

Childbirth Pain Relief: Pharmacological Interventions

2 contact hours

DESCRIPTION

The purpose of this course is to provide the learner with information about commonly used pharmacological methods of pain relief during childbirth. The content of the course includes information about the factors that impact pain and pain perception during labor; pharmacological pain interventions, including the indications, actions and side effects of various medications; local, regional and general anesthesia; and maternal and fetal physiological responses to medications and anesthesia.

OBJECTIVES

At the conclusion of this course, the learner will be able to:

1. Detail the factors that affect pain perception during labor and delivery.
2. Describe the care of a woman who is receiving pharmacological interventions during labor.
3. Relate the indications for, actions of, and maternal as well as fetal side effects of medications used during labor.
4. List the indications for and the maternal and fetal physiological responses to local, regional and general anesthesia.

INTRODUCTION

Nurses play a vital role in assisting women to make pain control choices during labor. Although physicians and some advanced practice nurse midwives order medications, nurses act as advocates, advisors and supportive agents for laboring women. As advocates, nurses assist women to voice their questions and concerns about the advantages and disadvantages of the options relating to medications and/or other interventions. As advisors, nurses are expected to provide women with sound knowledge about the pharmacological choices available at the birthing facility in which they work. As supportive agents, nurses work collaboratively with the laboring woman, her family and the healthcare team to support her decisions and to honor her current wishes. To be credible advocates, advisors and supportive agents, nurses must have in-depth knowledge of both the pharmacological and non-pharmacological approaches to pain relief in childbirth. This course will examine the most common choices of pharmacological pain relief in labor. Medications used in general anesthesia are not discussed.

PSYCHO-SOCIAL FACTORS THAT AFFECT PAIN CONTROL CHOICES

Childbirth is a normal but painful experience and many women use both pharmacological and non-pharmacological methods to attain relief. Before nurses administer any pharmacological options to women though, they must consider that pharmaceuticals are not a substitute for non-pharmacological interventions. The following critical factors affect women's choices:

Education

Many women have both opportunity and ability to access and learn about pain control choices for labor and birth. Despite public opportunities for education, however, some women are reluctant or unable to access information due to physical and/or social isolation. Perhaps cultural or religious beliefs prohibit knowledge acquisition. Immaturity and peer shared knowledge about labor and birth can contribute to a knowledge based on hearsay, rather than facts. Some women are conditioned to believe they have little control over choices. All of these factors have the potential to affect the choices that she will make.

Stress

Although women may attend prenatal classes, read birthing literature, question those within her sphere of influence, and listen to other women's stories, it is the nurse who has significant influence over the pain control choices that women ultimately make. By asking a woman to describe her understanding of pain control, nurses may discern where knowledge is incorrect or lacking. As a laboring patient in a hospital, women are under stress, in an unfamiliar environment, fatigued and in pain. These factors compromise their level of understanding so previous learning may have to be reinforced.

Fear

Not only does fear alter understanding of medical options and procedures, fear can also slow the quality of labor. Many worries afflict women in pregnancy. They may fear labor itself; fear dying, and/or fear having a maimed or deformed infant. Some worry they will be deserted by their partner (England, P. & Horowitz, R., 1998). There

may be fear of mutilation, loss of lifestyle, stillbirth, pain, and/or fear of the unknown. The tension resulting from fear increases the person's level of pain. With unrelieved fear and pain, catecholamines increase and this predisposes women to uterine contractions that are painful yet dysfunctional. Dysfunctional, prolonged labor can escalate into a spiral of maternal and fetal fatigue, resulting in higher rates of risk and the necessity for medical interventions (Faucher & Brucker, 2000).

Preconceived expectations

Some women diligently create scenarios of what they expect labor will be. Some believe their efforts will predispose them to an easier labor. Working with a woman's preconceived expectations to develop a plan of care demonstrates respect for the efforts she has taken to prepare for labor. Respect for these efforts provides women with some degree of control over an otherwise largely, uncontrollable experience. Partners may voice strong opinions and advocacy for their spouses' previous wishes. With patience and understanding, nurses have the privileged role of guiding couples to understand their options as labor progresses.

Nurse/Patient Preconceptions: A Case Study

In my early years as a labor/delivery nurse, I believed that if women received enough support and care during labor, most could have an unmedicated delivery. One day, a young woman, named Katlyn, arrived alone and in labor, which was unusual as most laboring women arrive with family or friends. As her nurse, I provided Katlyn with all the nonpharmacological comfort measures I knew. I worked with her to have an unmedicated delivery. I was her constant companion throughout the labor. I walked with her; encouraged her;

breathed with her; showered her; massaged her; and assuaged her anxiety. At no time did Katlyn ask for any medication. She had a normal, uneventful delivery with an intact perineum. She and the baby were fully alert and the baby breast-fed right away. Were her needs met? Does this sound ideal? Read on.

Oddly enough, when Katlyn came back the next year, I was her nurse again. We remembered each other and she said, "You were my nurse last year when I had my first baby." I replied, "How did you think the delivery went?" I was expecting her to tell me how wonderful she thought it was and how helpful I was. Katlyn startled me by shyly admitting that she thought I was "kinda mean" because I would not give her anything for pain when she was in labor. I was horrified to think that I had been responsible for her memory of a painful labor when my memory of it was so positive.

This experience profoundly affected the way I cared for laboring women. In reflection, I realized that I gave Katlyn the kind of experience I wanted, not what she wanted. She had an epidural with the second birth and was pleased with this experience. From this point on, I worked on "listening" and "hearing". I now focus on what is important to women in labor, rather than assume that I know best.

Lessons from this anecdote include the examination of our own bias, values and judgment when caring for others. As healthcare professionals, we have to seriously listen to women rather than assuming that we know best. This experience humbled me and contributed to my growth as a nurse. We are not always the experts for others – women are often their own best experts and need to be respected as such. They have to be informed about the options and then they must be able to make their own choices. It is up to the

nurse and midwife to support these decisions, regardless of whether or not we agree with them.

PHARMACOLOGICAL OPTIONS FOR PAIN CONTROL DURING LABOR

Responsibilities Relating to the Pharmacological Management of Labor

As instrumental players in the healthcare team, nurses are committed to provide safe care for mother and infant. Nurses must be open and receptive to women asking for pain relief medications and they must provide information that allows women to make informed choices. It is a nursing responsibility to have sound and thorough pharmacological knowledge in order to provide the information that these women require in order to make a knowledgeable decision.

Systemic Analgesia

The goal of pharmacological pain control in labor is to decrease or alter the normal sensation of pain while minimizing maternal and fetal side effects (Poole, 2003). I have often asked women to describe the characteristics of an optimal labor pain drug. The usual response is that they hope to have complete pain relief without any side effects. Unfortunately, we have not yet discovered such a medication. All medications affect both the mother and the fetus so proper administration is essential for safe and optimal pain relief in childbirth.

Medications used for pain during labor will always have some unwanted side effects on both mother and fetus. Maternal hypotension is common. Depending upon the type and the amount of medication given, women often experience extended periods of sedation. Dry mouth, urinary retention, slowing of gastrointestinal motility can also

be expected with many medications. Maternal drowsiness and hypoventilation are also common. Central nervous system depression in neonates is frequently noted in all the literature.

- *Maternal hypotension* is common with many medications so careful monitoring of maternal vital signs will alert the nurse to subtle changes. The weight of the gravid uterus compresses the aorta and inferior vena cava when a woman lies on her back during pregnancy. This position contributes to maternal hypotension and decreased uteroplacental perfusion (Conklin & Backus, 1999). Encouraging women to be upright, walking, or wedging the right hip while lying minimizes the aortocaval compression and this contributes to improved oxygenation of the uterus and placenta (Poole, 2003).
- *Sedative properties* – Many factors, such as race and weight, affect the way these drugs metabolize. In my practice, I have noted that Oriental women require far less amount of opioids than Caucasian or African American women. For example, when Oriental women are given a usual dose of Meperidine 100mg I/M, they become heavily sedated for many hours, are difficult to rouse and more often require Naloxone as a narcotic antagonist. Lesser dosage achieves adequate analgesia in these women. The amount of opioids administered should be titrated according to body weight. Individualizing care means that dosages should be decreased with smaller women. Assistance with ambulation to prevent injury may be required due to dizziness and sedation.
- *Dry mouth* – Provide good mouth care using lip lubricants, mouth swabs, brushing teeth and ensuring hydration.
- *Urinary retention* – Assess for urinary retention by measuring and recording urinary output, assessing the bladder for volume,

facilitating urination by opening a water faucet, pouring water over vulva, and/or mobilizing patient. Catheterization might be necessary when urinary retention becomes a concern.

- *Delayed gastric emptying* – In early labor, many women can tolerate small amounts of light foods that are easily digested, such as cereal, toast, fluids, and soup. Food with high protein and fat content are difficult to digest and are not recommended during labor. Be alert for vomiting and potential aspiration.
- *Maternal drowsiness and hypoventilation* Although medications are often administered to induce somulence, women should be woken frequently for vital signs, pulse oximetry and other interventions. She should be reminded to take deep breaths if respiratory depression is noted. Naloxone (Narcan), an antidote to reverse the respiratory depressive effects of opioids, should be close at hand in all labor areas.
- *Neonatal depression* is characterized by hypotonicity, respiratory suppression, and bradycardia. All staff that care for women in labor must be competent in neonatal resuscitation and nurses must have knowledge about naloxone. . Nurses should be prepared at all times for this common side effect of opioid use.

Summarized in Table 1 are the most common types of systemic medications used in labor.

Table 1.					
Systemic Analgesics for Childbirth (adapted from Faucher & Brucker, 2000; Poole, 2003; Springhouse Nurse's Drug Guide, 2002 and Canadian Compendium of Pharmaceuticals and Specialties, 2002).					
Class	Drug	Usual dose	Onset	Duration	Maternal and fetal effects and side effects
Barbiturates	Secobarbital (Seconal) Pentobarbital (Nembutal)	100 mg PO/IM 100 - 200 mg PO/IM	30-60 minutes	1-4 hours	Used very early in labor to assist in relaxation and sleep. Should be used early and timed to wear off before delivery. May cause neonatal CNS depression. Can impair neonate ability to suckle. Potentiates respiratory depressive side of opioids. May have antianalgesic effect.

Phenothiazines	Promethazine (Phenergan)	25mg IV 50mg IM	20 min	4-12 hours	Antiemetic and sedative effects. Usually combined with Meperidine to offset nausea caused by opioid. May have antianalgesic effect. May cause decreased uterine activity. Increased risk of neonatal hyperbilirubinemia.
Antiemetic	Dimenhydrinate (Gravol)	25mg IV 50mg IM 50 mg po	20 min	4 hours	Antiemetic and sedative effects. Usually combined with Meperidine to offset nausea caused by opioids. CNS depressant. Can cause dry mouth and respiratory depression in both mother and neonate.
Benzodiazepines	Diazepam (Valium) Oxazepam (Serax)	2-5mg IV or 10mg IM 15-30mg po	15-30 min IM 1-5mg IV 30 min	3-4 hours	Hypnotic. anticonvulsant, anxiolytic, and sedative effects. Can decrease anxiety about labor and facilitate sleep. Dose dependant for side effects. Prolonged half-life in neonate. Neonatal CNS depression. Use lowest possible dose.
Opioids	Meperidine (Demerol)	25-50mg IV 50-100mg IM	3-5 min IV 10-20 min IM	2-4 hours IV/IM	Most commonly used synthetic opioid for relief of pain associated with labor. Should not affect contraction quality if in active labor. Sedating effect. CNS depressant. Maternal and neonatal respiratory depression frequent – dose dependent.
	Morphine	2-5mg IV 5-10mg IM	3-5 min IV 10-20	4-6 hours IV/IM	Rarely used as analgesic for labor. May be given in early labor for inducing sleep. Fetal effects

			min IM		are dose and gestational age dependent. Can inhibit oxytocin release thereby decreasing contraction quality. Maternal and neonatal respiratory depression common. Often used in a form that is compatible for epidural and spinal anesthetics.
	Butorphanil (Stadol)	0.5-2 mg IV 1-3 mg IM	1-2 min IV 10-30 min IM	3-4 hours	Synthetic opioid used for intrapartum pain – minimal nausea and vomiting. Neonatal respiratory depression but does not increase with each dose. 5 times as potent as morphine and 40 times as potent as meperidine.
	Nalbuphine (Nubain)	0.1-0.2 mg/kg IV 0.1 mg/kg Im	2-3 min IV 15 min IM	3-6 hours IV/IM	Longer acting pain relief in labor. Less nausea and vomiting than meperidine. Used with caution in premature labor. Increased tendency to cause maternal sedation and dizziness. Can cause neonatal CNS depression, apnea, and bradycardia but less frequent than meperidine.
	Fentanyl (Sublimaze)	50-100mcg IM 1-2 mcg IV	7-15 min IM	30-60 min IV/IM	Greater analgesic potency than Meperidine and Morphine. Potent respiratory depressant. Can have cumulative effect over time. Safest opioid for epidural administration. Often used for spinal and epidural anesthetics.

Chronotropic inhalation agent	Nitrous oxide (Nitronox, Laughing gas)	Inhaled -dose is dependent upon number of times inhaled	2-3 min	Effects gradually wear off when inhalation stops	Especially helpful for short-term therapy during transition. Does not slow uterine contractions. Can be associated with neonatal depression if inhaled over long period.
Opioid Narcotic Antagonist	Naloxone (Narcan)	0.02mg/ml 0.01mg/kg of body weight. IV, IM or SC. May be repeated at 2-3 min intervals	Within 2 minutes	2-3 minutes (longer if given IM)	Reverses depressive effects of opioids such as respiratory depression, hypotonicity, hypotension and sedation. Usually given to neonates who respond poorly at birth. May be given to mother to reduce depressive effects just before delivery with less predictable effect.
Local anesthetic agents	Bupivacaine (Marcaine)	Strength 0.125% or 0.5%	Within 5-10 min	2-3 hours	Used to numb the pelvic floor for instrumental delivery or episiotomies. Can be used in higher concentration for operative delivery. Often mixed with fentanyl for epidural or spinal anesthesia. Causes vasodilation. Limited transfer to fetus according to current knowledge.
	Lidocaine (Xylocaine)	Topical application of 5% X 1 hour 2% strength for	Within 5 minutes	1 hour	Used to numb the pelvic floor for instrumental delivery or episiotomies. Works faster than bupivacaine. Readily crosses placenta. Topical application takes approx 1 hour to be effective.

		perineal injection			
	Ropivacaine (Naropin)			3-4 hours	Less potent than bupivacaine. Rapidly crosses placenta. Obstetrical use of this drug is new so limited knowledge about this drug and effects on fetus.

Regional Anesthesia

Regional anesthesia refers to local, epidural and spinal anesthesia, the most common methods used in current obstetrical management. The word "regional" means that the anesthetized area is localized in one region of the body, such as the abdominal area, without loss of consciousness. Medication for regional anesthesia is administered via local infiltration, pudendal, paracervical blocks, patient controlled pump, by continuous infusion or and with intermittent infusion through an epidural or spinal catheter. As with any medical intervention, regional anesthesia carries risks and benefits.

Local Anesthesia

Local anesthetics are injected into tissue that will then be blocked from sensing pain. This form of obstetrical anesthesia blocks pain impulse transmission through the pudendal nerve, which in turn anesthetizes the pelvic floor area. With episiotomies, a simple injection of local anesthetic usually provides adequate numbness in the pelvic floor. Because of the area injected, motor blocking is minimal unlike the motor impairment that accompanies epidural and spinal anesthesia (Poole, 2003). Although this technique has declined in use with the increase in epidurals and spinal anesthesia, it has certain advantages. The necessity of using intravenous fluids and NPO status are not required with local anesthetics as they are for epidural and spinal anesthesia. Sedative effects for mother and fetus are minimal when a local anesthetic is used.

In various areas of the world, including the vast continental Canada and USA, many semi isolated, isolated areas and facilities, such as private homes and birthing centers, do not have anesthetists or nursing anesthetists on staff to administer epidurals or spinals so these areas continue to use local pudendal nerve block and paracervical block as a means to provide women with some measure of relief.

The two greatest risk factors associated with local anesthesia are the potential for vascular infusion of the anesthetic and damage to the fetal scalp during injection (Poole, 2003). Although side effects are rare, nurses must be aware of the possibility of fetal bradycardia, maternal systemic toxicity, localized abscesses or hematomas, and vaginal mucosal tears.

Epidural, Spinal and Combined Spinal Epidural

Epidural anesthesia remains the most common type of regional anesthesia used for the control of pain in labor. Spinal anesthesia for Cesarean delivery provides profound and rapid anesthesia in the abdominal area. Increasingly, combined spinal-epidural (CSE) analgesia for labor has become popular. This technique offers more rapid onset of pain relief with little or no loss of motor function. Patient satisfaction is enhanced while there is less overall drug usage (Landau, 2002). In the case of CSE, the epidural space is identified, then a spinal needle slips into the epidural needle, and then it is guided further on and into the subarachnoid space. Once the medication is injected into this space, the spinal needle is removed leaving the epidural needle in place. At this point, the catheter is inserted through the epidural needle where it rests in the epidural space (Laudau, 2003 & Poole, 2003). Lastly, the epidural needle is removed and an epidural catheter remains in place for administration of medication.

A woman whose labor is short and moves along a normal progression often does not need or want epidural anesthesia. For long, difficult, exhausting labors, epidural anesthesia is a humane intervention. In my practice, I have noted that timely relief of intractable pain can make a positive difference in a woman's overall impression of her childbirth experience. Regional anesthesia may be warranted when labor is not progressing and a Cesarean Section is looming as a possibility. Epidural anesthesia is sometimes used when forceps are necessary or when the neonate's head is guided through the perineum with a vacuum extractor.

Women are often surprised that an intravenous, constant fetal monitoring, q _ hourly vital signs, NPO, and potentially a urinary catheter accompany epidural and spinal anesthesia. These prophylactic measures are in place to safeguard mother and fetus from the unwanted effects of these types of anesthesia. The most frequent unwanted side effects are hypotension, impaired motor ability, headache, voiding inability, pruritus, sedation, and nerve trauma (Mayberry, Clemmens, & De, 2002 & Zakowski, 2002).

Table 2. Regional anesthesia side effects, rationale and nursing responsibilities (Mayberry et al. 2002, Zakowski 2002).

Side effect	Rationale	Nursing Responsibilities
Hypotension	Initiation of regional anesthesia contributes to vasodilatation. Generalized vasodilatation predisposes a drop in blood pressure. Decreased maternal blood pressure reduces cardiac output thereby reducing blood flow to the placenta.	<ul style="list-style-type: none"> • Ensure adequate intravenous hydration prior to initiation of epidural or spinal anesthesia • Mother is usually kept NPO and requires hydration. • Position mother off her back • Monitor vital signs according to institution policy – usually q 5 min X 3 then q 1/2 h. • Fetal monitoring
Impaired motor ability	Historically, epidural anesthesia produced a profound, dense motor block of lower extremities. Refinement of medication combinations along with improved techniques now offer women improved pain relief with less deleterious effect on lower limb function. Ambulation is affected with epidurals. While most women still have sensation to their lower limbs with epidurals, many decline to be ambulatory.	<ul style="list-style-type: none"> • Considerable variability in how regional anesthesia will affect individuals. Nurse must accompany women when ambulatory and/or provide ambulation aids such as walker. • Encourage frequent changes of position while in bed (q _ to 1 hourly) • Test sensation every time every vital signs are monitored – q _ h. • Monitor so that anesthesia does not climb above lower ribs – keep mother semi fowlers with wedge under right hip if this is a problem.

Headache	If cerebral spinal fluid is lost when the puncture of the dura takes place, maternal headache can be disabling.	<ul style="list-style-type: none"> • Prompt reporting of maternal headache so blood patch can be arranged. • Cool packs to head and neck • Darkened room with minimal stimuli
Voiding inability	Voiding ability impaired due to decreased sensation of bladder distension.	<ul style="list-style-type: none"> • Encourage voiding prior to epidural • Carefully record urinary output • Facilitate voiding with running faucet, water over vulva, and/or mobilization of patient if possible. • Scan bladder capacity • Catheterization is frequently required.
Pruritis	Very common with regional anesthesia that uses opioids	<ul style="list-style-type: none"> • Treat promptly with antihistamine as ordered so that mother's rest is not impaired • Examine skin for breakdown from scratching. • Educate patient re reasons for itching
Sedation	With the relief of pain, women often sleep from sheer exhaustion. If opioids were used for labor pain prior to anesthesia, sedation may linger for many hours.	<ul style="list-style-type: none"> • Continue to arouse woman q _ h for vital signs or according to facility policy. • Between checks, encourage her and her partner to sleep.
Nerve Trauma	Rarely, pressure or trauma from epidural or spinal placement can damage a nerve root. This side effect is extremely rare, especially with women of childbearing age.	<ul style="list-style-type: none"> • Prompt reporting of symptoms (numbness, paresthesia to lower limbs, pain in area of needle insertion) anesthetist. • Symptoms might be transient – observe 2-3 days. • Nerves heal slowly and if damage resolves, it may take many months.

General Anesthesia

General anesthesia is most often used for emergency cesarean births. Conditions warranting an emergency cesarean delivery include fetal distress, maternal hemorrhage, maternal seizures, motor vehicle accidents or any other condition that might compromise the life of either mother or fetus. Nursing guidelines in caring for women undergoing a general anesthesia should include a specific post anesthetic recovery care plan. Typically, this includes one-to-one nursing care with routine head to toe assessments for at least two hours depending on degree of recovery. Especially imperative are airway management, close and frequent monitoring of vital signs including oximetry, fundal measurement, lochia volume and color assessment, and bladder assessment. The patient will have an intravenous and urinary catheter. Mothers who have undergone an emergency cesarean delivery require significant reassurance. In my practice, I have found that women who are united with their baby as soon as possible after birth voice greater satisfaction with the overall experience.

CONCLUSION

Nurses who provide effective and safe pain relief during childbirth need to be knowledgeable about pharmacological options. These nurses actively engage women in decision making surrounding choices whenever possible. There are no perfect drugs – all medications have unwanted side effects on mother and fetus. Careful, conservative planning can minimize these effects for both mother and baby.

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