

Review: glucosamine is more effective than selected non-steroidal anti-inflammatory drugs and placebo for reducing pain and more effective than placebo for improving function in patients with osteoarthritis

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QUESTION: Is glucosamine effective for reducing pain and improving function in patients with osteoarthritis?

Data sources

Published and unpublished studies were identified by searching Medline (1966 to November 1999), the Cochrane Controlled Trials Register (to November 1999), and Current Contents (1998–9); searching bibliographies of retrieved papers; and by contacting authors and content experts.

Study selection

English language studies were included if they were single or double blind, randomised controlled trials evaluating the effectiveness or toxicity of glucosamine for osteoarthritis, evaluated ≥ 1 outcome measure in response to treatment, and included patients ≥ 18 years of age with a diagnosis of primary or secondary osteoarthritis at any site. Only studies with suitable quantitative data for pooling were included in the meta-analysis.

Data extraction

Data were extracted on patient characteristics, methods, details about the intervention and control (type of treatment, dose, method of administration, and duration of treatment), outcomes, and adverse effects. Main outcome measures were pain, functional assessments, and toxicity. Study quality was determined using Gotzsche's method.

Main results

16 studies met the selection criteria: 3 studies compared glucosamine with the non-steroidal anti-inflammatory drug (NSAID) ibuprofen and 1 with piroxicam; 13 studies compared glucosamine with placebo. Glucosamine was more effective than NSAIDs and placebo for reducing pain (table). When function was analysed as a continuous outcome, glucosamine was as effective as NSAIDs and placebo for improving function; however, when analysed as a dichotomous outcome (percent of responders who had an improvement in score), glucosamine was more effective than placebo for improving function (table).

Conclusions

Glucosamine is more effective than selected non-steroidal anti-inflammatory drugs and placebo for reducing pain in patients with osteoarthritis. Glucosamine

is more effective than placebo for improving function (when measured as a dichotomous outcome).

*Glucosamine (Glu) v placebo (pl) or selected non-steroidal anti-inflammatory drugs (NSAIDs) in patients with osteoarthritis**

Outcomes	Comparison	Number of studies (number of patients)	Standardised mean difference (95% CI)	
Pain	Glu v NSAIDs	3 (292)	0.86 (0.58 to 1.14)‡	
	Glu v pl	7 (471)	1.40 (0.65 to 2.14)†	
Function	Glu v NSAIDs	2 (364)	0.32 (-0.28 to 0.92)†§	
	Glu v pl	3 (563)	0.63 (-0.04 to 1.29)†§	
		Weighted event rates (number of studies)	RBI (95% CI)	NNT (CI)
Glu v pl		51.8% v 34.2% (2)	52% (20 to 91)‡	6 (4 to 13)‡

*Abbreviations defined in glossary; RBI, NNT, and CI calculated from data in article. Outcomes were analysed using either a random (†) or fixed (‡) effects model. §Not significant.

COMMENTARY

Complementary and alternative medicine (CAM) is a growing area for healthcare consumers, yet research on the effectiveness of various CAM modalities has been limited. This systematic review by Towheed *et al* is one of the few reviews that has looked at the available research on a particular CAM treatment, in this case glucosamine use in osteoarthritis, and has drawn conclusions about its effectiveness.

The authors carefully selected 16 randomised, controlled trials that met strict criteria. In 12 of these trials, glucosamine sulfate was determined to be more effective than placebo or a selected NSAID in promoting pain control or functional ability. However, most studies used the Rotta preparation of glucosamine. It is unknown how these findings might differ if another preparation was used. Additionally, glucosamine has only been compared with the NSAIDs piroxicam and ibuprofen.

The results are relevant to nurses who work with adults with osteoarthritis in any healthcare setting. Staff nurses in hospitals, long term care facilities, and clinics frequently care for individuals with osteoarthritis. Patients with osteoarthritis need to have their pain controlled and function maintained, and glucosamine sulfate is an alternative to NSAIDs for this purpose. The safety profile of glucosamine in the short term is described by the authors of the review as excellent, with only 14 patients of nearly 1000 receiving glucosamine withdrawing from the study because of toxicity. It is a weakness of the review that adverse event data were not provided for the comparison NSAID or placebo groups; however, NSAIDs commonly cause gastrointestinal side effects such as bleeding and ulceration and older adults are at particular risk. The short term side effects of glucosamine are uncommon and include nausea and gastrointestinal distress; however, long term toxicity data are lacking.

Nurse practitioners and other advanced practice nurses might recommend glucosamine sulfate for their patients instead of NSAIDs as a first line drug treatment. According to the findings of this review, glucosamine can decrease pain and improve mobility with minimal side effects in patients with osteoarthritis.

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