

What is already known on this topic

Epidural analgesia during labour is effective but has been associated with increased rates of instrumental delivery

Studies have included women of mixed parity and high concentrations of epidural anaesthetic

What this study adds

Epidural infusions with low concentrations of local anaesthetic are unlikely to increase the risk of caesarean section in nulliparous women

Although epidural analgesia is associated with an increased risk of instrumental vaginal delivery, operator bias cannot be excluded

Epidural analgesia is associated with a longer second stage labour and increased oxytocin requirement, but the importance of these is unclear as maternal analgesia and neonatal outcome may be better with epidural analgesia

Differences in protocols for management of labour could have contributed to the differences in rates of instrumental vaginal delivery.

Another limitation was the large number of women who changed from parenteral opioids to epidural analgesia. Our intention to treat approach would likely render any estimation of the effects of epidural analgesia more conservative, but it was necessary to prevent selection bias. Comparing a policy of offering epidural analgesia with one of offering parenteral opioids reflects real life. As the definitions of stages of labour varied between trials, we were unable to determine if epidural analgesia prolonged the first stage, and the actual duration can only be estimated. Unlike previous reviews, we focused on nulliparous women because the indications for, and risks of, caesarean section differ with parity.

We limited our analysis to trials that used infusions of bupivacaine with concentrations of 0.125% or less, to reflect current practice. In a randomised controlled trial, low concentrations have been shown to reduce the rate of instrumental delivery.⁷

Epidural analgesia may increase the risk of instrumental delivery by several mechanisms. Reduction of serum oxytocin levels can result in a weakening of uterine activity.⁹⁻¹⁰ This may be due in part to intravenous fluid infusions being given before epidural analgesia, reducing oxytocin secretion.¹¹ The increased use of oxytocin after starting epidural analgesia may indicate attempts at speeding up labour. Maternal efforts at expulsion can also be impaired, causing fetal malposition during descent.¹² Previously, the association of neonatal morbidity and mortality with longer labour (second stage longer than two hours) had justified expediting delivery, leading to increased rates of instrumental delivery.¹³

Delaying pushing until the fetus's head is visible or until one hour after reaching full cervical dilation may reduce the incidence of instrumental delivery and its attendant morbidity.¹³ Although women receiving epidural analgesia had a longer second stage labour,

this was not associated with poorer neonatal outcome in our analysis.

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- Hawkins JL, Koonin LM, Palmer SK, Gibbs CP. Anesthesia-related deaths during obstetric delivery in the United States, 1979-1990. *Anesthesiology* 1997;86:277-84.
- Chestnut DH. Anesthesia and maternal mortality. *Anesthesiology* 1997;86:273-6.
- Roberts CL, Algert CS, Douglas I, Tracy SK, Peat B. Trends in labour and birth interventions among low-risk women in New South Wales. *Aust NZ J Obstet Gynaecol* 2002;42:176-81.
- Halpern SH, Leighton BL, Ohlsson A, Barrett JF, Rice A. Effect of epidural vs parenteral opioid analgesia on the progress of labor: a meta-analysis. *JAMA* 1998;280:2105-10.
- Zhang J, Klebanoff MA, DerSimonian R. Epidural analgesia in association with duration of labor and mode of delivery: a quantitative review. *Am J Obstet Gynecol* 1999;180:970-7.
- Howell CJ. Epidural versus non-epidural analgesia for pain relief in labour. *Cochrane Database Syst Rev* 2000;CD000331.
- Comparative Obstetric Mobile Epidural Trial (COMET) Study Group UK. Effect of low-dose mobile versus traditional epidural techniques on mode of delivery: a randomised controlled trial. *Lancet* 2001;358:19-23.
- Scottish Intercollegiate Guidelines Network. Methodology checklist 2: randomised controlled trials. www.sign.ac.uk/guidelines/fulltext/50/checklist2.html (accessed 7 Mar 2004).
- Goodfellow CF, Hull MG, Swaab DF, Dogterom J, Buijs RM. Oxytocin deficiency at delivery with epidural analgesia. *Br J Obstet Gynaecol* 1983;90:214-9.
- Bates RG, Helm CW, Duncan A, Edmonds DK. Uterine activity in the second stage of labour and the effect of epidural analgesia. *Br J Obstet Gynaecol* 1985;92:1246-50.
- Cheek TG, Samuels P, Miller F, Tobin M, Gutsche BB. Normal saline i.v. fluid load decreases uterine activity in active labour. *Br J Anaesth* 1996;77:632-5.
- Newton ER, Schroeder BC, Knape KG, Bennett BL. Epidural analgesia and uterine function. *Obstet Gynecol* 1995;85:749-55.
- Miller AC. The effects of epidural analgesia on uterine activity and labor. *Int J Obstet Anesth* 1997;6:2-18.

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Corrections and clarifications

The logrank test

An error in this Statistics Notes article by J Martin Bland and Douglas G Altman persisted to publication (1 May, p 1073). The third sentence—relating to the values in a table of survival times—should have ended: “but is this sufficient to conclude that in the population, patients with anaplastic astrocytoma have better [not ‘worse’] survival than patients with glioblastoma?”

Minerva

In the seventh item in the 17 April issue (p 964), Minerva admits to not being religious. Maybe this is why she reported that in the Bible Daniel has 21 chapters. It doesn't; it has only 12.

Exploring perspectives on death

In this News article by Caroline White (17 April, p 911), we referred to average life expectancy as running to 394 000 minutes—a rather brief life span, some might think, given that there are only 525 600 minutes in one non-leap year. Assuming that the average life expectancy referred to in the article was intended to relate to UK males (that is, 75 years), some straightforward maths reveals that 75 years (even discounting the extra length of leap years) in fact contain 39 420 000 minutes. Quite a lot of minutes were lost somewhere in our publication process.