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Disease-related malnutrition in outpatients with systemic sclerosis

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SUMMARY

Background & aim: Disease-related malnutrition is known to negatively affect clinical outcomes. The aim of the present study was to evaluate the prevalence of malnutrition in a cohort of outpatients affected by Systemic Sclerosis (SSc) and its association with clinical variables.
Methods: One hundred sixty SSc patients were consecutively evaluated. The following clinical variables were assessed: disease duration, activity and severity, treatments, functional status, gastrointestinal involvement. Nutritional assessment included: body mass index (BMI), weight loss (WL) history, nutritional intakes and serum prealbumin. Malnutrition was defined as BMI <20 kg/m^2 and/or previous 6-month WL $\geq 10\%$.
Results: Prevalence of malnutrition was 15% (10–21%). Logistic regression showed that malnutrition was independently associated with disease activity (OR 3.72; $p < 0.001$) and low serum prealbumin (OR 8.58; $p < 0.001$). The association with gastrointestinal involvement was not statistically significant, although a trend was detected (OR 1.88).
Conclusion: Malnutrition is common in SSc outpatients. It appears associated with disease activity and not influenced by nutritional intakes; gastrointestinal involvement might contribute to its development over time. Serum prealbumin could be an early marker of malnutrition in SSc, whose role should be confirmed by further longitudinal investigations. Prospective studies are also required to clarify the clinical significance of the association between malnutrition and disease activity in SSc.

1. Introduction

Disease-related malnutrition was reported to negatively affect patient's outcome in every healthcare setting. Chronic diseases associated with systemic inflammatory response have been frequently associated with malnutrition. Moreover, direct disease's involvement of the gastro-intestinal tract can significantly contribute to nutritional status deterioration.[1–3] Systemic sclerosis (SSc) often affects the gastro-intestinal tract.[4] Esophageal dysfunction is present in about 85% of patients with SSc.[5] Motility disturbances and lower esophageal sphincter dysfunction are common features possibly resulting in gastro-esophageal reflux, dysphagia, vomiting, regurgitation, esophagitis or stricture.[4,6] In the small intestine, bacterial overgrowth due to luminal content stasis or decreased permeability secondary to intestinal fibrosis, may cause malabsorption.[7,8] Functional derangements in SSc may also bring to a reduced food intake and overt malnutrition has been reported.[4,9,10] Nutritional assessment in patients with SSc has been considered in small case series.[10,11] The results from the first large-scale survey have been recently provided by Baron et al., who reported that moderate risk of malnutrition is associated with shorter disease duration, markers of gastrointestinal involvement and physician global assessment of disease severity.[12] A further focus has been also provided by Krause et al., who demonstrated that body composition derangements are significantly associated with disease activity and mortality.[13] Accordingly, further studies are required in order to deepen the knowledge about the role of nutritional status in SSc.

The aim of the present study was to evaluate the prevalence of malnutrition and investigate its association with the clinical features of the disease in a sample of SSc outpatients.

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2. Materials and methods

2.1. Study design

We designed a single-center cohort study of outpatients affected by SSc. The protocol was reviewed and approved by the local Institutional Ethics Committee. A cross-sectional analysis of baseline visit data was the object of the present study.

2.2. Subjects

All patients with SSc, as classified by Le Roy,[14] consecutively observed from February 2007 to September 2008 at the outpatient clinic of the Rheumatology Unit of the Research Hospital Fondazione IRCCS Policlinico San Matteo (Pavia, Italy) were eligible for study inclusion. Exclusion criteria were the absence of written informed consent and age <18 years. No restriction on the basis of drug treatment at the time of assessments or past therapy was considered.

2.3. Measurements

All patients underwent a complete clinical and nutritional assessment. For each participant all the evaluations were performed on the same day.

2.4. Clinical assessment

Clinical assessment included several issues such as:

- Demography: sex and age.
- Disease duration has been defined as the time since first non-Raynaud's phenomenon disease-related symptom.
- Medical history: age of disease's onset, presence of Raynaud's phenomenon, comorbidities, previous and current therapy.
- Physical examination.
- Disease subset: the kind of subset (limited/diffuse) was established on the basis of the extent of skin involvement.[15]
- Modified Rodnan Skin Score (mRSS): 17 body areas were examined through clinical palpation and scored on a 4-point ordinal scale by the examiner, according to skin thickness (scale range 0–51, from no skin thickening to severe involvement in all body areas).[16]
- Disease activity according to the criteria by Valentini et al.[16] Active disease was defined as a score ≥3.
- General disease severity according to the criteria by Medsger et al.[17]
- Auto-antibodies profile (anti-centromere, anti-topo-I or other).
- Gastro-intestinal symptoms: anorexia, (defined as lack of appetite) dysgeusia, dysphagia, nausea, vomiting (two or more episodes in the week before the examination), diarrhea (three or more acute watery episodes per day in the week before the examination), constipation, regurgitation, pyrosis, early satiety, abdomen swelling and the use of antibiotics for bacterial overgrowth.
- Gastro-intestinal involvement: defined as a severity score ≥1 according to the criteria by Medsger et al.[17] Furthermore, all patients underwent a barium esophagogram in order to collect qualitative information on esophageal motility and morphology.[18]
- Visceral involvement was assessed according to the EULAR Scleroderma Trials and Research group Database (EUSTAR) recommendations.[19]
- Functional disability as assessed through the Health Assessment Questionnaire.[20]
- Full investigation of the autoantibody profile.

2.5. Nutritional assessment

Nutritional assessment included the following evaluations:

- Anthropometry: body weight (to the nearest 0.1 kg) was assessed by the same calibrated scale, with the subject fasted and wearing only underwear. Body height (to the nearest 0.1 cm) was measured by the same telescopic stadiometer, with the subject in erect stretched position, the feet well positioned and the head held in the Frankfurt plane. Accordingly, body mass index (BMI) was calculated as weight (kg)/height (m)^2.[21]
- History of 6-month previous unintentional weight loss was obtained by anamnestic recall.
- Biochemistry: 8–12-h fasting venous blood samples were drawn on the same day and assessed for serum prealbumin using an immunonephelometric method (Dade Behring, Marburg, Germany). Reduced serum levels were defined by value <200 mg/L.[22] Energy requirements estimation: resting energy expenditure was estimated using the Harris–Benedict equation.[23] Total daily energy expenditure was calculated by multiplying the resting energy expenditure by a correcting factor of 1.5.
- Dietary intake: quantitative assessment was performed through the completion of a 3-day food diary including 2 non consecutive working days and a week-end day of the week preceding the clinical examination. Food records were initially reviewed for completion and analyzed after clarification for ambiguous information. Quantitative data on macronutrients intakes were obtained using the Italian food composition tables.[24]

Malnutrition was defined by the presence of a BMI <20 kg/m^2 and/or a spontaneous weight loss ≥10% of body weight in the previous 6 months. Despite a BMI less than 18.5 kg/m^2 is usually accepted as a practical limit for undernutrition, a value below 20 kg/m^2 is now widely accepted as underweight in developed countries, due also to the significant association with adverse health outcome in several chronic diseases.[22,26–28]

Energy intakes ≥75% of total daily energy expenditure were considered adequate.[29]

2.6. Statistical analysis

The prevalence of malnutrition was computed together with its exact 95% binomial confidence interval (95%CI). Data were described as mean and standard deviation (SD) or median and 25th–75th percentiles if continuous and as counts and percent if categorical. They were compared between groups of patients with the Student *t* or the Mann Whitney *U* test and the Fisher exact test, respectively. Non collinear variables with a $p < 0.1$ at univariable analysis and caloric intake were included in a multivariable logistic model. Stata 11.1 (StataCorp, College Station, TX, USA) was used for computation. A 2-sided $p < 0.05$ was considered statistically significant.

3. Results

3.1. Clinical and nutritional features

From February 2007 to September 2008, 160 SSc outpatients (87.5% females) were consecutively evaluated.

The demographic, clinical and nutritional features of the population are summarized in Table 1. General disease severity was normal in 75 patients (46.9%), mild in 59 (36.9%), moderate in 24 (15.0%) and severe in 2 (1.2%). Median age and disease duration at