Systematic review and meta-analysis of continuous local anaesthetic wound infiltration versus epidural analgesia for postoperative pain following abdominal surgery
Ventham NT, Hughes M, O'Neill S, Johns N, Brady RR, Wigmore SJ

CRD summary
The review concluded that use of local anaesthetic wound infiltration was associated with pain scores comparable to those obtained with epidural analgesia. The authors' conclusions appear broadly to be a fair reflection of the evidence, but the lack of use of their trial quality assessment results hinders the interpretation of the pooled estimates.

Authors' objectives
To compare epidural analgesia with continuous local anaesthetic wound infiltration techniques in patients who have undergone abdominal surgery.

Searching
PubMed, EMBASE and The Cochrane Library were searched to February 2013 without language restrictions; search terms were reported. ClinicalTrials.gov and the reference lists of included papers were also searched.

Study selection
Randomised controlled trials (RCTs) of adults (aged 16 years or older) who had undergone abdominal surgery (gastrointestinal, gynaecological including caesarean and urological) were eligible. Trials had to compare continuous or patient-controlled wound infusion of local anaesthetic using a wound catheter, with continuous or patient-controlled epidural analgesia with local anaesthetic, and/or opiates. The primary outcome was pain at rest, 24 hours after surgery.

The type of surgery used in the included trials varied widely, but in most studies either subcostal or lower abdominal incisions were made. Intervention protocols also varied. All but one of the trials used a subfascial or transversus abdominis plane position for wound catheters. The trials used levobupivacaine, bupivacaine or ropivacaine. A third of studies used an enhanced recovery protocol. Mean ages ranged between 28 and 74 years, and population characteristics varied.

Two reviewers independently selected the studies for inclusion.

Assessment of study quality
Study quality was assessed by two reviewers independently using the Cochrane risk of bias tool, and also by producing scores derived from both the Jadad scale criteria and other criteria; the maximum possible score was 15.

Data extraction
Two reviewers independently extracted pain score data in order to produce mean differences of scores, converted to a 0-10 scale (when necessary). Median data were converted to means. Dichotomous data were extracted in order to calculate odds ratios.

Methods of synthesis
Meta-analyses were performed to calculate pooled odds ratios or weighted mean differences with 95% confidence intervals, using a random-effects model. Heterogeneity was assessed using $I^2$ and $X^2$. Subgroup analyses examined the effect of incision type, and different intervention administration protocols.

Results of the review
Nine RCTs were included (505 participants). Studies generally had adequate randomisation methods but only three studies had low risk of bias for blinding of participants, study personnel, and outcome assessors. All studies scored between 11 and 13 out of 15, except for one study which scored 6.

There were no statistically significant differences between treatments in the pain scores at rest after 24 hours (eight RCTs) or 48 hours (seven RCTs) after surgery, nor for pain on movement at 24 hours (seven RCTs) or 48 hours (six
RCTs) after surgery; all analyses were subject to statistically significant heterogeneity.

A non-significant trend towards reduced opiate requirements was found favouring use of epidural analgesia, though significant heterogeneity was evident (WMD 10.0mg, 95% CI -1.0 to 21.1; five RCTs; $I^2=87\%$). There were no statistically significant differences between groups for treatment failure (six RCTs) nausea and vomiting (eight RCTs), and for local catheter complications and wound infections (seven RCTs). There was a significantly reduced incidence of urinary retention in the wound catheter group (OR 0.14, 95% CI 0.04 to 0.47, three RCTs; $I^2=53\%$), though significant heterogeneity was present.

Subgroup analyses showed no statistically significant differences in effect estimates according to incision type or protocol of administration (continuous versus bolus).

Authors' conclusions
Within a heterogeneous group of randomised trials, use of local anaesthetic wound infiltration was associated with pain scores comparable to those obtained with epidural analgesia. Further procedure-specific randomised trials including broader measures of recovery are recommended to compare the overall efficacy of epidural and wound infiltration analgesic techniques.

CRD commentary
The review addressed a clear question and was supported by reproducible eligibility criteria. Attempts to identify all relevant studies in any language were undertaken by searching electronic databases and checking references. Suitable methods (for example, independent duplicate processes) were used to reduce the risk of reviewer error and bias throughout the review.

Study quality was assessed using two different methods, but the assessment results were used neither for subgroup/sensitivity analyses, nor for interpreting the reliability of the pooled estimates. Appropriate methods were used to pool data and to assess heterogeneity. Some efforts were made to investigate heterogeneity using subgroup analyses.

The authors' conclusions appear broadly to be a fair reflection of the evidence, though the lack of use of their trial quality assessment results hinders the interpretation of the pooled estimates.

Implications of the review for practice and research
Practice: The authors stated that it was not possible to extrapolate equipoise in pain scores and opiate requirements to suggest equivalence in terms of overall clinical recovery.

Research: The authors stated that future comparisons should take place within standardised enhanced recovery pathways with a focus on specific markers of recovery (mobility, resumption of diet, bowel function, length of hospital stay and systemic complications). Furthermore, homogeneous randomised trials comparing wound catheters and epidurals on a procedure-specific basis were required.

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