CHAPTER 19

Providing Comfort During Labor and Birth

Key Terms

analgesia
anesthesia
doula
endorphins
epidural anesthesia
pain
pressure anesthesia
pudendal nerve block
transcutaneous electrical nerve stimulation (TENS)

Objectives

After mastering the contents of this chapter, you should be able to:

1. Describe the physiologic basis of contractions during labor and birth and how they relate to theories of pain relief.
2. Identify complementary and alternative therapies that may be used to promote a woman's comfort during labor and birth.
3. Discuss the pharmacologic agents commonly used to provide pain relief during labor and birth.
4. Assess the degree and type of discomfort a woman is experiencing, including her ability to cope with it effectively during labor and birth.
5. Formulate nursing diagnoses related to the effect of pain or pain relief during labor and birth.
6. Establish expected outcomes to meet the needs of a woman experiencing discomfort during labor and birth.
7. Plan nursing interventions to promote comfort during labor and birth.
8. Implement common complementary and pharmacologic measures for pain relief during labor and birth.
9. Evaluate expected outcomes for effectiveness of nursing care and achievement of a satisfying labor experience for a woman and her family.
10. Identify National Health Goals, related to analgesia and anesthesia, that nurses can help the nation achieve.
11. Identify areas related to promoting comfort during labor that could benefit from additional nursing research or application of evidence-based practice.
12. Use critical thinking to analyze ways to maintain family-centered care when analgesia and anesthesia are used in childbirth.
13. Integrate knowledge of pain relief measures during labor and birth with the nursing process to achieve quality maternal and child health nursing care.

Jonny Baranca is a primipara in early labor whom you admit to a birthing unit. Her cervix is 4 cm dilated. She tells you her sister had epidural anesthesia for the birth of her baby 3 months ago. She told Jonny that an epidural block completely obliterated her pain in labor. Based on her sister's experience, Jonny expected to be given an epidural block as soon as she arrived at the hospital. When you enter her room, you find her lying on her back in a birthing bed, crying. Her husband is shouting that his wife deserves better care than this.

Previous chapters discussed the process of labor and care for a woman in labor. This chapter adds information to your knowledge base about how to promote comfort during labor. This is important information, because it can help change labor from an experience so negative that it can result in post-traumatic stress syndrome to a positive, forward-moving experience.

Was the advice Jonny received from her sister realistic?
What are some immediate interventions you could do to help her better manage her pain?

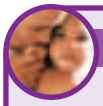
After you've studied this chapter, access the accompanying website. Read the patient scenario and answer the questions to further sharpen your skills, grow more familiar with RN-CLEX types of questions, and reward yourself with how much you have learned.

Concerns about the discomfort and pain that accompany labor and birth can dominate a pregnant woman's or couple's thoughts about childbirth, particularly as the baby's due date approaches. Providing information during prenatal visits about the numerous methods of comfort promotion and pain control available to women can help allay some of these fears. As discussed in Chapter 13, prepared childbirth classes can provide couples with an opportunity to learn and practice a variety of techniques, such as prepared childbirth breathing patterns, to help reduce the pain of labor. Often, however, the labor experience is so overwhelming, or so much greater than the couple expected, that administration of an analgesic or a regional anesthetic is necessary to reduce discomfort sufficiently to allow the woman to regain control over her labor process. If the result is to make labor a satisfying, positive experience, this intervention can ultimately promote the entire family's health (Goodman et al., 2004). In other instances, a woman may feel that she has failed because she required medication for pain relief. She needs to be reassured that labor is not a contest with winners and losers, only different routes to becoming new parents.

Much has been written in nursing literature about using the neutral term *contractions* instead of *labor pains,* to keep from reminding a woman how painful contractions can be. The theory is a sound one, not only because a woman is experiencing a *contracting* sensation but also because calling it *pain* could magnify her fear and tension. Tension, in turn, magnifies pain. Remember, however, that renaming it will not change its basic nature. By any name, discomfort accompanies labor. Fortunately, many nursing interventions can help reduce pain, so that labor is as fulfilling and rewarding an experience as a woman hoped it would be.

Making labor and birth a memorable experience for families is so important that National Health Goals have been established to address this topic. These are shown in Box 19.1.

BOX 19.1 FOCUS ON . . .



NATIONAL HEALTH GOALS

Because administration of either analgesia and anesthesia during labor can increase both maternal and fetal mortality, several National Health Goals are related to the types of pain relief used in labor. Examples include the following:

- Reduce the maternal mortality rate to no more than 3.3 per 100,000 live births, from a baseline of 7.1 per 100,000.
- Reduce the fetal death rate during the perinatal period (28 weeks of gestation to 7 days after birth) to no more than 4.5 per 1000 live births, from a baseline of 7.5 per 1000 (Department of Health and Human Services, 2000).

Nurses can help the nation achieve these goals by educating women about the advantages of preparing for childbirth, helping them to use breathing patterns or other complementary and alternative therapies and techniques during labor so that they need a minimum of analgesia and anesthesia, and conscientiously monitoring women who receive analgesics and anesthesia during labor and birth.

Areas that could benefit from additional nursing research include satisfaction with complementary or alternative therapy comfort measures, women's satisfaction with regional anesthesia in labor, and reasons that childbirth methods women prepare and use turn out to be inadequate.

Nursing Process Overview

For Pain Relief During Childbirth

Assessment

Pain, the sensation of discomfort, is a subjective, personal symptom; it is what the person says it is and present when the person says it is (Pasero & McCaffery, 2004). It is unique to each individual, so a woman is the only person who can describe or know the extent of her pain. To assess the amount of discomfort a woman is having in labor, listen carefully to what she is saying. Also look for subtle signs such as facial tenseness, flushing or paleness, hands clenched in fists, rapid breathing, or rapid pulse rate (Box 19.2).

Nursing Diagnosis

Although pain related to labor contractions is the most obvious nursing diagnosis applicable to labor, it is not the only relevant one during this time. Pain can create other problems for the laboring woman that can negatively affect the childbirth experience. If not resolved, these problems can intensify pain. Some women may become more concerned with their reaction to the pain than to the pain itself. Applicable nursing diagnoses include the following:

- Pain related to labor contractions
- Powerlessness related to duration and intensity of labor
- Anxiety related to lack of knowledge about "normal" labor process
- Risk for situational low self-esteem related to ineffectiveness of prepared childbirth breathing exercises
- Decisional conflict related to use of analgesia or anesthesia during labor

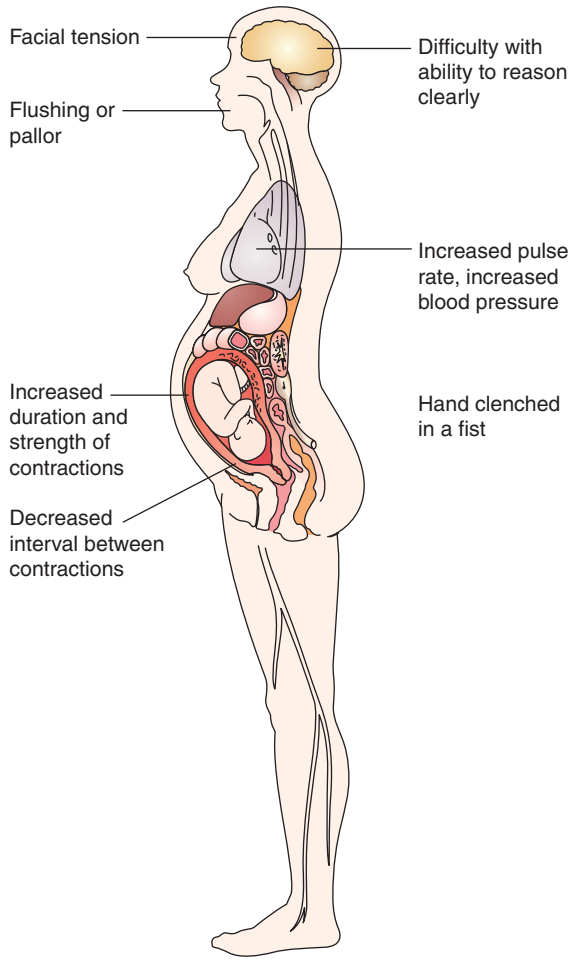
Outcome Identification and Planning

When developing outcomes and planning interventions to manage discomfort, consider the woman's perceptions about childbirth, her past childbirth experiences (if any), and the amount and type of childbirth preparation she and her partner have had to make the expected outcomes realistic for her. For example, an expectation that no medication will be used might be inappropriate.

Be aware that pharmacologic agents used during labor and birth may pose risks for both the mother (e.g., hypotension) and the fetus (e.g., bradycardia).

BOX 19.2 ASSESSMENT

Assessing the Woman in Pain Related to Labor



Therefore, their use must always be weighed against the alternative risk to the mother (enduring a painful labor). The decision may also affect family functioning if the method chosen limits the partner's participation in the birth.

- ***Implementation***

Many different interventions to promote comfort and relieve pain are available. Keeping a woman and her support person informed about their options as labor progresses is important. Simply knowing that birth is getting even a little closer can make the next few contractions easier to withstand. Supporting and encouraging a woman to use methods of complementary and alternative therapies for pain management (e.g., relaxation) also are helpful. Offering analgesia or assisting with anesthesia administration during labor or birth requires nursing judgment and a caring presence to help one woman accept analgesia when she needs it and to encourage another to experience childbirth without heavy sedation.

- ***Outcome Evaluation***

Evaluation is ongoing and typically must occur within a short time frame. The following are examples of expected outcomes to indicate successful achievement of outcomes:

- Client states that pain during labor was within a tolerable level for her.
- Couple report that they felt in control throughout the labor process.
- Client states that she does not feel intimidated by thoughts of pain during labor.

Long-term evaluation should reveal that the woman found labor and birth to be an experience that was not only endurable but allowed her to grow in self-esteem and the family to grow through a shared experience. Asking a woman to describe her labor experience afterward in relation to pain not only aids evaluation but helps her work through this emotional period of life and integrate it into her previous experiences.

EXPERIENCE OF PAIN DURING CHILDBIRTH

Pain accompanies labor contractions for a number of different reasons.

Etiology of Pain During Labor and Birth

Normally, contractions of involuntary muscles, such as the heart, stomach, and intestine, do not cause pain. This concept makes uterine contractions unique because they do cause it. Several explanations exist for why this happens. During contractions, blood vessels constrict, reducing the blood supply to uterine and cervical cells, resulting in anoxia to muscle fibers. This anoxia can cause pain in the same way that blockage of the cardiac arteries causes the pain of a heart attack. As labor progresses and contractions become longer and harder, the ischemia to cells increases, the anoxia increases, and the pain intensifies.

Pain also probably results from stretching of the cervix and perineum. This phenomenon is the same as that causing intestinal pain when accumulating gas stretches the intestines. At the end of the transitional phase in labor, when stretching of the cervix is complete and the woman feels she has to push, pain from the contractions often disappears as long as the woman is pushing, until the fetal presenting part causes the final stretching of the perineum.

Additional discomfort in labor may stem from the pressure of the fetal presenting part on tissues, including pressure on surrounding organs, such as the bladder, the urethra, and the lower colon. Pain at birth largely results from stretching of the perineal tissue.

Physiology of Pain

Pain is a basic protective mechanism that alerts a person that something harmful is happening somewhere in the

body. Pain sensation begins in nociceptors, the end points of afferent nerves, when they are activated by mechanical, chemical, or thermal stimuli. Nociceptors are located predominantly in the skin, bone periosteum, joint surfaces, and arterial walls. When end terminals are stimulated, chemical mediators such as prostaglandins, histamine, bradykinin, and serotonin are synthesized and sensitize the nociceptors. The pain impulse is transmitted along small, unmyelinated C fibers and large, myelinated A-delta fibers to the spinal cord. The more numerous C fibers conduct slowly and apparently carry dull, low-level pain; the fewer A-delta fibers apparently carry sharp, well-localized pain such as labor contractions.

In the dorsal horn of the spinal cord, somatostatin, cholecystokinin, and substance P serve as neurotransmitters or assist the pain impulse across the synapse between the peripheral nerve and the spinal nerve. The pain impulse then ascends the spinal cord to the brain cortex, where it is interpreted as pain.

The Melzack-Wall gate control theory of pain control (Melzack & Wall, 1965), the most widely accepted theory of pain response today, proposes that pain can be halted at three points: the peripheral end terminals, the synapse points in the dorsal horn, or the point at which the impulse is interpreted as pain in the brain cortex.

Pain in peripheral terminals is automatically reduced by the production of endorphins and enkephalins, naturally occurring opiates that limit transmission of pain from the end terminals. Pain can be reduced further by mechanically irritating nerve fibers by an action such as rubbing the skin. This technique blocks nerve transmission.

A major action of pain medications is to block spinal cord neurotransmitters, never allowing the pain impulse to cross to a spinal nerve. The brain cortex can be distracted from sensing impulses as pain by such techniques as imagery, thought stopping, aromatherapy, or yoga.

Sensory impulses from the uterus and cervix synapse at the spinal column at the level of T10 through T12 and L1. Pain relief measures for the first stage of labor, therefore, must block these upper synapse sites. For the elimination of pain during cesarean birth, receptors at the level of T6 through T8 must be blocked, so that both the upper and lower uterus are blocked.

Sensory impulses from the perineum are carried by the pudendal nerve to join the spinal column at S2, S3, and S4. When the perineum is initiating the pain, pain relief must block these lower receptor sites. This is an important point to remember when talking to a woman in labor about pain relief. Some interventions relieve pain for both the first and second stages of labor, whereas others work for one stage but not both.

Perception of Pain

The amount of discomfort a woman experiences during contractions differs according to her expectations of and preparation for labor, the length of her labor, the position of her fetus, and the availability of support people around her (Fig. 19.1). The discomfort she experiences can become compounded when fear and anxiety are also present.

Pain is perceived differently by different individuals because of psychosocial, physiologic, and cultural responses

FIGURE 19.1 The discomfort a woman experiences during childbirth may be related to the amount of support she receives from her family or health care providers. Here, the woman's support person uses the palm of his hand to apply counterpressure to the woman's lower back, helping to ease back pain, while the nurse assists.

(Box 19.3). The body's ability to produce and maintain **endorphins** (naturally occurring opiate-like substances) may influence a person's overall pain threshold and the amount of pain a person perceives at any given time. Women who come into labor believing the pain will be horrible are usually surprised afterward to realize that the agony they expected never materialized. On the other hand, expectations of pain may make a woman so tense during labor that her pain is worse than it would have been if she had been relaxed. A woman cannot relax simply because she is instructed to do so by another person, however. Some additional interventions must be used.

Factors Influencing Pain Perception

Fetal position is a physical variable that can influence the degree of pain a woman experiences. If the fetus is in an occiput posterior position, for example, the woman often reports intense or nagging back pain, even between contractions.

Psychological factors that can influence pain include fear, anxiety, worry, expectation of pain, body image, and self-efficacy. Women who believe that they can control their situation (have self-efficacy) are more apt to report a satisfactory birth experience than those who do not feel in control (Goodman et al., 2004).

BOX 19.3 FOCUS ON . . .

DIVERSITY OF CARE

Responses to pain are, in part, culturally determined. Based on this, some women believe that being stoic and nonverbal is what is expected of them. Others believe that expressing their discomfort by screaming or verbalizing their feelings will best reduce pain. If a woman is not proficient in English, it may be particularly difficult for her to describe her level of discomfort. Assess each woman individually to determine not only what level of comfort she feels is right for her during labor but also the manner in which she feels most able to express discomfort. Depend on facial expression, body posture, and tension, as well as voiced expressions, to determine a client's level of comfort (Callister et al., 2003).

The amount of analgesia that women desire or will accept is both situationally and culturally determined. In a culture in which birth is seen as a "natural" process, less analgesia is generally desired. Women who have an effective support person with them may need less pharmacologic pain relief than those who do not. Providing nursing support can have a positive influence on pain relief in labor.

COMFORT AND PAIN RELIEF MEASURES

The pattern of interventions to promote comfort and manage pain in labor has swung from a philosophy of no intervention (none given), to a philosophy of drug intervention as an essential element (too much given), to a modern approach of empowering women and their partners with information so that they can choose how to best relieve pain during labor, within the limits of medical safety. For centuries, in Western civilization, offering pain relief in labor was thought to be amoral because, according to the Biblical account, God commanded Eve, "I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children. . . ." (Genesis 3:16). In the witch-burning period of American history, the concept that childbirth should be painful was so strongly ingrained that women were burned as witches for providing comfort to other women in labor.

With the discovery of ether and chloroform in the 1800s, it became apparent that childbirth could be managed completely pain free. Unfortunately, this goal was achieved by means of complete anesthesia or unconsciousness during labor and birth. Women, afterward, had difficulty realizing that the birth was over and they were a new parent.

Current philosophy centers on informed decision making. Nurses play a key role in educating women and their support persons about the numerous comfort and pain relief strategies available and making sure couples understand the choices available to them along with the benefits and risks. Throughout their decision-making process, couples need support for their choices so that they can feel confidence in the method chosen.

Support From a Doula or Coach

A woman's husband or the father of her child has traditionally served as the chief support person in labor. However, some husbands or fathers find it difficult to provide effective coaching or support in labor because of their own emotional involvement in the birth. Women who are aware that they may not have effective one-to-one support in labor from their baby's father should be encouraged to identify an additional person who could come with them and provide this support. A **doula** is a woman who is experienced in childbirth, but without professional credentials, who guides and assists women in labor (Rosen, 2004). Having a doula can increase a woman's self-esteem as well as decrease rates of oxytocin augmentation, epidural anesthesia, and cesarean birth.

Checkpoint Question 1

Jonny asks you what is the purpose of a doula in labor. Your best answer would be:

a. She times contractions and keeps them from becoming too lengthy.
b. She can cook for a woman in labor to keep her from becoming dehydrated.
c. She can serve as a support person and coach during labor.
d. She replaces the husband as a woman's support person.

Complementary and Alternative Therapies for Pain Relief

Complementary and alternative therapies for pain relief involve nonpharmacologic measures that may be used either as a woman's total pain management program or to complement pharmacologic interventions. Most of these interventions are based on the gate control theory concept that distraction can be effective in preventing the brain from processing pain sensations coming into the cortex.

Relaxation

The technique of relaxation, as discussed in Chapter 13, is taught in most preparation for childbirth classes. Relaxation keeps the abdominal wall from becoming tense, allowing the uterus to rise with contractions without pressing against the hard abdominal wall. It also serves as a distraction technique because, while concentrating on relaxing, a woman cannot concentrate on pain. In addition to conscious relaxation, having a woman shift position or find the position in labor that is most comfortable for her can be helpful. Asking a woman to bring favorite music tapes or aromatherapy with her to enjoy in the birthing room is a good way to aid relaxation.

Focusing and Imagery

Concentrating intently on an object is another method of distraction, or another method of keeping sensory input

from reaching the cortex of the brain. For this technique, a woman uses a photograph of someone important to her or some image she finds appealing. She concentrates on it during contractions (focusing). Other women concentrate on a mental image, such as waves rolling onto a beach (imagery). Do not ask questions or talk to a woman while she is using imagery or focusing, because it breaks her concentration.

Breathing Techniques

Breathing patterns are also taught in most preparation for childbirth classes (see Chapter 13). They are advantageous because they help to relax a woman's abdomen. They are largely distraction techniques, because a woman concentrating on slow-paced breathing cannot concentrate on pain. Breathing strategies can be taught to a woman in labor if she is not familiar with their advantages before labor.

Herbal Preparations

Several herbal preparations have traditionally been used to reduce pain with dysmenorrhea or labor, although there is little factual support for their effectiveness. Examples include raspberry leaves, fennel, and life root. Blue cohosh (squaw root), used to induce uterine contractions, is not recommended because of the risk of acute toxic effects (e.g., cerebrovascular accident) to the mother or fetus (Finkel & Zarlengo, 2004).

Aromatherapy and Essential Oils

Aromatherapy is the use of aromatic oils to complement emotional and physical well-being. Their use is based on the principle that the sense of smell plays a significant role in overall health. When an essential oil is inhaled, its molecules are transported via the olfactory system to the limbic system in the brain. The brain responds to particular aromas with emotional responses. When applied externally, they are absorbed by the skin and then carried throughout the body. The oils used may be able to penetrate cell walls and transport nutrients or oxygen to the inside of cells. Jasmine and lavender are oils thought to be responsible for an easier labor. When a drop of oil, such as lavender, is placed on the skin, a woman is able to taste it within 15 seconds.

Heat or Cold Application

Heat and cold have always been used for pain relief after injuries such as minor burns or strained muscles. It is only lately that they have been investigated as effective ways to help relieve the pain of labor contractions. Women who are having back pain may find application of heat to the lower back by a heating pad or a moist compress very comforting.

Women who become warm from the exertion of labor find a cool washcloth to the forehead comforting. Ice chips to suck on to relieve mouth dryness are also refreshing.

Bathing or Hydrotherapy

Standing under a warm shower or soaking in a tub of warm water, jet hydrotherapy tub, or whirlpool is another way to apply heat to help reduce the pain of labor (Cluett et al., 2005). The temperature of water used should be between 95°F and 100°F (35.0°C and 37.8°C) to prevent hyperthermia. This type of pain relief measure usually is not recommended for women whose membranes have ruptured because of the risk of infection.

Therapeutic Touch and Massage

Therapeutic touch is the use of touch to comfort and relieve pain. It is based on the concept that the body contains energy fields that, when plentiful, lead to health and, when in less supply, result in ill health. Krieger (1990), in a classic work, defined therapeutic touch as the laying on of hands to redirect the energy fields that lead to pain. Although the action is not well documented, touch and massage probably work to relieve pain by increasing the release of endorphins. It also is a form of distraction. Effleurage, the technique of gentle abdominal massage often taught with Lamaze preparation for childbirth classes, is a form of therapeutic touch (Fig. 19.2).

Yoga

Yoga, a term derived from the Sanskrit word for union, denotes a series of exercises that were originally designed to bring people who practice it closer to their God. It offers a significant variety of proven health benefits, including increasing the efficiency of the heart, slowing the respiratory rate, improving fitness, lowering blood pressure, promoting relaxation, reducing stress, and allaying anxiety. Exercises consist of deep breathing exercises, body postures to stretch and strengthen muscles, and meditation to focus the mind and relax the body. It may be helpful in reducing the pain of labor through its ability to relax the body and possibly through the release of endorphins that may occur.

Reflexology

Reflexology is the practice of stimulating the hands, feet, and ears as a form of therapy (Martin, 2004). Professional

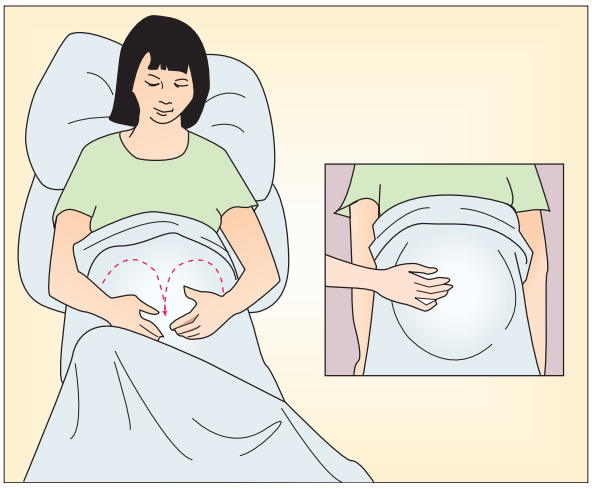


FIGURE 19.2 Effleurage is light massage that can distract a woman from discomfort during labor.

reflexologists apply pressure to specific areas of the hands, feet, and ears to alleviate common ailments such as headaches, back pain, sinus colds, and stress. The theory behind reflexology is that each of the body's organs and glands are linked to corresponding areas of the hands and feet. The body is divided into 10 zones that run in longitudinal lines from the top of the head to the tips of the toes. Application of pressure to the specific area aims to restore energy to the body and improve the overall condition.

Crystal or Gemstone Therapy

Some gemstones or crystals are thought to have healing powers, and women may bring these into a birthing room to use during labor. A woman who uses crystals or gemstones may believe that their healing power is magnified when they are positioned around her body. Be especially careful when changing bedding or rearranging equipment in a birthing room to respect the position of these crystals. A woman may feel that they do not work their healing powers in an altered position.

Hypnosis

Hypnosis is yet another method of pain relief for labor. A woman who wants to use this modality needs to meet with her hypnotherapist during pregnancy. At these visits, she is evaluated for and further conditioned for susceptibility to hypnotic suggestion. At the last prenatal visit, she is given the posthypnotic suggestion that she will experience reduced pain or absence of pain during labor. For a woman who is susceptible to hypnotic suggestion, the method can provide a very satisfactory drug-free method of pain relief (Cyna et al., 2004).

Biofeedback

Biofeedback is based on the belief that people have control and can regulate internal events such as heart rate and pain response. Women who are interested in using biofeedback for pain relief in labor must attend several sessions during pregnancy to condition themselves to regulate their pain response. During these sessions, a biofeedback apparatus is used to measure muscle tone or the woman's ability to relax.

Transcutaneous Electrical Nerve Stimulation

Transcutaneous electrical nerve stimulation (TENS) relieves pain by counterirritation on nociceptors (Simkin & Bolding, 2004). With two pairs of electrodes attached to a woman's back to coincide with the T10–L1 nerve pathways, low-intensity electrical stimulation is given continuously or is applied by the woman herself as a contraction begins. This stimulation blocks the afferent fibers, preventing pain from traveling to the spinal cord synapses from the uterus. As labor progresses and the pelvic division begins, the electrodes are moved to stimulate the S2–4 level. High-intensity stimulation is generally needed to control the pain at this stage.

TENS can be as effective as epidural anesthesia for pain relief in labor, but some women may object to being "tied down" to the equipment. Women with extreme back pain during labor may benefit the most from a TENS unit, because this type of pain is difficult to relieve with controlled breathing exercises. TENS is also discussed in Chapter 20 as it applies to the postoperative pain of a cesarean birth.

Acupressure and Acupuncture

Acupuncture is based on the concept that illness results from an imbalance of energy. To correct the imbalance, needles are inserted into the skin at designated susceptible body points (*tsubos*) located along meridians that course throughout the body to supply the organs of the body with energy. These points are not necessarily near the affected organ. Activation of these points apparently results in release of endorphins, so the system can be helpful, especially in the first stage of labor (Chung et al., 2003).

Acupressure, in contrast, is the application of pressure or massage at these points. A common point used for a woman in labor is Co4 (Hoku or Hegu point) located between the first and second metacarpal bones on the back of the hand. When a support person holds and squeezes a woman's hand in labor, he or she may be accidentally triggering this point.

Intracutaneous Nerve Stimulation

Intracutaneous nerve stimulation (INS) is a technique of counter-irritation involving the intradermal injection of sterile water or saline along the borders of the sacrum to relieve low back pain during labor (Leeman et al., 2003). Some women find the technique helpful; others prefer to bear back pain rather than submit to injections.

Checkpoint Question 2

Jonny asks you if she could use warm-water tub bathing during labor. Your best answer would be:

a. No. No one is allowed to tub bathe during labor.
b. Yes, as long as her membranes are not ruptured.
c. No, because warm water can diminish labor contractions.
d. Yes, as long as the warm water doesn't raise her temperature.

Pharmacologic Pain Relief During Labor

Pharmacologic management of pain during labor and birth includes **analgesia,** which reduces or decreases awareness of pain, and **anesthesia,** which causes partial or compete loss of sensation. Many choices are available today. For the best results, be sure women are included in a selection that is right for them.

Virtually all medication given during labor crosses the placenta and has some effect on the fetus, which makes it

important for a woman to receive as little systemic medication as possible. On the other hand, labor should not test a woman to the limit of her endurance, especially since local anesthesia is available. Be sure to caution women not to take acetylsalicylic acid (aspirin) for pain in labor. Aspirin interferes with blood coagulation, increasing the risk for bleeding in the newborn or mother.

Goals of Pharmacologic Management of Pain During Labor

Medication effectively used during labor must relax a woman and relieve her discomfort, yet have minimal systemic effects on her uterine contractions, her pushing effort, or her fetus. Whether a drug affects a fetus depends on its ability to cross the placenta. Drugs with a molecular weight of more than 1,000 cross poorly, whereas those with a molecular weight of less than 600 cross very readily. Drugs with highly charged molecules or molecules strongly bound to protein cross more slowly than others. Fat-soluble drugs cross most easily. A preterm fetus, which has an immature liver and is unable to metabolize or inactivate drugs, is generally more affected by drugs than a term fetus. If a drug causes a systemic response, such as hypotension, in a woman, it can result in a decreased oxygen (PO_2) gradient across the placenta and fetal hypoxia. If it causes confusion or disorientation, she may be unable to work effectively with contractions, prolonging labor. If a medication causes changes in a fetus, such as a decreased heart rate or central nervous system (CNS) depression, it may be difficult for the newborn infant to initiate respirations at birth, severely compromising the infant in the important first minutes of life.

Because pain is a subjective sensation, women experience different levels of pain during labor. Some women are most aware of pain early in labor, whereas some report the second stage of labor as the most difficult. The point at which pain medication is needed, therefore, differs from one individual to another. Once labor is well underway, medication to relieve discomfort can speed its progress: with pain gone, the woman can relax and work with, not against, her contractions (Camann, 2005). The American College of Obstetricians and Gynecologists (ACOG) currently recommends that women receive pain relief at the point they request it, regardless of cervical dilatation, even though medication given too early tends to slow labor contractions (ACOG, 2002). Unfortunately, no perfect analgesic agent exists for labor or birth that has no effect on labor, the mother, and the fetus.

Preparation for Medication Administration

The type of medication used during labor varies among different health care agencies and also changes based on new research as the effectiveness and safety of new drugs for use during labor are tested. To be safe, remember the criteria that a drug must fulfill to be used in pregnancy, or expand the rule of basic medication administration from "Never give any drug unless you know it is safe for your individual client" to "Never give a drug during labor without knowing it is safe for both of your clients: the mother and the fetus."

Medicines frequently used in labor and birth are shown in Table 19.1. Prepare the woman for the type of agent to be given, how it will be administered (e.g., "You'll need to lie on your side"), and what she can expect to happen after administration (e.g., "I'll be taking your blood pressure frequently"). Women in labor are under stress. Experiencing surprising body sensations from a drug without preparation can be so frightening that it can defeat their individual coping abilities. When a person struggles against medication administration because she does not understand the strange feeling it is causing, the risk of inadvertent problems increases.

What If... Jonny tells you she wants something for pain in labor but has no idea what to ask for? How would you advise her? You notice that Jonny's sister grips her hand very tightly during contractions. What possible pain relief measure is her sister's tight pressure providing for her?

Narcotic Analgesics

Narcotics are often given during labor because of their potent analgesic effect (Hawkins, 2003). All drugs in this category cause fetal CNS depression to some extent. Be sure to question an order for a narcotic if a woman is in preterm labor. Because of possible lung immaturity, a preterm infant may have extreme difficulty coping with the added insult of respiratory depression at birth.

Narcotic analgesics commonly used include meperidine hydrochloride (Demerol), morphine sulfate, nalbuphine (Nubain), fentanyl (Sublimaze), and butorphanol tartrate (Stadol). Meperidine is advantageous as an analgesic in labor because it has additional sedative and antispasmodic actions; these make it effective not only for relieving pain but also for helping to relax the cervix and providing a feeling of euphoria and well-being. It may be given either intramuscularly or intravenously. The dose is 25 to 100 mg, depending on a woman's weight and the route of administration. The drug begins to act about 30 minutes after intramuscular (IM) injection and about 5 minutes after intravenous (IV) administration. Its duration of action is 2 to 3 hours (Karch, 2004).

Demerol also may be self-administered by a patient-controlled analgesic (PCA) pump for low-dose but frequent administration during labor (Chang et al., 2004). Intrathecal administration (injection into the cerebral spinal fluid) is used less frequently.

Because Demerol crosses the placenta, it can cause respiratory depression in a fetus. The drug crosses the placenta minutes after either IV or IM administration to the mother. However, because the fetal liver takes 2 to 3 hours to activate the drug into the fetal system, the effect will not be registered in the fetus for 2 to 3 hours after maternal administration. For this reason, Demerol is given when the mother is more than 3 hours away from birth. This allows the peak action of the drug in the fetus to have passed by the time of birth.

It may be puzzling to see a sleepy baby delivered to a woman who was given Demerol 2 hours before birth and an alert baby delivered to a woman who had Demerol

TABLE 19.1

Analgesics and Anesthetics Commonly Used in Labor and Birth

Type	Drug	Usual Dosage/Route	Effect on Mother	Effect on Labor Progress	Effect on Fetus or Newborn
Narcotic analgesic	Meperidine (Demerol)	25 mg IV, 50–100 mg IM q3–4 h; also epidurally	Effective analgesic; feeling of well-being	Relaxation, possibly aiding progress during cervical relaxation. Slows labor contractions if given early.	Should be given 3 h before birth to avoid respiratory depression in newborn. Decreases beat-to-beat variability in FHR.
	Nalbuphine (Nubain)	10–20 mg IM q3–6 h, 0.3–3 mg/kg over 10–15 min IV	Slowing of respiratory rate; effective analgesic	Mild maternal sedation	Results in some respiratory depression
	Butorphanol (Stadol)	1–2 mg IM or IV q3–4 h	Withdrawal symptoms if woman is opiate-dependent	Possible slowing of labor if given early	Results in some respiratory depression
	Morphine sulfate	Intrathecally 0.2–1 mg; 5 mg epidurally	Pruritus; effective analgesia	Possible slowing of labor contractions.	Has minimal effect
	Fentanyl (Sublimaze)	50–100 µg IM or 25–50 µg IV; also epidurally	Hypotension; respiratory depression	Slowing of labor if given early	May result in respiratory depression
Lumbar epidural block	Local anesthetic Bupivacaine (Marcaine), Ropivacaine (Naropin)	Administered for first stage of labor; with continuous block, anesthesia will last through birth; injected at L3–4; Fentanyl or morphine possibly added	Rapid onset, in minutes; lasting 60–90 min; loss of pain perception for labor contractions and birth; possible maternal hypotension	Slowing of labor if given early; pushing feeling obliterated, resulting in possible prolonged second stage	May be some differences in response in first few days of life
Pudendal block	Local anesthetic Lidocaine (Xylocaine)	Administered just before birth for perineal anesthesia; injected through vagina	Rapid anesthesia of perineum	None apparent	None apparent
Local infiltration of perineum	Local anesthetic Lidocaine (Xylocaine)	Injected just before episiotomy incision	Anesthesia of perineum almost immediately	None apparent	None apparent
General intravenous anesthetic	Thiopental	Administered IV by anesthesiologist or nurse-anesthetist	Rapid anesthesia; also rapid recovery	Forceps required because abdominal pushing is no longer possible	Results in infant being born with CNS depression

Karch, A. M. (2004). *Lippincott's nursing drug guide.* Philadelphia: Lippincott Williams & Wilkins.

within 1 hour of birth. In the second instance, the peak action or peak effect has not yet occurred in the infant. This newborn needs careful assessment for the next 4 hours until the drug reaches its peak.

Nalbuphine hydrochloride (Nubain), butorphanol tartrate (Stadol), and remifentanil (Ultiva) are synthetic narcotic analgesics. The action of these agents is comparable to that of Demerol. Like Demerol, they may also leave a degree of respiratory depression in the newborn.

Whenever a narcotic is given during labor, a narcotic antagonist such as naloxone (Narcan) should be available for administration to the infant at birth (Box 19.4). Carefully

BOX 19.4 FOCUS ON . . .

PHARMACOLOGY

Naloxone Hydrochloride (Narcan)

Action: Naloxone hydrochloride is a narcotic antagonist that counteracts the effect of narcotic analgesics (Karch, 2004).

Pregnancy category: B

Dosage: 0.01 mg/kg, administered either IV via umbilical vein, SC, or IM; repeated at 2- to 3-minute intervals until response is obtained.

Possible adverse effects: Hypotension, hypertension, tachycardia, diaphoresis, tremulousness

Nursing Implications

- Anticipate the need for resuscitative measures; have resuscitative equipment and emergency drugs readily available.
- If no IV access is available, prepare for possible administration via endotracheal tube.
- If no response is seen after two or three doses, question whether respiratory depression is caused by narcotics.
- Continuously monitor all vital signs for changes.
- Remember that the pain-relieving effect of narcotics will be reversed; assess for pain in the neonate.

observe an infant who receives naloxone in the immediate postpartum period, because the infant's respirations may become severely depressed again when the drug's effect wears off. If severe infant respiratory depression is anticipated, Narcan can be given to the mother just before birth. It readily crosses the placenta and, because it interferes with or competes for narcotic binding sites, may increase the chance for spontaneous respiratory activity in the newborn.

What If... Jonny receives no narcotics during labor, yet her newborn is born very sleepy? Would you administer naloxone? Would asking Jonny if she used recreational drugs be warranted?

Intrathecal Narcotics. *Intrathecal* administration refers to injection into the spinal cord. With intrathecal narcotic injection, a catheter is introduced into the spinal canal (the subarachnoid space), and a narcotic such as morphine or fentanyl citrate is injected into the canal by way of the catheter. Both drugs provide excellent pain relief for labor pain. They take effect in 15 to 30 minutes, and pain relief lasts 4 to 7 hours. The woman is able to feel the urge to push at the second stage of labor, allowing her to actively participate in the birth. Because intrathecal injections are not as effective in reducing the pain of the actual birth, they may be supplemented with a pudendal block in late labor. Possible side effects of intrathecal morphine are intense pruritus, nausea, and vomiting. The pruritus can be treated with IV diphenhydramine (Benadryl) if it becomes too uncomfortable.

Additional Drugs

Additional drugs, such as tranquilizers, may be administered during labor to reduce anxiety or potentiate the action of a narcotic. Examples include hydroxyzine hydrochloride (Vistaril) or a phenothiazine derivative such as promethazine (Phenergan). These drugs do not relieve pain, so the woman in labor needs pain management measures in addition to these drugs.

Regional Anesthesia

Regional anesthesia is the injection of a local anesthetic such as chloroprocaine (Nesacaine) or bupivacaine (Marcaine) to block specific nerve pathways. It achieves pain relief by blocking sodium and potassium transport in the nerve membrane, thereby stabilizing the nerve in a polarized resting state, so that it is unable to conduct sensations.

Depending on the region anesthetized, the woman may or may not continue to be aware of contractions. Various regional anesthetic injection sites are shown in Figure 19.3. Women with preeclampsia may have associated bleeding defects and need to be assessed carefully before regional anesthesia is administered.

Because regional anesthetics are not introduced into the maternal circulation, it was once believed that they had no effect on a fetus. However, research has demonstrated that there is some uptake of these drugs by a fetus, possibly resulting in FHR decelerations and symptoms of flaccidity, bradycardia, and hypotension in the newborn (Karch, 2004). Effects are minimal when compared with those of systemic anesthetic agents, however. Most importantly, regional anesthesia allows a woman to be completely awake and aware of what is happening during birth. They do not depress uterine tone, so the uterus remains capable of optimal contraction after birth, thereby helping to prevent postpartal hemorrhage.

It is rare that an infant is born with symptoms of toxicity from a regional anesthetic. If this occurs, however, an exchange transfusion at birth will remove the anesthetic from the infant's bloodstream. Gastric lavage also will remove a great deal of anesthetic, because anesthetics have a strong affinity for acid media such as stomach acid.

Epidural Anesthesia (Peridural Block). The nerves in the spinal cord are protected by several tissue layers. The pia mater is the membrane adhering to the nerve fibers. Surrounding this is the *cerebrospinal fluid* (CSF). Next comes the arachnoid membrane and outside that, the *dura mater.* Outside the dura mater is a vacant space (the *epidural space*). Beyond it is the *ligamentum flavum,* yet another protective shield for the vulnerable spinal cord.

An anesthetic agent introduced into the CSF in the subarachnoid space is called a spinal injection or spinal anesthesia. An anesthetic agent placed just inside the ligamentum flavum in the epidural space is **epidural anesthesia** (see Fig. 19.3). Anesthetic agents placed in the epidural space at the L4–5, L3–4, or L2–3 interspace block

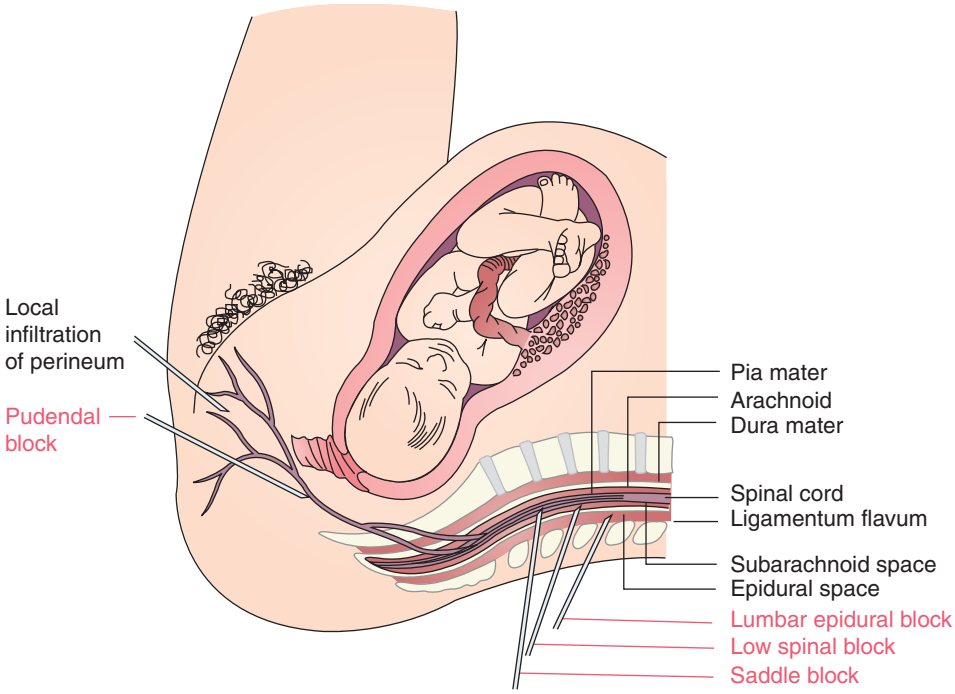


FIGURE 19.3 Anatomy of the spinal canal and sites of injection for regional anesthesia.

not only spinal nerve roots in the space but also the sympathetic nerve fibers that travel with them. Therefore, these blocks provide pain relief for both labor and birth. Such a block may actually increase contraction strength and blood flow to the uterus. Because the woman no longer experiences pain, the release of catecholamines (epinephrine) with a β-blocking effect from a pain response is decreased, making this a very effective pain relief measure for labor (Nystedt et al., 2004).

"Spinal headaches" occur only rarely after epidural anesthesia. These headaches are apparently caused by leakage of CSF or instillation of air into the CSF. With epidural anesthesia, the CSF space is not entered, so these problems do not occur. Because the injection technique is potentially frightening, women need continuous support during the process.

Epidural blocks, administered by an anesthesiologist or nurse-anesthetist, are suitable for almost all women. They are advantageous for women with heart disease, pulmonary disease, diabetes, and sometimes severe pregnancy-induced hypertension, because they make labor virtually pain free and thereby reduce stress from the discomfort of labor to a minimum. Because the woman does not feel contractions, her physical energy is preserved. Epidural blocks are acceptable for use in preterm labor because the drug has scant effect on a fetus and allows for a controlled and gentle birth with less trauma to an immature fetal skull. Because the woman receives no systemic medication, the infant responds more quickly after birth than if systemic narcotic analgesics were used.

The chief concern with epidural anesthesia is its tendency to cause hypotension because of its blocking effect on the sympathetic nerve fibers in the epidural space. This blocking leads to decreased peripheral resistance in the woman's circulatory system. Decreased peripheral resistance causes blood to flow freely into peripheral vessels, and a pseudohypovolemia develops, registering as hypotension. The combined use of fentanyl and bupivacaine can lower the risk for hypotension. In addition, the risk also can be reduced by being sure the woman is well hydrated with 500 to 1,000 mL of IV fluid, such as Ringer's lactate, before the anesthetic is given. Ringer's lactate is preferable to a glucose solution, because too much maternal glucose can cause hyperglycemia with rebound hypoglycemia in the newborn. Be certain that the woman does not lie supine but remains on her side after an epidural block, to help prevent supine hypotension syndrome.

If hypotension does occur, raising the woman's legs and administering oxygen and additional IV fluid, along with an agent such as ephedrine to elevate blood pressure, may be necessary to stabilize cardiovascular status.

In rare instances, the anesthetic does enter the blood circulation (Jenkins, 2005). This occurrence is manifested as drowsiness, a metallic taste on the tongue, slurred speech, blurred vision, unconsciousness, and seizure leading to cardiac arrest. If such symptoms occur, it is an emergency situation. The woman needs oxygen and an anticonvulsant such as diazepam (Valium) or thiopental (Pentothal) IV, followed by prompt birth of the fetus.

The use of an epidural block tends to prolong the second stage of labor, but whether this leads to an increase in cesarean births is controversial (Howell, 2005). Descent can slow, for example, taking 3 hours rather than 2 hours, but if there is no indication that this is detrimental to the fetus, it should not lead to a greater need for vacuum extraction or cesarean birth. Relaxation of the levator ani muscle may impede internal rotation of the fetal head, further slowing labor or making the use of forceps necessary to effect rotation. This occurs primarily when the fetus is in an occiput-posterior position. Oxytocin may be given to shorten labor. Allowing an epidural to wear off by the second stage of labor, so that the woman can push with

contractions, is another option. However, experiencing contractions at this point can be overwhelming for a woman and counteracts the original reason for giving the anesthetic: to reduce pain in labor.

Technique for Administration. Epidural anesthesia is begun when the cervix is dilatated 5 to 6 cm. An IV infusion and equipment for blood pressure monitoring should be in place. Help position the woman on her side or sitting upright. Her back should not be flexed, because this increases the possibility of puncturing the dura and accidentally giving the anesthetic as a spinal, not epidural, injection. The lumbar area of the back is cleaned with an antiseptic solution. A local anesthetic is injected into the skin to form a wheal over the L3 and L4 vertebrae. A special 3- to 5-inch needle is then passed through the L3–4 interspace into the epidural space. After needle placement, a polyethylene catheter is passed through the needle into the space, and the needle is then withdrawn, leaving the catheter to be taped in place. A closed system (a syringe is attached) is established to prevent infection through the catheter (Fig. 19.4).

The anesthetist then injects a small test dose of a local anesthetic solution into the catheter. Five minutes later, the woman's legs are inspected for flushing and warmness, evidence that the anesthetic is in the epidural space (peripheral dilatation is beginning). Assess the woman's pulse and blood pressure at this time. If the anesthetic was accidentally placed in a blood vessel, toxic symptoms of hypotension, slurred speech, and rapid pulse will be present. After assurance that the anesthetic is epidural, the initial dose of anesthetic is given through the catheter. This produces anesthesia up to the level of the umbilicus in 10 to 15 minutes. The effect of epidural anesthesia is short lived (40 minutes to 2 hours). To keep a woman free from discomfort during the duration of labor, another dose of anesthetic, termed a top-up, must be added, or anesthetic must be continually infused by an infusion pump.

Before an additional top-up dose is administered, ask the woman to both write and say out loud a phrase such as "I can do it" three times. If she is unable to do this, question the dose: lack of fine motor coordination and slurred speech indicate a slowly occurring toxic reaction.

Epidural anesthesia may also be given in a "segmented" fashion. With this technique, after the test dose, only a small dose (about 4 mL) is given. This provides anesthesia for uterine contractions but not perineal relaxation. Close to birth, if the woman sits up and an additional dose is given, perineal anesthesia will result. Leaving the lower anesthesia for late in labor in this way allows for better internal rotation of the fetal head, because the perineal muscle is not lax and there is less chance that forceps for rotation will be necessary.

A nurse should be in continuous attendance while an epidural anesthetic is given. Epidural anesthesia can cause a temporary elevation in temperature, so keep this in mind when evaluating a woman's temperature. To detect hypotension, continuously monitor blood pressure for the first 20 minutes after each new injection of anesthetic. Continue to monitor blood pressure throughout the time the anesthetic is in effect, to be certain that the systolic pressure does not fall to less than 100 mm Hg or decrease by 20 mm Hg or more in a hypertensive woman. A drop greater than this could be life-threatening to a fetus unless prompt, effective corrective measures are taken, such as repositioning and administering an antihypotensive agent. If such measures are instituted quickly, fetal outcome will not be compromised.

With an epidural block, the woman loses sensation of her bladder filling. Remind her to void every 2 hours, monitor intake and output, and observe and palpate for bladder distention to avoid overfilling. Be aware of the standards

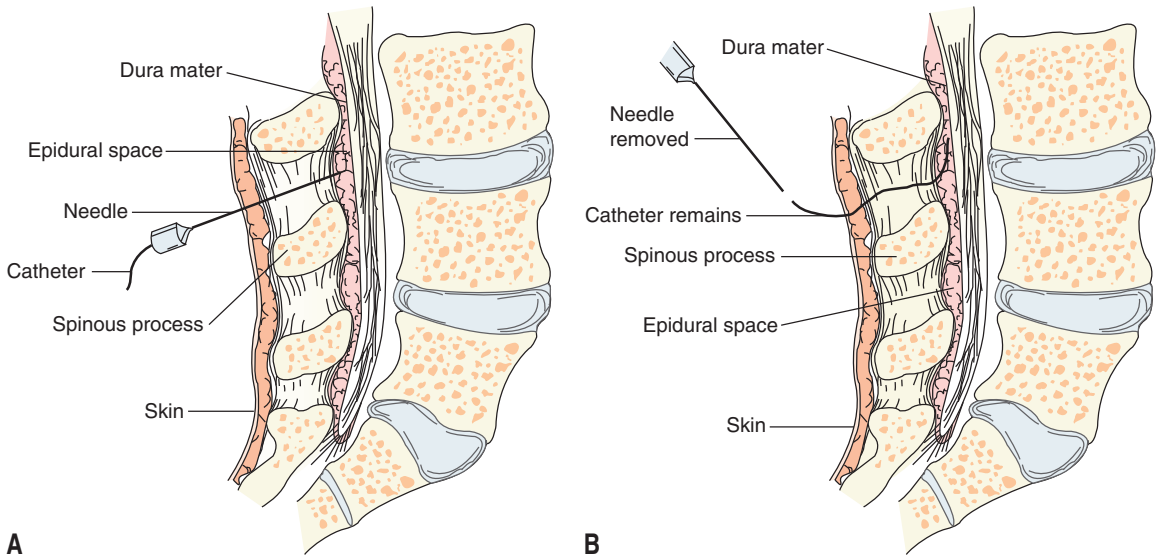


FIGURE 19.4 Epidural anesthesia. (**A**) A needle is inserted into the epidural space. (**B**) A catheter is threaded into the epidural space; the needle is then removed. The catheter allows medication to be administered intermittently or continuously to relieve pain during labor and childbirth.

and policies of the health care agency related to adding additional anesthesia and removal of the catheter.

Yet another technique used with epidural anesthesia is self-administration or patient-controlled epidural analgesia (PCEA). With this technique, an epidural catheter delivers an analgesic mixture whenever the client presses a button on a special pump. A lockout period follows each self-administration, to avoid overdosage. This method of administration is advantageous because less anesthetic is required, compared with continuous epidural infusion (CEI).

Spinal (Subarachnoid) Anesthesia. Spinal anesthesia is used less frequently today, in preference to lumbar epidural blocks. It may be used in an emergency, however, because the administration technique is simpler than that of an epidural and can be accomplished more rapidly.

For spinal anesthesia, a local anesthetic agent such as bupivacaine (Marcaine) or ropivacaine (Naropin) is injected using lumbar puncture technique into the subarachnoid space (into the CSF) at the third or fourth lumbar interspace. A narcotic agonist such as morphine or fentanyl may be added for additional pain relief. For administration, the woman is placed in a sitting position on the side of the birthing bed, with legs dangling and head bent. She is asked to bend her head forward so that her back curves and the intravertebral spaces open. Be sure to support her in this position, because she is "front-heavy" as a result of her pregnancy and could easily fall forward if not well supported.

After injection, the anesthetic normally rises to the level of T10. Anesthesia up to the umbilicus and including both legs will be achieved.

Spinal anesthetic agents may be "loaded" or "weighted" with glucose to make them heavier than CSF. This helps prevent them from rising too high in the spinal canal and interfering with the motor control of the uterus or with respiratory muscles.

After injection of the anesthetic, the anesthesiologist asks the woman to lie down again. It is important that she does lie down at this time, because if she sits up too long, the anesthetic will not rise high enough in the canal to achieve pain relief. On the other hand, she must not lie down before this time, or the anesthetic will rise too high in the canal. Lying with a pillow under the head also helps ensure that the anesthesia will be confined to the lower spinal canal.

Hypotension from sympathetic blockage in the lower extremities can occur immediately after administration. This leads to vasodilation and a decrease in central blood pressure. If hypotension occurs, placental blood perfusion will be compromised. Turn the woman to her left side to reduce vena cava compression. Expect the anesthesiologist to quickly increase the rate of IV fluid administration to increase blood volume. A vasopressor (e.g., ephedrine) to increase blood pressure and oxygen also may be administered. Never place a woman in a Trendelenburg position to help restore blood pressure after spinal anesthesia. This could make the anesthetic rise high in her spinal column, causing uterine or respiratory function to cease.

To guard against hypotension, IV fluids such as lactated Ringer's solution are usually given before the injection to ensure hydration. Be certain the fluid is infusing well before the anesthesia is administered.

A late complication of spinal anesthesia is a postpartal dural puncture headache (PDPH) or "spinal headache." This occurs because of continuous leakage of CSF from the needle insertion site and possibly from the irritation of a small amount of air that enters at the injection site. The shift in pressure of the CSF causes strain on the cerebral meninges, initiating the pain. The incidence of such headaches is reduced if a small-gauge needle is used for the injection and the woman drinks a quantity of fluid afterward, because a high fluid intake rapidly provides replacement of spinal fluid. Although it is usually encouraged, asking a woman to remain flat may not be necessary because of the routine use of small needles in most settings.

If a headache does occur, it can be relieved by having the woman lie flat and administering an analgesic. Some women find a cold cloth applied to the forehead helpful. If a headache is incapacitating, it can be treated with a blood patch technique. For this, 10 mL of blood is withdrawn from an accessible vein and then immediately injected into the epidural space over the spinal injection site. The injected blood clots and seals off any further leakage of CSF.

Checkpoint Question 3

Jonny chooses to have epidural anesthesia. What are two risks associated with this?

a. Hypotension and prolonged second stage of labor.
b. Severe headache and coldness of all extremities.
c. Continued back pain and short first stage of labor.
d. Hypertension and a reduced red blood cell count.

Combined Spinal Epidural Technique. Spinal anesthesia has an advantage over epidural anesthesia in that the pain control is immediate after injection of the anesthetic. A disadvantage of spinal anesthesia is that the woman can not ambulate afterward. To take advantage of the rapid onset of pain control but also allow for ambulation, combined spinal epidural (CSE) technique was originated. To administer this, the anesthesiologist first inserts an epidural needle using usual epidural technique. A catheter is inserted into the epidural needle and taped in place. The anesthesiologist then inserts a very fine spinal needle into the subarachnoid space and the CSF. It is confirmed that the second needle is into the CSF if a drop of fluid falls from the end of the needle. A small dose of narcotic (e.g., fentanyl) is then added to the CSF, and the spinal needle is withdrawn.

The advantage of a CSE administration is immediate pain relief, whereas an epidural block alone would take 20 to 30 minutes to accomplish this (Hughes et al., 2005). In addition, it allows the woman to be ambulatory, because the drug added to the CSF is a narcotic, not a local anesthetic. Possible complications that can occur from the CSE method include hypotension, pruritus, urinary retention, nausea and vomiting, and a PDPH (although all of these

are rare). Additional anesthesia for the duration of labor is achieved by the epidural route.

Medication for Pain Relief During Birth

Stretching of the perineum causes the pain during birth. The simplest form of pain relief for birth is the natural **pressure anesthesia** that results from the fetal head pressing against the stretched perineum. This natural anesthesia is often adequate to allow an episiotomy to be performed without a woman feeling the cut. The pain she experiences as the fetal head is born, although intense and hot, occurs suddenly and is over quickly. Often, after the hours of hard contractions a woman has come through, this flash of pain seems almost nothing. For some women, however, additional medication may be needed to reduce the pain of birth.

Local Anesthetics

Local Infiltration. Local infiltration is the injection of an anesthetic such as lidocaine (Xylocaine) into the superficial nerves of the perineum. It is used when the fetal head is too low to allow for a pudendal block. The anesthetic is placed along the borders of the vulva. The effect lasts for approximately 1 hour, allowing for suturing of an episiotomy without additional anesthetic.

Pudendal Nerve Block. A **pudendal nerve block** (Fig. 19.5) is the injection of a local anesthetic such as chloroprocaine (Nesacaine) or bupivacaine (Marcaine) near the right and left pudendal nerves at the level of the ischial spine. The injection, made through the vagina with the woman in a lithotomy or dorsal recumbent position, provides relief of perineal pain in 2 to 10 minutes that lasts for approximately 1 hour. Anesthesia achieved with this method is sufficiently deep to allow the use of low forceps during birth and an episiotomy repair. Although the injection is only local, the FHR and the mother's blood pressure should be checked immediately after the injection, in case maternal hypotension occurs.

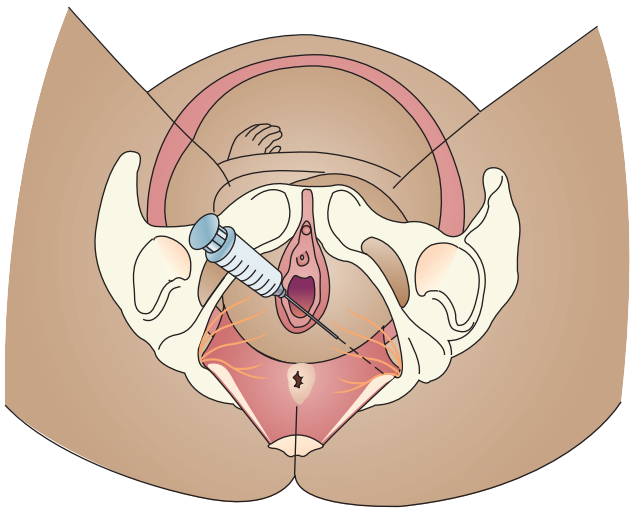


FIGURE 19.5 Pudendal nerve block.

General Anesthesia

General anesthesia is never preferred for childbirth, because it carries the dangers of hypoxia and possible inhalation of vomitus during administration. Pregnant women are particularly prone to gastric reflux and aspiration because of increased stomach pressure from the weight of the full uterus beneath it. The gastroesophageal valve also may be displaced and possibly functioning improperly. Despite these risks, general anesthesia may be necessary in emergency situations (e.g., abruptio placentae) when an immediate cesarean birth is required.

For complete and rapid anesthesia during childbirth, thiopental sodium (Pentothal), a short-acting barbiturate, is usually the drug of choice. It causes rapid induction of anesthesia and, because it has a short half life, allows for good uterine contraction afterward, with minimal postpartal bleeding. After induction with thiopental sodium, the woman is intubated, and anesthesia is then maintained by administration of nitrous oxide and oxygen. Thiopental sodium crosses the placenta rapidly. Infants born of a woman anesthetized by this method may be slow to respond at birth and may need resuscitation. However, in view of the degree of barbiturate intoxication demonstrable in these infants, their ability to respond and alertness at birth are always surprising.

All women who receive a general anesthetic must be observed closely in the postpartal period, because most gases used for general anesthesia cause uterine relaxation, opening the possibility of uterine atony and postpartal hemorrhage. Some women comment that their throat feels raw or sore afterward from insertion of an endotracheal tube. Using an anesthetic throat spray or gargle, sipping cold liquids, or sucking on ice chips (as soon as this is safe after general anesthesia) may help to relieve the discomfort.

Preparation for the Safe Administration of General Anesthesia. To ensure safe anesthesia administration, an anesthesiologist or nurse anesthetist needs a minimum of six drugs readily available: (1) ephedrine, to use in the event blood pressure falls; (2) atropine sulfate, to dry oral and respiratory secretions to prevent aspiration; (3) thiopental sodium (Pentothal), for rapid induction of a general anesthetic; (4) succinylcholine (Anectine), to achieve laryngeal relaxation for intubation; (5) diazepam (Valium), to control seizures, a possible reaction to anesthetics; and (6) isoproterenol (Isuprel), to reduce bronchospasm should aspiration occur. In addition to these medications, an adult laryngoscope, an endotracheal tube, a breathing bag with a source of 100% oxygen, and a suction catheter and suction source should be at hand.

Aspiration of Vomitus. Inhalation of vomitus from pressure of the uterus on the stomach can be fatal if a woman's airway becomes occluded by the foreign matter. In addition, stomach contents have an acid pH that can cause

chemical pneumonitis and secondary infection of the respiratory tract.

Some anesthesiologists may order IV ranitidine (Zantac) or an oral antacid such as sodium citrate to be given before general anesthesia is administered, to reduce the level of acid in stomach contents should aspiration occur. Metoclopramide (Reglan) increases gastric emptying and may also be prescribed.

For general anesthesia administration, a woman should be placed on her back with a wedge under her right hip to displace the uterus from the vena cava. To reduce the occurrence of hypotension and to establish a line for emergency medications, IV fluid administration is begun. The woman is given a rapid-induction IV agent and is then intubated with a cuffed endotracheal tube. To prevent gastric reflux and aspiration before intubation is achieved, cricoid pressure (which seals off the esophagus by compressing it between the cricoid cartilage and the cervical vertebrae) must be applied as soon as the IV agent is begun until the cuff on the tube is in place.

The moments of induction of general anesthesia before the endotracheal tube is safely in place are critical ones for the anesthesiologist. Respect his or her need to concentrate until the task is achieved.

If aspiration of vomitus occurs in the delivery room, prompt attention is essential. The anesthesiologist suctions the woman's trachea to remove as much foreign material as possible. The woman is intubated, if she was not previously, and given 100% oxygen. IV isoproterenol to reduce bronchospasm and a corticosteroid to reduce inflammation may be given. Positive-pressure ventilation may be started. Blood gas analysis and a chest radiograph usually are obtained to determine the degree of aeration of which the woman is still capable.

Usually, the woman will receive mechanical ventilation until her overall clinical condition improves, as shown by the x-ray films and blood gas concentrations. She is critically ill at the time of aspiration and often will be transferred to an intensive care unit for the special care she needs to survive this emergency.

Checkpoint Question 4

There is no reason to think that Jonny will need a general anesthetic. If she did, what type of drug is usually prescribed to minimize the risk of aspiration of vomitus?

a. An anticonvulsant such as diazepam (Valium).
b. A nerve relaxant such as phenobarbital.
c. Metoclopramide (Reglan) to speed gastric emptying.
d. Oxytocin to increase the effectiveness of labor.

NURSING CARE TO PROMOTE THE COMFORT OF A WOMAN DURING LABOR

The best approach to pain management for women in labor combines both pharmacologic and complementary and alternative therapy measures.

NURSING DIAGNOSES AND RELATED INTERVENTIONS

Nursing Diagnosis: Anxiety related to lack of knowledge about labor experience

Outcome Evaluation: Client identifies beginning and ending of contractions; expresses confidence rather than confusion about ongoing process.

In addition to causing local discomfort, pain can evoke a general stress response (fight-or-flight syndrome). This releases epinephrine, which causes peripheral and uterine vasoconstriction. The degree of pain experienced may increase because of the resulting increase in tissue anoxia. Reducing anxiety through relaxation techniques such as planned breathing exercises, or through administration of medication to reduce anxiety, can reduce vasoconstriction and help reduce pain.

Reduce Anxiety With Explanations of the Labor Process. Planning with women about their options for pain relief during labor should begin prenatally (Box 19.5). During labor, use a standard method of pain assessment, such as a scale of 1 to 10, so that the woman can rate her pain. Evaluate whether pain relief is adequate—not only whether pain relief was offered, but whether it was effective (Pasero & McCaffery, 2004).

Help women use natural methods based on the gate control theory (see Chapter 13) as well as pharmacology relief. Be sure to offer careful explanations of what is happening or what will happen during labor, because this can help alleviate anxiety and thereby reduce some discomfort.

Be sure to explain the characteristics of contractions and reinstruct as necessary (e.g., that labor contractions are rhythmic in nature and come and go repeatedly). Do not assume that a woman is aware of this simply because she is experiencing the contractions. Her pain may be so intense that she is unaware of any relief between contractions (Box 19.6). She may fear that things will worsen as labor progresses and that the pain will become continuous.

This on–off effect differentiates the pain of labor contractions from that of a toothache or headache, which is continuous. Sometimes, just knowing this can help a woman tolerate the pain even as it increases in intensity.

Do not assume everyone knows that the rupturing of membranes is painless, that a pink-stained show is normal, or that contractions change in character during the pelvic division of labor. A woman having her first child probably does not know these things. A woman having her second child may not

BOX 19.5 FOCUS ON . . .

FAMILY TEACHING

Learning More About Options for Pain Relief During Labor

Q. Jonny tells you, "My friends have told me horrible stories about pain during labor. What can I do so I won't hurt so much?"

A. Here are some suggestions to help with pain relief:

- Ask your obstetrician or nurse-midwife early in pregnancy about pain control options. The options your care provider suggests may actually influence your decision as to whether this is the optimal care provider for you.
- Attend childbirth preparation classes during pregnancy, and conscientiously practice breathing or other relaxation exercises. These measures can be adequate all by themselves; if not, they complement pharmacologic methods of pain relief.
- Make a birth plan detailing what position you choose for labor and other options you want to use. This helps give you a greater sense of control.
- Be certain a support person will be with you during labor. Name a second person or investigate using a doula if you are uncertain whether your usual support person can fill this role.
- Late in pregnancy, if you are still concerned, let your primary care provider know. In addition to medication for pain relief during labor, medication to reduce anxiety is also available.
- On admission to the hospital, let the medical and nursing staff know that you are concerned. The most commonly used options today are oral, intramuscular, or intravenous administration of narcotics and injection of regional anesthesia by epidural block. Ask questions about any method suggested that you do not understand.
- Be aware that the choice of receiving analgesia or anesthesia is yours. On the other hand, if a complication occurs, be ready to compromise in the interest of safety for yourself or your child.

remember, or she may find this time so different from the last time (even if it is well within normal limits) that she is frightened. Be certain to give explanations to a woman's husband or support person, as well; otherwise, he or she may start to convey anxiety back to the woman in labor.

Nursing Diagnosis: Ineffective coping related to combination of uterine contractions and anxiety

Outcome Evaluation: Client expresses confidence in her ability to maintain active participation during labor; demonstrates continued breathing tech-

BOX 19.6 FOCUS ON . . .

COMMUNICATION

Suppose Jonny stated early in labor that she didn't want to use any medication for pain relief. As soon as her contractions became 30 seconds in length, however, she requested some analgesia. Her physician prescribed intramuscular meperidine. Her contractions are now 40 seconds in duration and only moderately strong. She looks increasingly uncomfortable with each contraction.

Less Effective Communication

Nurse: How are you feeling, Jonny? Is there anything I can do for you?
Jonny: I need something else for pain. I can't stand this any longer.
Nurse: Didn't the medicine I gave you work at all?
Jonny: It's working for now, but it won't be enough by another half hour. I'll need something else by then.
Nurse: You won't be able to get anything for another 2 hours. I'm sorry.

More Effective Communication

Nurse: How are you feeling, Jonny? Is there anything I can do for you?
Jonny: I need something else for pain. I can't stand this any longer.
Nurse: On a scale of 0 to 10, with 0 being no pain and 10 being the worst pain ever, how would you rate your pain now?
Jonny: It's about a 2 now, but it'll be a 10 in another half-hour when my contractions will be constant and stronger. I won't be able to stand them when they don't let up at all.
Nurse: I'm sorry. I must not have explained that contractions always have a space in between them. Let's talk about that.

Because women in labor are under stress, they may not hear instructions as well as they normally would. First, assess the pain. Asking a woman to rate her pain on a scale of 0 to 10 is an effective method for pain assessment. Also, be certain to assess whether the woman has a clear understanding of the nature of labor contractions so that she is well prepared to manage them.

niques; expresses need to change position; and expresses confidence in the labor nurse and other health care providers.

Help the Woman Identify Coping Strategies. Because pain is not a new phenomenon for a woman of childbearing age, a nurse can help her recall methods she usually uses to combat pain or anxiety. This can go a long way toward helping the woman collect her resources and decide on a pain relief strategy (Box 19.7).

Provide Comfort Measures. Usually, anyone can tolerate a little discomfort from a backache, being thirsty, having dry lips, or having a leg cramp. However, few people can tolerate having all of these discomforts simultaneously or feeling even one of them while experiencing labor contractions.

Assist a woman's support person to provide the usual comfort measures that are helpful for anyone with pain, such as reassurance or a change in position. For dry lips, ice chips to suck on, moistening the lips with a wet cloth, or using a moisturizing jelly may be helpful. A cool cloth to wipe perspiration from her forehead can avoid her feeling overheated.

Be aware of what is happening to a woman's bedclothes and clothing, which will wrinkle rapidly and stick to her skin because she is perspiring. If a waterproof pad is used under her buttocks, it will become soiled with vaginal secretions and feel hot and sticky. However, never apply sanitary pads in labor. Although they absorb vaginal secretions well, they tend to slip out of place, possibly carrying pathogens from the rectal area forward to the vaginal opening. Instead, change the waterproof pad frequently. At least halfway through the first stage of labor, or more frequently as indicated by the woman's condition, change the sheets and give her a clean gown. She could bathe or take a shower if that would be helpful. These measures can help her feel clean and refreshed, with a ready-to-go-again feeling.

Think of comfort measures for the woman's support person as well. Is the chair by the side of the bed comfortable? Does he or she need to stretch or take a beverage or bathroom break? It is difficult for the support person to comfort a woman if he or she is uncomfortable because of spending hours sitting still in one position.

Nursing Diagnosis: Pain related to labor contractions

Outcome Evaluation: Client states pain is reduced to a tolerable level with techniques used and is able to handle or "work with" contractions; demonstrates ability to listen and respond to questions and instructions.

Encourage Comfortable Positioning. An upright, sitting, or walking position may be most comfortable for a woman in early labor. Contractions also are most efficient in this position. Before membranes have ruptured, therefore, a woman may be most comfortable either sitting in a chair or ambulating. After the membranes have ruptured and if the fetal head is not engaged, there may be danger in walking about, because the cord might prolapse and impede fetal circulation. If this is so, the woman should remain in bed at this time. Urge her not to lie on her back, to avoid supine hypotension syndrome.

Encouraging position changes from time to time is important. Assist the woman to find a satisfying position by moving bedclothes or monitor leads, if any are attached. If she wishes to walk and has no support person, walk with her. Pelvic rocking between contractions may relieve tense back muscles.

Position changes are also essential in the second stage of labor. Depending on medical protocols and barring any medical contraindications, a woman might prefer to sit, stand, kneel on hands and knees, lie in dorsal recumbent or lateral recum-

BOX 19.7 FOCUS ON . . .

EVIDENCE-BASED PRACTICE

Can women in labor identify coping strategies they have used in the past to manage pain?

Because pain is experienced in individual ways, it follows that the best coping strategies for pain should also be individualized. To investigate whether nulliparous women can identify their own preexisting coping strategies for managing pain and anxiety, 23 nulliparous women were interviewed during their third trimester of pregnancy as to what strategies they usually used to cope with pain and anxiety. A separate sample of 20 women were interviewed following birth regarding the coping strategies they had used to manage pain and anxiety during labor. The findings of this study revealed that women in both samples were able to identify coping strategies that they have successfully employed to manage pain and anxiety in the past. The researchers concluded that women may benefit from assistance in pregnancy to develop strategies for labor that are based on their own coping repertoire.

This is an important study for nurses, because nurses are the health care providers women in labor depend on to help them manage pain. Helping a woman identify a coping strategy with which she is already familiar and in which she has confidence could prove to be a more effective pain management technique than trying to teach a new, untried strategy during labor.

Escott, D., et al. (2004). The range of coping strategies women use to manage pain and anxiety prior to and during first experience of labour. *Midwifery, 20*(2), 144–156.

bent positions, or squat (see Chapter 18). Keep in mind that maintaining these positions often requires assistance from one or two support people.

Assist the Woman With Prepared Childbirth Method. Depending on the type of childbirth preparation a woman and her support person have had, the method used may include breathing exercises, distraction by focusing on an external object, acupressure, therapeutic touch, music therapy, guided imagery, self-hypnosis, or a combination of these methods (see Chapter 13). Biofeedback is not well documented in labor but also may be effective.

Often, with the discomfort and stress of labor, it is easy for a woman to forget what was learned in the relaxed, fun setting of an antepartal class. As necessary, review previously learned breathing techniques with the woman. Urge her to begin these early in labor, even before contractions become strong. It is not essential for women to use complex breathing patterns in labor; even a woman who has had no prior training in breathing exercises can use a simple breathing pattern to alleviate discomfort with just a little guidance from a nurse (Box 19.8).

Massage is another pain relief method that can be taught to a woman and her support person during labor. It may be especially useful if a woman is experiencing back pain from labor, because rubbing or massaging the sacral area often alleviates back pain. Firm counterpressure on the lower back, thighs, feet, hands, or shoulders can provide a relaxing distraction from the sensation of internal pressure and pain.

Provide Pharmacologic Pain Relief. Helping a woman decide if and when medication for pain relief should

BOX 19.8: Focus on Nursing Care Planning

A Multidisciplinary Care Map for A Woman Requiring Comfort Measures During Labor and Birth

Jonny Baranca is a primipara in early labor whom you admit to a birthing unit. She tells you her sister had epidural anesthesia for the birth of her baby 3 months ago. She told Jonny that preparation for labor really wasn't necessary because an epidural block completely obliterated her pain in labor. Based on her sister's experience, Jonny expected to be given an epidural block as soon as she arrived at the hospital. When you enter her room, you find her lying on her back in a birthing bed, crying. Her husband is standing outside in the hallway at the nursing desk, shouting that his wife deserves better care than this.

Family Assessment

Gravida 1, para 0; accompanied by husband who will act as support person and coach. Client works as clerk in clothing store; husband is law student at local university.

Client Assessment

Contractions are of moderate intensity, every 6 to 7 minutes, 35 seconds' duration. Cervix dilatated 4 cm, 60% effaced. Membranes intact. FHR 148; fetus in ROA position. Attended childbirth education classes but did not practice breathing exercises.

Nursing Diagnosis

Pain related to effects of uterine contractions and pressure on pelvic structures

Outcome Criteria

Client confirms that discomfort is controlled with either nonpharmacologic or pharmacologic methods; responds to questions and instructions; identifies need for additional pain relief measures if required during labor.

(continued)

Team Member Responsible	Assessment	Intervention	Rationale	Expected Outcome
Activities of Daily Living				
Nurse	Assess what birth plan the woman has devised. Inspect the client's suprapubic area and palpate for bladder distention.	Remind client she does not need to remain in bed. Encourage client to void every 2 hours.	Ambulation can increase comfort. A full bladder contributes to the client's discomfort and may impede fetal descent, possibly prolonging labor.	Client ambulates in early labor. Has no signs of bladder distention; voids every 2 hours during labor.
Consultations				
Physician/ Nurse	Locate which health care provider is on call to provide anesthetic pain relief in labor.	Notify nurse-anesthetist concerning client's wish to receive an epidural block as soon as possible.	Respecting client's wishes is a prime mode of encouraging self-efficacy.	Pain management team supports client's wish for pharmacologic intervention; encourages nonpharmacologic measures until epidural anesthetic is appropriate.
Procedures/Medications				
Nurse	Assess how client's husband views his role in labor. Review with couple how much and what kind of pain relief they plan for labor.	Allow client's husband to take occasional breaks. Stay with the client during this time to provide support. Inform the couple about possible pharmacologic relief methods available to them	Occasional relief breaks allow a support person to conserve energy and provide continued support throughout labor. Providing the couple with information offers them choices, enhancing a sense of control.	Client allows health care providers to substitute for husband so husband can take occasional breaks. Couple states which pain relief methods they wish during labor.
Nutrition				
Nurse	Determine when patient last ate.	Provide client with ice chips as desired.	Ice chips or hard candy can relieve mouth dryness from breathing exercises.	Client states her mouth discomfort is alleviated.
Patient/Family Education				
Nurse	Assess what couple learned in preparation for childbirth classes about pain control in labor.	Provide information on epidural anesthesia; update the couple on labor progress.	An epidural is the pain control method chosen; frequent updates on progress help alleviate anxiety and fears that may exacerbate pain.	Couple confirm that they are certain epidural anesthesia is their method of choice; receive frequent updates on labor progress.
Psychosocial/Spiritual/Emotional Needs				
Nurse	Assess level of client's pain by both verbal and nonverbal indicators. Use 1 to 10 scale and evaluate response to techniques used.	Teach breathing exercises for use during early labor until client receives epidural relief.	Pain is a subjective experience, so only the woman can know her level of pain. Breathing exercises can be an effective way to reduce the pain of labor.	Client rates her level of pain from labor contractions not above 3 on a 1 to 10 scale.

(continued)

Team Member Responsible	Assessment	Intervention	Rationale	Expected Outcome
		Psychosocial/Spiritual/Emotional Needs		
Nurse	Assess what nonpharmacologic measures (e.g., music, room temperature) client thinks would help complement epidural block and aid comfort.	Provide a comfortable environment: clean sheets, comfortable room temperature, cool washcloth to forehead, closed room door. Refrain from intervening with client during a contraction.	A comfortable environment aids in relaxation, promoting effective coping. Interrupting the client's breathing can make the technique ineffective as a pain relief measure.	Client reports she feels environment is comfortable and complements other pain relief measures.
		Discharge Planning		
Nurse	Ask client and husband to evaluate their labor experience.	Review with client pain relief measures used and determine which were most effective.	Reviewing a possibly traumatic event experience helps to put it into perspective among life events.	Client and support person state that labor and birth was at worst a tolerable experience; at best, a highlight of their lives.

be given requires an in-depth understanding of the available drugs, their effects on the mother and the fetus, and their mechanism and duration of action. It also requires sympathetic listening and counseling skills. Many women come into labor wishing to avoid drugs entirely. Once in labor, they may change their minds but hesitate to say so, especially if their partners also believe that a birth without the use of drugs is ideal. Other women come into labor asking to receive something immediately to avoid experiencing any pain. In both instances, provide information about the use of drugs and their ultimate effects. Maintain a supportive presence to help a woman make the best decision for herself and her baby. Some women require analgesia or anesthesia because of a complication. Helping these women and their support persons understand why the medication is necessary calls for equal care and skill. As a rule, record a baseline FHR and maternal blood pressure and pulse before administering medication; reassess 15 minutes later for fetal and maternal safety.

Checkpoint Question 5

Jonny reports in early labor she isn't having much pain. You assess that her contractions are also not strong. What position usually promotes efficient uterine contractions in early labor?

a. Sitting or standing.
b. Lying supine.
c. Lying prone.
d. Side-lying.

Key Points

Pain in labor occurs because of anoxia to uterine cells, stretching of the cervix and perineum, and pressure of the presenting part of the fetus on maternal tissues.

Each person perceives pain differently. Only a woman herself can describe the extent of her pain.

Usually, the better prepared a woman is for childbirth, the less analgesia and anesthesia is necessary.

Encourage complementary and alternative therapies such as reducing anxiety, providing changes in position, increasing knowledge, and supporting prepared childbirth exercises in conjunction with prescribed analgesics.

Be certain to ask about allergy to a medication before administering it during labor. Women under stress may omit mentioning this unless directly asked.

Women may lose their ability to use controlled breathing after systemic narcotic administration because of a "lightheaded" feeling. They may need additional support during this time to be able to continue with a breathing technique until the analgesic agent begins to have an effect.

Regional anesthesia (e.g., epidural anesthesia) can be extremely effective in relieving labor pain. Be certain the woman is well hydrated with IV fluid and that her blood pressure is within normal limits before administration of the anesthetic agent.

During regional or general anesthesia administration, if the woman must lie supine, she should have a

wedge positioned under her right buttock to help prevent supine hypotension syndrome. If hypotension should occur after epidural anesthesia administration, elevating a woman's legs is an emergency measure to help relieve hypotension.

If a narcotic analgesic is used, naloxone (Narcan) must be available for possible newborn resuscitation.

General anesthesia is rarely administered for an uncomplicated labor, because it has risks for both the mother and the infant, but may still be used in an emergency.

Critical Thinking Exercises

1. Jonny, the patient you met at the beginning of the chapter, did not attend any preparation for childbirth classes because she planned to rely totally on a regional block for pain relief. If you had met her during pregnancy, instead of when she was beginning labor, would you have supported this plan? Are there any complementary and alternative therapies that she could have planned for in addition to relying on a regional block?
2. Suppose Jonny says she wants a general anesthetic for labor or she will leave the hospital. Her physician has said that he cannot justify a general anesthetic for uncomplicated labor. You find Jonny crying because her doctor won't give her anything for pain. How would you handle this situation?
3. Suppose Jonny seems well prepared for labor but, after an injection of meperidine early in labor, grows angry with her husband and refuses to use breathing exercises because she feels "so lightheaded" from the medicine. How would you help her at this point?
4. Examine the National Health Goals related to comfort in labor. Most government-sponsored money for nursing research is allotted based on these goals. What would be a possible research topic to explore pertinent to these goals that would be applicable to the Baranca family and also advance evidence-based practice?

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