Delayed versus early pushing in women with epidural analgesia: a systematic review and meta-analysis
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CRD summary
This review of women receiving epidural analgesia found a statistically significant reduction in rotational or mid-pelvic instrumental deliveries with delayed pushing. However, an increase in the duration of the second stage of labour was also observed. The review's conclusions appear in line with the results presented and highlight the need to clarify all relevant risks and benefits.

Authors' objectives
The aim was to compare the potential benefits and harms of a policy of delayed pushing among women with uncomplicated pregnancies and effective analgesia established in the first stage of labour.

Searching
MEDLINE, EMBASE and CINAHL (all up to October 2003) and the Cochrane CENTRAL Register were searched; the search terms were reported. The search was supplemented by cross-checking reference lists. There was no attempt to identify unpublished studies.

Study selection
Study designs of evaluations included in the review
Only randomised controlled trials (RCTs) were included in the review.

Specific interventions included in the review
To be included, the trials had to use delayed pushing. The duration of delay varied between the studies. In some studies it was between one and three hours (or earlier if there was an involuntary desire to push), in others women were delayed until the head became visible at introitus or rotation and descent ceased. Comparators, although not pre-specified, were immediate or early pushing.

Participants included in the review
The participants were women in labour who had effective epidural analgesia in the first stage. More than half of the studies included only nulliparae. All trials included women in spontaneous or induced labour, giving birth to a single cephalic-presenting foetus. Most of the studies specified that women with major obstetric complications were excluded.

Outcomes assessed in the review
The primary outcome was any instrumental delivery. The secondary maternal outcomes were: rotational delivery or mid-pelvic instrumental delivery, second-stage Caesarean section, length of second stage, duration of pushing, episiotomy, perineal laceration, postpartum haemorrhage, maternal fever, satisfaction with labour care, and longer term outcomes such as urinary or faecal incontinence and sexual problems. The infant outcomes were: Apgar scores, umbilical arterial pH, need for positive pressure ventilation, admission to neonatal intensive care, birth trauma and perinatal death.

All of the included trials assessed the primary outcome, instrumental delivery. Some also reported secondary outcomes. No trial reported rates of urinary incontinence, and few studies reported infant outcomes.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed each study for inclusion. Any discrepancies were resolved by consensus.
Assessment of study quality
Each study was assessed for allocation concealment, loss to follow-up and intention-to-treat analysis. Two reviewers independently assessed the validity of each study. Any discrepancies were resolved by consensus.

Data extraction
Two reviewers independently extracted the data using a standard form. The results were extracted as reported in the trials, ignoring missing data. For dichotomous outcomes, relative risks (RRs) with 95% confidence intervals (CIs) were calculated. For continuous variables, the weighted mean differences (WMDs) and 95% CIs were calculated.

Methods of synthesis
How were the studies combined?
A meta-analysis was used to calculate the overall effect estimates. The Mantel-Haenszel fixed-effect model was used where the assumption of homogeneity was satisfied, where it was not the DerSimonian random-effects model was used instead.

How were differences between studies investigated?
Cochran's Q statistic and the I-squared test were used to assess differences in treatment effect between the studies.

Subgroup analyses were conducted for the primary outcome only. Planned subgroups were on parity, type of epidural analgesia, type of analgesic agent and study quality. Post hoc analyses were on immediate versus early pushing in the control group, duration of pushing limited to one hour and then instrumental delivery versus no stated limits, and comparative use of forceps and vacuum extraction.

Results of the review
Nine RCTs with a total of 2,953 participants were included in the review.

Only one trial reported adequate allocation concealment with central randomisation. The review authors stated that all trials used intention-to-treat analyses. Recruitment and randomisation occurred at different stages of labour between the studies.

Overall, the number of instrumental deliveries and the rate of second-stage Caesarean section were not reduced statistically significantly with delayed pushing. However, the meta-analysis revealed a 31% reduction in rates of rotational and mid-pelvic instrumental delivery (RR 0.69, 95% CI 0.55, 0.87) and an increase in spontaneous vaginal births (RR 1.22, 95% CI 1.05, 1.42), based on 8 studies. Overall, second-stage labour was 58 minutes longer in the delayed pushing group (WMD 58.2, 95% CI 21.51, 94.84), but the results were highly heterogeneous (P<0.01) and no difference was found.

No statistically significant differences were found in those maternal morbidity outcomes assessed: intrapartum fever (heterogeneous results), episiotomy, perineal lacerations, post-partum haemorrhage, maternal satisfaction with labour care, and faecal and urinary incontinence. Infant outcomes were not reported in most studies. No statistically significant differences were found for Apgar scores, positive pressure ventilation resuscitation, umbilical artery pH, admission to neonatal intensive care unit, infant trauma or perinatal death.

The only statistically significant pre-planned subgroup analysis found a reduction in instrumental deliveries where epidurals contained local anaesthetic (bupivacaine) alone. None of the post hoc subgroup analyses were statistically significant.

Authors' conclusions
The review demonstrated a significant reduction in rotational or mid-pelvic instrumental deliveries with delayed pushing. However, the benefits came at the expense of an increase in the duration of the second stage of labour.
CRD commentary
Generally, this was a well-conducted review. Relevant methods, such as duplicate screening and data extraction, were used to avoid bias and errors. The objectives and inclusion criteria were clearly defined, and the literature search was fairly thorough. However, the authors did not attempt to identify unpublished studies, and the possibility of publication bias was not investigated. The methodological quality of the included trials was investigated briefly. The methods used to combine the studies in a quantitative synthesis seemed appropriate. Heterogeneity in the results was thoroughly investigated, and a clear distinction was made between pre-planned and post hoc subgroup analyses. The authors’ conclusions appear to follow from the results of the review.

Implications of the review for practice and research
Practice: The authors stated that for women in hospitals with high rates of rotational or mid-pelvic instrumental deliveries, a policy of delayed pushing for those with epidural analgesia would be beneficial. However, for hospitals with low rates of these procedures, a small reduction in rotational or mid-pelvic instrumental deliveries may not justify the increased duration of the second stage and time spent in the delivery suite.

Research: The authors stated that trials with sufficient power to assess longer term pelvic floor morbidity and whether delayed pushing can reduce second-stage Caesarean sections, are required.

Bibliographic details

PubMedID
15663115

Other publications of related interest
This additional published commentary may also be of interest. Young G. Review: delayed pushing reduces rotational or mid pelvic instrumental deliveries but increases duration of the second stage of labour in women having epidural analgesia. Evid Based Med 2005;10:122.

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