Epidural ropivacaine versus bupivacaine for labor: a meta-analysis
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CRD summary
This well reported review compared ropivacaine versus bupivacaine for labour analgesia. The authors' concluded that both ropivacaine and bupivacaine provide excellent labour analgesia, and that there was no significant difference between the two drugs in mode of delivery, maternal satisfaction, or neonatal outcomes. Although, the review only included English language papers, the authors' conclusions are supported by the evidence presented.

Authors' objectives
To systematically review and combine the results of randomised controlled trials (RCTs) comparing ropivacaine with bupivacaine for labour analgesia.

Searching
MEDLINE (from January 1966), the Science Citation Index, the Cochrane Library and EMBASE were searched until March 2002. The references of retrieved articles and reviews on the subject were handsearched, as were several journals: International Journal of Obstetric Anesthesia, British Journal of Anaesthesia, Anesthesiology, and Anesthesia and Analgesia. The abstracts from the Society for Obstetric Anesthesia and Perinatology meetings (1995 and 2001) were screened and the authors of clinical trials were contacted for additional data. Only English language papers were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
Only RCTs were eligible for inclusion in the review.

Specific interventions included in the review
Studies that compared epidural ropivacaine with bupivacaine for labour analgesia were eligible for inclusion. The additional administration of opioids was possible, but trials that used adjuvant medication (e.g. clonidine or fentanyl) in only one group were excluded. Studies that determined the effective dose by varying doses during treatment were also excluded.

Participants included in the review
Studies of women in labour using epidural pain relief were eligible for inclusion. Some of the included studies only provided data from nulliparous patients.

Outcomes assessed in the review
The primary outcome assessed in the review was the incidence of spontaneous vaginal delivery. The secondary outcomes were further obstetric, analgesia-related and neonatal data.

The obstetric outcomes included the total length of labour, the length of the second stage of labour, the incidence of forceps delivery and Caesarean delivery.

The analgesic outcomes included the onset and duration of analgesia, the number of excellent analgesia, the incidence of ambulation, the need for bladder catheterisation, hypotension, nausea or vomiting, the incidence of no motor block or full motor block, the duration of block, and the incidence of inadequate analgesia and block failure.

The neonatal outcomes were the incidence of an Apgar score of less than 7 at one minute and five minutes, an umbilical artery pH of less than 7.2 and the mean umbilical cord pH.

How were decisions on the relevance of primary studies made?
At least two reviewers independently assessed the eligibility of the studies.

**Assessment of study quality**
The quality of the studies was evaluated using the Jadad scale, which assesses randomisation, blinding and the handling of withdrawals, and the reporting of these features. Allocation concealment was also used as a quality criterion. At least two reviewers independently assessed the validity of fully published trials. Any disagreements were resolved by discussion.

**Data extraction**
At least two reviewers independently extracted the data. Any discrepancies were resolved by re-examining the articles. The population type (nulliparous, mixed), the number of patients, and the concentration and maintenance regimen of the anaesthetics were extracted.

The odds ratio (OR) and confidence intervals (CIs) were calculated for dichotomous data. For continuous data, the weighted mean differences and CIs were calculated.

**Methods of synthesis**

How were the studies combined?
The ORs and weighted mean differences were pooled statistically applying a random-effects model. In case the studies showed statistically significant heterogeneity, the studies were not pooled statistically but were described qualitatively.

How were differences between studies investigated?
A chi-squared analysis was used to check for heterogeneity between the primary studies. A P-value of less than 0.05 was considered statistically significant.

**Results of the review**
Twenty-three RCTs (2,074 patients) met the inclusion criteria.

There was no statistically significant difference (P=0.12) in the incidence of spontaneous vaginal delivery in the two anaesthetic groups (OR 1.17, 95% CI: 0.96, 1.44). There were also no statistically significant differences in any of the other obstetric, analgesic or neonatal outcomes.

The motor block outcomes were not pooled statistically due to heterogeneity (P=0.002). Nineteen of the 23 studies favoured ropivacaine, but only 5 of the predominantly small primary studies reported significant differences.

There was also no significant difference in the primary outcome ‘incidence of spontaneous vaginal delivery’ when selecting only published studies, or when using only data from nulliparous patients.

**Authors’ conclusions**
There were no statistically significant differences between the two drugs in the incidence of any obstetric or neonatal outcome.

**CRD commentary**
The review addressed a clear research question with explicit inclusion criteria and was well reported. The authors searched explicitly for unpublished studies and for additional data from existing studies, which will help to reduce publication bias. However, since the review was restricted to English language papers, potentially relevant studies could have been excluded. At least two independent reviewers selected the studies for inclusion, assessed the quality of the studies, and extracted the data, thus reducing the potential for bias and errors.

With the selection of RCTs, the review summarised the best available evidence. However, many of the samples sizes
in the primary studies were very small. The review considered numerous outcomes.

The authors discussed the findings of their review carefully and calculated the statistical power of the study. The authors' conclusions appear plausible.

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

Practice: The authors did not state any implications for practice.

Research: The authors stated that further studies using clinically appropriate concentrations of drugs are required to determine whether or not there is a difference in the incidence of motor block.

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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.