Patient-controlled epidural analgesia for labor

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CRD summary
The authors concluded that using high volume dilute local anaesthetic solutions with a continuous background infusion appeared to be the most successful strategy for patient-controlled epidural analgesia in labour. Lack of reporting of review methods and an inadequate assessment of study quality made it difficult to assess the reliability of the authors’ conclusions.

Authors’ objectives
To evaluate patient-controlled epidural analgesia (PCEA) for women in labour.

Searching
MEDLINE and EMBASE were searched for studies published in English before April 2008. Search terms were not reported.

Study selection
Randomised controlled trials (RCTs) that evaluated PCEA for labour were eligible if they compared any of the following: background infusion versus no background infusion; ropivacaine versus bupivacaine; high-volume bolus versus low-volume bolus and/or longer versus shorter lockout interval; or a novel approach to PCEA versus standard treatment. Review outcomes were maternal analgesia, maternal satisfaction, motor block and clinician workload.

The included studies evaluated PCEA using bupivacaine or ropivacaine with fentanyl or sufentanil; some studies also used epinephrine (see Results for further information on interventions). Studies were generally in low-risk nulliparous or mixed parity patients.

The authors did not state how papers were selected for the review.

Assessment of study quality
Validity was apparently assessed using the level of blinding.

The authors did not state how many reviewers assessed blinding.

Data extraction
The authors did not state how data were extracted for the review.

Methods of synthesis
The studies were grouped by comparison of interventions and combined in a narrative synthesis.

Results of the review
Background infusion versus no background infusion:

Seven RCTs (n=573 patients). Most studies used low infusion rates (<5mL/hour). Five studies used double-blinding, one study used single-blinding and the level of blinding was unclear in the seventh study.

Absence of background infusion was associated with a higher incidence of intense pain in one of five studies and more clinician interventions in two of five studies. There was no significant difference between treatment groups in significant motor block (five studies) or maternal satisfaction (five studies).

Ropivacaine versus bupivacaine:
Eleven studies (n=2,083 patients). Concentrations of agents ranged from 0.05% (with fentanyl) to 0.125% for bupivacaine and from 0.05% to 0.20% for ropivacaine. All studies used double or triple-blinding.

There was no significant difference between ropivacaine and bupivacaine in maternal analgesia (11 studies), maternal satisfaction (four studies) and clinician rescue bolus doses (six studies). Bupivacaine was associated with an increased incidence of motor block in five of 10 studies.

**Bolus dose volume and lockout interval:**

Six RCTs (n=588 patients). Studies evaluated bupivacaine (0.0625% to 0.125%) and ropivacaine (0.1% to 0.2%) with fentanyl or surfentanil. Bolus volumes ranged from 2mL to 20mL. Lock intervals ranged from five to 30 minutes. A background infusion was used in addition to PCEA in three studies. All six studies used double-blinding.

One study reported that increasing bolus volume and lockout interval improved maternal analgesia. One study reported that a shorter lockout interval was associated with improved PCEA success to demand ratio. There was no difference between treatment groups in unscheduled clinician interventions (six studies) and significant motor block (six studies). Larger bolus volumes were not associated with increased side effects of toxicity.

**Drug concentration:**

Six RCTs (n=789 patients). Studies evaluated bupivacaine (0.0625% to 0.25%) and ropivacaine (0.1% to 0.2%) with fentanyl or surfentanil. Four studies used double-blinding and one used single blinding; the other study did not mention blinding.

There was no difference between treatment groups in maternal analgesia (six studies).

High-concentration local anaesthetics were associated with: increased local anaesthetic use in four studies (local anaesthetic dose reduction with the more dilute solutions ranged from 35% to 75%), significantly greater motor block in three studies and higher PCEA success to demand ratios in two studies. Two studies found less pruritus with local anaesthetics without opioids.

**Authors' conclusions**

Use of high volume dilute local anaesthetic solutions with a continuous background infusion appeared to be the most successful strategy for PCEA in labour.

**CRD commentary**

The review question was clearly stated and inclusion criteria were appropriately defined. The search was limited to English-language publications listed in two databases, which raised potential for publication and language biases and the omission of other relevant studies. Methods used to select studies and extract data were not described and so any efforts were made to reduce reviewer errors and bias were unknown. No information was provided about the validity of methods used to assess outcomes and this combined with a limited quality assessment made it difficult to judge the reliability of the results. In view of the differences between studies, a narrative synthesis was appropriate. Lack of reporting of review methods and an inadequate assessment of study quality made it difficult to assess the reliability of the authors’ conclusions.

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

**Practice:** The authors stated that the optimal bolus and lockout interval for labour PCEA remained unknown. Larger bolus doses (>5mL) of dilute local anaesthetic may give greater analgesia than small boluses.

**Research:** The authors stated that there was ongoing research into new methods of delivering PCEA, which included mandatory programmes, intermittent boluses and computerised feedback dosing.

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