Editorial

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Calcium Supplementation in Autoimmune Rheumatic Diseases

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Calcium (Ca) is an essential electrolyte and the most abundant mineral in the human body. Regular calcium intake is crucial to prevent deficiencies [1]. This ion plays multiple physiological roles, primarily in maintaining bone mass. Additionally, it is involved in blood coagulation, muscle contraction, and other vital processes [1].

Several studies have explored calcium supplementation in osteoporosis. It is widely recommended that calcium be obtained through diet and supplements, with meta-analyses confirming its benefits in bone health [2]. However, in the context of autoimmune rheumatic diseases, research on calcium supplementation remains limited, with only a few studies assessing its effects in rheumatoid arthritis (RA).

This brief survey aimed to analyze the existing studies on calcium supplementation in autoimmune rheumatic diseases. A comprehensive literature search was conducted from 1966 to April 2024 without language restrictions. The databases Scielo, PubMed, and Web of Science were used for data collection.

The search identified only three studies, encompassing a total of 917 participants [3–5]. All studies focused exclusively on RA. The mean age of participants ranged from 51.5 $\pm$ 12.2 to 62.3 $\pm$ 6.93 years, with a predominance of females (80.3% to 100%). The mean disease duration varied from 8 to 12 $\pm$ 9.2 years. Calcium supplementation was administered at a dosage of 1000 mg/day orally, and no study reported adverse effects (see Table 1, Ref. [3–5]).

In terms of outcomes, the first study [3] investigated the association between calcium supplementation and mortality. It identified an increased baseline erythrocyte sedimentation rate (ESR) as a predictor of higher all-cause mortality and cardiovascular death among calcium-supplemented individuals. The second study assessed coronary artery calcification using computed tomography. It found that individuals receiving higher calcium supplementation ($\geq$1000 mg/day) had a significantly lower prevalence of baseline coronary artery calcification scores $>$100 units [4]. The third study evaluated the incidence of RA in a large cohort and concluded that calcium combined with vitamin D supplementation did not significantly affect RA incidence [5]. Notably, none of the studies examined the impact of calcium supplementation on RA-related clinical or inflammatory parameters (see Table 1, Ref. [3–5]).

We identified only three studies investigating calcium supplementation in autoimmune rheumatic diseases, all of which focused exclusively on RA. The findings in RA remain inconclusive, with reports of increased mortality, a potential protective effect against coronary artery calcification, and no significant influence on RA incidence. However, there is a notable lack of studies addressing calcium supplementation in other autoimmune rheumatic diseases, such as lupus, myositis, and Sjögren's syndrome. This gap in the literature underscores the need for further research to evaluate the effects of calcium supplementation alongside conventional treatments, particularly regarding its impact on clinical and inflammatory outcomes in a broader spectrum of autoimmune conditions.

Table 1. Studies on calcium supplementation in rheumatic disease.

Author, year, reference	Study design	N	Disease	Age, gender	Disease duration	Calcium dosage	Follow-up	Outcome	Side effects
Provan *et al*., 2017 [3]	Prospective, observational, longitudinal nested cohort study	609	Rheumatoid arthritis	51.5 ± 12.2 yo 80.3% females	12 ± 9.2 years	ND	1996/1997 to 2010	Increased baseline ESR and use of Ca supplementation were predictors of increased all-cause mortality and risk of death from cardiovascular death.	ND
Geraldino-Pardilla *et al*., 2015 [4]	Prospective cohort	145	Rheumatoid arthritis	59 ± 8 yo 86% females	8 (4–17)	>1000 mg/day	39 months	Baseline coronary artery calcification scores >100 units were significantly less frequent in the higher (≥1000 mg/day) supplemental calcium.	ND
Racovan *et al*., 2012 [5]	Randomized placebo-controlled trial	163 incident RA from 32,435	Rheumatoid arthritis	62.32 ± 6.93 yo 100% females	ND	1000 mg calcium carbonate plus 400 IU of vitamin D3 daily or placebo	5.1 years	Ca and vitamin D supplementation did not significantly affect RA incidence.	ND

ESR, erythrocyte sedimentation rate; N, number; ND, not described; yo, years old; Ca, Calcium; RA, rheumatoid arthritis.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article.

Author Contributions

CMDS: analysis, critical revision. EGBF: analysis, critical revision. ATAM: analysis, critical revision. JFDC: conception, analysis, writing, interpretation, revision, submission. All authors have read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

The authors declare no conflict of interest. Jozélio Freire de Carvalho is serving as one of the Editorial Board members of this journal. We declare that Jozélio Freire de Carvalho had no involvement in the peer review of this article and has no access to information regarding its peer review.

References

[1] Li K, Wang XF, Li DY, Chen YC, Zhao LJ, Liu XG, *et al*. The good, the bad, and the ugly of calcium supplementation: a review of calcium intake on human health. Clinical Interventions in Aging. 2018; 13: 2443–2452. https://doi.org/10.2147/CIA.S157523.

[2] Shea B, Wells G, Cranney A, Zytaruk N, Robinson V, Griffith L, *et al*. Meta-analyses of therapies for postmenopausal osteoporosis. VII. Meta-analysis of calcium supplementation for the prevention of postmenopausal osteoporosis. Endocrine Reviews. 2002; 23: 552–559. https://doi.org/10.1210/er.2001-7002.

[3] Provan SA, Olsen IC, Austad C, Haugeberg G, Kvien TK, Uhlig T. Calcium supplementation and inflammation increase mortality in rheumatoid arthritis: A 15-year cohort study in 609 patients from the Oslo Rheumatoid Arthritis Register. Seminars in Arthritis and Rheumatism. 2017; 46: 411–417. https://doi.org/10.1016/j.semarthrit.2016.07.011.

[4] Geraldino-Pardilla L, Dhaduvai S, Giles JT, Bathon JM. Lack of association of oral calcium supplementation with coronary artery calcification in rheumatoid arthritis. Arthritis & Rheumatology (Hoboken, N.J.). 2015; 67: 1465–1473. https://doi.org/10.1002/art.39100.

[5] Racovan M, Walitt B, Collins CE, Pettinger M, Parks CG, Shikany JM, *et al*. Calcium and vitamin D supplementation and incident rheumatoid arthritis: the Women's Health Initiative Calcium plus Vitamin D trial. Rheumatology International. 2012; 32: 3823–3830. https://doi.org/10.1007/s00296-011-2268-1.