Epidurals: Do They or Don't They Increase Cesareans?

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ABSTRACT

The controversy over whether epidurals increase the risk of cesarean has raged since the 1970s. This article provides a history of the early observational research designed to answer this question and an in-depth analysis of the most recent randomized control trials. Based on the research, the author concludes that we cannot assure women that epidurals do not increase the risk of cesarean.

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Let's start with a bit of background for those of you who didn't personally live through the early controversy over whether epidurals increased the cesarean rate. As epidurals began to achieve popularity in the late 1970s and 1980s, one researcher sounded the alarm when he and his group published a study of 714 first-time mothers showing that even after excluding women with big babies and women whose labor pattern was abnormal prior to having an epidural, epidurals remained a potent factor in cesarean rates for delayed progress (Thorp, Parisi, Boylan, & Johnston, 1989). Everyone pooh-poohed his finding on grounds that observational studies can't truly determine whether epidurals lead to more cesareans or women experiencing more prolonged, painful labors, and therefore at higher risk for cesarean, were more likely to want epidurals. The "chicken versus egg" question, they argued, couldn't be resolved without a randomized controlled trial (RCT), and it wasn't likely that women would agree to be assigned

by chance to have an epidural or not. In point of fact, that same year saw publication of a small Danish RCT (107 women, 104 of them first-time mothers; Philipsen & Jensen, 1989). It reported that having an epidural nearly tripled the cesarean rate (16% vs. 6%) for "cephalopelvic disproportion" despite no clinical evidence of CPD being a requirement for inclusion. The investigators ignored this, however, concluding only that instrumental vaginal delivery rates were similar, and epidurals provided better pain relief. In any case, the anesthetic dose was much higher than was already becoming the norm, so it could be reasonably argued that the trial's findings wouldn't apply to modern-day practice.

Thorp, meanwhile, took up the RCT challenge. He and his colleagues carried out an epidural versus no epidural trial in 93 first-time mothers and found that epidurals did, in fact, lead to cesareans (25% vs. 2%), not vice versa (Thorp et al., 1993). That bit of unwelcome news precipitated a stampede to perform

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more RCTs, and when enough of those had accumulated, to a series of systematic reviews pooling their data (*meta-analysis*), of which the Cochrane review, Anim-Somuah, Smyth, and Jones (2011), is the latest. These reached the more comfortable conclusion that epidurals didn't increase likelihood of cesarean, and pro-epiduralists breathed a collective sigh of relief and went back, if they had ever stopped, to unreservedly recommending epidurals. (This rather sweeps under the rug the other problems epidurals can cause, but that's a topic for another day.)

WEAKNESSES OF THE "EPIDURAL" VERSUS "NO EPIDURAL" TRIALS

The finding that epidurals don't increase cesareans is puzzling because they increase likelihood of factors associated with them (Anim-Somuah et al., 2011). For one thing, they increase use of oxytocin to augment labor, which implies they slow labor. For another, more women run fevers, and it stands to reason that a woman progressing slowly who starts running a fever is a likely candidate for cesarean. For a third, the difference in fetal malposition (occiput posterior) rates at delivery comes close to achieving statistical significance, meaning the difference is unlikely to be due to chance. Persistent OP is strongly associated with cesarean delivery (Cheng, Shaffer, Caughey, 2006; Fitzpatrick, McQuillan, & O'Herlihy, 2001; Phipps et al., 2014; Ponkey, Cohen, Heffner, Lieberman, 2003; Senécal, Xiong, & Fraser, 2005; Sizer & Nirmal, 2000). Epidurals even increase cesareans for fetal distress by 40%, although the absolute difference didn't amount to much (1 more per 100 women). Could a difference exist and meta-analysis of RCTs fail to detect it?

A string of well-conducted observational studies over the years have suggested that they could (Eriksen, Nohr, & Kjaergaard, 2011; Kjaergaard, Olsen, Ottesen, Nyberg, & Dykes, 2008; Lieberman

et al., 1996; Nguyen et al., 2010), the most recent of which is a very large, very convincing study published in fall of 2014 (Bannister-Tyrrell, Ford, Morris, & Roberts, 2014). Its authors point out, as have others before them, the weaknesses of the RCTs, weaknesses serious enough to nullify their results or make them inapplicable to typical community practice (*external validity*).

To begin with, in most trials, substantial percentages of women allocated to the non-epidural group ended up having epidurals, and some women allocated to the epidural group ended up not having one. Since RCTs analyze results according to group assignment (to do otherwise would negate the point of random assignment, which is to avoid bias), not what actually happened, this diminishes differences between groups. In addition, trials were mostly confined to women with no medical or obstetric complications who were treated according to strict protocols for labor management and indications for cesarean surgery. Neither is the case in most hospitals. To these I would add that many trials lumped together first-time mothers and women with prior births when reporting outcomes. First-time mothers are much more susceptible to factors that impede progress, so including women with prior vaginal births can make it appear that epidurals are less problematic for first-time mothers than they really are. In addition, three of the trials were carried out in a hospital where participants were mostly attended by midwives, and cesarean rates were much lower than is common for women attended by obstetricians.

All of this means that any null results in meta-analyses of the trials can be taken with a grain of salt, any findings of significant differences probably represent a minimal value, and first-time moms may be harder hit than appears. To cite one example, Anim-Somuah et al. (2011) reported that 5 more women per 100 having epidurals had a malpositioned baby at delivery (18% vs. 13%) in the 4 trials reporting this outcome, a difference, as I said, that just missed achieving statistical significance. But when I confined results to the two trials in first-time mothers alone in which 10% or fewer of the women in the "no-epidural" group had an epidural, the gap widened to 9 more per 100 (11% vs. 2%).

SUMMARY OF THE BANNISTER-TYRRELL ET AL. (2014) ANALYSIS

Bannister-Tyrrell and colleagues (2014) drew their population from a database of 210,700 Australian women with no prior cesareans who were laboring at

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term with a singleton, head-down baby. A strength of the database was that, unlike most, it distinguished epidurals for labor from epidurals for delivery. Using a long list of factors, investigators constructed a propensity score for how likely a woman was to have an epidural, matched women according to their score, and compared results according to whether women with the same score had or didn't have an epidural. Matched controls were found for 52,600 women who had an epidural and were found across the full range of propensity scores. Women having epidurals were 2.5 times more likely to have a cesarean (20% vs. 8%), or put another way, 12 more women per 100 having epidurals had a cesarean (*absolute excess*), which amounts to 1 additional cesarean for every 8.5 women having an epidural (*number needed to harm*). Among first-time mothers, women having epidurals were 2.4 times more likely to have a cesarean. Study authors didn't provide cesarean rates for this subgroup, but the raw cesarean rates overall were 18% in first-time mothers versus 2% in women with prior births, so the effect on this more vulnerable population could be dire.

But there's still more. Investigators further adjusted for confounding factors not captured in their database. These included differences in health-care settings (same state but not same city), care provider (women without epidurals are more likely to be attended by midwives), and for confounding interventions more likely with epidurals (continuous fetal monitoring). Relative risk of cesarean with an epidural remained at 2.5. Investigators then adjusted for the association between occiput posterior baby and cesarean by setting estimates of the risk ratio to exceed the strongest associations reported in the literature, and they assumed that the prevalence of severe labor pain was 3 to 4 times higher in women having epidurals. Factoring these into their statistical analysis reduced the risk ratio, but women having epidurals still were 50% more likely to have a cesarean. This means that with a baseline cesarean rate of 8% in women without an epidural, 12% of women with an epidural will have one or 4 more women per 100 or 1 more cesarean for every 25 women.

THE TAKE-HOME

At the very least we cannot assure women with confidence that epidurals don't increase the likelihood of cesarean. For this reason and because of their numerous other drawbacks and considering that comfort measures and other strategies have been shown to be both effective for most women and free

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of adverse effects (Declercq, Sakala, Corry, & Applebaum, 2006; Jones et al., 2012), women may want to make epidurals Plan B rather than Plan A. That being said, whatever their choice, women can minimize their chance of cesarean—with or without an epidural—by choosing a midwife or doctor whose policies and practices promote spontaneous vaginal birth <http://www.lamaze.org/HealthyBirthPractices>.

REFERENCES

- Anim-Somuah, M., Smyth, R. M., & Jones, L. (2011). Epidural versus non-epidural or no analgesia in labour. *Cochrane Database of Systematic Reviews*, (12), CD000331. <http://dx.doi.org/10.1002/14651858.CD000331.pub3>
- Bannister-Tyrrell, M., Ford, J. B., Morris, J. M., & Roberts, C. L. (2014). Epidural analgesia in labour and risk of caesarean delivery. *Paediatric and Perinatal Epidemiology*, 28(5), 400–411. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/25040829>
- Cheng, Y. W., Shaffer, B. L., & Caughey, A. B. (2006). Associated factors and outcomes of persistent occiput posterior position: A retrospective cohort study from 1976 to 2001. *Journal of Maternal-Fetal & Neonatal Medicine*, 19(9), 563–568. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/16966125?dopt=Citation>
- Declercq, E., Sakala, C., Corry, M. P., & Applebaum, S. (2006). *Listening to Mothers II: Report of the Second National U.S. Survey of Women's Childbearing Experiences*. New York, NY: Childbirth Connection. Retrieved from http://childbirthconnection.org/pdfs/LTMII_report.pdf
- Eriksen, L. M., Nohr, E. A., & Kjaergaard, H. (2011). Mode of delivery after epidural analgesia in a cohort of low-risk nulliparas. *Birth*, 38(4), 317–326. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22112332>
- Fitzpatrick, M., McQuillan, K., & O'Herlihy, C. (2001). Influence of persistent occiput posterior position on delivery outcome. *Obstetrics and Gynecology*, 98(6), 1027–1031. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11755548?dopt=Citation>
- Jones, L., Othman, M., Dowswell, T., Alfirevic, Z., Gates, S., Newburn, M., . . . Neilson, J. P. (2012). Pain management for women in labour: An overview of systematic reviews. *Cochrane Database of Systematic Reviews*, (3), CD009234. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22419342>
- Kjaergaard, H., Olsen, J., Ottesen, B., Nyberg, P., & Dykes, A. K. (2008). Obstetric risk indicators for labour dystocia in nulliparous women: A multi-centre cohort study. *BMC Pregnancy Childbirth*, 8, 45. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18837972?dopt=Citation>
- Lieberman, E., Lang, J. M., Cohen, A., D'Agostino, R., Jr., Datta, S., & Frigoletto, F. D., Jr. (1996). Association of epidural analgesia with cesarean delivery in

- nulliparas. *Obstetrics and Gynecology*, 88(6), 993–1000. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8942841>
- Nguyen, U. S., Rothman, K. J., Demissie, S., Jackson, D. J., Lang, J. M., & Ecker, J. L. (2010). Epidural analgesia and risks of cesarean and operative vaginal deliveries in nulliparous and multiparous women. *Maternal Child Health Journal*, 14(5), 705–712. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19760498?dopt=Citation>
- Philipsen, T., & Jensen, N. H. (1989). Epidural block or paracetal pethidine as analgesic in labour: A randomized study concerning progress in labour and instrumental deliveries. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, 30(1), 27–33. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2924990>
- Phipps, H., Hyett, J. A., Graham, K., Carseldine, W. J., Tooher, J., & de Vries, B. (2014). Is there an association between sonographically determined occipitotransverse position in the second stage of labor and operative delivery? *Acta Obstetrica et Gynecologica Scandinavica*, 93(10), 1018–1024. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/25060716>
- Ponkey, S. E., Cohen, A. P., Heffner, L. J., & Lieberman, E. (2003). Persistent fetal occiput posterior position: Obstetric outcomes. *Obstetrics and Gynecology*, 101(5, Pt. 1), 915–920. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12738150?dopt=Citation>
- Senécal, J., Xiong, X., & Fraser, W. D. (2005). Effect of fetal position on second-stage duration and labor outcome. *Obstetrics and Gynecology*, 105(4), 763–772. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15802403>
- Sizer, A. R., & Nirmal, D. M. (2000). Occipitoposterior position: Associated factors and obstetric outcome in nulliparas. *Obstetrics and Gynecology*, 96(5, Pt. 1), 749–752. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11042312?dopt=Citation>
- Thorp, J. A., Hu, D. H., Albin, R. M., McNitt, J., Meyer, B. A., Cohen, G. R., & Yeast, J. D. (1993). The effect of intrapartum epidural analgesia on nulliparous labor: A randomized, controlled, prospective trial. *American Journal of Obstetrics and Gynecology*, 169(4), 851–858. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8238138?dopt=Citation>
- Thorp, J. A., Parisi, V. M., Boylan, P. C., & Johnston, D. A. (1989). The effect of continuous epidural analgesia on cesarean section for dystocia in nulliparous women. *American Journal of Obstetrics and Gynecology*, 161(3), 670–675. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2782350>

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