The Influence of Fast and Vegetarian Diet on Parameters of Nutritional Status in Patients with Rheumatoid Arthritis

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Summary Nutritional status was studied over a period of 13 months in 34 patients with rheumatoid arthritis (RA). Seventeen patients fasted for 7-10 days, were then transferred to a gluten-free vegan diet for 3.5 months and finally to a lactovegetarian diet for 9 months. The remaining 17 patients followed a “normal” diet. After one month, the values for body mass index (BMI) and triceps skinfold thickness (TSF) were significantly reduced in the diet group compared with the values at inclusion (p<0.001), whereas upper arm muscle area (UAMA) was not significantly reduced. Evaluation of the whole study course revealed a significantly lower BMI (p=0.04) and TSF (p<0.01) in the diet group compared with the control group. The concentration of insulin-like growth factor 1 (IGF1) was significantly reduced in the diet group after one month compared with the value at inclusion (p=0.01), but the overall difference between the two groups was not significant. There were no overall significant differences with regard to VAMA, concentration of serum albumin, haemoglobin, ferritin, zinc and copper between the two groups. Thus fast, followed by diet manipulations for one year, had a minor impact on nutritional status in patients with RA.

Key words Rheumatoid Arthritis, Nutritional Status, IGF1, Trace Elements, Diet Manipulations.

INTRODUCTION

Poor nutritional status has been reported in patients with rheumatoid arthritis (RA), (1,2) as well as in patients with juvenile rheumatoid arthritis (JRA) (3-5). This has been attributed to the release of phlogistic agents such as interleukin 1 and tumour necrosis factor alpha from mononuclear phagocytes (6,7). An increased pool of amino acids are used for synthesis of acute phase reactants, and the amino acids are also available for gluconeogenesis. Hence, the inflammatory process alters amino acid metabolism which in turn will affect body muscle mass and the serum concentration of albumin and other parameters used to assess nutritional status (1). It seems most likely that this is the main reason for impaired nutritional status in patients with RA, since food and nutrient intake in patients with RA and JRA has been found to be similar to that in control groups (5,8-10).

Studies have shown that fast (11-13) and also dietary manipulation (14,15) can reduce disease activity in patients with RA. It has been hypothesized that the improvement seen after fasting is attributed to normalization of the immune system such as an increase of the suppressor cell activity has been reported (12,13). Furthermore, it has been hypothesized that the stress of a fast would increase the production of cortisol, but the increase of cortisol in serum has not been found significant until after 10 days of fast (16). It has also been suggested that a reduced intake of protein and tryptophan could cause improvement in the clinical state with a drop in sedimentation rate and plasma fibrinogen (17). In a 13-month study we found a significant reduction of both subjective as well as objective parameters reflecting disease activity in patients with RA (18).
The treatment consisted of a 7-10 day fast, followed by an individually adjusted gluten-free vegan diet for 3.5 months and ending in an individually adjusted lactovegetarian diet for the remaining 9 months. Besides energy and protein deficit during the fasting period, a reduced intake of energy and protein could also be expected during the vegan and the lactovegetarian diet periods (19). The aim of the present study was to evaluate the impact of low energy and protein intake on the nutritional status in patients with RA.

MATERIALS AND METHODS

Study design

The study was a prospective, randomized, single-blind, clinical trial designed to assess the effect of a 4-week health farm program, followed by an individually adjusted vegetarian diet for one year (18). The patients were randomized to either a diet group or a control group (20). The study was approved by the regional scientific ethical committee.

Patients

Fifty-three omnivorous patients with RA were enrolled in the study (45 females and 8 males). All patients satisfied the criteria of the American Rheumatism Association for classical or definite RA (21). All patients had active disease. Twenty-seven patients were allocated to the diet group and 26 to the control group. Due to problems with the interpretation of the dietary data in patients who were prematurely withdrawn from the study, this report includes the data from the patients who completed the study, i.e., 17 patients in the diet group (2 males and 15 females) and 17 patients in the control group (3 males and 14 females). The median age of the diet group was 50 years (range 30-63), and in the control group 57 years (range 38-78). Median disease duration was 6 years (1-32) in the diet group and 11 years (1-31) in the control group. The data from the premature withdrawals are addressed separately.

Treatment

The patients in the diet group started with a 4-week health farm stay which was initiated with a fast of 7-10 days. The fast was interrupted if the weight reduction exceeded 10% of the body weight. Dietary intake during the fast consisted of herb teas (a teaspoon of honey was allowed, in case of low blood-sugar), garlic, vegetable broths, decoction of potatoes and parsley and vegetable juices of carrots, beets and celery. No fruit juices were allowed. Thereafter the patients reintroduced a “new” food item every 2nd day, but kept a strict gluten-free vegan diet (a diet without dairy products, meat and fish) during the following 3.5 months (Table I). During this diet period the patients had either to drink milk made of sesame seeds or to take calcium supplementation. After 3.5 months on this very strict vegan diet, a more liberal lactovegetarian diet (a diet without meat and fish) was instituted (Table I).

The patients in the control group had a 4-week stay in a convalescent home. The patients were instructed to live as normal as possible with regard to food intake and were not given any dietary instructions, except for two patients who were given low fat diet guidelines, because of elevated serum cholesterol.

Anthropometric measurements

Weight (wt), height (h), upper arm circumference (UAC) and triceps skinfold-thickness (TSF) were measured by the same physician (JKK) at the beginning of the study, after the 4-week stay in the health farm/convalescent home and every three months thereafter (18). A Harpenden calipermeter (10g/mm²) was used for skinfold measurements and the median of 3 determinations was used in the calculations. Body mass index (BMI) and upper arm muscle circumference (UAMC) were calculated according to the following formulas: BMI = wt/h² and UAMC = UAC-π·TSF/2. UAMC was used to calculate upper arm muscle area (UAMA) (22), using corrected equations according to Heymsfield:

$$UAMA_{(men)} = UAMC^2/4\pi - 10$$
$$UAMA_{(women)} = UAMC^2/4\pi - 6.5$$

Blood analyses

Venous peripheral blood samples were collected before the morning meal, between 0800 and 1000 a.m.. The concentration of haemoglobin, albumin, copper and zinc were analyzed immediately. Serum samples were frozen (-20°C) for subsequent analyses of ferritin and insulin-like growth factor 1 (IGF1) and plasma frozen (-70°C) for analyses of tryptophan. Serum copper and zinc were measured by atomic absorption spectrophotometry. Tryptophan concentration was measured in platelet rich plasma using the method described by Larsson et al. (23) and IGF1 was analyzed by radioimmunoassay (24).