Comparative effectiveness of pain management interventions for hip fracture: a systematic review

CRD summary
The review concluded that nerve blockade seemed to be effective in reducing acute pain after hip fracture. Lack of evidence made it difficult to draw firm conclusions about the benefits or harms of many other pain management interventions. These conclusions reflected the evidence presented and are likely to be reliable.

Authors' objectives
To review the benefits and harms of pharmacological and non-pharmacological interventions for managing pain after hip fracture.

Searching
The authors listed 14 bibliographic databases that they searched from January 1990 to December 2010. Conference proceedings databases and trials registries were searched. Selected conference proceedings were handsearched. No language restrictions were imposed. Search terms were reported. Reference lists of relevant articles were screened for additional studies.

Study selection
Randomised controlled trials (RCTs), non-randomised trials, cohort studies and case-control studies of pain management interventions for adults aged 50 or older hospitalised for acute hip fracture were eligible for the review. Interventions could be administered at any point in the care pathway. The main outcomes of interest were acute pain (up to 30 days), chronic pain (up to one year), 30-day mortality and serious adverse events.

Most of the included studies investigated preoperative or intraoperative pain management interventions in acute care settings. Nerve blockade, anaesthesia and traction were the most common types of intervention. Mean age of study participants ranged from 59 to 86 years; 74% were female. Almost half of the included studies excluded participants with cognitive impairment or delirium. Pain was measured using various validated visual and numerical scales.

Two reviewers independently selected studies for the review. Disagreements were resolved by consensus or adjudication by a third reviewer.

Assessment of study quality
Study quality was assessed using the Cochrane Collaboration risk of bias tool for RCTs and non-randomised trials and the Newcastle-Ottawa scale for observational studies.

Two reviewers independently assessed study quality. Disagreements were resolved by consensus or adjudication by a third reviewer.

Data extraction
Odds ratios (ORs) were calculated or extracted for dichotomous outcomes and mean differences were calculated or extracted for continuous outcomes, each with 95% confidence intervals (CIs).

Two reviewers independently extracted data. Disagreements were resolved by consensus or adjudication by a third reviewer.

Methods of synthesis
Where studies were considered sufficiently similar, odds ratios were pooled using the DerSimonian and Laird random-
effects model (or the Peto method for rare events). Pooled standardised or weighted mean differences were calculated for continuous outcomes. Statistical heterogeneity was quantified using $I^2$. Where heterogeneity was substantial ($I^2 > 75\%$) the effect of various modifiers was investigated. Various pre-specified subgroup analyses were performed. Overall strength of evidence for each major outcome was assessed using the GRADE (Grades of Recommendation Assessment, Development and Evaluation) approach and classified as high, moderate, low or insufficient.

**Results of the review**

Eighty-three studies were included in the review: 64 RCTs, five non-randomised trials and 14 cohort studies. The total number of participants was not reported. Sample size ranged from 14 to 1,333 (median 60) participants. Only two RCTs were considered to be at low risk of bias. Methodological quality of the cohort studies was classed as moderate.

Moderate-quality evidence indicated that various types of nerve block were superior to no block for reducing acute pain and delirium (OR for delirium 0.33, 95\% CI 0.16 to 0.66; four RCTs). Based on low-quality evidence, skin traction did not significantly reduce acute pain compared with no traction. Moderate or substantial heterogeneity was present in analyses of both nerve block and traction.

Evidence for most other interventions was considered insufficient to draw firm conclusions. None of the studies assessed effects on chronic pain outcomes.

**Authors' conclusions**

Nerve blockade seemed to be effective in reducing acute pain after hip fracture. Lack of evidence made it difficult to draw firm conclusions about the benefits or harms of many other pain management interventions.

**CRD commentary**

The review question and inclusion criteria were broad but clear. The search covered a wide range of relevant sources. There were no language restrictions and efforts were made to locate unpublished studies, which minimised risks of language and publication biases. Appropriate methods were used to reduce reviewer errors and bias during the review process.

Quality of the included studies was assessed and the results were used in the synthesis. Details of included studies were presented in the full report (see Other Publications of Related Interest). Appropriate methods were used to synthesise the data and assess the overall strength of the evidence.

The authors’ conclusions reflected the evidence presented and are likely to be reliable.

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

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

**Research**: The authors presented a list of minimal scientific criteria to guide future trials on pain management for patients with hip fracture.

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Record Status
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.