

Corticosteroid injections for osteoarthritis of the knee: meta-analysis

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Abstract

Objectives To determine the efficacy of intra-articular corticosteroid injections for osteoarthritis of the knee and to identify numbers needed to treat.

Data sources Cochrane controlled trials register, Medline (1966 to 2003), Embase (1980 to 2003), hand searches, and contact with authors.

Inclusion criteria Randomised controlled trial in which the efficacy of intra-articular corticosteroid injections for osteoarthritis of the knee could be ascertained.

Results In high quality studies, the pooled relative risk for improvement in symptoms of osteoarthritis of the knee at 16-24 weeks after intra-articular corticosteroid injections was 2.09 (95% confidence interval 1.2 to 3.7) and the number needed to treat was 4.4. The pooled relative risk for improvement up to two weeks after injections was 1.66 (1.37 to 2.0). In the statistically significant studies the numbers needed to treat to get one improvement was 1.3 to 3.5 patients.

Conclusion Evidence supports short term (up to two 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 (16-24 weeks). A dose equivalent to 50 mg of prednisone may be needed to show benefit at 16-24 weeks.

Introduction

Intra-articular injection of steroid is a common treatment for osteoarthritis of the knee. Clinical evidence indicates that benefit is short lived, usually one to four weeks, although rheumatologists have seen a considerable and sustained response beyond a few weeks.¹

Concerns are that long term treatment could promote joint destruction and tissue atrophy.¹ Studies of cartilage damage, however, suggest that changes are more likely to be due to the underlying disease than the steroid injection.²

We performed a meta-analysis to determine whether intra-articular injections of corticosteroid are more efficacious than placebo in improving the symptoms of osteoarthritis of the knee. We also determined the numbers needed to treat.

Methods

We searched the Cochrane controlled trials register, Medline, and Embase (see bmj.com for search terms). Authors were contacted for details of any further work, and reference lists were scrutinised for relevant papers.

Our selection criterion was randomised placebo controlled trials in which the efficacy of intra-articular corticosteroids for osteoarthritis of the knee, of any duration, could be assessed. We considered improvement as the most important patient oriented outcome. Terms for improvement were distinct improvement, subjective improvement, decreased pain, overall improvement, clinically relevant outcomes, and response to the osteoarthritis research scale.³⁻⁸ Numbers needed to treat were calculated from dichotomous outcomes.⁹

The two authors independently assessed methodological quality, and consensus was reached through discussion.¹⁰ Data extraction was similarly achieved. We calculated the relative risk and number needed to treat for improvement. An a priori subgroup analysis was conducted for study quality, dose of drug, duration of effect, specialty of injector, and condition of the knee. The dose equivalents were obtained from elsewhere.¹¹

Results

Ten trials met the inclusion criteria (see bmj.com for details).^{1 3-8 12-14} Six studies provided showed a significant improvement (relative risk 1.66, 95% confidence interval 1.37 to 2.01; fig 1). For these studies the number needed to treat to obtain one improvement was between 1.3 and 3.5. Only one study investigated potential loss of joint space.¹

Neither of the two high quality studies were statistically significant for improvement at 16 to 24 weeks, but the pooled result gave a relative risk of 2.09 (1.20 to 3.65) with a number needed to treat of 4.4 (fig 2). We found no results for pain 16 weeks after injection. A funnel plot indicated an absence of small studies with small effects.

The result for improvement up to two weeks for the high dose studies was similar. The effect at 16 to 24 weeks was the same as the two high quality studies.

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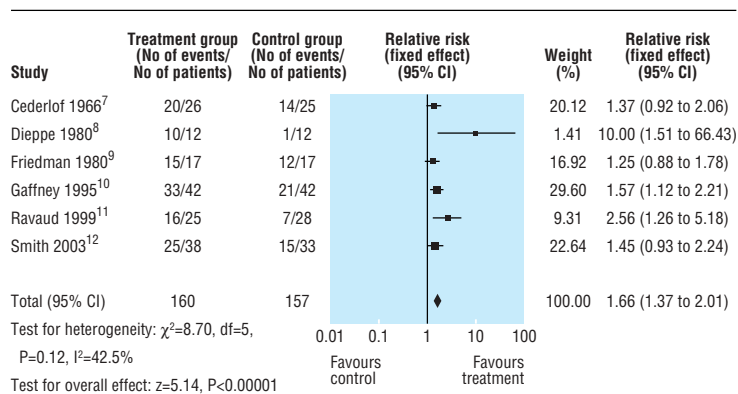


Fig 1 Improvements in symptoms of osteoarthritis up to two weeks after steroid injection in knee

The equivalent prednisone dose varied from 6.25 mg to 80 mg.

Discussion

Intra-articular injections of corticosteroid improve symptoms of osteoarthritis of the knee. Effects were beneficial up to two weeks and at 16 to 24 weeks. We also report clinically significant numbers needed to treat, ranging between 1.3 and 3.5 patients. The one study that investigated potential loss of joint space found no difference between corticosteroid and placebo up to two years.¹ This study also used a higher dose of triamcinolone (40 mg) than most of the other studies (20 mg) and gave repeated injections (every three months for two years).

Although one limitation of our review is possible publication bias, we believe that our comprehensive, systematic search strategy enabled us to identify most research in this discipline. Another limitation was the small size of the included studies.

Unlike other reviews we report improvement in symptoms, as we believe this is a more important patient oriented outcome than are increases in range of movement or pain reduction.¹⁵ We had the benefit of access to an article before its publication.⁸ When this was added to the two high quality studies, the pooled result was statistically significant for these studies.

The dose of corticosteroid required to improve symptoms is not clear. The equivalent dose of prednisone varied from 6.25 mg to 80 mg.^{8,14} A dose of 20 mg triamcinolone (equivalent to 25 mg of prednisone) seems to be efficacious for pain control at two weeks. Only one study used 40 mg triamcinolone, but results at 24 months for night pain and stiffness

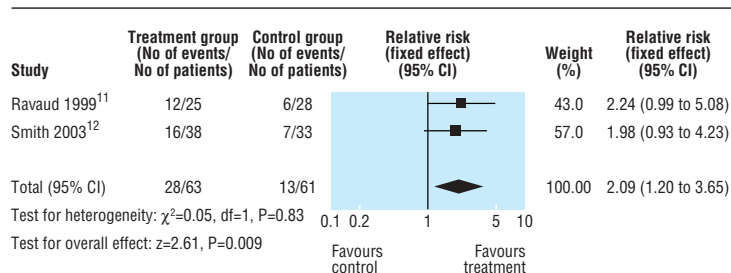


Fig 2 Improvements in symptoms of osteoarthritis at 16-24 weeks after high dose steroid injection in knee for two high quality studies

What is already known on this topic

Intra-articular corticosteroids provide short term (two weeks) relief of symptoms of osteoarthritis of the knee

Concerns are that multiple injections may damage articular cartilage

What this study adds

Intra-articular corticosteroids are probably effective in improving symptoms of osteoarthritis of the knee for 16 to 24 weeks

The number needed to treat to obtain one improvement is 4.4

varied according to the scale used.¹ This study also gave repeated injections and monitored loss of joint space (reporting no difference). The two studies using high doses showed a statistically significant longer benefit.^{1,8}

One study recommended joint lavage combined with steroid injection if a knee effusion persisted after one or two steroid injections eight to 10 days apart.² Joint lavage was either efficacious (at two weeks) or nearly efficacious (efficacious when controlled for severity from radiographic evidence at 24 weeks) for more than 16 weeks.^{7,8}

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