5. Non-Pharmacologic Pain Management versus Epidural Analgesia

A new report, ***Hormonal Physiology of Childbearing: Evidence and Implications for Women, Babies, and Maternity Care*** (2015), synthesizes an extensive literature about hormonally-driven processes of parturition and the early postpartum period. The following information is drawn from this report.

Birth certificates report that epidural or spinal analgesia is used in about 72% of labors in the United States.[1] This fact sheet summarizes the beneficial hormone actions of physiologic childbearing (conforming to healthy biologic processes), the hormonal benefits of non-pharmacologic pain management, and practices that support beneficial hormonal physiology when epidural analgesia is administered.

Beneficial hormonal actions during labor:

- Endogenous oxytocin levels increase throughout labor,[2] contributing to effective labor progress and endogenous analgesia. Oxytocin peaks in the pushing stage promote efficient expulsion. In the hour after birth, further oxytocin peaks[3] promote uterine contractions and may reduce hemorrhage risk. Physiologic oxytocin activity may also support successful breastfeeding.
- Prolactin hormone actions are synergistic with oxytocin and also peak in the hour after birth, supporting early lactation.[4]
- Endogenous beta-endorphins rise with increasing levels of labor pain,[5] giving endogenous analgesia and may activate reward systems after birth in relation to birth and baby.[6]
- Maternal epinephrine and norepinephrine (catecholamines) increase in response to labor pain.[7] When the mother's pain and fear levels remain in tolerable states of "eustress," catecholamines promote alertness and effective pushing. When stress is excessive, labor may slow via elevations in catecholamines and several other hormonal pathways.

Benefits of non-pharmacologic pain management:

- Non-pharmacologic pain management (for example, immersion in water, relaxation techniques, labor support, and massage) avoids the risks of epidural analgesia, which can interrupt endogenous oxytocin,[8] beta-endorphins,[9] epinephrine-norpeinephrine,[7]and prolactin,[10] and their physiologic peaks in late labor. Oxytocin reduction may increase the need for synthetic oxytocin, and for vacuum or forceps assisted birth.[11] Although not well studied, epidural analgesia may adversely impact breastfeeding success.
- Labor support by a trained doula provides emotional support and physical comfort.[12] Reductions in stress and catecholamines may mediate benefits of doula care and may also optimize oxytocin, prolactin, and beta-endorphins. Lower epidural rates and increased vaginal birth and breastfeeding rates of women with doula care[12] may reflect hormonal benefits from reduced stress.

Access *Hormonal Physiology of Childbearing: Evidence and Implications for Women, Babies, and Maternity Care* (2015) by Dr. Sarah J. Buckley and related material, including individual fact sheets and the full set, at ChildbirthConnection.org/HormonalPhysiology.

Practices that support beneficial hormone action when epidural analgesia is needed

When epidural and other interventions are used, childbearing women and newborns can benefit from support of physiologic processes as far as safely possible. Ways to foster these processes include:

- Provide non-pharmacologic options ("comfort measures") in early labor to promote coping and delay epidural administration. Delayed epidural administration may reduce hormonal effects, as seen in animal studies.[13]
- Promote skin-to-skin contact in the first hours after birth. This may benefit maternal oxytocin, beta-endorphins, and prolactin, and counter any adverse effects on breastfeeding.[14] This may also benefit newborn transition[19] and breastfeeding initiation[15] and reduce postpartum hemorrhage risk by elevating maternal oxytocin.[3]

Precautionary Point: Long-term studies of possible effects from fetal exposure to analgesic drugs in labor are lacking. Developmental and epigenetic principles suggest that perinatal exposures could have long-lasting programming effects.[16] Limited animal[17] and human studies[18] suggest cause for concern. While this research is sparse, a precautionary approach to exposures in essentially healthy women and babies is prudent, while we await more definitive data.

Selected references – see report for additional documentation:

1. Centers for Disease Control and Prevention. User guide to the 2012 natality public use file.
2. Fuchs, A.R., et al. (1991). Oxytocin secretion and human parturition: Pulse frequency and duration increase during spontaneous labor in women. *Am J Obstet Gynecol, 165*(5 Pt 1), 1515-1523.
3. Matthiesen, A.S., et al. (2001). Postpartum maternal oxytocin release by newborns: Effects of infant hand massage and sucking. *Birth, 28*(1), 13-19.
4. Stefos, T., et al. (2001). Maternal prolactin secretion during labor: The role of dopamine. *Acta Obstet Gynecol Scand, 80*(1), 34-38.
5. Hoffman, D.I., et al. (1984). Plasma beta-endorphin concentrations prior to and during pregnancy, in labor, and after delivery. *Am J Obstet Gynecol, 150*(5 Pt 1), 492-496.
6. Nelson, E.E., et al. (1998). Brain substrates of infant-mother attachment: Contributions of opioids, oxytocin, and norepinephrine. *Neurosci Biobehav Rev, 22*(3), 437-452.
7. Neumark, J., et al. (1985). Effects of epidural analgesia on plasma catecholemines and cortisol in parturition. *Acta Anaesthesiol Scand, 29*(6), 555-559.
8. Rahm, V.A., et al. (2002). Plasma oxytocin levels in women during labor with or without epidural analgesia: A prospective study. *Acta Obstet Gynecol Scand, 81*(11), 1033-1039.
9. Browning, A.J., et al. (1983). Maternal and cord plasma concentrations of beta-lipotrophin, beta-endorphin and gamma-lipotrophin at delivery: Effect of analgesia. *Br J Obstet Gynaecol, 90*(12), 1152-1156.
10. Jouppila, R., et al. (1980). The effect of segmental epidural analgesia on maternal prolactin during labour. *Br J Obstet Gynaecol, 87*(3), 234-238.
11. Anim-Somuah, M., et al. (2011). Epidural versus non-epidural or no analgesia in labour. *Cochrane Database Syst Rev*(12), CD000331.
12. Hodnett, E.D., et al. (2013). Continuous support for women during childbirth. *Cochrane Database Syst Rev, 7*, CD003766.
13. Krehbiel, D., et al. (1987). Peridural anesthesia disturbs maternal behavior in primiparous and multiparous parturient ewes. *Physiol Behav, 40*(4), 463-472.
14. Halpern, S.H., et al. (1999). Effect of labor analgesia on breastfeeding success. *Birth, 26*(2), 83-88.
15. Moore, E.R., et al. (2012). Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev, 5*, CD003519.

cont'd

16. Dahlen, H.G., et al. (2013). The EPIIC hypothesis: Intrapartum effects on the neonatal epigenome and consequent health outcomes. *Med Hypotheses, 80*(5), 656-662.
17. Golub, M.S., et al. (1998). Perinatal bupivacaine and infant behavior in rhesus monkeys. *Neurotoxicol Teratol, 20*(1), 29-41.
18. Jacobson, B., et al. (1990). Opiate addiction in adult offspring through possible imprinting after obstetric treatment. *Br Med J, 301*(6760), 1067-1070.

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