Research Summaries for Normal Birth

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ABSTRACT

In this column, the author summarizes four research studies that contribute to the body of literature on the benefits and physiology of normal childbirth. The topics of the studies include the effect of digital rotation of the baby in occipito-posterior position on position at birth and birth outcomes; temperature disturbances during skin-to-skin contact among babies exposed to epidural analgesia and exogenous oxytocin during labor; the prevalence of and motivations for “maternal request” cesarean surgery; and the benefits of delayed clamping of the umbilical cord after birth.

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DIGITAL ROTATION WHEN THE BABY IS OP DECREASES NEED FOR CESAREAN SECTION AND INSTRUMENTAL VAGINAL BIRTH

- Reichman, O., Gdanský, E., Latinsky, B., Labi, S., & Samueloff, A. (2007, March 16). Digital rotation from occipito-posterior to occipito-anterior decreases the need for cesarean section [Epub ahead of print.]. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*.

Summary

In this prospective, controlled trial, researchers studied the effect of digital or manual rotation of the fetal head from occipito-posterior (OP) to occipito-anterior (OA) on mode of birth, position of the baby at birth, length of hospital stay, perineal integ-

rity, Apgar score, and other obstetric and neonatal outcomes. To perform digital rotation, a physician or midwife applies upward pressure with the fingertips against the parietal bone of the fetal skull near the posterior fontanelle after the woman is fully dilated and the baby is engaged in the pelvis. Manual rotation is a variant using the practitioner's whole hand.

Nulliparous women were eligible for the study if they were in labor at term, the baby was engaged in the OP position, and at least 1 hour of second-stage labor had elapsed (90 minutes if the woman had an epidural). Multiparous women had to meet the same criteria, except they were eligible after 30 minutes of second-stage labor (1 hour if using an epidural). Women carrying a suspected macrosomic baby or who had previously had cesarean surgery were excluded. During the first 6 months of the study, 30 women were enrolled in the study as controls:

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They met study eligibility requirements but did not undergo digital rotation. In the second 6-month period, 31 women (the rotation group) met eligibility requirements and underwent digital or manual rotation of the fetal head by a physician or midwife experienced in the technique. Researchers confirmed OP position by ultrasound in the intervention group. Although digital examination is not as reliable as ultrasound in the diagnosis of OP position, 85% of the babies in the control group eventually gave birth to a baby who was OP, suggesting that the diagnosis was accurate at least 85% of the time. To avoid possible bias, the clinicians who performed rotations did not participate in the woman's care thereafter.

Among women who underwent digital or manual rotation, 77% had spontaneous vaginal births compared with only 26% of those in the control group. They were also much more likely to give birth (regardless of mode of birth) to babies in the OA position (93% vs. 15%). None of the women who underwent rotation had a cesarean birth compared with 23% of those who did not undergo rotation. Also, vacuum-assisted birth was significantly less likely, with 23% in the rotation group versus 50% in the control group. All of these differences were highly statistically significant (very unlikely to be the result of chance). Duration of second stage was an average of 39 minutes shorter, and the women were discharged almost a day earlier in the rotation group. Episiotomy was significantly more likely in the control group (65% vs. 30%). Other outcomes, such as low Apgar scores and likelihood of postpartum hemorrhage or infection, were similar across the two groups, although the study was too small to detect differences in uncommon adverse outcomes.

Significance for Normal Birth

When a baby is engaged in an OP position during the second stage of labor, a large body of research suggests that the likelihood of vaginal birth is highly dependent on whether the baby rotates to an OA position. Maternal hands-and-knees positioning has been associated with successful rotation to OA in at least one trial (Stremmler et al., 2005) but may be difficult for women using an epidural,

which sharply increases the chance of persistent OP (Lieberman, Davidson, Lee-Parritz, & Shearer, 2005). Forceps rotation is also effective but is risky for both the mother and the baby. Some practitioners perform vacuum-assisted rotations but this method has not been studied for safety and there is anecdotal evidence of harm (Society of Obstetricians and Gynaecologists of Canada, 2005). This trial provides evidence that manual and digital rotation are effective alternatives to instrumental rotation. Although larger studies are needed to have complete confidence about safety, this uncertainty must be balanced against the known harms of cesarean surgery, instrumental vaginal births, and episiotomies.

Although digital rotation is a relatively straightforward procedure, it is still considered among the obstetric "arts" in that it is a skill honed through experience that not every practitioner possesses. However, this study suggests that many, if not most, cesarean sections and instrumental vaginal births for persistent posterior position in second stage can be safely prevented with digital rotation. If a laboring woman is presented with the need for an operative birth for prolonged second stage in the presence of fetal malposition, she should be informed that digital rotation is a low-risk alternative and arrangements should be made to provide access to a practitioner who can perform it if her practitioner is unable to do so. Pregnant women should also be advised that epidural analgesia can increase the likelihood of persistent malposition and of the potential consequences of this complication.

EPIDURAL USE IN LABOR APPEARS TO DISTURB NEWBORNS' PHYSIOLOGIC RESPONSE TO SKIN-TO-SKIN CONTACT

- Jonas, W., Wiklund, I., Nissen, E., Ransjö-Arvidson, A. B., & Uvnäs-Moberg, K. (2007). Newborn skin temperature two days postpartum during breastfeeding related to different labour ward practices. *Early Human Development*, 83(1), 55–62.

Summary

In this prospective observational study, researchers examined the normal physiologic skin temperature patterns in breastfeeding newborns held skin-to-skin two days after birth and compared findings in babies whose mothers had received epidural

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analgesia and oxytocin in labor or oxytocin alone with those whose mothers were not exposed to either intervention. First-time mothers giving birth on a weekday to healthy, full-term, singleton infants with a 1-minute Apgar score of at least 8 were recruited and remained eligible if they were not separated from their babies after the birth and the babies were exclusively breastfed. The study took place in Sweden, where usual care includes immediate and prolonged skin-to-skin contact after the birth and rooming-in is practiced and where, at this particular maternity hospital, sufentanil (an opioid that crosses the placenta) is included in the epidural preparation. In total, 47 mother-infant pairs participated in the study, 9 of whom underwent oxytocin augmentation (oxytocin group), 20 of whom had received both epidural analgesia and oxytocin in labor (epidural group), and 18 of whom had neither intervention (control group). Clinical characteristics across the three groups were similar except with respect to the use of nitrous oxide, which was more common in the epidural group.

On the second postpartum day, after exhibiting signs of hunger (e.g., rooting), each infant was undressed, weighed, placed skin-to-skin on the mother, and covered with a light blanket. The researchers documented interscapular (between the shoulder blades) temperatures immediately after the mother and infant established skin-to-skin contact and at 5, 10, 20, and 30 minutes after the first reading. They also documented the time of onset and duration of breastfeeding as well as the environmental temperature in the maternity rooms. The temperature at the moment breastfeeding began was not documented, so the interval reading preceding onset of suckling was used as a proxy.

At the moment skin-to-skin contact commenced, babies in the epidural group had significantly higher temperatures than those in the control group. Epidural-exposed babies also exhibited a significant negative correlation between their age (in hours) and their temperature, such that the younger the baby, the higher the temperature at the first reading. This finding correlates with the well-documented finding that epidural analgesia raises maternal and newborn temperatures. In both the control group and the oxytocin group, temperatures rose significantly over the first 10 minutes of skin-to-skin contact and then remained stable, with the plateau level among control group babies slightly lower than that exhibited by oxytocin-exposed babies (35°C vs.

36°C). In contrast, temperatures in the epidural-exposed babies decreased significantly during the first 10 minutes and, then, remained relatively stable around 34.5°C. In the control group, the temperature rise occurred after the onset of suckling and continued beyond 5 minutes. In contrast, temperatures rose in the oxytocin group immediately upon skin-to-skin contact and did not continue to rise after several minutes of suckling. In the epidural group, no temperature rise was noted after the onset of suckling.

Significance for Normal Birth

This small study does not provide strong evidence of any particular harm from epidurals or oxytocin augmentation. Rather, it serves as a cautionary tale of the wide-ranging and unpredictable disturbances caused by intervening in the normal process. For the first time, researchers have demonstrated the normal temperature patterns in babies on the second day of life who have not been separated from their mothers and who are held skin-to-skin. They have further demonstrated that interventions that took place in labor are associated with disturbances in this normal physiologic response many hours later. The complex hormonal changes that occur during skin-to-skin contact in the postpartum period are just beginning to be understood. However, evidence suggests that these hormonal shifts modulate newborns' feeding and bonding behavior, temperature stability, and how much they cry, as well as the mother's mood. It is possible that some babies will not be able to reap the full benefits of skin-to-skin contact if they are not able to respond to this stimulus as nature intended. More research is needed to determine the clinical significance of the temperature pattern disturbances observed in this study. Given the evidence that epidurals containing fentanyl (a drug closely related to sufentanil) increase the risk of early breastfeeding cessation (Beilin et al., 2005), it is possible that such disturbances represent a pathway by which labor interventions may impact newborn feeding behavior.

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STUDY SHEDS LIGHT ON THE PREVALENCE AND NATURE OF “MATERNAL REQUEST” CESAREAN SECTIONS

- Weaver, J. J., Statham, H., & Richards, M. (2007). Are there “unnecessary” cesarean sections? Perceptions of women and obstetricians about cesarean sections for nonclinical indications. *Birth*, 34(1), 32–41.

Summary

This study combined qualitative and quantitative methods to evaluate the perceptions of both women and obstetricians of so-called “maternal request” cesarean sections. The investigation comprised four substudies. In the first, 64 pregnant women (23 multiparous, 41 nulliparous) completed questionnaires about their wishes for their birth, as well as information about past pregnancies and births. They then kept diaries throughout their pregnancies, recording information about events that occurred that affected their desires related to mode of birth. In the second substudy, researchers interviewed women who considered or were asked to consider cesarean sections during their pregnancies. In both of the first two substudies, women who had previously given birth by cesarean section were apparently included. In the third substudy, researchers interviewed 24 obstetricians, five of whom were specifically recruited to the study because of their strong views on one side or the other of the maternal request cesarean debate. Finally, 785 obstetricians completed postal questionnaires about their experience with maternal request cesarean section and their perceptions of its contribution to the overall rise in the cesarean-section rate. The study took place from 2000–2001 in the United Kingdom.

Among women in the study, concern for the safety of the baby tended to take priority over preferences about the mode of birth. Cesarean section was widely perceived as safer than vaginal birth for babies, and many participants expressed an assumption that risks to the mother were minor. Only one nulliparous woman (2.6% of nulliparas) desired a cesarean section when asked early in her pregnancy what she would like for the birth of her baby. Among multiparas, 26% wanted a cesarean section early in their pregnancies, but some, if not all, of these women may have given birth by cesarean previously (the researchers did not specify). In women interviewed postnatally, 8 women asked

for and had elective cesareans, but all 8 believed they had clinical justification for the operation, such as history of a previous loss or preexisting problems with their pelvic-floor muscles. Among all respondents, fear of pain, a traumatic vaginal birth, or an unplanned cesarean after a difficult labor were common and arose from women’s own experiences, as well as from comments from health professionals, families, and friends. The obstetricians who were interviewed echoed the role of fear in prompting women’s requests for cesarean sections, and some felt that women asking for elective cesarean sections were actually asking for a guarantee of the baby’s safety more than a specific mode of birth. Although the doctors stressed the importance of taking time to talk to women and explore safe and acceptable alternatives, some felt that they lacked the time necessary to do this properly.

Among the physicians responding to the survey, 55% reported having six or fewer requests for elective cesareans in the previous 12 months, including 4% who had had none. Despite this, 77% of obstetricians cited “maternal request” as one of the three main reasons for the rising cesarean rate in the UK. This was the most popular response given, with “litigation and defensive practice” cited by 67% of doctors. Qualitative data from the interviews suggested that some doctors may have been known for performing elective cesareans and, therefore, were sought out by women wanting this option. Quantitative data from survey respondents seemed to support this: Twenty-eight percent of the doctors reported receiving two-thirds of the total requests.

Significance for Normal Birth

There is a widespread and growing public perception—reinforced by media reports—that women are to blame for the rising cesarean rate because they increasingly want medically unnecessary cesarean surgeries. Yet, this study and the other available evidence suggest that cesareans done purely for maternal request are rare. The study sheds light on the nature of the contradiction and provides evidence about what motivates the women who do consider elective cesarean surgery. Indifference about mode of birth and preference for cesarean section appear to be fueled by the erroneous belief that cesareans are less risky for babies than vaginal birth. Further, women worry about having traumatic or painful labor and birth experiences, and some explore the option of scheduled cesarean surgery as a means to manage these fears. Childbirth

educators and other birth professionals must begin to address these fears more effectively with women, especially when the care provider is unable or unwilling to adequately explore women's feelings, beliefs, and concerns. We also must correct misinformation that leads women to think that vaginal birth is risky for babies or that cesarean section is a panacea that averts poor outcomes. Finally, we must recognize that framing the issue as one of "maternal request" is disingenuous at best and deceitful at worst, considering the evidence that women rarely ask for elective cesarean sections and that those who do may be led to believe that their requests are medically justified. As advocates for better maternity care, we must work to refocus the debate on the obstetric practices and policies, such as routine electronic fetal monitoring or liberal use of induction, for which there is strong evidence that they put women and babies at risk for preventable cesareans.

SYSTEMATIC REVIEW PROVIDES DEFINITIVE EVIDENCE OF THE BENEFIT OF DELAYED CORD CLAMPING

- Hutton, E. K., & Hassan, E. S. (2007). Late versus early clamping of the umbilical cord in full-term neonates: Systematic review and meta-analysis of controlled trials. *Journal of the American Medical Association*, 297(11), 1241–1252.

Summary

In this systematic review, researchers compared the effects of immediate and delayed cord clamping in babies born full-term. Following the usual methodology of systematic reviews, reviewers systematically searched the literature, identified all published controlled trials that were relevant to the topic, and applied predetermined criteria to decide which studies to include. They then assessed the methodological quality of the included studies and used a standard grading scheme to rate each as either high- or low-quality. When more than one trial reported on a particular outcome, researchers used a statistical technique to pool their data (meta-analysis), which increases the power to detect differences between groups. Whenever feasible, the researchers reanalyzed data using only the high-quality studies to determine if the weaknesses of the lower-quality studies might have affected review results.

We must recognize that framing the issue as one of "maternal request" is disingenuous at best and deceitful at worst, considering the evidence that women rarely ask for elective cesarean sections and that those who do may be led to believe that their requests are medically justified.

Fifteen trials involving 1,912 newborns were included. In all but one of the trials, early cord clamping was defined as occurring immediately after birth or within 10 seconds, with the remaining trial allowing up to 60 seconds in the early-clamping group. Delayed clamping was typically defined as occurring at 3 minutes or after the cord stopped pulsing, with one study defining delayed clamping as occurring 2 minutes after birth.

Delayed cord clamping was associated with an 80% reduction in the newborn's likelihood of being anemic at 24–48 hours and half the risk of being anemic at 2–3 months. Statistically significant differences disappeared by 6 months. Delayed cord clamping also improved hematologic status (hematocrit level, mean hemoglobin level, and blood volume) in the hours after birth and improved increasing mean serum ferritin levels (an indicator of iron deficiency) in both the short and long term. Immediate cord clamping has been justified on the theoretical grounds that late cord clamping would increase the incidence of symptomatic polycythemia (elevated red blood cell count), respiratory difficulties, and neonatal jaundice. However, babies in the delayed-clamping group were no more likely to have clinical jaundice or to require phototherapy for elevated bilirubin levels than babies in the early-clamping group. Similarly, there were no differences between the two groups in the likelihood of respiratory difficulties or admission to neonatal intensive care. Although polycythemia was more common, this increase was not clinically important because no baby experienced clinical symptoms. One possible explanation for this is that laboratory norms have been set artificially low because they were determined in populations where immediate clamping was routine.

Significance for Normal Birth

Immediate cord clamping has been performed routinely for decades without evidence of benefit. Placental transfer of oxygenated blood, nutrients, and stem cells continues for several minutes after birth.

Physiologic principles suggest that the optimal transition to life outside the womb depends on this transfer. By emptying the engorged placenta, blood volume transfer to the newborn may also facilitate normal placental detachment. And, of course, delayed cord clamping keeps babies in their mothers' arms, the ideal place to regulate their temperature and initiate bonding and breastfeeding. This may be an important first step in promoting nonseparation of mother and baby after birth. This systematic review provides the "gold standard" of evidence that immediate cord clamping is harmful for babies. It also reminds us that any routine interference in the normal physiology of birth, no matter how benign it seems, may have far-reaching ill effects. Childbirth educators and other birth professionals play a crucial role in informing women about the importance of delaying cord clamping for at least several minutes after birth.

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