



Breastfeeding Problems Following Anesthetic Administration

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ABSTRACT

Research literature supports the notion that maternal comfort should be considered a priority and that mothers should receive adequate information regarding any drug prior to receiving that drug. Some studies indicate that difficulties with breastfeeding may be related to the amount of the anesthetic or analgesic that is administered to the mother. Thus, it seems wise to administer the lowest possible dose to the mother in order to minimize the amount of drug (or metabolite) exposure to the nursing infant. Infant exposure can be further reduced if breastfeeding is avoided during the times when the mother receives high doses of anesthetics and analgesics. However, because relatively small amounts of the drug are excreted into the breast milk, some mothers may opt to continue nursing after weighing the benefits of breastfeeding against the potential risk to the infant. Others may choose to “pump and dump” breast milk while they receive anesthetic or analgesic agents. Any concerns in this regard should be discussed with the anesthesia provider, preferably prior to labor or to any surgeries while breastfeeding.

Journal of Perinatal Education, 15(3), 50–57, doi: 10.1624/105812406X119039

Keywords: anesthetic agents, analgesic agents, epidurals, maternal pain, breastfeeding, infant drug exposure

READERS' QUESTION

I have always thought that epidurals were safe for babies. Now I have heard that this may depend on what medications were used in the epidural, and that they might depress an infant and even interfere with breastfeeding. What is correct, and what should I tell expectant parents in my classes about epidurals and anesthesia for birth?

- A nurse midwife in Maryland
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COLUMNISTS' REPLY

Contemporary, evidence-based practice supports breastfeeding as the normal and preferred method of infant nutrition. Indeed, research sponsored by the World Health Organization, the U.S. Department of Health and Human Services, the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, the American Academy of Family Physicians, the Association of Women's Health, Obstetric and Neonatal Nurses, and virtually every health-care organization

throughout the world have found that breastfeeding significantly benefits mothers and their infant. Because of the health costs to mothers and infants of feeding with breast-milk substitutes—and in the absence of the rare maternal disease or maternal use of medication that is contraindicated in breastfeeding—childbirth educators, nurses, and other professionals should strongly promote and support breastfeeding.

Researchers have identified a variety of factors that may adversely impact a mother's ability to breastfeed. For example, Fein and Roe (1998) sent a breastfeeding questionnaire to 2,615 women during their pregnancy and at regular intervals following birth. Of these women, 1,488 returned completed questionnaires. The researchers found that women who were employed on a full-time basis at 3 months postpartum decreased breastfeeding duration by an average of 8.6 weeks ($P < .001$) compared to mothers who were not employed. Additionally, employed women who worked 4 or fewer hours per day had a breastfeeding duration that was statistically similar to women who were not employed at all.

Researchers have also found that other variables may be linked to initiation and continuation of breastfeeding, including older age of the mother (some studies note younger mothers), ethnic minority status, lack of family support systems, lower social economic status, and not having enough milk production (Dennis, 2002; Jordan, Emery, Bradshaw, Watkins, & Friswell, 2005; Volmanen, Valanne, & Alahuhta, 2004). Additional studies have concluded that working part time, as opposed to full time, is an effective strategy to promote continued breastfeeding (Fein & Roe, 1998).

Relatively little evidence exists on the relationship between the administration of analgesia and/or anesthesia and initiation and continuation of breastfeeding, primarily because there are many obstacles to giving pregnant and lactating women medications that may have an impact on their baby. The need or option to use pain medication and anesthesia may arise for a woman at any time during pregnancy, birth, or active lactation. Optional uses include routine and elective use of analgesia and/or anesthesia as a pain management tool for otherwise normal birth. Elective or routine use of any drug requires extra scrutiny. Even routine use requires patient consent or refusal. In its introduction to the six care practices that promote normal birth, Lamaze International (2005) includes

the following statement: "Any intervention in birth, no matter how harmless it may seem, may disrupt these precise hormonal shifts and create problems that must be 'managed' with medical expertise and equipment."

The level of pregnant and lactating women's need for information is unique; for informed consent, they must know and evaluate the risks both to themselves and to their infant. Furthermore, breastfeeding research has failed to focus on the relationship of medical interventions during birth and the breastfeeding behaviors of mother or infant (Kroeger & Smith, 2004). The remainder of this article examines current research on the effects of analgesics and anesthetics on breastfeeding, as well as the implications for educators, nurses, and others who care for women and their infants.

EXISTING RESEARCH CONCERNING ANALGESICS, ANESTHETICS, AND BREASTFEEDING

Use of Epidural Anesthesia during Labor and Birth

Research on the impact of epidural anesthesia (EA) on breastfeeding has produced conflicting results. In 1988, Lie and Juul interviewed 56 cesarean-section patients who averaged 27.8 years of age. The patients were divided into two groups of 28 participants, those who received EA and those who received general anesthesia (GA). The two groups were identical with respect to age, parity, participation in antenatal preparatory courses, and former breastfeeding experiences. They were then compared to each other and to a control group of 28 patients who gave birth vaginally. Each study group included 17 women who gave birth to their first baby (61%) and 11 women who gave birth to their second baby (39%) and had breastfed their first child.

In Lie and Juul's (1988) study, 82% of the women who received EA reported an uncomplicated postpartum period. Seventy-nine percent of the women who had GA said they had no complications following birth. Among the EA patients, 82% reported skin contact with their newborn immediately following the birth, but none of the GA patients said they had skin contact with their newborn immediately after birth. In terms of eye contact immediately following birth, 21% of the EA patients reported eye contact with their baby, but

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 For excellent information and resources on the benefits of breastfeeding, visit the Web sites of the organizations mentioned at the beginning of this article and type "breastfeeding" in the search feature. For example, the American Academy of Pediatrics features a policy statement on breastfeeding (<http://aappolicy.aappublications.org/cgi/content/full/pediatrics;115/2/496>), as does the American Academy of Family Physicians (<http://www.aafp.org/online/en/home/policy/policies/b/breastfeedingpolicy.html>). Also, the U.S. Department of Health and Human Services breastfeeding resource page features numerous links on the benefits of breastfeeding to mother and baby (<http://www.4woman.gov/breastfeeding/index.cfm?page=home>).

none of the GA patients reported eye contact. All of the EA patients stated they experienced physical bonding with their infant within 8 hours of birth, while GA patients reported that physical bonding did not occur until 12 hours after birth. Ninety-six percent of the EA patients reported they had established breastfeeding by the 7th day following birth, whereas 89% of the GA patients stated that they had established breastfeeding by the 7th day postpartum. Significantly, more EA patients continued to breastfeed after discharge and maintained breastfeeding for a longer duration than did those in the GA group. After 3 months, 89% of the EA patients were still breastfeeding their infant, and only 61% of the GA patients were still breastfeeding ($p < .025$). By 6 months, the percentage of EA patients' breastfeeding efforts had decreased to 71%, while the percentage of GA patients still breastfeeding had decreased to 39% ($p < .025$). In the control group of vaginal births, the breastfeeding frequencies were similar to the EA group. Based on these findings, EA was recommended as the preferred anesthesia for cesarean-section births in women who wish to breastfeed.

In a later study, researchers surveyed 100 privately insured women who were breastfeeding at hospital discharge and then again at 6 months postpartum (Kiehl, Anderson, Wilson, & Fosson, 1996). Women who received EA had lower rates of breastfeeding at 6 months (30% vs. 50% continuation). However, the researchers failed to note whether participants who did not receive EA had been given any other type of analgesia or anesthesia during their labors. Additionally, due to low response rates of women without private insurance, the researchers were unable to determine breastfeeding patterns among women who did not have private insurance.

Halpern and colleagues (1999) conducted a more comprehensive study, comparing breastfeeding at 6 weeks postpartum among 189 women who received an epidural versus an opioid for pain during labor. An amazing 93% of the women were still breastfeeding at 6 weeks postpartum. Additionally, neither the use of EA nor the use of an opioid predicted difficulties in initiating or continuing breastfeeding at 6–8 weeks postpartum.

To help determine the effect of EA administered during labor on infant breastfeeding, an observational, pilot-study survey was performed on 500 women of mixed parity (Beilin et al., 2005). On the first day following birth, the women were questioned about whether their infant was having any

problems breastfeeding. Their medical records were then reviewed to find the type of anesthesia the woman had received while she was in labor. Among the women who gave birth to their first baby, the researchers found no difference in breastfeeding success between those who received EA and those who did not receive EA. However, a difference was noted between women who had breastfed previously and who had received a larger dose of epidural fentanyl (a potent analgesic that is sometimes added to EA). Women who received >150 mcg of epidural fentanyl reported breastfeeding problems more often (65%) than those who were given <150 mcg (35%) of epidural fentanyl.

The above findings prompted the researchers to conduct a prospective, randomized, double-blind study to determine whether epidural fentanyl has an impact on breastfeeding (Beilin et al., 2005). Enrolled in the study were women who presented for an attempted full-term vaginal birth, had previously breastfed a child for at least 6 weeks, planned to breastfeed their current child, and had no contraindications to epidural anesthesia. After the patient requested EA, she was randomly assigned to one of three groups. Group 1 patients were not given epidural fentanyl. Instead, EA was initiated with 10 ml of bupivacaine 0.25% (a local anesthetic) and maintained with an infusion of 0.125% bupivacaine at a rate of 10 ml/hr. Group 2 patients (intermediate fentanyl) were given 150 mcg or less of epidural fentanyl. EA was initiated with 10 ml of 0.25% bupivacaine and maintained with an infusion of 0.0625% bupivacaine and 2 mcg/ml of fentanyl at a rate of 10 ml/hr. Group 3 patients (high-dose fentanyl) were given an EA with 10 ml of 0.125% bupivacaine and 100 mcg of fentanyl. The anesthetic was maintained with an infusion of 0.0625% bupivacaine with 2 mcg/ml of fentanyl at a rate of 10 ml/hr. The goal was to give >150 mcg of fentanyl.

Throughout this primary study, Beilin and colleagues (2005) examined 180 women during a 4-year period. Demographic and labor characteristics were similar between the three groups. More than 95% experienced a spontaneous vaginal birth. No difference was reported in the 1-minute and 5-minute Apgar scores in any of the three groups. The researchers noted a significant difference in the fentanyl concentration in the umbilical cord blood, but the bupivacaine concentrations were about the same. Maternal reported difficulties with breastfeeding after 24 hours were 21% for

the high-dose fentanyl group, 10% for the intermediate-fentanyl group, and 10% for the no-fentanyl group. The most frequently noted breastfeeding issues were that the infant was sleepy (55%), did not latch onto the nipple (23%), and was fussy and refused to feed (19%). The authors also found, among other things, that women who received >150 mcg of fentanyl via EA were less likely to be breastfeeding 6 weeks postpartum. Results of this research would have been more generalizable if the researchers had also examined women in the same hospital who had received no medications in labor to determine the rates and types of reported breastfeeding difficulties.

Another study was conducted in the United Kingdom to determine the effect of labor analgesia on early infant-feeding behavior (Jordan et al., 2005). The study included a group of 425 healthy women who had experienced their first birth and had healthy, term, single babies. The type of infant feeding upon discharge from the hospital was reported, and women in the study group had all received EA with fentanyl. Study results indicated that when the well-established determinants of breastfeeding success were accounted for (advanced maternal age, antenatal intent to breastfeed, occupation), higher doses of epidural fentanyl seemed to impede breastfeeding success.

Use of Anesthetic Agents to Control Pain Following Birth

An area of particular concern to anesthesia providers relates to the assertion that anesthetic agents used to control pain after birth may have a negative impact on the mother's ability to successfully breastfeed. A prospective study examined 102 full-term births by cesarean section (Wittels et al., 1997). The patients were given EA with 2% lidocaine and 1:200,000 epinephrine to facilitate birth. Following umbilical cord clamping, each patient was dosed with 4 mg of epidural morphine. At this point, they were randomly assigned to receive either patient-controlled analgesia (PCA) meperidine or PCA morphine. The average PCA opioid consumption throughout a 48-hour period postpartum was reported to be 0.54 mg/kg for morphine and 4.7 mg/kg for meperidine. The researchers noted that the use of meperidine was associated with significantly poorer neonatal alertness and orientation, as compared to the women who used PCA morphine.

Additional concerns revolve around fears that some of the administered anesthetic agents might

harm the infant following ingestion of drug-tainted breast milk. Recent research has attempted to link the administration of commonly accepted anesthetics and medications with breastfeeding problems. Studies that have examined the mainstays of obstetric anesthesia (neuraxial; spinal or epidural) and their impact on breastfeeding success or on adverse infant-feeding effects have tended to conclude that a dose-response relationship exists (Tsen, 2005). Namely, the higher the concentration of fentanyl (a commonly used analgesic epidural agent), the greater the likelihood is of infant problems such as respiratory depression (Jordan et al., 2005). Side effects associated with the use of fentanyl have been reported in infants younger than 6 months old and include sedation, lethargy, and diarrhea (Briggs, Freeman, & Yaffe, 2005).

Although epidurals are not without risk, it appears unlikely that a correctly functioning labor or postoperative epidural, dosed with the lowest possible concentration of local anesthetic and with the lowest possible concentration of analgesic, has a significant effect on breastfeeding success or failure. Subsequent studies also suggest that the use of an epidural with low-dose concentrations of bupivacaine and fentanyl after the initiation of breastfeeding has no effect on the duration or success of continued breastfeeding (Volmanen et al., 2004).

SPECIFICS ON ANESTHETICS USED IN LABOR AND FOLLOWING BIRTH

Since 1983, the American Academy of Pediatrics has published research-based guidelines on the appropriate doses of accepted anesthetic agents to be used in women contemplating breastfeeding. The most recent research-based guideline was released in 2001 (American Academy of Pediatrics, Committee on Drugs, 2001). Additional sources of information to guide providers and patients in the selection of pharmacologic agents includes *Breastfeeding and Maternal Medication: Recommendations for Drugs in the Eleventh WHO Model List of Essential Drugs* (World Health Organization, 2002) and *Drugs in Pregnancy and Lactation* (Briggs et al.,

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TABLE

Commonly Used Anesthetics in Labor and Postpartum and Their Impact on Breastfeeding*

Drug Name	Classification	Infant Impact	Major Maternal Side Effects	Compatible with Breastfeeding?	FDA Category (see Box)
Bupivacaine	Local anesthetic	May produce central nervous system (CNS) depression with high maternal serum levels	Decreased maternal blood pressure	Yes, according to American Academy of Pediatrics (AAP, 2001)	C
Cocaine	Local anesthetic	Irritability, seizure risk, and CNS tremors	Seizure risk and cardiac arrhythmias	Unsafe, according to Epocrates (2006) and Briggs, Freeman, & Yaffe (2005)	C
Fentanyl (Sublimaze)	Narcotic analgesic	Dose dependent; may cause respiratory depression at high levels	Respiratory depression, nausea, and vomiting	Yes, safe for breastfeeding	C
Halothane	Inhaled general anesthetic	Limited human data; animal data suggest low risk	Used for general anesthesia	Yes, according to AAP (2001)	B
Isoflurane	Inhaled general anesthetic	No human data	Used for general anesthesia	Yes, according to AAP (2001); probably safer than halothane	B
Ketamine (Ketalar)	Intravenous (IV) anesthetic	Limited human data; animal data suggest low risk	Used for general anesthesia; respiratory depression and hypotension	Probably safe	B (some sources); D (other sources)
Lidocaine	Local anesthetic for epidural and spinal	May produce CNS depression with high maternal serum levels	Decreased maternal blood pressure	Yes, according to AAP (2001)	B
Midazolam (Versed)	Sedative, Benzodiazepam	Some evidence of relationship to "floppy infant syndrome" (e.g., mild sedation, hypotonia, reluctance to suck, cyanosis, and decreased responses to cold stress)**	Sedation	Unknown; may be of concern	D
Morphine (Duramorph)	Narcotic analgesic	Apnea and bradycardia with repeated maternal doses (dose-dependent)	Respiratory depression at higher doses, nausea, and vomiting	Yes (in single dose); probably safe for breastfeeding	C
Nitrous Oxide	Inhaled anesthetic	Unknown or no clinical effects	Used for general anesthesia; in the past, used for analgesia	Compatible when mother receives during cesarean section; unlikely that infant will be exposed to a significant extent	C
Propofol (Diprivan)	IV anesthetic	Limited human data	Used for general anesthesia; respiratory depression and hypotension	Probably safe	B
Remifentanyl (Ultiva)	Narcotic analgesic	Unknown	Respiratory depression, nausea, and vomiting	Probably safe or safety unknown	C
Rocuronium (Zemuron)	Muscle relaxant	Unknown	Muscle weakness and respiratory depression	Probably yes	B

(Continued)

TABLE
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Drug Name	Classification	Infant Impact	Major Maternal Side Effects	Compatible with Breastfeeding?	FDA Category (see Box)
Ropivacaine (Naropin)	Local anesthetic	Unknown	Decreased maternal blood pressure	Yes, according to Briggs et al. (2005); safer than bupivacaine	B
Sevoflurane	Inhaled general anesthetic	No human data	Used for general anesthesia	Yes, according to AAP (2001); probably safer than halothane	B
Succinylcholine	Muscle relaxant	Unknown	Muscle weakness, respiratory depressions, and malignant hyperthermia	Probably yes	C
Sufentanil (Sufenta)	Narcotic analgesic	Unknown	Respiratory depression, nausea, and vomiting	Safety unknown	C
Thiopental	IV anesthetic	Limited data	Used for general anesthesia; respiratory depression and hypotension	Probably safe	C
Vecuronium	Muscle relaxant	No human data		Probably yes	C

*Adapted from the following resources:

American Academy of Pediatrics [AAP], Committee on Drugs. (2001). The transfer of drugs and other chemicals into human milk. *Pediatrics*, 108(3), 776–789.

Briggs, G. G., Freeman, R. K., & Yaffe, S. J. (2005). *Drugs in pregnancy and lactation* (7th ed.). Philadelphia: Lippincott, Williams & Wilkins.

World Health Organization. (2002). *Breastfeeding and maternal medication: Recommendations for drugs in the eleventh WHO model list of essential drugs*. Retrieved May 12, 2006, from http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/BF_Maternal_Medication.pdf

**Source:

McElhatton, P. R. (1994). The effects of benzodiazepine use during pregnancy and lactation. *Reproductive Toxicology*, 8(6), 461–475.

2005). These references served as a basis in compiling the Table, which lists commonly used anesthetic agents and their impact on breastfeeding. The accompanying Box describes the U.S. Food and Drug Administration’s categories (A, B, C, D, or X) for drugs used in pregnancy, as identified for each anesthetic agent listed in the Table.

RECOMMENDATIONS

Unfortunately, no definitive research findings are available on the use of several of the anesthetic and analgesic agents and their impact on breastfeeding. However, the following recommendations can be made, based on existing research and knowledge of the various anesthetics.

1. Most authorities stress the importance of sound hospital policies that promote breastfeeding education and practice. Halpern and colleagues (1999) found that EA with local anesthetics and opioids did not significantly affect the success of

lactation in a hospital that strongly supports and promotes breastfeeding.

2. Research indicates that some difficulties with breastfeeding may be related to the amount of the anesthetic or analgesic that is given. Thus, it seems wise to administer the lowest possible dose to the mother in order to minimize the amount of drug (or metabolite) exposure to the nursing infant.
3. Infant exposure can be further reduced if breastfeeding is avoided during the times when the mother receives high doses of anesthetics and analgesics. However, because relatively small amounts of the drug are excreted into the breast milk, some mothers may opt to continue nursing after weighing the benefits of breastfeeding against the potential risk to the infant. Others may choose to “pump and dump” breast milk while they receive anesthetic or analgesic agents. Any concerns in this regard should be discussed with the anesthesia provider, ideally during the

BOX

U.S. Food and Drug Administration's Categories for Drugs Used in Pregnancy*

Category	Description
A	Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities.
B	Animal studies have revealed no evidence of harm to the fetus; however, there are no adequate and well-controlled studies in pregnant women. OR Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus.
C	Animal studies have shown an adverse effect and there are no adequate and well-controlled studies in pregnant women. OR No animal studies have been conducted and there are no adequate and well-controlled studies in pregnant women.
D	Studies—adequate, well-controlled, or observational—in pregnant women have demonstrated a risk to the fetus. However, the benefits of therapy may outweigh the potential risk.
X	Studies—adequate, well-controlled, or observational—in animals or pregnant women have demonstrated positive evidence of fetal abnormalities. The use of the product is contraindicated in women who are or may become pregnant.

*Source:

Meadows, M. (2001, May–June). Pregnancy and the drug dilemma. *FDA Consumer Magazine*, 35(3). Retrieved May 12, 2006, from http://www.fda.gov/fdac/features/2001/301_preg.html

pregnancy or before the woman is in active labor (Spigset & Hagg, 2000).

4. When it is necessary to repeat administration of agents to a mother—as in the case of an analgesic (such as morphine) to treat ongoing maternal pain—the woman can either pump the breast milk prior to receiving the next dose of the agent or feed the infant during a time when the maternal blood level is lowest (American Academy of Pediatrics, Committee on Drugs, 2001).
5. Drug exposure can also be minimized if the mother requests, or the provider uses, short-acting medications (American Academy of Pediatrics, Committee on Drugs, 2001).
6. The literature supports the notion that maternal comfort should be considered a priority and that mothers should receive adequate information regarding any drug prior to receiving that drug.

IMPLICATIONS FOR CHILDBIRTH EDUCATORS

Childbirth educators can help women approach anesthesia and analgesia in an informed manner. De-

cidating on the use of anesthetic or analgesic agents is not as simple as some other medical choices. In an ideal world, every anesthesiologist and anesthetist would use evidence-based best practices adapted to the need of the individual patient. In the real world, many people know that they are better off if they learn about and actively participate in their care.

Anesthesia is a complex area and not a normal topic that the average person should be expected to learn. However, most mothers can understand, for example, that the safest epidural is dosed with the lowest possible concentration of local anesthetic and with the lowest possible concentration of analgesic and is not administered with the first contractions of a laboring uterus. Educators can help them request this procedure of caregivers.

Although many mothers have an opportunity to compare caregivers and choose a caregiver for birth or primary care, most people have little influence over which anesthesiologist or nurse anesthetist is available at the hospital when patients need their care. Sometimes, communication and concerns about this topic can be addressed with the primary caregiver, who will advocate for the patient with the anesthesia provider. Including any wishes about anesthesia or analgesia in a pregnant mother's birth plan and sharing them with hospital staff provide another route for the woman to facilitate communication of her preferences.

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Perinatal educators should advise mothers about the basics of anesthesia and analgesia and encourage them to become active recipients of health care, expressing any concerns or wishes to their caregivers. Parents can be reassured that, based on the best evidence at the time, the most commonly used anesthetic agents should not be withheld for fear of affecting the infant. However, this is an area of ongoing research. One of the parents' first responsibilities is giving informed consent (or refusal) for medical procedures that may impact the health of their infant. Mothers should ask questions and weigh the risks and benefits of any drug that is to be administered (Lang, Geldner, & Wulf, 2003; Littleford, 2004).

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