

An Adult with Atopic Dermatitis and Repeated Short-term Fasting

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Abstract It has been reported that nutritional stress, such as short-term fasting and long-term energy restriction, has a suppressive effect on allergic dermatitis in experimental animals. Furthermore, clinical study has demonstrated a positive association between weight loss by low-energy diet and improvement in patients with atopic dermatitis. In this report, a 23-year-old female with atopic dermatitis received a treatment of repeated short-term fasting. 24-hour fasting was conducted once a week for a period of 20 weeks. On the fasting day, the amount of energy intake was 200 kcal. No medication was administered during the trial period. Clinical symptoms were evaluated using the Scoring Atopic Dermatitis index, and IgE, lactase dehydrogenase-5, and number of eosinophils were measured. At the end of the trial, body weight was reduced and clinical symptoms improved, whereas no improvements in laboratory findings were shown. For sufficient evidence of the effects of fasting, additional controlled study is needed. *J Physiol Anthropol Appl Human Sci* 22 (5): 237–240, 2003 <http://www.jstage.jst.go.jp/en/>

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inflammation of the skin (Leung, 2000).

With regard to the dietary environment on AD, numerous publications have exclusively focused on the elimination of food antigens such as cow's milk or eggs (Boyano-Martinez et al., 2002; Mattila et al., 2003; Oranje et al., 2002; Sicherer and Sampson, 1999). Alternatively, we conducted a treatment consisting of an energy-restricted diet for patients with AD, and reported that body weight loss by energy restriction was positively associated with improvement of AD (Kouda et al., 2000; Tanaka et al., 2001). We also demonstrated in laboratory animals that long-term moderate dietary restriction suppresses the progression of dermatitis in NC/Nga mice, a model for human AD (Fan et al., 2001). Fasting, defined as the complete restriction of nutrients, is one type of dietary restriction. Previously, we reported that short-term fasting demonstrated suppression of allergic contact dermatitis in ICR mice (Nakamura et al., 2001), and the result was comparable to the result of moderate long-term dietary restriction in NC/Nga mice.

We herein report a case of a human adult with AD who received treatment of repeated 24-hour fasting.

Case

The subject was a 23-year-old woman with a history of AD since the age of 3. She had been treated with topical corticosteroids over the ensuing years, and had failed to respond to prolonged topical steroid treatment at around the age of 17, at which time the application of topical steroids was ceased due to insufficient response. Since that time, her clinical symptoms had been exacerbated during the summer season.

The subject participated in a trial of 24-hour fasting once a week for 20 weeks from May to September. No additional changes in lifestyle or environment were made throughout the study period. On each fasting day, the subject's dietary intake included only soup, tea containing persimmon leaf extract, and water. The subject took the soup, the ingredients of which were 540 ml of hot water, extracts from 10 g of dried tangle and 10 g of dried mushroom, 30–40 g of soy sauce, and 30 g of unrefined

Introduction

Homo sapiens experienced high frequencies of undernutrition and starvation, and adapted to the state of restricted food (Baker, 1988). However, in the modern world, most people living in the advanced nations can easily obtain sufficient food, and there are few or no restrictions on having a meal.

Currently, the prevalence of atopic diseases is on the rise in socio-economically developed communities. Atopy refers to the state of being allergic to common environmental antigens, a disorder promoted by genetic and environmental factors. Atopic diseases are characterized by inadequately restrained Th-2 immune mechanisms and IgE production (Hopkin, 2002). Atopic dermatitis (AD) is one of atopic diseases, and involves

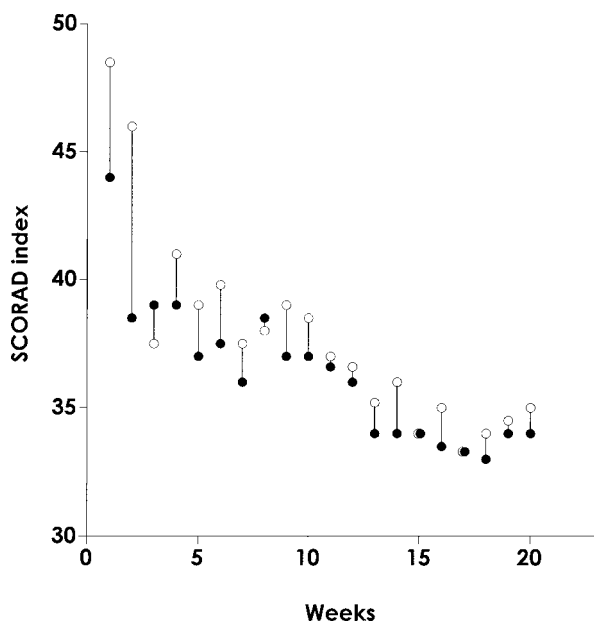


Fig. 1 Effect of repeated 24-hour fasting on female adult subject with atopic dermatitis. Open circle (○) indicates the Scoring Atopic Dermatitis (SCORAD) index evaluated one day before fasting, and closed circle (●) indicates the SCORAD index one day after fasting.

sugar, twice a day. Carbohydrate intake on the day of fasting was 60.8 g, protein 6.4 g, fat 0.0 g, sodium 4.0 g, and potassium 0.9 g. Caloric intake on the fasting day was 200 kcal, which is 11% of the recommended dietary allowance for a female of the size of the subject. The subject was allowed water and tea ad libitum. There were no changes in lifestyle and environment excepting dietary intake on the fasting days. On all other days during the study period, the subject ate ordinary meal. Before participation, the subject was explained about the content and significance of this trial and gave informed consent. She received care in compliance with the ethical guidelines of the Declaration of Helsinki.

One day before and after the fasting, clinical symptoms of AD were evaluated using the Scoring Atopic Dermatitis (SCORAD) index, which combines the extent and intensity of lesions, and subjective symptoms (European Task Force on Atopic Dermatitis, 1993). A blood sample was collected before and after the trial, and IgE, lactate dehydrogenase-5 (LDH-5), and number of eosinophils were measured.

At the beginning of the trial, the height, weight, and body mass index (BMI) of the subject were 155.0 cm, 48.0 kg, and 20.0 kg/m², respectively. Clinical examination revealed severe AD with generalized infiltrated lesions, lichenification, and excoriation. IgE was 214 IU/ml, LDH-5 was 14.5 IU/L, and number of eosinophils was 280/μL. SCORAD index was 48.5.

During the trial, the SCORAD index was improved after each fasting period (Fig. 1). Subjective symptoms, such as daytime pruritus and sleep loss, remarkably improved.

At the end of the trial, the height, weight, and BMI of the subject were 155.0 cm, 45.0 kg, and 18.7, respectively.

Infiltrated lesions, lichenification, and excoriation were alleviated. IgE was 1201 IU/ml, LDH-5 was 22.9 IU/L, and number of eosinophils was 729/μL. SCORAD index decreased to 33.8, reflective of the fact that mainly the extent of lesions and subjective symptoms had decreased. The subject's condition has remained stable without topical corticosteroid treatment during and after this trial.

Discussion

Dietary restriction is well acknowledged to prolong lifespan and prevent several diseases in experimental animals (Weindruch and Walford, 1988; Yu, 1996). Dietary restriction has also been demonstrated to attenuate the inflammatory state (Kari et al., 1997; Klebanov et al., 1995; Perkins et al., 1998). In clinical study, Lithell et al. (1983) reported 3 cases with AD that were improved by a low-calorie vegetarian diet. Recently, we offered a low-energy diet to 19 adults with AD, and found that improved SCORAD index accompanied reduction of oxidative DNA damage. In addition, a relationship between weight loss with energy restriction and clinical improvement of AD was shown. Thus, we hypothesized that energy restriction suppresses the allergic reaction (Kouda et al., 2000; Tanaka et al., 2001). This suppressive effect on allergic reaction was confirmed using an experimental animal model for human AD, NC/Nga mice, which underwent long-term moderate dietary restriction (Fan et al., 2001).

Short-term fasting, constituted by a complete restriction of diet, is one method of dietary restriction. Previously, we demonstrated the suppressive effect of short-term fasting on allergic contact dermatitis in experimental animals (Nakamura et al., 2001). However, there are few clinical reports on the effect of fasting on allergic diseases.

In the present study, repeated short-term fasting was administered to a subject with AD. As a result, the subject experienced improvement in clinical symptoms throughout the study period (May to September), whereas she had previously experienced exacerbation of clinical symptoms during the summer season. The extent of lesions and subjective symptoms were improved, and were accompanied by reduction in body weight. These results are consistent with findings from a previous trial investigating the effect on AD of dietary restriction (Kouda et al., 2000; Tanaka et al., 2001).

The precise mechanism of influence of nutritional stress on allergic dermatitis is still unclear. We previously reported that Nc/Nga mice under the condition of dietary restriction showed suppressed dermal staining for inflammatory cytokines (IL-4 and IL-5) (Fan et al., 2001). Fasting has also been reported to affect immune variables such as T cell subsets and NK cell activity, at least in part through changes in adrenal gland-related hormones (Komaki et al., 1988). In addition, fasting has also been reported to increase serum corticosteroid (Ahima et al., 1996; Brady et al., 1990; Faggioni et al., 2000). These endocrinologic or immunologic changes or interrelationships among various responses resulting from nutritional stress may

be involved.

Man is adapted to his traditional nutrient environment. Previous studies on earlier hominids have shown that most of their food came from non-meat sources, and that the teeth and jaw structures of early hominids indicate a predominantly vegetarian diet. Further, throughout the course of history homo sapiens have experienced high frequencies of deficiency of some nutrients (Baker, 1988). However, most people living in relatively developed countries are generally able to obtain a sufficient amount and variety of food. Thus, there is the discrepancy between the traditional environment man has adapted and the environment in modern society (Katsuura and Yasukouchi, 2000), which raises the possibility of a rise in prevalence of allergic diseases.

In this report, we present a case of an adult female with atopic dermatitis that was clinically improved by repeated short-term fasting for 20 weeks. However, this result cannot conclusively confirm the suppressive effect of short-term fasting on AD. For sufficient evidence of the effects of short-term fasting on AD, a controlled trial is needed.

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