Effect of epidural analgesia for labor on the Cesarean delivery rate
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Authors' objectives
To determine whether Caesarean delivery rate increases with increased use of epidural analgesia.

Searching
MEDLINE was searched from January 1981 to April 1992, bibliographic references from relevant articles were examined, and relevant journals were handsearched. The search was restricted to English language articles, and employed the following search terms: 'epidural' or 'extradural', 'cesarean' or 'caesarean', and 'primigravid' or 'nulliparous'. The textbook 'Effective care in pregnancy and childbirth' (see Other Publications of Related Interest) was also searched.

Study selection
Study designs of evaluations included in the review
Non-randomised and randomised controlled trials (RCTs), and studies with a retrospective forward design without a control group.

Specific interventions included in the review
Epidural anaesthesia, mainly bupivacaine, either by continuous or intermittent infusion.

Participants included in the review
Primigravid women of standard obstetric risk with singleton pregnancies in vertex presentation, with spontaneous labour at term.

Outcomes assessed in the review
Caesarean delivery rates were assessed.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The quality of the primary studies is assessed according to study design, i.e. according to whether individual studies are randomised or not: a separate analysis was carried out for the 2 RCTs. The authors do not state how the papers were assessed for quality, or how many of the authors performed the quality assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
Pooled (crude) Caesarean rates are presented for epidural and non-epidural deliveries, and for the 2 RCTs alone. A random-effects meta-analysis was also carried out. Pooled rates are also presented for the subgroups of studies reporting Caesarean deliveries for dystocia, deliveries for foetal distress, and epidural use in the second stage of labour.

How were differences between studies investigated?
Differences were investigated by subgroup analysis, by analysing the RCTs separately, and by carrying out a separate random-effects meta-analysis. Differences between studies were also described to illustrate the variation. No homogeneity tests were reported in the paper, although it is stated in the abstract that they were conducted.

**Results of the review**

Six studies met the inclusion criteria, of which 2 were RCTs. The total number of participants was 3,022 (1,699 epidural and 1,323 non-epidural). Two studies were also identified as RCTs, but were not included in the meta-analyses as the control groups had also received epidural analgesia during the first stage of labour.

The pooled rate of Caesarean delivery was significantly higher in women receiving epidural analgesia with a risk difference (i.e. difference in rates) of 10.3% (95% confidence interval, CI: 8.2, 12.5); the risk difference for RCTs only was 14.6% (95% CI: 5.4, 23.8). The random-effects risk difference was not significant (p=0.08), though no summary information is presented on risks calculated by this method.

For studies of Caesarean deliveries for dystocia, the Caesarean delivery rate was higher in the epidural group with a pooled risk difference of 9.1% (95% CI: 6.7, 11.5), and a pooled risk for RCTs only of 12.3% (95% CI: 4.3, 20.3).

For studies of Caesarean delivery for foetal distress, the pooled risk difference was 0.7% and not significant. No other summary figures were given for this subgroup.

A subgroup analysis was also carried out for the patients who received oxytoxin in one included study. Use of oxytoxin and use of epidurals were significantly associated (p<0.05). There was a non significant increase of 1.4% in the Caesarean rate in the epidural group receiving oxytoxin.

Results were also stratified according to whether the patients were private or clinic patients; a 4% and 1% increase in Caesarean rates was shown for private and clinic patients, respectively, representing a relative risk of 1.2 in both groups (not significant). However, the underlying Caesarean rates were different for private and clinic patients overall: 17.1 and 5.2% respectively (p<0.05). For patients receiving oxytoxin the disparity was larger: 27.1 versus 5.3% respectively (p<0.05).

**Authors' conclusions**

Epidural analgesia increases the risk of Caesarean delivery by about 10%.

**CRD commentary**

While the separate analysis of the methodologically stronger trials does not contradict the overall findings, the study would have benefited from a more formal quality assessment of all the included trials and perhaps weighting of individual studies according to quality, e.g. undue weight seems to be given to non-randomised studies. Heterogeneity between these trials is described, but is not explored fully. The meta-analysis method used may not have been the most appropriate, since it involved only a simple pooling of the crude rates from individual trials; this ignores the wide variation in sample sizes between individual studies and is likely to lead to a less accurate estimate of the risk difference. The random-effects analysis, which contradicted the findings of the pooled analysis, is largely ignored. It is unclear, therefore, whether the direction and size of the effect are reliable. It should be noted that the subgroup analyses are based on small numbers. The search strategy employed by this review is quite restricted: only English language studies were considered and no attempt was made to find unpublished studies.

**Implications of the review for practice and research**

The results of this review suggest an increase in Caesarean delivery associated with epidural analgesia, but further research is needed to assess the validity and implications of these initial results.

**Bibliographic details**

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Other publications of related interest

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.