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Midwifery Today
First Hours After Birth: Family Integration and Mutual Regulation

Penny Simkin, PT, CD(DONA) Summer 2012

The drama after birth sometimes unfolds with comments like these from the mother: "I did it! I did it! I can't believe I did it!" "Oh my, is that our baby?" "What is it—a boy or girl?" "Is she all right?" "She doesn't look like a baby!" "Look at her little hands, and her feet!" "We made her!" "She's so big!" "Look, she has your dimple!" We've all heard these outbursts of joy and relief right after the baby comes out, sometimes among kisses, tears of joy and exhaustion or happy laughter.

We've also all heard expressions of exhaustion and relief from the mother and seen a temporary lack of interest in her baby. The exclamations might sound more like these: "It's over! I can't believe it's over!" "Can I just lie here for a minute?" "I can't hold the baby right now. You take it." "Please just leave me alone right now." "I'm so glad it's over." "We're never doing this again!" Sometimes it takes a while before the mother can turn her attention from the intensity of the birth to her baby.

The mother may respond in silence and stillness, moaning a bit as tears flow or crying from relief, joy, exhaustion or simply waiting for the next feelings to come as she holds her baby on her chest; feeling him, but not yet really looking at him.

Regardless of how the drama unfolds, the mother's reaction is correct. Once the intense experience of labor and birth is over, whether orgasmic, ecstatic, triumphant, tedious, disappointing, exhausting or traumatic, she may need time to internalize the reality that she is no longer in labor—it is over and she has her baby. We should trust that her reactions after the birth are correct for her and are the result of a lifetime of experiences, her current circumstances and the nature of this birth experience. No woman should be rushed to hold and suckle her baby any more than she should be rushed to get into labor, dilate her cervix, push her baby and placenta out or latch the baby onto her breast. Nor should her ability to mother her baby be judged by how she responds in these moments.

No matter how she first feels once the baby is born, there is often a pause during which an unrushed mother takes a few moments to get her breath before turning her attention to her baby (Malloy 2011). Labor, which had consumed her entire being for hours, perhaps days, is now in the past. It may take some time to absorb that reality. She may focus immediately on her baby—with curiosity, disappointment, engrossment or rapture. If she has given birth without medications or interventions, her own oxytocin, which began to surge during the baby's journey down the birth canal, is now at high levels; endorphins are also flowing, and these combine to give the mother high spirits and feelings of love and gratefulness. These hormones also help override the fatigue, pain and discouragement that she may have felt earlier.

The Baby

While all this is going on in the mother, her baby is undergoing an enormous physiological shift from depending on the placenta for survival and growth to depending on himself and his mother to thrive outside the womb—to breathe, take in food, regulate his body temperature and adapt to his new surroundings. While his mother is taking a pause between being pregnant and being a mother, the baby is going through a compelling drama that culminates in his first breaths and cries. Soon, three open shunts that were key to his circulation in utero (foramen ovale and ductus arteriosus in the heart, and the ductus venosus in the liver) close completely to reroute the baby's circulation through his lungs and liver. This transition from fetal to newborn circulation takes place in about the amount of time it takes for the mother to make her own transition out of labor and focus on her baby.

The Father or Life Partner

The partner has had his own unique experience—the mother may never know what this was. Pride, excitement, indescribable joy, love for mother and baby, relief, gratefulness, exhaustion, shock, insignificance, loneliness, fear, trauma—any or all of these may be felt, but the partner says little about these feelings, as this is not about the partner, but about the mother and the baby. As a rule, his or her feelings are private and unacknowledged. It might be helpful and appreciated if the partner can share these feelings with a trusted friend, family member, doula or midwife.

Other Loved Ones in Attendance

Others who attend the birth may have their own unique experiences as well and may benefit from a chance to talk. Usually all, except the midwife, heave a sigh of relief and joy when the baby is born.

The Midwife (or Nurse, or Doctor)

As the guardian of normal birth, the midwife is not ready to celebrate. She knows there is still much to come

before she celebrates. She cannot be swept up completely in the joy and relief of the moment. Though appearing calm in order to preserve a peaceful and reassuring environment, she remains alert and attentive to mother and baby. She assesses their well-being as they make the transition from a unit to a dyad, becoming acquainted with each other's sights, smells, sounds, tastes and touch. The midwife remains quietly vigilant, knowing that events sometimes take a turn that requires quick action. Midwives all over the world know that the birth is not over when the baby is born, and so they do not relax until the placenta is completely expelled and the mother and baby are stable and healthy.

The Fourth Stage of Labor

The fourth stage, as is true of the third stage, is always defined by what is going on in the mother—beginning after the birth of the placenta and lasting for one to two hours. It is sometimes referred to as the “recovery” or “stabilization” stage, when the mother's vital signs become stable, all necessary perineal repairs are completed, the uterus remains contracted and there is minimal blood loss. The location of the baby and presence or absence of contact between mother and baby are not included in the definition.

Long ago, Sharon Rising (midwife, now best known for designing the successful Centering Pregnancy Model of group prenatal care) introduced the holistic concept that fourth stage should encompass not only the mother, but the motherbaby dyad or the family triad. As early as 1974, she defined the fourth stage as the stage of “family integration” (Rising 1974).

In 1972, Marshall Klaus, John Kennell and their colleagues suggested that mothers and their infants need to be kept together during a sensitive period of bonding during the first hour after birth. They urged that this process not be interrupted (Klaus et al. 1972). Over the next decades, they further developed this concept of the “sensitive period,” highlighting it as a time when mother and baby tune in to each other and establish very strong bonds. They acknowledged that interruption of mother-infant contact during the sensitive period did not cause long-lasting or irrevocable negative effects, as they had hypothesized earlier (Klaus and Kennell 2001). Their work was pivotal in highlighting the third and fourth stages as times when a great deal of physiological and interpersonal interaction takes place that fosters other outcomes such as neonatal adaptation, breastfeeding and maternal recovery, as described below.

It is inappropriate to discuss the fourth stage in terms of only the mother or the baby, since mothers and babies, as with all other mammals, are normally entwined and mutually dependent on each other. With today's customary involvement in birth by the father or significant other, the fourth stage also includes other loved ones. They belong close to each other during this time. The midwife, nurse and doula should move into the background, still observant and carrying out their roles unobtrusively.

Rising's expansion of fourth stage to include the baby has been adopted spottily in conventional maternity care. Usual practice still includes removal of the baby from the mother immediately or within a few minutes after birth to an area where the baby can be assessed and given routine medications and procedures (Declerq et al. 2006; Chalmers et al. 2008). Once they are reunited, mother and baby are often rushed to bond and to breastfeed. Maternity care providers have generally been slow to accept the subtle ways an unrushed and undisturbed mother and infant “mutually regulate” each other's physiological adjustment to their new roles.

Mutual Regulation

“Mutual regulation refers to the influence that mother and baby have on each other's physiology and behavior, helping to bring them into optimal function.” (Buckley 2009, 249) With the baby held close in skin-to-skin contact, not only is the mother providing everything her baby needs—warmth, colostrum, the familiarity of her heartbeat and voice, touch stimulation, smell and more—but the baby is reciprocating by giving her mother some stimulation that she needs for involution, successful breastfeeding and bonding with her baby. The baby's squirming on her mother's abdomen and her nuzzling and suckling at the breast releases oxytocin that stimulates the uterus to contract and expel the placenta. The baby's actions also stimulate mom's pituitary gland to secrete prolactin, the key to both the production of breast milk and to altruistic maternal behavior (i.e., putting the baby's needs ahead of her own), which is essential for the survival of the baby. When unrushed and undisturbed, the mother (or both parents) become acquainted with their child and can allow their curiosity to lead them to discover all of the baby's little details at their own pace (Buckley 2009; Hanson and Simkin 2011).

If the delicate hormonal interaction and mutual regulation between baby and mother or parents are postponed, rushed, disturbed, altered with medications or interrupted by surgery, they may not resume as smoothly when the delay is over. The chances increase for emotional stress for mother and baby, more crying by the baby, temperature drops in the baby, poorer uterine muscle tone, challenges in the initiation of breastfeeding and increased need for medical interventions (Buckley 2009; Hanson and Simkin 2011; Moore,

Anderson and Bergman 2007).

Unrushed Breastfeeding

Trends in breastfeeding management have shifted over the years. In the 1960s and 1970s, what might be called the *Breastfeeding Renaissance*, the art of breastfeeding was being rediscovered. Before then, two generations of doctors and women had become convinced that cow's milk formula was superior to breast milk. When breastfeeding made its comeback led by La Leche League, a group of mothers who wanted to convince other mothers of the benefits of breastfeeding, it was a matter of reinventing the wheel since so few people knew much about it. During that time, the goal was to get mother and baby together as soon as possible after birth and to get the baby to suckle as soon as possible for the purpose of feeding. The assumption was that newborns are hungry at birth and need to eat immediately. Many techniques were devised to make the baby open his mouth (sometimes the nurse would pry it open with her finger!) to accomplish a "latch" by "ramming" the baby on the nipple whenever his mouth was open (even with crying). The "only right way" for a baby to latch on has given way over the years to a more relaxed approach, thankfully, but we've spent a long time recovering from the loss of the art of breastfeeding.

A whole new professional specialty, the lactation consultant, exists today to restore the normalcy and prevalence of breastfeeding. The need for this specialty is a reflection of two things: the degree to which women today have lost confidence in their bodies and the excessive interference in the labor process (induction, augmentation, opioids, epidural analgesia and surgical deliveries, along with policies of separating mothers from their newborns). All these practices interfere with breastfeeding success.

The good news is that today's advice regarding the latch is much more baby-centered than it was decades ago. We now know that eating is not the first concern of the newborn. He needs to adjust to his new surroundings and his new relationship with his mother. "Baby-led" (Smilie 2008) and "laid-back" (Colson, Meek and Hawdon 2008) breastfeeding, as well as simplified breastfeeding explanations (Mohrbacher and Kendall-Tackett 2010) prevail today. Finally, the World Health Organization's influence in promoting baby-friendly practices that encourage breastfeeding the world over have increased the level of knowledge and the rates of success in breastfeeding (WHO/UNICEF 1989). Yet, in many industrialized countries, hospital practices have not kept pace with knowledge of best breastfeeding practices, and women still struggle to maintain breastfeeding rates through the first days and weeks after birth. A better start during the fourth stage of labor with unrushed and undisturbed mother and baby lying together skin-to-skin, will increase successful breastfeeding relationships.

Postscript: Singing to Baby Before and After Birth

Finally, I can't write about the fourth stage of labor without discussing a most delightful and meaningful custom—choosing one song and singing it to the baby regularly before and after birth. I've become passionate about this idea and hope readers will feel the same.

Here is what I suggest to expectant parents (Simkin 2011):

- Any time after about 32 weeks gestation (when the fetus's hearing is developed), pick a song that is easy to sing—one that you like very much.
- Every day, one or both parents sing the song aloud to the baby.
- After the first few minutes of lung-clearing crying have passed, sing this song to greet your baby, and frequently thereafter, to soothe, reassure and calm the baby. The baby knows and likes her song being sung by the familiar voices she has known almost all her life.

It becomes the baby's song—a wonderful technique for singing her to sleep or soothing her when fussy (but not hungry).

Is singing better than reading or talking to the baby? Perhaps it is, because with music plus words, both sides of the brain are stimulated. Is singing better than playing recorded music for the baby? Yes, because, the parents' familiar voices (even if off-key) add a very special dimension. Their voices are always with them—there is no need for audio equipment.

Here are some heartwarming stories from parents who sang to their babies in utero:

A baby boy was greeted in the operating room after being born by cesarean by his dad singing, "Here Comes the Sun." This was the only familiar thing for the baby, who calmed and oriented toward his father, bringing tears to the eyes of some medical staff (and me, the doula).

A little girl, born after a normal vaginal birth, basked contentedly between her parents as they sang, "You Are My Sunshine." Later they would sing it to her in the car when she'd cry and they couldn't stop to cuddle her. It would calm her down.

A little girl, born without incident after passing meconium, shockingly could not breathe after birth. While in the neonatal intensive care unit on life support with severe meconium aspiration syndrome, her parents sang

her song, "Julia," to her frequently. Every time, her vital signs improved. Her need for morphine decreased. The staff were moved and thrilled to see her improvement, and the parents realized they could help their baby as no one else could! She is developing normally today.

Please suggest this idea to your clients. Every birth you attend will be so gratifying, and your clients will be empowered with the special gift only they can give their baby.

Conclusion

The conventional definitions of third and fourth stages include only the mother, and the baby is customarily removed from the mother and returned some time later wrapped in a blanket, having received medications and assessments. The time after birth is a time when mother and baby belong together, unrushed and undisturbed as they adjust together to their new roles. Once the placenta has been born, the fourth stage is a time for stabilization of mother and baby, family integration and mutual regulation. Both mother and child benefit from skin-to-skin contact. We've reviewed many of the benefits of a holistic approach to the fourth stage of labor, treating the mother-baby dyad as inseparable. By singing before and after birth, parents have a heartwarming and practical way to soothe and communicate with their baby.

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Ideas for the Best Planned Cesarean Possible

By Penny Simkin

You may feel disappointed that you must plan a cesarean for your safety or your baby's. Here are some ideas for making the cesarean birth of your baby very special and personally satisfying for you, your partner, and your baby.

Before the surgery:

- Be sure you understand and agree with the reasons for the cesarean (i.e., malpresentation of the baby, or a medical problem for you or the baby).
- Learn about the procedure. Read about it in *Pregnancy, Childbirth and the Newborn* or the *Birth Partner* and discuss it with your caregiver.
- Learn about your anesthesia choices and how each is administered. General information is available in the books mentioned above. If possible, however, meet and discuss medications with an anesthesiologist along with any concerns you have. A spinal is the most common type of anesthesia when a cesarean is planned in advance, but there are other possibilities. (See "Anesthesia and other medication issues" below).
- Learn the layout of the operating room, particularly where the baby will be taken for initial care. Will she be in the same room or an adjacent room? Will you be able to see or hold her? Can your partner move back and forth between you and your baby?
- Discuss the possibility of waiting until you go into labor and then going to the hospital to have the cesarean. The advantage is that the timing for birth is more likely to be optimal for the baby. The disadvantages are that you might not know the doctor on call who will do the surgery, and that you cannot plan ahead (which is the same as with most vaginal births).
- If you do not await the onset of labor, you will make your appointment for the surgery. Consider being the first on the day's schedule for two reasons: there is less likely to be a delay (from earlier surgeries taking longer than expected); and you will not be as hungry if you do not have to wait all day. You will probably have to avoid eating from the night before.
- There is a new practice, "seeding the baby" with mother's microbes which you may want to discuss with your doctor in advance. The procedure allows the baby to pick up some of the mother's important microbes (ie: beneficial bacteria that help protect the baby from harmful bacteria) which vaginally born babies get as they pass through the birth canal. While it may at first seem bizarre, you may want to read this and discuss it with your doctor. Here is how it is done:
 1. As long as you do not have Group B strep or other disease causing microbes (ask your doctor), one to two hours before you go to the operating room, a sterile pad is unfolded and inserted in your vagina, where it will remain for at least an hour before surgery.
 2. Then, just before the surgery begins, the gauze should be removed and placed in a sterile container.
 3. As soon as possible after the birth, the gauze is wiped over the baby – mouth, face, and body. In this way, your baby can get some important protective bacteria that a cesarean-born baby would otherwise miss. This link: <http://www.healthygutbugs.com/babys-microbiome-expectant-mothers-care/> has an excellent discussion of this topic.

During the surgery and repair:

- For your personal comfort, consider these ideas:
 - Ask if at least one arm can be left unrestrained.
 - Have your partner put some pleasant-scented (lavender and bergamot are popular) lotion, massage oil, or cologne on your cheeks. He can also put it on his wrist for you to sniff. This is soothing and may counteract the “hospital smells.” Because some staff members may be allergic to some scents, you should ask if this is okay.
 - Bring your own music to listen to during the surgery. Music that is familiar and that you love is most soothing. Many operating rooms have CD players, or check whether you may use your own ear buds and music player.
 - Plan to use relaxation techniques and rhythmic slow breathing (like sighing) during the surgery. Hold your partner’s hand.
- Ask them to lower the screen when the baby is lifted from your body so that you can see the birth.
- Ask if they will delay clamping your baby's umbilical cord for 30 seconds to three minutes after birth, or “milk” the cord, to allow the baby's blood that is in the placenta to return to the baby. There are many advantages for mother and baby to delayed cord clamping. (see Pregnancy, Childbirth and the Newborn)
- During the repair procedure, some doctors lift your uterus out of your abdomen to inspect it and then replace it, while others believe this is unnecessary and possibly problematic. This procedure may cause greater nausea, and more severe gas pains than if the uterus is not lifted out. You might wish to discuss this with your doctor beforehand. Ask about the advantages and the disadvantages.
- Ask about picture taking during the surgery or afterwards. There sometimes are policies restricting picture taking. With a digital camera you can see pictures or videos of your baby within seconds.
- Once your baby is born, it may be possible to have him or her placed on your chest, skin to skin. This practice is becoming more popular for healthy babies, and the skin to skin contact helps warm your baby, and allows him to feel your touch and smell your skin.
- If you don't get the baby right away, your partner may be able to bring the wrapped baby back to you for your first contact. You can nuzzle, kiss and talk to your baby. Ask if you will be able to hold her or breastfeed until you leave the operating room.
- You and your partner might talk or sing to your baby. A familiar voice often calms the baby at this time, and seeing the baby’s response is a poignant moment for you both. If you sing the same song (i.e., “You Are My Sunshine”) aloud to the baby daily for a few weeks before birth, it soothes the baby at birth and long afterwards when hearing your voices and the familiar song.

Anesthesia and other medication issues:

- The spinal block has many advantages for a planned cesarean, which make it the usual choice. It is quick to administer and to take effect. It usually involves only a single injection, and does not require a catheter in your back as does an epidural. It causes numbness that lasts a few hours. You remain awake and aware. It hardly affects your baby. The injection may also contain some long-acting narcotic such as morphine that provides good postpartum pain relief without grogginess for up to 24 hours after the

surgery. If you have been in labor and already have an epidural, they will likely add medicine to the epidural for a cesarean to increase the numbing effect. There are some concerns about spinal and epidural blocks that might be disturbing or frightening:

- It is not uncommon to have a period after the block is given when you feel breathless or as if you cannot breathe. It can be scary. This sometimes happens because the anesthetic may numb the nerves that let you feel your breathing, while the nerves to the muscles that make you breathe are probably not blocked. In other words, you are breathing, but cannot feel it.
- What to do: Say that you cannot breathe. The anesthesiologist, who is at your head, will check and reassure you. Your partner should coach you with every breath, watching closely and saying, "Take a long breath in -- yes you are doing it, and now breathe out. Good." Your partner might also hold your hand in front of your mouth so you can feel your breath, and reassure you, "You are breathing, even though it doesn't feel like it." This feeling does not last for the entire surgery.
- On very rare occasions, the level of anesthesia rises high enough to involve the muscles of breathing, so that you really are not breathing. You cannot talk either. The anesthesiologist, who is watching the monitors closely, discovers this and takes measures to assist your breathing. You and your partner should also have a signal. If you can't breathe and can't talk, blink your eyes many times. That means, "I can't breathe!" Your partner should be watching you, and if you blink in that way, says, "I think she can't breathe!" This may alert the anesthesiologist a few seconds before he would pick up the problem.
- On other rare occasions, the anesthesia is not adequate, and you feel the surgery. This is very scary. The doctors will probably want to make sure your reaction is not an anxiety reaction to the surgery, and may seem not to believe you at first. If you are feeling the surgery, tell them to stop. Your partner must help you with this. Make them give you better anesthesia before proceeding. This might mean they would repeat your block or give you a general anesthetic so that you are totally unaware of what is going on.
- During the repair, you may feel nauseated and shaky for a period of time. These are normal reactions to major surgery and vary from feelings of queasiness to vomiting, and from trembling to shaking and teeth chattering. There are medications to ease these symptoms. They are often put into your IV without you knowing, which may be okay with you. They may, however, cause amnesia (e.g., Versed), or make you very sleepy. They can keep you from being able to nurse your baby (or to remember that you did), and to remember the first hours of your baby's life. If you want to stay awake for this time, discuss this with your anesthesiologist ahead of time. You might ask the anesthesiologist not to give you anything for nausea or trembling unless you ask. You may very well be able to tolerate these temporary symptoms, but if you cannot, then you can ask for the medication.
- Post-operative pain medications are available to help you during the days and weeks after the birth. Some women try to avoid using them due to worries about possible effects on the baby. However, since very small amounts reach the baby, the effects seem to be minimal. The baby nurses and remains awake and alert for periods of time. The downside of avoiding pain medications is extreme pain, which greatly reduces your ability to move about and to care for, nurse, and enjoy your baby. With adequate pain relief, you can have more normal interactions with your baby.

The first few days:

- Most hospitals have a bed available for the partner so he or she can remain in the hospital with you. This is lovely for many reasons. You are together as a family. Your partner can share in baby care. If your partner stays, your baby can probably room in with you the entire time. If he or she is not there, you will need help from the nurse to change the baby's diapers, move him from one breast to the other, and carrying him, even for short distances. In some hospitals, the baby spends more time in the nursery if the partner is not there.
- Breastfeeding is definitely possible! There can be some challenges after a cesarean, however. Nursing positions such as sidelying, and the "football" or clutch hold avoid painful pressure on your incision. Using a pillow over the incision also reduces pain while holding your baby on your lap. Ask for help from the hospital's breastfeeding consultant in getting started with nursing.
- Rolling over in bed can be very painful, if you don't know how to do it. The least painful way uses "bridging." To roll from back to side, first draw up your legs, one at a time so that your feet are flat on the bed. Then "bridge," that is, lift your hips off the bed, by pressing your feet into the bed. While your hips are raised, turn hips, legs, and shoulders over to one side. This avoids strain on your incision.
- Help at home is essential to a rapid recovery. If possible, someone (relative, friend, or postpartum doula) in addition to your partner should help keep the household running smoothly. If that person knows about newborn care and feeding, all the better. All three (or more) of you need nurturing and help during the first days and weeks to ease and speed your recovery and help you establish yourselves as a happy family.

As you can see, there are many possible options for a cesarean birth. Some are personal touches and personal self-care measures that will improve your satisfaction and self-confidence. Others are measures that involve the support of the hospital staff and your doctors. After thinking about your own preferences, prepare a birth plan, review it with your caregiver, and bring it to the hospital for the nurses to read.

I hope these suggestions will help you have the best cesarean ever!

Moving Beyond the Debate: A Holistic Approach to Understanding and Treating Effects of Neuraxial Analgesia

Penny Simkin, PT

ABSTRACT: *Neuraxial analgesia is here to stay, yet, spirited debate continues over potential harms and the quality of research that fails to identify them. This paper proposes moving beyond the debate and examining holistically the impact of neuraxial analgesia on the psychophysiology of mother and baby. A review of alterations in functioning of many systems is followed by a suggested four-part protocol to partially restore normal physiology and emotional well-being, and improve outcomes of neuraxial analgesia. (BIRTH 39:4 December 2012)*

Key words: *cardiovascular system, emotional needs, endocrine system, epidural analgesia, fetus, genitourinary system, musculoskeletal system, nervous system, neuraxial analgesia, newborn, side effects, undesired effects*

And so these men of Iodostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong! (1)
—From “*The Blind Men and the Elephant*,” by John Godfrey
Saxe, American Poet (1816–1887)

Over the past decade, the term *neuraxial analgesia* has replaced *epidural* or *spinal* in the anesthesia literature. This umbrella term covers the genre of pain relief techniques that employ opioids, with or without local anesthetics that are injected or continuously infused into the intradural or extradural space. (See the list of different forms of neuraxial analgesia, below). A spirited debate over the scientific validity of studies examining the effects, advantages, disadvantages, benefits, and harms of epidural or neuraxial analgesia has raged since the 1960s, when it became widely available. Although the benefits of excellent pain relief, mental awareness, and an opportunity to rest are agreed on, the trade-offs are

where enormous disagreement lies. Does neuraxial analgesia increase labor dystocia, fetal malpositions, maternal fever, fetal intolerance of labor, cesareans, instrumental deliveries, low Apgar scores, neonatal intensive care unit admissions, perineal damage, breastfeeding difficulties, and other adverse outcomes? Research findings on these questions and many others are inconsistent, and the quality of the research studies is equally inconsistent.

Disagreement persists partly because of the enormous challenges of conducting generalizable research on neuraxial analgesia. Background conditions in the research hospitals, such as “usual care” policies, presence of midwives, and rates of interventions and surgery, vary and will influence the external validity of findings. Furthermore, ethical considerations must allow women to “cross-over” from one assigned group to another, and outcomes must be reported according to their assigned treatment group rather than according to the actual treatment received. Cross-over rates are generally high, leaving interpretation of the results confusing or

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meaningless. These problems and many others are well described in the literature (2–5).

The different perspectives among maternity care practitioners, scholars, researchers, and the public bring to mind the well-known Indian parable, “*The Blind Men and the Elephant*” (1). Briefly, it goes like this: A group of blind men examined an elephant by touch, to learn what an elephant is like. Each one felt a different part of the elephant’s body, and based his impressions of the whole elephant on the one part. For example, the one who felt the tail described the elephant as a rope; he who felt the trunk said it was a tree branch; he who felt the ear said it was a fan; he who felt the leg said it was a tree; and so on. The verse, quoted at the beginning of this article, describes the ensuing heated debate over what an elephant is.

Neuraxial analgesia encompasses a variety of techniques, all of which involve the neuraxis, listed as follows (6): spinal anesthesia, intrathecal opioids, epidural opioids, patient-controlled epidural analgesia, standard epidural, segmental epidural, and combined spinal-epidural.

Attempts to understand the truth about neuraxial analgesia resemble the parable—looking at the bits (the desirable and undesirable effects) instead of how it affects the whole fetoplacental-maternal unit. We are missing the “elephant” for its parts.

A more holistic approach includes, first, focusing on the physiology of the maternal-fetal-placental unit in pregnancy and labor; second, reviewing alterations in physiology caused by neuraxial analgesia; third, considering simple practices or interventions to reduce some of the undesirable effects; and fourth, understanding the psychological and emotional challenges of laboring women—even though they have no pain—to increase their sense of accomplishment and satisfaction with their birth experience. We should not assume that a pain-free woman needs little attention to her emotional needs.

My contention is that not all the problems with epidurals result from the analgesia, but some may be created or exacerbated by the management that accompanies them.

Physiological Adjustments That Support Fetal Growth and Well-Being

The dramatic physiological shifts taking place in the mother and her growing fetus during pregnancy improve her tolerance of the physiological burden of growing a fetus and newborn and enhance their chances of survival and good health. Every maternal organ system adapts to meet the fetus’s needs. Then, in late pregnancy, the fetal lungs mature and initiate a cascade of hormones from the fetal hypothalamus, pituitary, and adrenal glands that

climaxes in labor and birth. In a complex series of events, the contributions from the fetus and placenta combine with the mother’s physiological and psychological resources, resulting in a well-orchestrated process that ends with a robust alert newborn in the arms of a tired but eager mother. If the couple is relatively undisturbed and undistracted, another flood of hormones—beta-endorphins, oxytocin, catecholamines, and prolactin—binds them together while they employ all their senses in getting to know one another (7).

This elegant process is usually reliable, and even works pretty well when the laboring woman’s activities, such as walking, moving freely, eating, and drinking, are restricted, and when additional interventions and medications are used. Side effects exist, however, and the challenge with elective interventions is to understand how the normal process is altered, and to recognize the trade-offs—what is gained and what is lost. This knowledge may enable reduction or elimination of some undesired side effects, or replacement of the intervention with a more acceptable alternative. Neuraxial analgesia, widely used during normal labors, would benefit from this type of analysis.

Multisystem Effects of Neuraxial Analgesia in Labor

Although described as regional analgesia, meaning that only a portion of the body is affected by neuraxial analgesia, the effects are ubiquitous and alter most organ systems. A summary follows of some of those effects on different physiological systems: the endocrine system, the central and peripheral nervous systems, the cardiovascular system, the musculoskeletal system, and the genitourinary system.

The Endocrine System

Three major hormones—oxytocin, beta-endorphins, and catecholamines—and the delicate interplay among them have an enormous influence over such crucial factors as labor progress; the woman’s mental state throughout labor; her level of alertness; pain tolerance; energy; capacity to expel her baby; entrainment and mutual regulation between mother and baby; and the mother’s capacity to feed her baby. Loneliness, fear, anger, systemic illness, and some drugs such as synthetic oxytocin, epinephrine, tocolytics, and others result in inhibition, overproduction, or imbalance among these hormones. In addition, it is clear that neuraxial analgesia, containing sufentanil or fentanyl, and the “-caine” family of anesthetic agents, also disrupts these hormonal interactions (8).

Neuraxial analgesia often slows normal labor by blocking the normal oxytocin surge and resulting

spontaneous expulsive efforts of second stage (8). Maximum maternal effort and instrumental delivery or a cesarean delivery are often required to expedite the birth. Furthermore, the normal late-labor catecholamine surge, which causes maternal alertness and a burst of energy needed to expel the baby, is blocked by neuraxial medications. Finally, also blocked is production of beta-endorphins, the body's own narcotic-like pain relievers, which foster a sense of well-being and instinctual behavior, and euphoria after birth (7,8).

On the other hand, first-stage labor progress is sometimes slowed abnormally by extreme fear or distress, which may lead to an abnormally high production of maternal catecholamines (the "fight-or-flight" response). Although normal and beneficial in late labor, high catecholamine levels earlier in labor can decrease uterine blood flow and prolong labor. In such cases, neuraxial analgesia reduces catecholamine production, especially epinephrine, causing, in effect, a "mind-body split," which, according to anecdotal reports, seems to allow progress to improve. This same catecholamine-reducing phenomenon may, however, also lead to fetal bradycardia. Although the mechanism for this effect is not clear, one hypothesis states that the sudden drop in circulating epinephrine (especially after intrathecal opioid administration) may increase uterine tone to unsafe levels, and ultimately result in fetal bradycardia. The size of the effect varies, and it is usually temporary (6).

The Central Nervous System and Peripheral Nervous System (Sensory, Motor, and Autonomic, Which Includes the Sympathetic and Parasympathetic Nervous Systems)

Depending on the placement of the neuraxial analgesic "cocktail" (within the dural sac or extradurally), transmission of sensory and motor impulses is blocked or diminished either from within the central nervous system (as with intrathecal opioids and spinal anesthesia) or within the peripheral nervous system (as with epidural opioids, the segmental or standard epidural block). The combined spinal-epidural analgesia affects transmission in both systems. The opioid agents (e.g., fentanyl or sufentanil), whether given intrathecally or epidurally, also reach the woman's brain by means of the circulation, and may depress respiration. Nausea, itching, and mild sedation also may result from the opioids reaching the central nervous system. The fetus and newborn also receive these medications (see below). Effects are dose-dependent.

The pain-relieving success of neuraxial analgesia comes from blocking transmission of pain and other impulses over the sensory neurons that connect muscles and organs with the spinal cord and brain. Sensation is

blocked throughout the mid-trunk and reduced in the lower body, giving relief from labor pain. The accompanying motor block decreases the woman's control over movements in her lower body and decreases pelvic floor muscle tone. Blocking the parasympathetic nervous system results in decreased uterine contractility; alterations in temperature regulation; vasodilation in the affected areas; and reduced ability to dissipate heat because no sweating occurs in the affected areas. These effects, some of which are dose-dependent and duration-dependent, contribute to maternal and fetal pyrexia and fetal tachycardia (6,9).

The Cardiovascular or Circulatory System

Hypotension occurs secondary to the vasodilation in the part of the body affected by analgesia. Higher concentrations of medication appear to increase the likelihood of this side effect, and it is also more severe if the woman is supine. A secondary effect of maternal hypotension is inadequate perfusion of the placenta, which is evidenced by nonreassuring fetal heart tones.

The Musculoskeletal System

Effects of motor nerve blockage include reduction or loss of the woman's control over voluntary muscles in her middle and lower trunk, and her legs are temporarily weakened or paralyzed. Bearing-down efforts are less effective. Pelvic muscle tone is reduced, which impairs fetal rotation and increases the risk of occiput posterior position at delivery (10). Delaying bearing-down efforts until the fetal head is visible at the introitus reduces the likelihood of occiput posterior at delivery (11). Use of gravity-enhancing positions and movements is impossible or possible only with assistance. The extent of these effects varies with the route of administration, selection of medication, dosage, and duration of administration of the analgesic medication (11).

Injury to pelvic floor musculature and anal, urinary, and flatal incontinence are all increased by the kind of pushing usually required of women (prolonged maximal breath holding and straining), and the increased incidence of fetal malposition at delivery, which requires instrumental delivery (10–12).

The Genitourinary System

The lack of sensation from the woman's bladder and inability to void voluntarily increase the possibility of

urinary retention or bladder distention during and after labor. The woman requires careful observation for evidence of bladder distention, monitoring of fluid intake and output, and continuous or periodic catheterization to empty her bladder. In addition, secondary to the increased need for instrumental delivery, the chances of perineal trauma are increased, including third- and fourth-degree lacerations. The likelihood of urinary and anal incontinence increases after instrumental delivery (12).

What about the Fetus and Newborn?

Direct effects on the fetus and newborn of the medications used in neuraxial analgesia are difficult to identify, partly because of the low doses used (compared with systemic opioids), and the low rates of transfer across the placenta. Fentanyl and sufentanil are detectable in newborn blood for a day or more. Because of numerous confounding variables, it is not possible to quantify direct effects on the newborn, although studies of breastfeeding initiation and the newborn's neurobehavior raise some concerns about difficulties in establishing breastfeeding (2). Indirect effects on the newborn, however, have been clearly demonstrated and are significant (2). Maternal fever may lead to fetal hyperthermia, tachycardia, and possible surgical delivery. Epidurals are associated with a significant increase in cesarean deliveries for fetal distress (4). The use of synthetic oxytocin increases risks of uterine hyperstimulation and fetal intolerance of labor. The higher rate of fetal malposition at birth and the mother's less effective expulsive efforts lead to more instrumental deliveries (4,8,10,12) and possible injury to the newborn.

The mother with neuraxial analgesia is not flooded with oxytocin and beta-endorphins at birth (7) and may experience a more muted immediate response to her newborn, although the significance of such an effect is unclear. Until the extent of these newborn effects (direct or indirect) has been clarified, it seems wisest to provide conditions to foster optimal mother-infant interactions—skin-to-skin contact, unrushed baby-led or “laid back” breastfeeding opportunities, quiet dim-lit undisturbed surroundings that allow for unobtrusive assessment of the newborn, and postponement of procedures and separation. These practices enhance maternal and newborn adaptation and mutual regulation (13,14).

Can Changes in Obstetric Management Reduce Problems of Neuraxial Analgesia?

Neuraxial analgesia is here to stay. Although the debate on true effects will and should continue, more attention

must be given to other questions. Can some of the disruption in labor physiology be prevented or reversed by different management? Can different management reduce some of the undesired effects of neuraxial analgesia, improve some outcomes, lower costs, and increase the woman's participation in the process? If nonpharmacological approaches to maintain labor progress and relieve other symptoms were included in management, might some benefits result? Following is a four-part management proposal for maternity health practitioners:

1. Inform the woman ahead of time, in complete childbirth education classes and prenatal discussions between the woman and her caregiver, with a) the standard information on risks and benefits; b) complete explanations of how the analgesia is administered; and c) the package of hospital policies and procedures (often surprising to the woman) required to ensure that it is a safe procedure (i.e., intravenous fluids and synthetic oxytocin, continuous electronic fetal monitoring, limitation of movement, bladder catheterization, frequent blood pressure monitoring, pulse oximetry, and others). In addition, describe some common although potentially frightening or disturbing effects (e.g., actions required if there is a drop in the woman's blood pressure or fetal bradycardia; difficulties or frustrations over pushing without sensation; newborn care practices if fever has occurred). Forewarned is forearmed, and unpleasant surprises and maternal distress may be reduced.
2. Try to shorten the duration of exposure by delaying the administration of neuraxial analgesia. Some side effects develop and worsen with time, such as slow labor progress; maternal fever; fetal tachycardia; increasing motor loss in lower limbs; possible need for cesarean (although this is controversial) for poor progress, fetal malposition, or fetal intolerance of labor; and delay in successful breastfeeding. If labor is intolerable, however, an epidural should not be delayed (15).
3. Treat the woman as much as possible like a person who does not have an epidural. Adopt practices that encourage behavior resembling what women do when not anesthetized, for example:
 - Employ cooling measures as soon as the woman's temperature begins to rise (do not wait until it reaches clinical fever temperature), with cool packs over the parts of her body where sensation is normal, an electric fan, lowering the room temperature, and removing blankets. (This practice has not been scientifically evaluated, and definitely merits controlled

investigation of whether it results in fewer maternal and neonatal fevers, fewer neonatal intensive care unit admissions, fewer fetal occiput posterior positions, and less use of antibiotics to the mother and newborn) (2,16).

- Provide the woman with beverages in small amounts for her comfort and sense of normalcy (17).
 - Keep the woman moving as safety permits; for example, use the “rollover,” in which she spends 30 minutes in each of the following positions: 1) semi-reclining; 2) left side-lying; 3) left Sims’ (semi-prone, with upper hip and knee flexed); 4) kneeling on the lowered foot of the bed and leaning forward onto a pile of pillows, or kneeling over a birth ball; 5) right Sims’; and 6) right side-lying. Of course, if she has too little muscle tone or the fetus does not tolerate one or more positions, use the other positions. Pelvic shape and gravity effects are altered with the rollover. Recruit her support team to help her with position changes. If she is exhausted and needs sleep, you should not waken her to change positions so often (18). (Such a protocol has not been studied and deserves scientific evaluation of its effects on fetal position, labor progress, and mode of delivery.)
 - Delay maternal bearing down until the fetal head is visible, or the woman has an urge to push (11).
 - Once the woman begins pushing, model for her how to push like a woman who is pushing spontaneously without an epidural—breath holding and straining for 5 to 7 seconds, then taking 4 to 6 quick breaths, and bearing down again. She should repeat these actions until the contraction wanes. Keep an eye on the contraction monitor and give her feedback on how the numbers go up as she bears down, and how much she adds to the intensity of the contractions. This approach is far more motivating and empowering than requiring constant straining for 10 seconds at a time.
 - During labor, avoid twisting the woman’s trunk while helping her to change positions. During pushing, if supporting her legs, respect the limits of her hip and knee joints and low back by not spreading her legs as far apart or as close to her ears as possible. These precautions may avoid damaging her joints, which she would not feel until afterwards. Thirty to fifty percent of women report backache after childbirth (6). Perhaps some backache is caused unintentionally and is preventable.
- Place the baby skin-to-skin with the mother, and do assessments and procedures while they are together. Allow plenty of time for unrushed breastfeeding, with minimal instruction or handling of her breasts (14).
4. Attend to the woman’s emotional needs. The staff and her partner are likely to assume that because she has no pain, she is emotionally content (19). Although they are very glad for the pain relief, many women still have distress over other things, which may leave them feeling lonely, worried, disappointed, or even mistreated. Here are some examples of emotionally stressful events associated with the use of neuraxial analgesia:
- Having to wait for an available anesthesiologist
 - Administration of the epidural, especially if it does not go in smoothly
 - Surprise or shock over the many safety precautions or interventions (listed above)
 - Feeling alone, if her partner and nurse go out of the room, leaving her with no one to talk to or to ask for small comforts (sip of water or ice chips, extra pillow, etc.)
 - Little control over what is done to her, and passive cooperation while the nurse makes all decisions (regarding drinking, changing position, and others)
 - Helplessness and immobility; discomfort with numbness, itching, nausea, breakthrough pain
 - Fright when the staff rush in to correct her drop in blood pressure and in the fetal heart tones
 - Worries about the baby’s well-being; impatience over the length of labor
 - Tension, anxiety if her temperature is beginning to rise, or the baby is becoming tachycardic; feeling incompetent and frustrated over difficulty with pushing, being directed to “Push, Push, Push” when she feels she is pushing as hard as she can.
- Few studies have been done of women’s emotional responses with neuraxial analgesia during labor. One, however, found that although pain decreased markedly when women received an epidural, their distress levels did not, and were actually similar to those of women without epidurals. In other words, the women’s distress over their pain shifted to concerns over other things (such as those described above) after the epidural (19).
- Another study of nulliparas’ experiences of labor with an epidural found that the women were pleased with the pain relief and stress reduction it provided, but some felt unsettled or ambivalent afterwards. These experiences were caused by two main factors: the

attitudes, actions, and treatment by health caregivers; and insufficient knowledge about side effects and how these are managed. The authors concluded that the epidural “does not guarantee a quality birth experience” (20). The take-home message from these studies is that women still need education and emotional support for satisfaction with childbirth, even if they are free of pain.

Restoring Women to a Central Role

Studies of neuraxial analgesia have not brought people closer to agreement on its safety, its side effects, and its role, direct or indirect, in causing untoward outcomes. Supporters of routine use of neuraxial analgesia in early labor clash with those who advocate lower rates and later administration. Each side has produced evidence supporting its point of view, and has argued that their opponents are wrong, like the blind men and the elephant.

The intention here is not to add fuel to the controversy. Rather, it is to suggest that it is time to shift the focus from the parts—the end effects—to the whole body and psyche of the maternal-fetal-placental being, and how it is transformed by neuraxial analgesia. This more holistic approach provides a context for understanding side effects and encourages constructive efforts to prevent these effects by preserving normal physiological function as much as possible. The goal, of course, is to avoid some of the riskier interventions by maintaining normal physiology where possible. This approach restores the woman to a central role. When she becomes more active in her labor and receives attention to her psychological needs, some outcomes will improve and her satisfaction will be enhanced.

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