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Original article

Omega-3 fatty acids, inflammatory status and biochemical markers of patients with systemic lupus erythematosus: a pilot study☆

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ABSTRACT

Background: Studies have shown that omega-3 fatty acids reduce the concentrations of eicosanoids, cytokines, chemokines, C-reactive protein (CRP) and other inflammatory mediators.

Objective: To investigate the effects of omega-3 fatty acids on circulating levels of inflammatory mediators and biochemical markers in women with systemic lupus erythematosus (SLE).

Methods: Experimental clinical study (clinical trial: NCT02524795); 49 women with SLE (ACR1982/1997) were randomized: 22 to the omega-3 group (daily intake of 1080 mg EPA + 200 mg DHA, for 12 weeks) and 27 to the control group. The inflammatory mediators and biochemical markers at T0 and T1 in omega-3 group were compared using Wilcoxon test. *U*-Mann–Whitney test was used to compare variations of measured variables [ΔV = pre-treatment (T0) – post-treatment (T1) concentrations] between groups. $p < 0.05$ was considered significant.

Results: The median (interquartile range – IQR) of age was 37 (29–48) years old, of disease duration was 7 (4–13) years, and of SLEDAI-2K was 1 (0–2). The median (IQR) of variation in CRP levels between the two groups showed a decrease in omega-3 group while there was an increase in control group ($p = 0.008$). The serum concentrations of IL-6 and IL-10, leptin and adiponectin did not change after a 12 week treatment.

Conclusions: Supplementation with omega-3 had no impact on serum concentrations of IL-6, IL-10, leptin and adiponectin in women with SLE and low disease activity. There was a

☆ Study conducted at Unidade de Reumatologia, Hospital das Clínicas; Faculdade de Medicina, Departamentos de Sistema Locomotor, Cirurgia e Medicina Interna, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.

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significant decrease of CRP levels as well as evidence that omega-3 may impact total and LDL-cholesterol.

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Ácidos graxos ômega-3, estado inflamatório e marcadores bioquímicos de pacientes com lúpus eritematoso sistêmico: estudo piloto

Palavras-chave:
Ômega-3
Citocinas
Adipocinas
Proteína C-reativa
Lúpus eritematoso sistêmico

RESUMO

Introdução: Estudos têm mostrado que os ácidos graxos ômega-3 reduzem as concentrações séricas de eicosanoides, citocinas, quimiocinas, proteína C-reativa (PCR) e outros mediadores inflamatórios.

Objetivo: Investigar os efeitos dos ácidos graxos ômega-3 sobre os níveis circulantes de mediadores inflamatórios e marcadores bioquímicos em mulheres com lúpus eritematoso sistêmico (LES).

Métodos: Ensaio clínico randomizado (ensaio clínico: NCT02524795); foram randomizadas 49 mulheres com LES (ACR1982/1997): 22 para o grupo ômega-3 (dose diária de 1.080 mg de EPA + 200 mg de DHA durante 12 semanas) e 27 para o grupo controle. Os mediadores inflamatórios e marcadores bioquímicos em T0 e T1 no grupo ômega-3 foram comparados pelo teste de Wilcoxon. O teste U de Mann–Whitney foi usado para comparar variações das variáveis mensuradas [ΔV = concentrações pré-tratamento (T0) – concentrações pós-tratamento (T1)] entre os grupos. Um $p < 0,05$ foi considerado significativo.

Resultados: A mediana (intervalo interquartil – IIQ) da idade foi de 37 anos (29 - 48), a duração da doença foi de sete anos (4 - 13) anos e o *Systemic Lupus Disease Activity Index* (SLEDAI-2K) foi de 1 (0 - 2). A mediana (IIQ) da variação nos níveis de PCR entre os dois grupos mostrou um decréscimo no grupo ômega-3, enquanto houve um aumento no grupo controle ($p = 0,008$). As concentrações séricas de IL-6 e IL-10, leptina e adiponectina não se alteraram após um tratamento de 12 semanas.

Conclusões: A suplementação de ômega-3 não teve impacto sobre as concentrações séricas de IL-6, IL-10, leptina e adiponectina em mulheres com LES e baixa atividade da doença. Houve uma diminuição significativa nos níveis de PCR, bem como evidências de que o ômega-3 pode impactar sobre o colesterol total e LDL.

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Introduction

Omega-3 fatty acids have been considered antiinflammatory lipids based on epidemiological studies of Greenland Eskimos, whose diet is rich in polyunsaturated fatty acids from fish. The prevalence of diseases with an inflammatory component such as acute myocardial infarction, diabetes mellitus, multiple sclerosis, asthma and thyrotoxicosis, was lower in the Eskimos compared to Western countries populations.[1]

Fatty acids of the omega-3 family [mainly the α-linolenic acid, eicosapentaenoic (EPA) and docosahexaenoic (DHA)], as well as those of the omega-6 family [represented mainly by linoleic acid and arachidonic acid (AA)] are essential for the synthesis of eicosanoids, prostaglandins, leukotrienes, thromboxanes and other oxidative factors, major mediators and regulators of inflammation.[2,3] Studies have shown that omega-3 fatty acids control inflammation by reducing C-reactive protein (CRP), eicosanoid proinflammatory cytokines, chemokines and other inflammatory mediators.[4–7] Furthermore, they present beneficial effects in the prevention and control of cardiovascular diseases, dyslipidemia and diabetes mellitus.[8–13]

Systemic lupus erythematosus (SLE) is an inflammatory autoimmune disease characterized by loss of cellular immune regulation balance and increased levels of circulating inflammatory mediators.[14] Thus, omega-3 supplementation could represent additional therapy for individuals with SLE. However, little is known on the role of these fatty acids in patients with SLE, including the effects on inflammatory cytokine concentrations and on disease activity.

The aim of this study was to investigate the effects of omega-3 fatty acids on circulating levels of inflammatory mediators and biochemical markers in women with SLE.

Patients and methods

This is a clinical trial of the use of omega-3-polyunsaturated fatty acids in SLE patients followed at the Rheumatology Unit of Hospital das Clínicas, Universidade Federal de Minas Gerais, UFMG (clinical trial: NCT02524795). The Research Ethics

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