CEI⁵.

Intermittent Epidural Bolus Analgesia (IEB)

Definition:

Epidural medication is delivered via bolus at regular intervals by a programmable infusion pump. Additional epidural medication is delivered on demand by patient request through a hand held PCEA. Epidural pump programming may include clinician administered boluses. The anesthesiologist will order limits and timing of boluses.

Supporting Information:

IEB is an appealing concept. Some evidence suggests IEB slightly reduces local anesthetic usage and improves maternal satisfaction. Given the wide confidence intervals (CI) of the pooled results for many outcomes, definite conclusions cannot be drawn for those outcomes, but there is also a potential that IEB lowers the rate of instrumental delivery rate and need of anesthesia interventions⁶.

More evidence is required to conceptualize the ideal IEB regimen and investigate its effect on labour analgesia and obstetric outcomes. (Intermittent epidural bolus compared with continuous epidural infusions for labour analgesia: a systematic review and meta-analysis). Possible IEB dosing regimen: 10 mL of bupivacaine every 60 minutes starting 40 minutes after initial loading dose of 10 mL 0.1% bupivacaine. Full list of possible dosing could be found in meta-analysis on this topic: intermittent epidural bolus compared with continuous epidural infusions for labour analgesia: a systematic review and meta-analysis⁷.

Management of Side Effects of Epidural

When a neuraxial technique is chosen, appropriate resources for the treatment of complications (e.g. hypotension, systemic toxicity, and high spinal anesthesia) should be available. If an opioid is added, treatments for related complications (e.g. pruritus, nausea, and respiratory depression) should be available.

Patient Monitoring in Labour

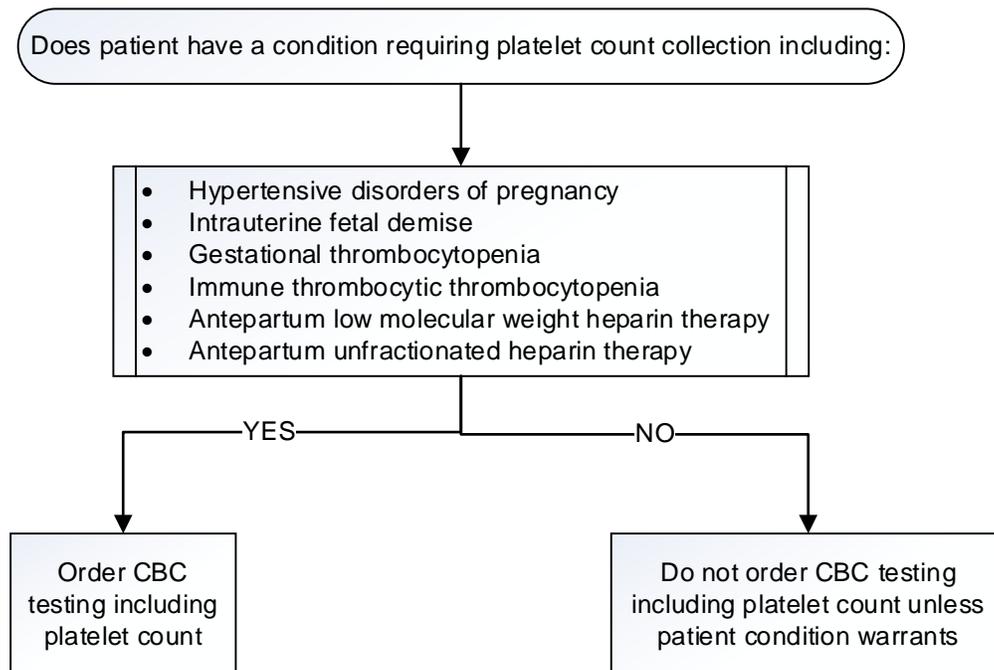
Patients with indwelling epidural catheters should be continuously monitored for complications while in labour and following delivery.

Laboratory Tests

Evidence and best practice including the ASA and NICE guidelines as well as Choosing Wisely **do not support** routine bloodwork including complete blood count, type and screen or cross match for obstetrical patients expected to have an uncomplicated delivery or cesarean section.

Review of site ordering practices, red cell inventory and patient history can limit orders, preserve inventory and decrease cost while improving patient safety by limiting unnecessary transfusions.

Figure 1: Determining Patient Need for Lab Testing



CBC Testing

The decision to order a CBC testing including a platelet count should be individualized and based on a patient’s history, physical examination, and clinical signs. A routine platelet count is unnecessary in a healthy parturient.

Conditions requiring platelet count:

- Hypertensive disorders of pregnancy;
- Intrauterine fetal demise;
- Gestational thrombocytopenia;
- Immune thrombocytic thrombocytopenia;
- Antepartum low molecular weight heparin therapy;
- Antepartum unfractionated heparin therapy

Type and Screen Testing

A routine blood cross-match is not necessary for healthy and uncomplicated parturients for vaginal or operative delivery and the decision whether to order or require a blood type and screen or cross-match should be based on maternal history and/or anticipated hemorrhagic complications.

Conditions requiring type and screen testing:

- Abnormal placentation
- Hypertensive disorders of pregnancy
- Previous uterine surgery
- Any condition likely to lead to operative delivery

Airway Management during Initial Provision of Neuraxial Analgesia in a Labour Delivery Room Setting

Suggested resources to have immediately available within the Labour & Delivery Unit

- Laryngoscope and assorted blades,
- Oropharyngeal airway (OPA) and nasopharyngeal airway (NPA),
- Endotracheal tubes with stylets,
- Oxygen source,
- Suction source with tubing and tonsil suction tip,
- Self-inflating bag and mask for positive-pressure ventilation,
- Medications for blood pressure support, muscle relaxation, and hypnosis,
- Wedge to aid in positioning the patient minimizing risk of hypotension syndrome.

Cesarean Section Anesthesia

The decision to use a particular anesthetic technique for cesarean delivery should be individualized, based on anesthetic, obstetric, or fetal risk factors (e.g. scheduled versus emergency surgery), the preferences of the patient, and the judgment of the anesthesiologist.

TAP blocks provide effective analgesia after cesarean section; however, additional benefits are more difficult to demonstrate when long-acting intrathecal opioids are administered⁸.

Spinal/Epidural Anesthesia

Neuraxial anesthesia (either spinal or epidural) is generally the preferred anesthetic technique for cesarean delivery. The choice of neuraxial technique may depend upon the urgency, indications, patient comorbidities and presence or absence existing epidural catheter.

General Anesthesia

Consider selecting neuraxial techniques in preference to general anesthesia for most cesarean deliveries.

General anesthesia may be the most appropriate choice in some circumstances (e.g. conditions requiring emergency cesarean section and maternal contraindications to neuraxial anesthesia).

Patient Positioning

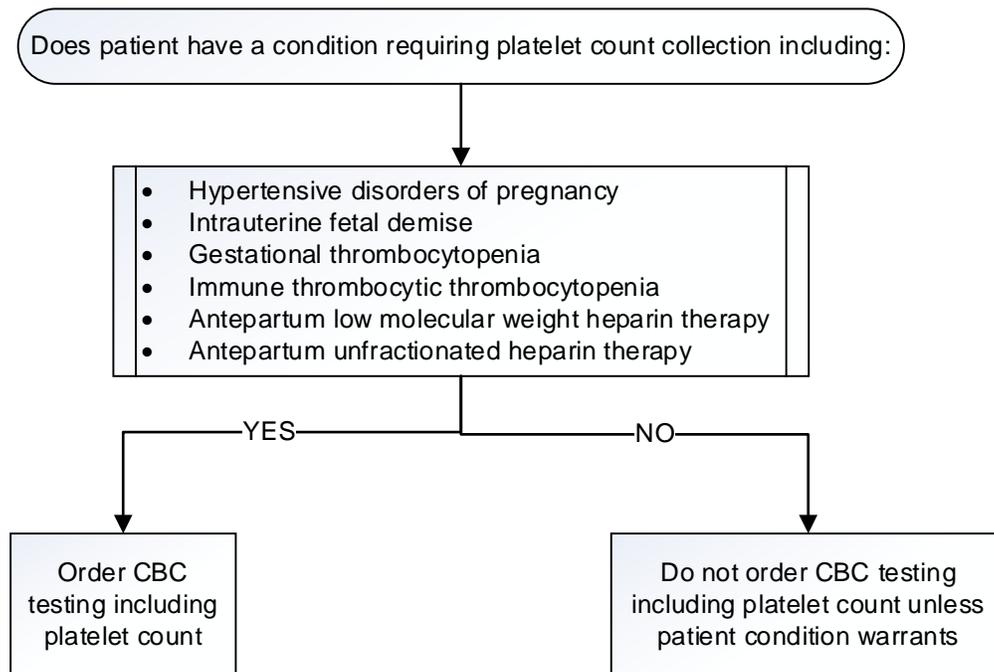
Uterine displacement (usually left displacement) should be maintained until delivery regardless of the anesthetic technique used.

Laboratory Tests

Evidence and best practice including the American Society of Anesthesiologists (ASA) and National Institute for Health and Clinical Excellence (NICE) guidelines as well as Choosing Wisely **do not support** routine bloodwork including complete blood count (CBC), type and screen or cross match for obstetrical patients expected to have an uncomplicated delivery or cesarean section.

Review of site ordering practices, red cell inventory and patient history can limit orders, preserve inventory and decrease cost while improving patient safety by limiting unnecessary transfusions.

Figure 2: Determining Patient Need for Lab Testing



CBC Testing

The decision to order CBC testing including a platelet count should be individualized and based on a patient's history, physical examination, and clinical signs. A routine platelet count is unnecessary in a healthy parturient.

Conditions requiring platelet count:

- Hypertensive disorders of pregnancy;
- Intrauterine fetal demise;
- Gestational thrombocytopenia;
- Immune thrombocytic thrombocytopenia;
- Antepartum low molecular weight heparin therapy;
- Antepartum unfractionated heparin therapy.

Type and Screen Testing

A routine blood cross-match is not necessary for healthy and uncomplicated parturients for vaginal or operative delivery and the decision whether to order or require a blood type and screen or cross-match should be based on maternal history and/or anticipated hemorrhagic complications.

Other conditions the team may wish to consider type and screen testing are:

- Abnormal placentation;
- Hypertensive disorders of pregnancy;
- High risk for postpartum hemorrhage (PPH);
- Bleeding dyscrasias;
- Previous uterine surgery.

NPO Consideration for Obstetric Patients at Risk for Cesarean Section

The risk of intake for uncomplicated labouring patients will be determined by the obstetrician and anesthesiologist.

Clear Fluid Intake

Oral intake of moderate amounts of clear fluids may be allowed for uncomplicated obstetric patients undergoing scheduled cesarean section delivery for up to 3 hours before induction of anesthesia.

Solid Food Intake

Obstetric patients at low risk for complications undergoing scheduled cesarean section delivery should have a fasting period from solids of 6 hours for a carbohydrate based meal and 8 hours for a fatty and/or protein based meal prior to induction of anesthesia as per the Canadian Anesthesia Society (CAS) guidelines.

Obstetric patients with additional risk factors for aspiration (e.g. GERD, hiatal hernia, current BMI greater than 40) or patients at increased risk for operative delivery may have further restriction for oral intake.

Aspiration Prophylaxis

Before surgical procedures (e.g., cesarean delivery or postpartum tubal ligation), consider the timely administration of sodium citrate, H₂-receptor antagonists, and/or metoclopramide for aspiration prophylaxis.

Postpartum Analgesia for Patients Delivering by Cesarean Section

Consider selecting neuraxial opioids rather than intermittent injections of parenteral opioids for postpartum analgesia.

Options include:

- Morphine preservative free 100 mcg (0.1 mg)
 - Hydromorphone preservative free 50 mcg (0.05 mg)
- NOTE: 50–100 mcg of intrathecal hydromorphone approximates 100 -200 mcg of intrathecal morphine⁹

Non-opioid analgesics should generally be the first choice for pain management in breastfeeding postpartum women, as they do not impact maternal or infant alertness (III)¹⁰.

Adjuvant Medications

Codeine or Codeine with acetaminophen (Tylenol 3)

Although rare, rapid metabolizers of codeine are known, and levels of morphine following the use of codeine may be significantly elevated thus putting the infant at risk. Due to the possibility of rapid metabolizers resulting in a high level of morphine may put the infant at risk, codeine is **NOT recommended** for breastfeeding mothers.

Non-steroidal anti-inflammatory (NSAID) Medications

There is no specific dosing for postpartum perineal or incisional pain following cesarean delivery. Available evidence and/or expert consensus is inconclusive or is inadequate for determining infant risk when used during breastfeeding. Caution, however should be used in women with uncontrolled gestational or preexisting hypertension, preeclampsia/HELLP (hemolysis, elevated liver enzymes, low platelet count), low platelet count, borderline renal function.

Celecoxib

Celecoxib transfer into milk is extraordinarily low (less than 0.3% of the weight-adjusted maternal dose). Its short term use is safe. Recommended oral dose for acute pain and dysmenorrhea is 200 mg twice daily¹¹.

Diclofenac

Diclofenac is reasonably safe to use during breastfeeding as a short-term analgesic. When administered gastro-resistant tablets 50 mg every 12 hours, traces of the medication can be found in breast milk, but in such small amounts that are not expected side effects in the infant.

Ibuprofen

Ibuprofen is considered an ideal, moderately effective analgesic. Its transfer to milk is low to nil.

Recommended oral dosing is 200 to 400 mg every 4 to 6 hours as needed; maximum: 1,200 mg/day

Ketorolac

Ketorolac is a potent analgesic in breastfeeding mothers and is increasingly popular when used postpartum. Its primary benefit is excellent analgesia, with no sedative properties. In addition, the transfer of ketorolac into milk is extremely low. However, ketorolac's use in postsurgical patients with hemorrhage may be somewhat risky as it inhibits platelet function, although this is somewhat controversial. Ketorolac should not be used in patients with a history of gastritis, aspirin allergy or renal insufficiency.

Recommended IV/IM dosing is: 10 mg to 30 mg every 4 to 6 hours as needed (maximum: 120 mg/day) for up to 2 days; lowest effective dose should be utilized.

Naproxen

Naproxen transfer into breast milk is low, but gastrointestinal disturbances have been reported in some infants following prolonged therapy. Short-term use (1 week) is probably safe.

Recommended dosing for treating mild to moderate pain: 750 mg/day divided into 2 or 3 doses per day; dose may be increased to 500 mg twice daily.

Acetaminophen

Acetaminophen is a safe and effective analgesic in postpartum mothers. It is advisable to consider scheduled dosing of acetaminophen as opposed to on as needed basis to facilitate continuous analgesia.

Recommended dosing:

Immediate-release: Immediate-release dosage form: 325 mg to 1000 mg PO every 4 to 6 hours; maximum total daily acetaminophen dose from all sources is 4000 mg.

Extra strength: 1000 mg every 6 hours; maximum daily dose: ≤ 4000 mg daily unless directed by a health care provider and under health care provider supervision.

Opioid Medication

Hydromorphone

Hydromorphone 2 to 4 mg PO every 2 to 4 hours as needed is a safe and effective choice for analgesia in breastfeeding postpartum women.

Morphine

Morphine 10 to 20 mg PO every 2 to 4 hours as needed is still considered an ideal analgesic for breastfeeding mothers due to its limited transport to milk and its poor oral bioavailability in infants.

Oxycodone

Oxycodone is present in breast milk in variable concentrations ranging from unmeasurable to 229 mcg/L. The relative Infant Dose (RID) range from 1.01 to 8%. Oxycodone may not be safe for the rare mother who is an ultra-rapid metabolizer, as it is also a substrate for CYP2D6. A recent retrospective study showed that one in five breastfed infants with mothers medicated with oxycodone experienced central nervous system depression. The strong concordance between maternal and infant symptoms may be used to identify babies at higher risk. It is important to follow these infants carefully for drowsiness¹².

In summary, when an opiate is needed, use of oxycodone in breastfeeding women is not recommended by some guidelines¹⁰. Other guidelines note it may be useful to treat pain in some postpartum women, although prolonged and frequent use may cause neonatal sedation¹². Maternal doses greater than 30 mg/day are not recommended¹³. In addition, caution should be used in a woman who may be an ultrarapid metabolizer; oxycodone is a substrate for CYP2D6 and their breastfeeding infants may be at higher risk for adverse event¹².

Fentanyl Patient Controlled Analgesia, Adult – Labour Order Set

Patient Care

- Clinical Communication: Prior to starting PCA, review all previous narcotic, anti-nauseant and sedation orders with ordering service.
- Notify Anesthesia for all problems and orders related to pain, sedation, nausea and vomiting, and pruritus.

Monitoring

- Vital Signs Protocol Epidural/PCA Analgesia-Obstetrics – Monitor as follows: heart rate, blood pressure, pain and sedation score and respiratory rate every 5 minutes x 3, then every 15 minutes x 1, then every 30 minutes. Increase monitoring frequency as patient condition indicates.

Intravenous Therapy

- Intravenous Cannula – Insert: Initiate IV.
- 0.9% NaCl infusion at _____ mL/hour.
- Lactated ringers infusion at _____ mL/hour.

Fentanyl PCA Medication

Recommended standard dosing 10 to 25 micrograms. Suggested lockout 6 minutes. Suggested no 4 hour dose limit unless required by policy.

Suggested initial dosing for frail or small patients: PCA dose 15 microgram, lockout interval 8 minutes, no 4 hours dose limit.

- fentaNYL PCA only, _____ micrograms IV.
Lockout interval _____ minutes.
4 hour dose limit _____ micrograms.
For inadequate analgesia after one hour, increase PCA dose to _____ micrograms.
For uncontrolled pain, if sedation level is 0 or 1 and respiratory rate is greater than 11/minute, give a loading dose equal to PCA dose every 5 minutes to a maximum of 3 doses. Check respiratory rate and sedation level 5 minutes, 15 minutes and 1 hour after each dose. If 3 doses ineffective, call the ordering physician.

Treatment of Side Effects

Patient Care

- In and Out catheter PRN for urinary retention

Respiratory Care - PRN

- Oxygen Saturation Monitoring – continuous, PRN
- Oxygen Therapy – Nasal Cannula, Adult, 2 to 3 LPM flowrate to maintain SpO₂ greater than or equal to 92%, continuous, PRN

Medications

Antipruritics – PRN

Recommended standard dose range: 12.5 to 50 mg.

- diphenhydRAMINE _____ mg IV every 4 hours PRN for pruritus.

- nalbuphine 2.5 mg IV every 3 hours PRN for pruritus.

Recommended standard dose range: 0.02 to 0.04mg.

- naloxone _____ mg IV every 2 hours PRN for pruritus.
- naltrexone 5 mg PO/NG/OG every 12 hours PRN for pruritus.

Antiemetics – PRN

Recommended standard dose range 25 to 50 mg.

- dimenhydrinate _____mg IV every 6 hours PRN for nausea & vomiting.
- metoclopramide 10 mg IV every 4 hours PRN for nausea & vomiting.
- ondansetron 4 mg IV every 8 hours PRN for nausea & vomiting.

Naloxone Protocol

Patient Care

- Notify Attending Service when Respiratory rate less than 8 per minute and sedation level 3.
- Vital Signs: When respirations less than 8 per minute and sedation level 3 as per local Naloxone Protocol monitor pulse, respirations, oxygen saturation, pain score, sedation level, blood pressure every 5 minutes for 30 minutes and then every 15 minutes for one hour and then when required.

Medication

- naloxone 0.1 mg Direct IV every 3 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.
- If no IV access, naloxone 0.2 mg subcutaneously/intramuscularly (IM) every 10 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.

Remifentanil Patient Controlled Analgesia, Adult – Labour Order Set

Patient Care

- Clinical Communication: Discontinue IV PCA and notify attending Anesthesiologist STAT if maternal SpO₂ less than 90% and patient is unresponsive to oxygen supplementation
- Notify Attending Anesthesiologist if systolic blood pressure is less than 90 mmHg or greater than 20% drop from baseline, analgesia is ineffective, unable to manage side effects/complications, the 4 hour dose limit is reached before 4 hours elapse
- Notify Anesthesia for all problems and orders related to pain, sedation, nausea and vomiting, and pruritus.
- Notify Labour and Delivery Anesthesiologist STAT and discontinue IV PCA infusion if respiratory rate less than 8/minute and Sedation Level 3 (see Naloxone protocol)

Monitoring

- Vital Signs Protocol PCA/Continuous Infusion– Monitor as follows: heart rate, blood pressure, pain and sedation score and respiratory rate every 10 minutes x 30 minutes when IV PCA initiated or when any change is made to PCA or infusion settings, then every 1 hour for duration of infusion or more frequently if clinically indicated.
- Fetal heart rate (FHR) and uterine activity monitoring as indicated by intrapartum FHR monitoring guidelines

Respiratory Care – Continuous during PCA Infusion

- Oxygen Saturation Monitoring: continuous
- Oxygen Therapy – Nasal Cannula, Adult, 2 to 3 LPM flowrate to maintain SpO₂ greater than or equal to 92%, continuous, as needed

Intravenous Therapy

- Intravenous Cannula – Insert: Initiate IV.
- 0.9% NaCl infusion at _____ mL/hour.
- Lactated ringers infusion at _____ mL/hour.

Remifentanil PCA Medication

PCA dose 0.25 micrograms/kg. Suggested lockout 2 minutes. Suggested 4 hour dose limit 3000 mcg. Recommended continuous infusion dose 1.5 micrograms/kg/hour.

NOTE: Remifentanil infusion is microgram/kg/hour not microgram/kg/minute.

- Remifentanil PCA 10 microgram/mL PCA and Continuous Infusion. Preparation: mix 1 mg remifentanil in 100 mL normal saline.
PCA dose _____ micrograms IV.
Lockout interval _____ minutes.
4 hour dose limit _____ micrograms.
Continuous rate _____ micrograms/kg/hour.

For inadequate analgesia after one hour, change:

For inadequate analgesia [change 1 setting at a time every hour];

Recommended continuous infusion dose increase to 3 micrograms/kg/hour for inadequate analgesia.

Increase continuous rate to _____ microgram/kg/hour.

Recommended PCA dose 0.5 microgram/kg.

Increase PCA dose to _____ micrograms.

Transitions and Referrals

- Consult _____

Treatment of Side Effects

Patient Care

- In and Out catheter PRN for urinary retention

Respiratory Care

- Discontinue IV PCA and notify Labour and Delivery Anesthesiologist STAT if maternal oxygen saturation is less than 90% and unresponsive to oxygen supplementation
- Oxygen therapy: titrate to oxygen saturation greater than or equal to 95%
- Oxygen therapy: titrate to oxygen saturation greater than or equal to 92%
- Oxygen therapy: titrate to oxygen saturation greater than or equal to _____%

Medications

Antipruritics – PRN

Recommended dose range 12.5 to 50 mg.

- diphenhydrAMINE _____ mg IV every 4 hours PRN for pruritus.
- nalbuphine 2.5 mg IV every 3 hours PRN for pruritus.

Recommended dose range 0.02 to 0.04 mg.

- naloxone _____ mg IV every 2 hours PRN for pruritus.
- naltrexone 5 mg PO/NG/OG every 12 hours PRN for pruritus.

Antiemetics – PRN

Recommended dose range 12.5 to 50 mg.

- dimenhydrINATE _____ mg IV every 4 hours PRN for nausea & vomiting.
- metoclopramide 10 mg IV every 4 hours PRN for nausea & vomiting.
- ondansetron 4 mg IV every 8 hours PRN for nausea & vomiting.

Naloxone Protocol

Patient Care

- Notify Attending Service when Respiratory rate less than 8 per minute and sedation level 3.
- Vital Signs: When respirations less than 8 per minute and sedation level 3 as per local Naloxone Protocol monitor pulse, respirations, oxygen saturation, pain score, sedation level, blood pressure every 5 minutes for 30 minutes and then every 15 minutes for one hour and then when required.

Medication

- naloxone 0.1 mg Direct IV every 3 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.
- If no IV access, naloxone 0.2 mg subcutaneously/intramuscularly (IM) every 10 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.

Labour Epidural Analgesia, Adult – Inpatient Order Set

Patient Care

This order should only be discontinued by Anesthesia or Acute Pain Services.

- Invasive Anesthetic Technique Performed: This patient recently underwent an invasive anesthetic procedure.
- Notify Anesthesia for all problems and orders related to pain, sedation, nausea and vomiting, and pruritus for first 24 hours.
- Notify Anesthesia for sensory level monitoring above T4.
- Epidural Catheter: Remove. Activate when appropriate post-delivery.
- Clinical Communication: Prior to direct discharge from Labour and Delivery unit, ensure patient is stable.

Monitoring

Preselected orders are recommended based on evidence. If selecting alternative option, deselect preselected order.

- Vital Signs Protocol – Monitor as follows: heart rate and blood pressure every 5 minutes x 4, then every 15 minutes x 2, then every 30 minutes after administering any physician-delivered bolus. Increase monitoring frequency if patient condition indicates.
- Vital Signs Protocol – Monitor as follows: pain score, sedation level, respiratory rate and block level every 15 minutes x 4 then every one hour. Increase monitoring frequency if patient condition indicates.
- Fetal Heart Rate: Monitor for 20 minutes after any physician-delivered bolus as per Obstetric Protocol. Increase monitoring frequency if patient condition indicates.
- Sensory Level Monitoring – Monitor as follows: every 1 hour for duration of infusion.
- Bromage Scale Assessment: Monitor every 4 hours or prior to any ambulation attempts.

Intravenous Therapy

- Intravenous Cannula: maintain for duration of therapy until epidural block is resolved, initial postpartum monitoring complete and patient able to void spontaneously.

Labour Epidural Medications (Choose One):

Continuous epidural infusion and patient administered bolus (PCEA) – Recommended:

Recommended BUPivacaine concentration: 0.5 mg/mL, 0.6 mg/mL, or 0.8 mg/mL.

- fentaNYL EPIDURAL 2 mcg/mL with BUPivacaine _____ mg/mL concentration, continuous and BOLUS,
Rate _____ mL/hour,
Bolus dose _____ mL,
Bolus lockout _____ minutes,
Hourly limit 40 mL,
Clinician bolus _____ mL.
May give clinician bolus every _____ hour(s) PRN.

IF 2 clinician boluses ineffective contact the appropriate services specified in protocol Notify Order.

OR

For inadequate analgesia [change 1 setting at a time every 1 hour]:

Increase continuous rate by 2 mL/hour to a maximum of _____ mL/hour,
 Increase bolus dose to _____ mL,
 Decrease lockout to _____ minutes.

Epidural with programmed intermittent bolus and patient administered bolus (PIEB):

Recommended BUPivacaine concentration 0.5mg/mL, 0.6mg/mL, or 0.8 mg/mL.

- fentaNYL EPIDURAL 2 mcg/mL with BUPivacaine _____ mg/mL concentration, intermittent and BOLUS.

Programmed Intermittent Bolus Settings:

Intermittent bolus _____ mL,
 Time to first programmed bolus _____ minutes
 Programmed bolus time interval _____ minutes

AND

Patient Administered Bolus Settings:

Patient administered bolus _____ mL
 Patient administered bolus lockout _____ minutes
 Clinician bolus _____ mL,
 May give clinician bolus every _____ hour(s) PRN.

IF 2 clinician boluses ineffective contact the appropriate service specified in protocol Notify Order.

OR

Hourly limit 40 mL, Local Anesthetic _____.
 For inadequate analgesia [change 1 setting at a time every 1 hour]:
 Increase continuous rate by 2 mL/hour to a maximum of _____ mL/hour,
 Increase bolus dose to _____ mL,
 Decrease lockout to _____ minutes.

Continuous Epidural Infusion only:

Recommended BUPivacaine concentration 0.5 mg/mL, 0.6 mg/mL, or 0.8 mg/mL.

- fentaNYL EPIDURAL 2 mcg/mL with BUPivacaine _____ mg/mL concentration, continuous only,
 Rate _____ mL/hour,
 Hourly limit 40 mL,
 Clinician bolus _____ mL.
 May give clinician bolus every _____ hour(s) PRN.

IF 2 clinician boluses ineffective contact the appropriate services specified in protocol Notify Order.

OR

For inadequate analgesia [change 1 setting at a time every 1 hour]:
 Increase continuous rate by 2mL/hour to a maximum of _____ mL/hour,
 Increase bolus dose to _____ mL,
 Decrease lockout to _____ minutes.

Transitions and Referrals

- Consult _____

**Treatment of Side Effects
Patient Care**

- In and Out catheter PRN for urinary retention

Respiratory Care - PRN

- Oxygen Therapy: Titrate to Saturation SpO₂ equal to or greater than 93%, continuous, as needed

Medications

Antipruritics – PRN

*Recommended standard dosing 10 to 50 mg. Recommended single dose maximum 100 mg.
Recommended daily maximum 400 mg.*

- diphenhydrAMINE _____ mg IV every 4 hours PRN for pruritus.
- nalbuphine 2.5 mg IV every 3 hours PRN for pruritus.

Recommended standard dosing 0.02 to 0.04 mg.

- naloxone _____ IV every 2 hours PRN for pruritus.
- naltrexone 5 mg PO/NG/OG every 12 hours PRN for pruritus.

Antiemetics – PRN

Recommended standard dosing 12.5 to 50 mg.

- dimenhydrINATE _____mg IV every 4 hours PRN for nausea & vomiting.
- metoclopramide 10 mg IV every 4 hours PRN for nausea & vomiting.
- ondansetron 4 mg IV every 8 hours PRN for nausea & vomiting.

Naloxone Protocol

Patient Care

- Notify Attending Service when Respiratory rate less than 8 per minute and Sedation Level 3.
- Vital Signs: When respirations less than 8 per minute and Sedation Level 3 as per local Naloxone Protocol monitor pulse, respirations, oxygen saturation, pain score, sedation level, blood pressure every 5 minutes for 30 minutes and then every 15 minutes for one hour and then when required.

Medication

- naloxone 0.1 mg Direct IV every 3 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.
- If no IV access, naloxone 0.2 mg subcutaneously/intramuscularly (IM) every 10 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.

Monitoring Post Cesarean Section with Intrathecal Medication Order Set

Patient Care

This order may be discontinued after delivery unless specified by Anesthesia/Acute Pain Service that it should be left active postpartum.

- Invasive Anesthetic Technique Performed: This patient recently underwent an invasive anesthetic procedure.
- Notify Labour and Delivery Anesthesiologist for all problems related to pain, sedation, nausea and vomiting, and pruritus for first _____ hours.
- Notify Acute Pain Service for all problems related to pain, sedation, nausea and vomiting, and pruritus until discharge from APS.

Monitoring

- Vital Signs Protocol Post Intrathecal/Epidural Morphine (L&D/Low Risk) – Monitor as follows: pulse, blood pressure and pain score every hour for 8 hours then every 8 hours for 16 hours. Respirations, SpO₂ and Sedation Level for every hour for 8 hours then every 2 hours for 16 hours.

OR

- Vital Signs Protocol Post Intrathecal/Epidural Morphine – Monitor as follows: every one hour for 8 hours, then every 2 hours for 16 hours. Increase frequency of monitoring PRN or as indicated by physician.
- Bromage Scale Assessment – Monitor as follows: every 4 hours and as needed. Also assess prior to ambulation. Continue assessment until block has resolved.
- Sensory Level Monitoring – Monitor sensory block level every 1 hour for 4 hours. Continue assessment every 4 hours until block has resolved.

Respiratory Care

- Oxygen Therapy: titrate to saturation (SpO₂ greater than or equal to 92%).

Intravenous Therapy

- Maintain Intravenous Access for duration of therapy by intravenous infusion or saline lock for 12 hours post spinal/epidural opioid.
- 0.9% NaCl infusion at _____ mL/hour.
- Lactated ringers infusion at _____ mL/hour.

Medications

- Epidural/Spinal Medication: _____ administered at (hh:mm): _____ (as documented in the Anesthetic Record).

Nonopioid Analgesics

Recommended standard dosing: 325 to 1000 mg.

- acetaminophen _____ mg PO every 6 hours.
- diclofenac EC 50 mg PO every 12 hours with food.

Recommended standard dosing: 200 to 600 mg.

- ibuprofen _____ mg PO every _____ hours.

Recommended standard dosing 250 mg three times daily or 325 mg two times daily.

- naproxen _____ mg PO _____ daily with food for breakthrough pain.

Recommended frequency every 6 hours.

- ketorolac 10 mg IV every 6 hours.

Recommended standard dosing 25 to 50 mg. Suggested maximum 200 mg/day.

- indomethacin _____ mg PO _____ times a day.

Recommended standard dosing 50 to 100 mg. Suggested maximum 200 mg/day. Administer twice daily if dose is greater than 100 mg.

- indomethacin _____ mg RECTALLY _____ times a day.

Recommended only if proven history of ulcers, complicated perforation, obstruction or major bleeding.

- celecoxib 200 mg PO twice daily with meals.

Opioid Analgesics

Recommended standard dosing 5 to 10 mg.

- oxyCODONE _____ PO every 4 hours PRN for breakthrough pain.

Recommended standard dosing 10 to 20 mg.

- morphine _____ mg PO every 3 hours PRN for breakthrough pain.
- HYDROMORPHONE 2 – 4 mg PO every 3 hours PRN for breakthrough pain.

Treatment of Side Effects

Patient Care

- In and Out catheter every 6 hours as needed for urinary retention

Medications

Antipruritics – PRN

Recommended standard dosing 10 to 50 mg. Recommended single dose maximum 100 mg.

Recommended total daily maximum 400 mg.

- diphenhydrAMINE _____ mg IV every 4 hours PRN for pruritus.
- nalbuphine 2.5 mg IV every 3 hours PRN for pruritus.

Recommended standard dosing 0.02 to 0.04 mg.

- naloxone _____ mg IV every 2 hours PRN for pruritus.
- naltrexone 5 mg PO/NG/OG every 12 hours PRN for pruritus.

Antiemetics – PRN

Recommended standard dosing 50 to 100 mg. Recommended total daily maximum 400 mg.

- dimenhydrINATE _____ mg IV every 4 hours PRN for nausea & vomiting.

- metoclopramide 10 mg IV every 4 hours PRN for nausea & vomiting.
- ondansetron 4 mg IV every 8 hours PRN for nausea & vomiting.

Naloxone Protocol

Patient Care

- Notify Attending Service when Respiratory rate less than 8 per minute and Sedation Level 3.
- Vital Signs: When respirations less than 8 per minute and sedation level 3 as per local Naloxone Protocol monitor pulse, respirations, oxygen saturation, pain score, sedation level, blood pressure every 5 minutes for 30 minutes and then every 15 minutes for one hour and then when required.

Medication

- naloxone 0.1 mg Direct IV every 3 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.
- If no IV access, naloxone 0.2 mg subcutaneously/intramuscularly (IM) every 10 minutes PRN for respiratory rate less than 8 per minute and sedation level 3. Maximum 4 doses. Give first dose STAT.

Analytics

Analytic 1

Name of Measure	Rate of postdural puncture headache in obstetrical patients.
Definition	Measurement of the frequency of postdural puncture headaches for obstetrical patients receiving an epidural for pain management during labour.
Rationale	Postdural puncture headaches are a rare but at times severe complication associated with epidural initiation. When obstetrical patients experience this complication, it can affect the ability to effectively care for their newborn until the side effects resolve. Measurement of the rate of postdural puncture headaches will provide the information for clinicians on the incidence of this complication at the facility and ensure adequate follow up of these patients.

Analytic 2

Name of Measure	Maternal oxygen desaturation during remifentanil PCA use.
Definition	Measurement of the frequency of maternal desaturation during remifentanil PCA use during labour defined as oxygen saturation less than 90% despite supplemental oxygen therapy.
Rationale	The use of remifentanil PCA for pain management in labour is a relatively new pain relief option for obstetrical patients. One of the side effects that is concerning for anesthesiologists and obstetrical staff is the potential for maternal respiratory depression which in addition to being a maternal side effect can affect the fetal tolerance of labour. Measurement of the incidence of oxygen desaturation during remifentanil PCA use will provide the information needed to guide clinicians providing this pain management option for obstetrical patients.

Analytic 3

Name of Measure	Maternal hypotension during remifentanil PCA use
Definition	Measurement of the frequency of hypotension during remifentanil PCA use during labour defined as systolic blood pressure less than 90 mmHg or greater than 20% drop from baseline.
Rationale	The use of remifentanil PCA for pain management in labour is a relatively new pain relief option for obstetrical patients. One of the side effects that is concerning for anesthesiologists and obstetrical staff is the potential for maternal hypotension which in addition to being a maternal side effect can affect the fetal tolerance of labour. Measurement of the incidence of maternal hypotension during remifentanil PCA use will provide the information needed to guide clinicians providing this pain management option for patients.

Analytic 4

Name of Measure	Maternal bradycardia during remifentanil PCA use.
Definition	Measurement of the frequency of maternal bradycardia during remifentanil PCA use during labour defined as heart rate less than 60 beats per minute or greater than 20% drop from baseline.
Rationale	The use of remifentanil PCA for pain management in labour is a relatively new pain relief option for obstetrical patients. One of the side effects that is concerning for anesthesiologists and obstetrical staff is the potential for maternal bradycardia which in addition to being a maternal side effect can affect the fetal tolerance of labour. Measurement of the incidence of maternal bradycardia during remifentanil PCA use will provide the information needed to guide clinicians providing this pain management option for patients.

Analytic 5

Name of Measure	Atypical/Abnormal fetal heart rate during remifentanil PCA use.
Definition	Measurement of the frequency of atypical and/or abnormal fetal heart rate as assessed by obstetrical staff during remifentanil PCA use during labour.
Rationale	The use of remifentanil PCA for pain management in labour is a relatively new pain relief option for obstetrical patients. One of the side effects that is concerning for anesthesiologists and obstetrical staff is the potential for maternal respiratory depression and/or hypotension which can affect the fetal tolerance of labour as a result. Measurement of the incidence of atypical/abnormal fetal heart rate during maternal remifentanil PCA use will provide the information needed to guide clinicians providing this pain management option for obstetrical patients.

Outcome Analytic 1

Name of Measure	Number of times Fentanyl Patient Controlled Analgesia – Labour Order Set is used.
Definition	To determine frequency of Order Set Usage.
Notes for Interpretation	Health record to have coding for Fentanyl Patient Controlled Analgesia – Labour Order Set.

Outcome Analytic 2

Name of Measure	Adherence to clinical standards in Fentanyl Patient Controlled Analgesia – Labour Order Set
Definition	To determine compliance to clinical standards within the order set
Rationale	What percentage of the time are the orders within the Patient Controlled Analgesia – Labour Order Set followed for patients in which the Patient Controlled Analgesia – Labour Order Set is ordered?
Notes for Interpretation	Health record to have coding for Fentanyl Patient Controlled Analgesia – Labour Order Set.

Outcome Analytic 3

Name of Measure	Number of times Labour EPIDURAL Analgesia Order Set is used.
Definition	To determine frequency of Order Set Usage.
Notes for Interpretation	Health record to have coding for Labour EPIDURAL Analgesia Order Set.

Outcome Analytic 4

Name of Measure	Adherence to clinical standards in Labour EPIDURAL Analgesia Order Set
Definition	To determine compliance to clinical standards within the order set
Rationale	What percentage of the time are the orders within the Labour EPIDURAL Analgesia Order Set followed for patients in which the Labour EPIDURAL Analgesia Order Set is ordered?
Notes for Interpretation	Health record to have coding for Labour EPIDURAL Analgesia Order Set.

Outcome Analytic 5

Name of Measure	Number of times Remifentanil Patient Controlled Analgesia - Labour Order Set is used.
Definition	To determine frequency of Order Set Usage.
Notes for Interpretation	Health record to have coding for Remifentanil Patient Controlled Analgesia – Labour Order Set.

Outcome Analytic 6

Name of Measure	Adherence to clinical standards in Remifentanil Patient Controlled Analgesia - Labour Order Set.
Definition	To determine compliance to clinical standards within the order set
Rationale	What percentage of the time are the orders within the Remifentanil Patient Controlled Analgesia - Labour Order Set followed for patients in which the Remifentanil Patient Controlled Analgesia - Labour Order Set is ordered?
Notes for Interpretation	Health record to have coding for Remifentanil Patient Controlled Analgesia - Labour Order Set.

Outcome Analytic 7

Name of Measure	Number of times Intrathecal Monitoring Post Cesarean Section Order Set is used.
Definition	To determine frequency of Order Set Usage.
Notes for Interpretation	Health record to have coding for Intrathecal Monitoring Post Cesarean Section Order Set.

Outcome Analytic 8

Name of Measure	Adherence to clinical standards in Intrathecal Monitoring Post Cesarean Section Order Set.
Definition	To determine compliance to clinical standards within the order set
Rationale	What percentage of the time are the orders within the Intrathecal Monitoring Post Cesarean Section Order Set followed for patients in which the Intrathecal Monitoring Post Cesarean Section Order Set is ordered?
Notes for Interpretation	Health record to have coding for Intrathecal Monitoring Post Cesarean Section Order Set.

Clinical Recommendations Summary

Clinical Question #1: In patients undergoing cesarean section, what is the evidence to support the use of intraoperative dexamethasone for postoperative nausea and vomiting prophylaxis?

Clinical Recommendation #1: Current evidence does not support the use of intraoperative dexamethasone to reduce the incidence of postoperative nausea and vomiting.

Quality of Evidence: GRADE C

Strength of Recommendation: Weak

Clinical Question #2: In parturients receiving epidural analgesia, what are the effects of continuous epidural infusion (CEI) compared to continuous plus patient-controlled epidural analgesia (PCEA/PCA) bolus on maternal analgesia (efficacy), maternal satisfaction, motor block and clinician workload?

Clinical Recommendation #2: Review of the studies on the mode of delivery of epidural analgesia does not support a strong recommendation regarding background infusion rate, lockout interval timeframe, and intermittent bolus dose. There was some suggestion of lower total dose of local anesthetic and lower incidence of motor block in the protocols using patient controlled bolus delivery. However, given the small sample sizes in the studies, the variations in defining and/or measuring patient satisfaction and pain, the variations in study protocols and patient populations no definitive recommendation could be made.

Quality of Evidence: GRADE C

Strength of Recommendation: Insufficient evidence

References

1. Marwah R, Hassan S, Carvalho JC, Balki M. Remifentanyl versus fentanyl for intravenous patient-controlled labour analgesia: an observational study. *Can J Anaesth*.2012;59:246-254. doi: 10.1007/s12630-011-9625-0.
2. Patel NP, El-Wahab N, Fernando R, et al. Fetal effects of combined spinal-epidural vs epidural labour analgesia: a prospective, randomized double-blind study. *Anesth*. 2014; 69(5):458-67. doi: 10.1111/anae.12602.
3. Simmons SW, Taghizadeh N, Dennis AT, Hughes D, Cyna AM. Combined spinal-epidural versus epidural analgesia in labour. *Cochrane Database Syst Rev*. 2012;10:CD003401. doi: 10.1002/14651858.CD003401.pub3.
4. McGrady E, Litchfield K. Epidural analgesia in labour. *Continuing Education in Anesthesia Critical Care & Pain*, 2014; 4(4). 114–117.
5. Van der Vyver M, Halpern S, Joseph G. Patient-controlled epidural analgesia versus continuous infusion for labour analgesia: a meta-analysis. *Br J Anaesth* 2002, 89(3):459-65.
6. Capogna, G., Camorcia, M., Stirparo, S., Farcomeni, A. Programmed intermittent epidural bolus versus continuous epidural infusion for labour analgesia: The effects on maternal motor function and labour outcome. A randomized double-blind study in nulliparous women. *Anesth Analg*. 2011; 113(4):826-831. doi: 10.1213/ANE.0b013e31822827b8.
7. George RB, Allen TK, Habib AS. Intermittent epidural bolus compared with continuous epidural infusions for labour analgesia: a systematic review and meta-analysis. *Anesth Analg* 2013; 116(1):133-44. doi: 10.1213/ANE.0b013e3182713b26.
8. Champaneria R, Shah L, Wilson MJ, Daniels JP. Clinical effectiveness of intravenous abdominis plane (TAP) blocks for pain relief after cesarean section: a meta-analysis. *Int J Obstet Anesth* 2016; 28:45-60. doi: 10.1016/j.ijoa.2016.07.009.

9. Rathmell JP, Lair TR, Nauman B. The role of intrathecal drugs in the treatment of acute pain. *Anesth Analg*. 2005; 101(5Suppl):S30-43.
10. Sachs H. The Transfer of Drugs and Therapeutics into Human Breast Milk: An Update on Selected Topics. *Pediatrics*. 2013;132(3):e796-e809. doi:10.1542/peds.2013-1985
11. Product Monograph: CELEBREX, celecoxib capsules. GD Searle LLC. Pfizer Canada Inc. Kirkland, QC, 2015.
http://www.pfizer.ca/sites/g/files/g10017036/f/201505/CELEBREX_PM_E_179963_03March2015.pdf
12. Montgomery A, Hale T.ABM. Clinical Protocol #15: Analgesia and Anesthesia for the Breastfeeding Mother, Revised 2012. *Breastfeeding Med*. 2012;7(6). doi: 10.1089/bfm.2012.9977.
13. American College of Obstetricians and Gynecologists. Practice Bulletin No. 177: Obstetric Analgesia and Anesthesia. *Obstet Gynecol*. 2017;129(4):e73–e89. doi: 10.1097/AOG.0000000000002018.

American Society of Anesthesiologists. Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. *Anesth*. 2016; 124:270-300. Doi: 10.1097/ALN.0000000000000935.

BC Women's Hospital and Health Centre. Fentanyl: Protocol for labour. 2014.

Beatty NC, Arendt KW, Niesen AD, Wittwer ED, Jacob AK. Analgesia after cesarean delivery: a retrospective comparison of intrathecal hydromorphone and morphine. *J Clin Anesth*. 2013; Aug, 25(5):379-383. doi:10.1016/j.jclinane.2013.01.014.

Dobson G, Chong M, Chow L, Guidelines to the practice of anesthesia – revised edition 2017. *Can J Anaesth* 2017; 64(1):65-91. doi: 10.1007/s12630-016-0749-0.

Griffiths JD, Gyte GML, Paranjothy S, Brown HC, Broughton HK, Thomas J. Interventions for preventing nausea and vomiting in women undergoing regional anesthesia for cesarean section. *Cochrane Database Syst Rev* 2012(9):CD007579. doi: 10.1002/14651858.CD007579.pub2.

Halpern SH, Carvalho B. Patient-controlled epidural analgesia for labour. *Anesth Analg*. 2009;108:921-928. doi: 10.1002/14651858.CD007579.pub2.

Konefał H, Jaskot B, Czeszyn´ska MB, Pastuszka J. Remifentanil patient-controlled analgesia for labour—monitoring of newborn heart rate, blood pressure and oxygen saturation during the first 24 hours after delivery. *Arch Med Sci*. 2013;9(4):697–702). doi: 10.5114/aoms.2012.31306.

Stock O, Beckmann M. Why group & save? Blood transfusion at low-risk elective cesarean section. *Anzjog*. 2014. 54:279-282. doi:10.1111.ajo.12177.

Keywords

Labour Analgesia
Labour Anesthesia
Obstetrical Anesthesia
Patient Controlled Analgesia

Patient Controlled Epidural Analgesia/Anesthesia
 Postpartum Analgesia/Anesthesia
 Cesarean Section Analgesia/Anesthesia

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Appendix A – Resource for Healthcare Providers

PCA Information

Intravenous infusion of fentaNYL and remifentanil are a pain relief option for parturient.

PCA Infusion Set Up

Administration Tubing

The tubing is designed for the PCA solution to be administered through the **main line** and the intravenous infusion solution bag is attached at the **Y-site** thus the PCA solution does not mix or “back flow” into the intravenous infusion solution bag. Refer to [Appendix B](#) for a diagram of the administration tubing set up.

Note: The main intravenous infusion administration line is to be connected to the PCA infusion administration set.

If the PCA is stopped:

- Turn off the PCA infusion pump
- Disconnect the PCA administration from the patient
- Disconnect the intravenous infusion solution from the PCA tubing and reconnect this solution line to the patient.

PCA Infusion Assessment

Descriptor	Drowsiness	Respiratory Depression
Mild	Subjective sensation of sleepiness and able to relax between contractions	No evidence of hypoventilation between contractions
Moderate	Patient sleeping between contractions but arouses during contraction	Respiratory rate greater than 10 but less than 20 between contractions. Increases to 20 during contraction
Excessive	Patient sleepy between and during contractions	Respiratory rate less than 10 at any point

During PCA use, continuous assessment for evidence of drowsiness and/or respiratory depression is required

If respiratory depression is suspected

- Assess patient according to [Table 1](#)
- Use pulse oximetry as required
- Contact physician if patient is exhibiting signs of moderate or excessive respiratory depression

Document patient assessment

Potential Side Effects Labour Analgesia PCA Infusions

Table 4: Side Effects for Labour Analgesia		
Side Effect	Signs/Symptoms	Action
Allergic Response	Rash	Stop infusion. Call anesthesiologist
Anaphylaxis – Rare Allergic Response	Rash Shortness of breath Hypoxia Hypotension Swollen face	Stop infusion Call anesthesiologist Initiate resuscitation measures (code 66, code blue, rapid response team, medical help)
Nausea and Vomiting		Contact anesthesiologist if unresolved with prescribed antiemetics. Administer ondansetron and/or dimenhydrinate as per prescriber's orders
Pruritis	Itching	Contact anesthesiologist if unresolved with prescribed antipruritics. Administer diphenhydramine hydrochloride as per prescriber's orders
Respiratory Depression	If the: Respiratory rate is 10 per minute and/or Sedation scale is 3	Discontinue the PCA infusion Gently rouse patient and instruct her to breathe Initiate oxygen therapy at 8 to 10 liters/minute Call the anesthesiologist STAT If respirations are 8/minute, follow naloxone protocol within order set
Pain	Pain Scale greater than 7	Call anesthesiologist.
Hypotension	Systolic blood pressure less than 90	Call anesthesiologist.
Heart Rate	Less than 60 beats per minute	Call anesthesiologist if associated with hypotension.

Appendix B – Bromage Scale

Bromage Scale Table	
Bromage 0 (none)	Full flexion of knee and foot
Bromage 1 (partial)	Just able to move knee and foot
Bromage 2 (almost complete)	Able to move foot only
Bromage 3 (complete)	Unable to move foot or knee

Appendix C – Dermatome Level Assessment

