Research Summaries for Normal Birth

Amy M. Romano, MSN, CNM
Henci Goer

ABSTRACT

In this column, the authors summarize four research studies that further support the benefits of normal birth. The topics of the studies include the association of cesarean birth with an increased risk of neonatal death; the use of acupuncture and self-hypnosis as effective pain-management strategies; factors associated with amniotic-fluid embolism; and the positive influence of continuous support by lay doulas on obstetric outcomes for low-income women.

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CESAREAN BIRTH ASSOCIATED WITH INCREASED RISK OF NEONATAL DEATH

- MacDorman, M. F., Declercq, E., Menacker, F., & Malloy, M. H. (2006). Infant and neonatal mortality for primary cesarean and vaginal births to women with “no indicated risk,” United States, 1998–2001 birth cohorts. *Birth*, 33(3), 175–182.

Summary

In this epidemiologic study, analysts compared neonatal mortality rates (death before 28 days after birth) according to delivery route in 5,800,000 babies born alive in the United States between 1998 and 2001 to women at “no indicated risk” for cesarean surgery or other poor outcome. “No indicated risk” was defined as singleton, term gestations (37–41 weeks), baby presenting head-down, no medical risk factors or

complications of labor noted on the birth certificate, and no prior cesareans.

Overall, the researchers found that babies born by cesarean were 2.9 times more likely to die than those born vaginally (0.62 per 1,000 vaginally born babies died vs. 1.77 per 1,000 born by cesarean section), which calculates to an excess risk of 1.15 deaths per 1,000 births with cesarean surgery. The researchers developed three models to control for demographic and medical factors that might affect the association. In the first model, mortality rates were adjusted according to gestational age, birth weight, race/ethnicity, first birth or prior births, education level, and smoking status. After adjusting for these factors, cesarean birth still conferred 2.7

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times the risk of neonatal death. In the second model, infants with congenital anomalies were excluded because malformations might increase both the risk of death and of cesarean birth. This also had little effect on the adjusted odds ratio. In the third model, analysts additionally excluded newborns with Apgar scores of <4 on grounds that poor condition at birth might indicate a lack of oxygen during labor. Hypoxia would also increase the risk of both death and cesarean birth. Even with the added restrictions, infants still incurred double the risk of neonatal death with cesarean birth.

Significance for Normal Birth

Many doctors and women believe that birth by cesarean is safer than vaginal birth for babies. The “premium baby” argument is particularly persuasive for women who have had difficulty conceiving or who anticipate having one or, at most, two children. It is difficult to disentangle neonatal deaths caused by complications that resulted in the need for cesarean surgery from risks attributable to the surgery itself. By isolating an ultra low-risk population of sufficient size to overcome that problem, this study establishes the falsehood of that belief. This is important information for women in a climate in which cesarean surgery, as compared to normal birth, is presented as benign, if not superior, and in which cesareans are frequently undertaken casually and sometimes electively.

SYSTEMATIC REVIEW SHOWS ACUPUNCTURE, SELF-HYPNOSIS EFFECTIVE NONPHARMACOLOGIC PAIN-MANAGEMENT STRATEGIES

- Smith, C. A., Collins, C. T., Cyna, A. M., & Crowther, C. A. (2006). Complementary and alternative therapies for pain management in labour. *Cochrane Database of Systematic Reviews*, Issue 4. Art. No.: CD003521. DOI: 10.1002/14651858.CD003521.pub2.

Summary

This Cochrane systematic review evaluated the effects of several complementary or alternative ther-

apies on the use of pharmacologic pain relief in labor, maternal satisfaction, and other obstetric outcomes. Using predetermined eligibility criteria, researchers identified 14 trials involving 1,537 women who were randomized to an alternative pain-management modality, a placebo, no treatment, or pharmacologic forms of pain management.

Evidence from three trials involving 496 women suggested that women receiving acupuncture are less likely to require pharmacologic forms of analgesia (including epidural) and may have reduced need for oxytocin augmentation than women who receive no treatment or “sham” acupuncture. Meta-analysis of five trials involving 749 women suggests that hypnosis reduces the need for pharmacologic forms of pain relief (including epidural) and improves maternal satisfaction and may result in higher rates of vaginal birth and less use of oxytocin augmentation compared with routine care. No evidence of significant benefit was found for acupressure, aromatherapy, massage, relaxation, or audio-analgesia; however, trials were few in number and extremely small in size for aromatherapy, massage, relaxation, and audio-analgesia, which means benefit cannot be ruled out. No evidence of harm was found for any of the interventions studied. Trials involving other forms of nonpharmacologic pain relief, such as hydrotherapy and continuous labor support, were not included in this review.

Significance for Normal Birth

Epidural analgesia, used by the majority of laboring women today, while effective, restricts women’s freedom of movement and typically necessitates routine or frequent use of interventions such as intravenous lines, continuous electronic fetal monitoring, oxytocin augmentation, and bladder catheterization. In short, epidurals and other pain-relief drugs often transform a normal labor into a medicalized event. Epidural use is also associated with an increased risk of instrumental vaginal birth, intrapartum fever, fetal malposition, and anal sphincter laceration (Lieberman & O’Donoghue, 2002). Opioids do not provide sufficient pain relief for many women and increase the risk of neonatal respiratory problems. Nonpharmacologic modalities, if effective, have the potential to avoid these harms while maintaining or enhancing women’s satisfaction with the birth experience. This systematic review provides the “gold standard” of evidence that acupuncture and hypnotherapy are effective alternative pain-relief methods.

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AMNIOTIC-FLUID EMBOLISM ASSOCIATED WITH INDUCTION OF LABOR

- Kramer, M. S., Rouleau, J., Baskett, T. F., & Joseph, K. S. (2006). Amniotic-fluid embolism and medical induction of labour: A retrospective, population-based cohort study. *Lancet*, 368(9545), 1444–1448.

Summary

This epidemiological study analyzed factors associated with amniotic-fluid embolism (AFE) in 3 million women who gave birth to singleton infants in Canadian hospitals between 1991 and 2002. Overall, 180 cases were diagnosed from hospital discharge records for a rate of 6.0 per 100,000 births. Of these, 24 (13%) were fatal for a maternal mortality rate of 0.8 per 100,000 births. After taking into account confounding factors, medical induction (i.e., induction with oxytocin or prostaglandins) remained an independent risk factor, nearly doubling the risk of AFE (adjusted odds ratio 1.8, 95% confidence interval 1.3–2.7). Medical induction of labor conferred an excess risk of AFE of 4–5 per 100,000 births compared with spontaneous labor onset and an excess risk of maternal death of 1–2 per 100,000 births. In the United States, where 4 million women give birth annually and the induction rate is about 20%, the authors calculated that inducing labor results in 30–40 excess cases of AFE per year and 10–15 maternal deaths. [Reviewer's note: *Listening to Mothers II*, a national survey of women giving birth in 2005, reported that 34% of labors were induced, according to the women themselves (Declercq, Sakala, Corry, & Applebaum, 2006). This increases the number of excess AFE cases to 55–70 per year and maternal deaths to 15–25.] Surgical induction (i.e., induction by rupturing membranes) was not associated with AFE.

Other factors positively associated with AFE were maternal age ≥ 35 years, cesarean section, vaginal instrumental birth, placenta previa or abruptio, eclampsia, polyhydramnios, cervical laceration or uterine rupture, and fetal distress. The study's authors note that the association with cesarean section is likely to represent the consequences of AFE, not a cause, although cesarean as a causal factor cannot be ruled out.

Significance for Normal Birth

Amniotic fluid embolism is thought to arise when simultaneous tears in the fetal membranes and uter-

ine blood vessels permit amniotic fluid to enter the maternal venous circulation. It is not known what substances in amniotic fluid cause the sudden breathing difficulties and cardiopulmonary collapse that constitute the syndrome, but one theory is that it is an anaphylactic reaction to exposure to fetal cells and other components of amniotic fluid in susceptible women. Uterine stimulation has long been suspected of being a contributing factor, but AFE's rarity has made determining this difficult. This study is the first one of a population large enough to have the statistical power to detect a difference between groups, and its findings confirm the association. The extremely small possibility of AFE should not deter induction for compelling medical reasons, but many inductions are undertaken electively or for less than compelling reasons. In these cases, because of its catastrophic nature, the excess potential for AFE should be given serious consideration.

CONTINUOUS SUPPORT BY LAY DOULAS IMPROVES OBSTETRIC OUTCOMES FOR LOW-INCOME WOMEN

- Campbell, D. A., Lake, M. F., Falk, M., & Backstrand, J. R., (2006). A randomized trial of continuous support in labor by a lay doula. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(4), 456–464.

Summary

In this randomized, controlled trial, researchers compared the obstetric outcomes of laboring women who were accompanied by family or friends without special training with laboring women who had the added support of a family member or friend who had completed a brief "lay doula" training. Eligible low-risk nulliparas attending an ambulatory care center serving low-income, underinsured women were randomized during pregnancy to the doula group ($n = 298$) or control group ($n = 300$). Women randomized to the doula care group identified a female friend or relative to provide lay doula care and, together with her chosen companion, attended a 4-hour training course taught by a DONA-certified doula. The training course was provided in two 2-hour sessions and was conducted in the location of the participants' choosing. Topics included an overview of childbirth, how to assess labor progress, coping strategies and comfort measures for labor, and supportive techniques such as praise, reassurance, and anticipatory guidance.

For a copy of the *Listening to Mothers II* survey, call Childbirth Connection (formerly Maternity Center Association) at 212-777-5000 or visit the organization's Web site (www.childbirthconnection.org).

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Women randomized to the lay doula group had significantly shorter labors and greater cervical dilation at the time of epidural analgesia than the women in the control group. Additionally, their newborns had higher Apgar scores at 1 and 5 minutes. No statistically significant differences were found in the rate of cesarean surgery, length of second stage of labor, or overall epidural use. A secondary analysis of participants who actually received doula care versus those who did not (i.e., not intent-to-treat) showed the same significant findings and also revealed a nonsignificant trend toward a lower cesarean surgery rate in the doula group (10.6% vs. 15.5% in the control group, $p = .09$).

Significance for Normal Birth

The results of this randomized, controlled trial are consistent with those of other well-designed trials and systematic reviews of doula care in labor. The authors of the study suggest that professional doula care may be neither affordable nor accessible to low-income women, nor cost-efficient for hospitals to provide. A model in which a brief training is provided to a female companion of the pregnant woman's choosing may overcome these obstacles and appears to result in many of the same benefits as have been found with traditional doula care. However, more research is warranted to determine

the feasibility of replicating the training model used in this study, where a single trainer provided individualized workshops in a variety of community-based settings.

The lack of significant effect on cesarean or epidural rates observed in this trial may result from the high baseline rates of epidurals, oxytocin augmentation, and cesarean surgery in the hospital where the study took place. While continuous labor support is associated with numerous benefits for laboring women, the study's authors assert that their results "[support] the hypothesis that the effects of the birth environment typified by high rates of medical intervention have the ability to overpower the benefits of continuous support in labor" (p. 461).

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AMY ROMANO is a certified-nurse midwife. She is also the Perinatal Research and Advocacy Coordinator for the Lamaze Institute for Normal Birth (www.lamaze.org). HENCI GOER is an award-winning author of two books on evidence-based maternity care. She is a resident expert for the Lamaze Institute for Normal Birth and moderates the online Normal Birth Forum (www.lamaze.org).