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ORIGINAL ARTICLE

Nutritional supplementation and dietary advice in geriatric patients at risk of malnutrition ☆

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Summary
Background & Aim: Effects of combined nutritional treatment of patients at risk of protein-energy malnutrition (PEM) discharged from a geriatric service were evaluated.
Methods: Patients ($n = 108$, age 85 ± 6 years) at risk of malnutrition according to the short form of the mini nutritional assessment were randomly allocated to dietary counseling, including liquid and multivitamin supplementation, i.e. intervention (I, $n = 51$) and to controls (C, $n = 57$). Body weight, biochemical indices (e.g. insulin-like growth factor I (IGF-I)), Katz activities of daily living (ADL) index, mini mental status examination (MMSE) and quality of life (QoL) by SF-36 were assessed at the start of the study and after 4 months. Statistical analyses were performed on "intention-to-treat" and on "treated-as-protocol" bases.
Results: Fifty-four patients, 29 in the I-group (86 ± 7 years, 66% females) and 25 in the C-group (85 ± 7 years, 72% females) completed the study according to the protocol. Both modes of analysis revealed a significant positive effect of the combined nutritional intervention on weight maintenance. Treated-as-protocol analyses showed that Katz ADL index improved in the I-group ($p < 0.001$; $p < 0.05$ between the groups). Serum IGF-I levels

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increased in the I-group ($p<0.001$), but were unchanged in the C-group ($p = 0.07$ between the groups). QoL was assessed to be low and had not changed after nutritional treatment.
Conclusions: Combined nutritional intervention prevented weight loss and improved ADL functions in discharged geriatric patients at risk of malnutrition.

Introduction

Protein-energy malnutrition (PEM) is a common occurrence in geriatric patients.[1–3] In line with several studies,[4,5] we have reported that PEM, according to the mini nutritional assessment (MNA), is associated with a two-fold risk of long-term mortality in geriatric patients.[2] PEM in old age may be a reversible condition if given the right treatment. Recent meta-analyses suggest that oral nutritional treatment of elderly people who are at risk of malnutrition may reduce mortality[6,7] and complications,[8] especially in hospitalized subjects.[8] However, the effects on elderly residing at home and on functional outcome measures such as activity of daily living (ADL) are still unclear. PEM in itself and treatment of PEM affect blood lipids and vitamin status, e.g. the vitamin B complex. Serum levels of such biochemical markers may indicate risk for cardiovascular events and cognitive dysfunction.[9,10]

The aim of this study was to assess the effects of combined nutrition intervention, i.e. dietary counseling, liquid and vitamin supplementation on weight, ADL functions, quality of life (QoL) assessment and biochemical indices in geriatric patients at risk of malnutrition, after discharge from hospital.

Materials and methods

Patients admitted to two wards at the Department of Geriatric Medicine at Rosenlund Hospital, Stockholm, were considered for participation in the study. One ward mainly treated elderly adults after trauma with or without fracture; the other ward mainly took care of acutely ill elderly patients with various somatic disorders. Data were collected between January 1999 and June 2000. Three hundred and sixty-four consecutive patients had their nutritional status assessed by a short form of the mini nutritional assessment (MNA-SF,[11] see below) within 3 days of admission. Only patients with risk of PEM were asked to participate in the study. Patients with malignant disorders, terminal illness or with severe cognitive dysfunction were excluded.

Study design and intervention protocol

Random allocation to either the intervention group or to the control group was performed by drawing files from a sealed box. The open intervention consisted of two individualized counseling sessions by a dietician—once before discharge and then at home within 1 week of discharge. The dietician also had telephone contact at three time points: 1–2 weeks after discharge, once in the middle of the study period and one week before follow-up. The patients were advised to increase their intake of fat by using full-fat milk instead of low-fat milk, cream and creme fraiche in their cooking and to eat more snacks between meals. They were also prescribed a liquid supplement (Semper®, 200 ml/package). Patients could choose between a complete or an incomplete formula corresponding to 85 or 120 kcal, respectively, and 4 or 5 g protein/100 ml (Table 1). The patients were encouraged to take 1–2 packages/day and they were also prescribed a daily multivitamin supplement: Friggs®. For nutrient content, see Table 1. Compliance with the prescription, i.e. how many of the prescribed packages that had been consumed, was recorded at all five contacts with the dietician. The control group was given brief written dietary advice. The follow-up examination was planned at 4 months after the start of the study.

Nutritional assessment

Nutritional status was assessed by MNA-SF.[11] MNA-SF consists of six items taken from the full MNA formula[12]: body mass index (BMI), appetite, weight loss, mobility, current illness and neuropsychological problems. Each item gives a score of 0–2 or 3 points, and the total score ranges from 0 (worst) to 14 (best). A total score of $\leqslant 10$ points was selected as a cut-off point for being considered as at risk of having malnutrition, and only patients with an MNA$\leqslant 10$ points were enrolled.

The BMI (kg/m^2) was calculated after the patients were weighed with a chair scale, and their standing height was measured with an unstretchable measuring tape. When they were not able to stand, their height was measured lying in a stretched position on a bed.

The biochemical nutritional indicator insulin-like growth factor I (IGF-I) was determined by a radio immunoassay (RIA) after serum had been acid–ethanol extracted and cryoprecipitated.[13] Serum levels of IGF-binding protein-1 (IGFBP-1) were determined according to Povoa et al.[14] The bioavailability of the anabolic mediator IGF-I depends on the serum levels of IGFBP-1; thus, a ratio of IGF-I/IGFBP-1 was calculated. A ratio of <5 was chosen as indicating a catabolic state.[15] The IGF-I values were also expressed as