Corticosteroid injections for osteoarthritis of the knee: meta-analysis

Arroll B, Goodyear-Smith F

CRD summary
This review assessed the efficacy of intra-articular corticosteroid injections for osteoarthritis of the knee. The authors concluded that the evidence supports short-term (up to 2 weeks) improvement in symptoms after corticosteroids and probable improvement at 16 to 24 weeks. Studies using different outcome measures were pooled and this weakens the evidence.

Authors' objectives
To assess the efficacy of intra-articular corticosteroid injections for osteoarthritis of the knee.

Searching
The Cochrane Controlled Trials Register, and MEDLINE and EMBASE (from inception to 2003), were searched; the search terms were reported. In addition, contact was made with authors and the reference lists of identified studies were checked.

Study selection
Study designs of evaluations included in the review
Randomised placebo-controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies that assessed corticosteroid injections versus placebo were eligible for inclusion. The specific corticosteroids assessed were merticortelone, triamcinolone, methylprednisolone, hydrocortisone, cortivazol, and hydrocortisone acetate in combination with hydrocortisone tertiary-butylacetate. In the included studies, the equivalent dose of prednisone ranged from 6.25 to 80 mg.

Participants included in the review
Studies that included patients with osteoarthritis of the knee were included.

Outcomes assessed in the review
Studies that reported efficacy outcomes were eligible for inclusion. The review assessed improvement. This was defined in the primary studies as distinct improvement, subjective improvement, decreased pain, overall improvement, clinically relevant outcomes, and response on the osteoarthritis research scale.

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

Assessment of study quality
The quality of the primary studies was assessed according to the Jadad scale, which assesses methods of randomisation, blinding, and the reporting of withdrawals and losses to follow-up. Two reviewers independently assessed the quality of the primary studies and reached consensus through discussion.

Data extraction
Two reviewers independently undertook the data extraction. Data were extracted on the number improved in both the intervention and control groups. The relative risk (RR), with 95% confidence intervals (95% CIs), and the number-needed-to-treat (NNT) were then calculated.
Methods of synthesis
How were the studies combined?
Studies reporting data on improvement in symptoms after injection were combined in a meta-analysis, using a fixed-effect model that was weighted according to sample size. The NNT was calculated for these studies. Publication bias was assessed using a funnel plot.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test.

Results of the review
Ten RCTs (n=538) were included.

On the Jadad scale, out of a possible quality score of 5, one study scored 2, five scored 3, and four scored 5.

The meta-analysis (6 RCTS, n=317) showed that intra-articular steroids significantly improved symptoms compared with the control (RR 1.66, 95% CI: 1.37, 2.01). No statistically significant heterogeneity was found (P=0.12). Neither of the two high-quality studies (scoring 5 on the Jadad scale) individually found a statistically significant improvement with intra-articular corticosteroids at 16 to 24 weeks, but the meta-analysis showed a statistically significant improvement compared with the control (RR 2.09, 95% CI: 1.20, 3.65). The NNT was 4.4. Studies reported no important harms other than transient redness and discomfort. No studies reported outcomes for pain 16 weeks after injection. The results for improvement up to 2 weeks were similar for the high-dose studies, as was the effect for improvement at 16 to 24 weeks.

The funnel plot indicated an absence of small studies with small effects.

Authors' conclusions
The evidence supports short-term (up to 2 weeks) improvement in symptoms of osteoarthritis of the knee after intra-articular corticosteroid injection. Significant improvement was also shown in the only methodologically sound studies addressing longer-term response (16 to 24 weeks). A dose equivalent to 50 mg prednisone may be needed to show benefit at 16 to 24 weeks.

CRD commentary
The review question was clearly defined in terms of the interventions and study designs, while inclusion criteria for the outcomes and participants were broadly defined. Several sources were searched for relevant studies, but the authors did not state whether any language restrictions were applied; this raises the possibility of publication bias. It was unclear how many reviewers selected studies for inclusion in the review, and whether any efforts were made to minimise selection bias. Efforts were made to minimise bias and errors in the quality assessment and data extraction processes. Study quality was assessed using established criteria, but the validity and reliability of the methods used to measure the outcomes were not assessed.

There was insufficient information on the included studies to assess whether it was appropriate to combine the studies in a meta-analysis. Ten studies were originally included in the review, but only 6 studies reported adequate data for inclusion in the meta-analysis. The meta-analysis appeared to pool several different definitions of improvement, which may not have been appropriate. The results from the other 4 studies were not discussed in the text. It therefore appears that only the studies that showed a benefit were reported, which would overly inflate the results for any treatment effect. Thus, the authors' conclusions are likely to be biased, and may not be warranted.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.
Funding
New Zealand Accident Rehabilitation and Compensation Insurance Corporation.

Bibliographic details

PubMedID
15039276

DOI
10.1136/bmj.38039.573970.7C

Original Paper URL
http://bmj.bmjournals.com/cgi/content/full/328/7444/869

Other publications of related interest
This additional published commentary may also be of interest. Shoor S. Review: intra-articular corticosteroid injections are better than placebo for improving symptoms of knee osteoarthritis. Evid Based Med 2005;10:23.

Indexing Status
Subject indexing assigned by NLM

MeSH
Adrenal Cortex Hormones /administration & dosage; Controlled Clinical Trials as Topic; Humans; Injections; Middle Aged; Osteoarthritis, Knee /drug therapy; Risk Factors

AccessionNumber
12004008248

Date bibliographic record published
30/09/2005

Date abstract record published
30/09/2005

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.