

Does Lipoic Acid Consumption Affect the Cytokine Profile in Multiple Sclerosis Patients: A Double-Blind, Placebo-Controlled, Randomized Clinical Trial

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Key Words

Lipoic acid · Multiple sclerosis · Cytokine profile · Inflammatory factors

Abstract

Background: A limited amount of data exists regarding the effect of lipoic acid (LA), an oral antioxidant supplement, on cytokine profiles among multiple sclerosis (MS) patients. **Objective:** We aimed to assess the effect of daily consumption of LA on the cytokine profiles in MS patients. **Methods:** In this double-blind, placebo-controlled, randomized clinical trial, 52 relapsing-remitting MS patients with an age range of 18–50 years were recruited into 2 groups: LA consumption (1,200 mg/day) or placebo. Patients followed their prescribed supplements for 12 weeks. Fasting blood samples for cytokine profile measurement were collected at baseline and after the intervention. Anthropometric parameters were measured based on the standard guidelines. **Results:** INF- γ , ICAM-1, TGF- β and IL-4 were significantly reduced in the LA group compared to the placebo group [(INF- γ : 0.82 ± 0.2 vs. 0.2 ± 0.2 pg/ml, $p < 0.0001$), (ICAM-1: 20.2 ± 9.4 vs. 8 ± 10 ng/ml, $p = 0.0001$), (TGF- β : 103.1 ± 20.2 vs. 54.9 ± 26 ng/ml, $p <$

0.0001) and (IL-4: 0.1 ± 0.1 vs. 1.02 ± 1.7 ng/ml, $p = 0.0112$)]. No significant changes in TNF- α , IL-6, EDSS and MMP-9 were found between the LA and placebo groups ($p = 0.6$, $p = 0.8$, $p = 0.09$ and $p = 0.8$, respectively). **Conclusion:** The results suggested that consumption of 1,200 mg LA per day beneficially affects several inflammatory cytokines including INF- γ , ICAM-1 TGF- β and IL-4. Further investigations are needed to verify the beneficial role of LA on other cytokine profiles among MS patients.

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Introduction

Multiple sclerosis (MS) is a chronic disabling autoimmune and demyelination disease of the central nervous system (CNS) [1, 2]. High levels of proinflammatory factors, the increasing production of free radicals and oxidative stress in CNS are related to the pathogenesis of this disease [3]. It seems that both genetic and environmental factors play an important role in the incidence and development of MS [4–6]. The prevalence of MS has increased globally [7, 8]. Recent evidence points to a high and in-