

Do calcium supplements increase the risk of cardiovascular events?

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Assess

Madam Chan, a 65-year-old retired staff nurse, walks into my clinic and asks for a refill of her prescription of losartan 50 mg daily and calcium carbonate 1200 mg daily. Her blood pressure is well controlled at 130/80 and she feels well otherwise. Examination and her annual investigation reports reveal no abnormalities.

I remember the news of calcium supplements increasing the risk of cardiovascular events on BBC. Her bone mineral density scan, which was carried out a year ago, was normal. Madam Chan was started on calcium supplements by another doctor 5 years ago.

Ask

Do calcium supplements increase the risk of cardiovascular events?

In PICO format:

Population	Adult (specifically menopausal women)
Intervention	Calcium supplements
Control	No calcium supplements or placebo
Outcome	Cardiovascular events

Acquire

We searched the medical literature using the terms “calcium supplements” and “cardiovascular events” in PubMed Clinical Queries, Trip database, and Cochrane reviews. Cochrane reviews did not address this question. Trip database identified an abstract in DARE (database of abstracts of systematic reviews that have been quality assessed) on the following review¹: Bolland MJ, Avenell A, Baron JA, et al. Effect of calcium supplements on risk of myocardial infarction and cardiovascular events: meta-analysis. (BMJ. 2010;341:10.1136/bmj.c3691). This review was also picked up in PubMed Clinical Queries.

Appraise

The first step is to decide whether the research question of the study fits the PICO for our clinical question. The stated objective in the paper¹ is “To investigate whether calcium supplements increase the risk of cardiovascular events.” This seems to fit our PICO well; so, we shall proceed with appraisal of the review.

Using the FAST criteria:²

Find	Did the review find all the relevant studies?	Terms used should fit. At least 2 databases are required along with a secondary search.	Search terms were appropriate - "calcium", "randomised controlled trial", and "placebo". Three databases were searched, including reference lists of meta-analyses and trial registries.
Appraise	Did they select only good-quality studies?	Inclusion and exclusion criteria should be predetermined and clearly defined. Appraisal methods should be shown.	Clearly defined criteria for selection. Although appraisal was carried out, only summary figures were given, making it difficult to appraise the individual trials.
Synthesis	How was the effect measure pooled?	Was the pooling of results from the different studies appropriately carried out?	Analysis was carried out appropriately on patient-level data as well as on trial-level data.
Transferability	Is the average effect similar across studies?	If not, is it because of biases or PICO is different? If yes, will it be the same in different individuals and which treatment (dosage, brand) should I choose?	Test for heterogeneity was not significant.

Answer

Calcium supplements were associated with about 30% increase in the incidence of myocardial infarction. From the patient-level analysis, it was evident that treatment of 1000 people with calcium for 5 years would cause additional 14 myocardial infarctions, 10 strokes, and 13 deaths, but prevent 26 fractures.

Apply

These results can be applied to Madam Chan as the mean age in the included studies ranged from 51 to 77 years, two-thirds of studies were conducted on women, and supplement types included carbonate, citrate, or lactogluconate-carbonate with doses ranging from 0.6 to 2 g/day.

I explain to Madam Chan that the risk is small but significant. She agrees to stop using calcium supplements. Three months later, she brings her latest bone mineral density results, which show a drop in her T-score. She is worried as there is a family history of osteoporosis. We discuss the issue in detail and come to a conclusion that she should restart taking her calcium supplements but with a lower dose of 600 mg daily and should increase her dietary calcium.

Discussion

As calcium supplements are widely used, even a small risk of increased harm would have substantial effect on the population. The review by Bolland et al. sparked a great debate⁴⁻⁶ over the use of calcium supplements. Although the evidence points to an increased risk of myocardial infarction with calcium supplements, this must be tempered by the patient's own priorities and needs. The practice of evidence-based medicine should be a combination of research evidence, clinical expertise, and patients' values and expectations.⁷

This case report highlights the method used to answer a clinical question using evidence from the medical literature. Clinical Queries in PubMed and Trip database are very useful for finding relevant articles focusing on the clinical question without having to search through a large number of articles. Clinical Queries uses in-built search filters and Trip database was designed as an archive of answers to clinical questions. Cochrane reviews and the DARE databases are also useful for searching systematic reviews to answer clinical questions related to intervention studies.

References

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