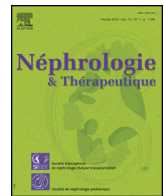




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Original article

Assessing the prevalence of protein-energy wasting in haemodialysis patients: A cross-sectional monocentric study

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ABSTRACT

Introduction. – Protein-energy wasting (PEW) is a strong predictive factor for morbidity and mortality in haemodialysis (HD) patients. However, there is no consensus for its assessment. The present study aimed to assess the nutritional status of patients on chronic HD by use of different nutritional assessment parameters, and at verifying which can identify the greatest number of HD patients with PEW. Also, to investigate predictors of nutritional status in a haemodialysis center in Morocco.

Patients and methods. – This is a cross-sectional analysis performed on 126 patients aged 44.82 ± 14.01 years, undergoing maintenance HD in the Department of nephrology of the university hospital centre of Casablanca, Morocco. Energy and nutrients intake assessment was obtained by a three-day period food recall. Biochemical parameters, bioelectric impedance analysis, and subjective global assessment (SGA), have been performed to assess nutritional status.

Results. – According to SGA the prevalence of PEW was 74.62%. However, when using the ISRMN malnutrition criteria only 36.50% of the patients were diagnosed with PEW. Pearson correlation showed a negative association between the degree of malnutrition evaluated by SGA and serum prealbumin ($r = -0.54$; $P = 0.0001$), serum albumin ($r = -0.50$; $P = 0.001$), energy ($r = -0.34$; $P = 0.002$), protein intake ($r = -0.41$; $P = 0.0001$), and a significant positive correlation with CRP ($r = 0.65$; $P = 0.0001$) was determined, but not with anthropometric measurements nor lipids profile. The areas under the receiver operating characteristic curve were 0.841 (95% CI: 0.751–0.932) for serum prealbumin, and 0.737 (95% CI: 0.634–0.840) for serum albumin.

Conclusion. – Our results showed a high prevalence of PEW among Haemodialysis patients. Also, our findings suggest that SGA, serum albumin and prealbumin may be relative appropriate and practical markers for assessing nutritional status in HD patients.

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1. Abbreviations

BIA	bioelectrical impedance analysis	CRP	C-reactive protein
BMI	body mass index	DEXA	dual-energy X-ray absorptiometry
CKD	chronic kidney disease	ESRD	end-stage renal disease
		HD	haemodialysis
		HDL-C	HDL-cholesterol
		ISRMN	International Society of Renal Nutrition and Metabolism

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LDL-C	LDL-cholesterol
NKF/KDOQI	The National Kidney Foundation and Kidney Disease/ Dialysis Outcomes and Quality Initiative
PEW	protein-energy wasting
PEM	protein-energy malnutrition
SGA	subjective global assessment
TC	total cholesterol
TG	triglycerides

2. Introduction

Protein-energy wasting (PEW) represents one of the most serious complications of chronic kidney disease (CKD) [1] and its consequences, particularly for patients on maintenance dialysis, are devastating in terms of quality of life, morbidity, and mortality [2].

Several designations have been previously used for the syndrome of wasting such as uremic malnutrition, protein-energy malnutrition (PEM), or malnutrition-inflammation complex [3]. Hence, the confusing terminology used to describe the interrelated mechanisms causing wasting, malnutrition and inflammation in patients with CKD led the International Society of Renal Nutrition and Metabolism (ISRNM) to convene an expert panel to reexamine the nomenclature used for the diagnosis of the wasting syndrome, distinct from malnutrition and inflammation [4]. PEW is therefore the new terminology proposed to describe a state of decreased body stores of protein and energy fuels (i.e., body protein and fat mass) [5].

In haemodialysis (HD) patients, various studies using different criteria have been used to establish the presence of PEW and reported that the prevalence varies between 15 and 76%, according to the type of dialysis modality, nutritional assessment tools, and origin of the patient population [6]. Hence, several factors are associated with this high prevalence of malnutrition in HD patients, including recurrent illness, inadequate food intake, hormonal and gastrointestinal disorders, dietary restrictions, drugs that alter nutrient absorption, insufficient dialysis, and constant presence of associated diseases. Furthermore, uremia, acidosis, and HD procedure per se are hypercatabolic and associated with the presence of an inflammatory state and socioeconomic and cultural aspects [7].

Thus, because of that high prevalence of PEW in HD patients, nutritional assessment should be performed to identify the risks and/or causes of deterioration of the nutritional status, and to establish a nutritional diagnosis [8]. However, there is not a method that can be considered as a gold standard to validate the scoring systems. The quest for a gold standard has resulted in many clinical scoring lists, tools, and parameters to diagnose malnutrition. The National Kidney Foundation and Kidney Disease Outcomes and Quality Initiative (NKF/KDOQI) recommends combining measures tools and endorses the use of subjective global assessment (SGA) as an effective, noninvasive, fast, easy, and inexpensive nutrition assessment tool [9]. The SGA is based on clinical history and physical examination, which are combined subjectively to form a global rating of well-nourished, moderately malnourished, or severely malnourished. Other clinical nutrition-related scoring lists that have been proposed to assess PEW include the Geriatric Nutritional Risk Index (GNRI) and the composite score on protein-energy nutritional status (cPENS) [10]. Furthermore, a number of more or less individual parameters have been associated with PEW, such as serum albumin, body mass index (BMI) [11] and the normalized protein nitrogen appearance (nPNA) rate [12].

However, which of those methods should be used to detect more precisely a patient with PEW is yet to be determined. The difficulty in establishing the best method to assess PEW lies in the fact that all such parameters have limitations when used in isolation [13]. In this sense, the ISRNM expert panel has proposed a set of criteria to identify PEW in CKD patients [5], and suggests that PEW can be diagnosed if at least three of the four categories are present [5]:

- serum chemistry (low serum levels of albumin, prealbumin, or total cholesterol);
- body mass (unintentional weight loss overtime, decreased BMI, or total body fat percentage);
- muscle mass (decreased muscle mass over time, mid-arm muscle circumference, or creatinine appearance);
- dietary intake (unintentional decreased protein or energy intake).

In Morocco, there is a lack of data regarding the nutritional status of HD patients because it is not a routine practice in hospital treatment centers. However, the prevalence of PEW and the appropriateness of diagnostic criteria have not yet been described using ISRNM criteria in our country. Therefore, the first aim of our study was to assess the prevalence of PEW in patients on chronic HD by using of different nutritional assessment parameters, and at verifying which can identify the greatest number of HD patients with PEW. The second aim sought to investigate predictors of nutritional status in a haemodialysis center in Morocco.

3. Patients and methods

This is a cross-sectional analysis of the patients with end-stage renal disease (ESRD) undergoing maintenance HD in the Department of nephrology-transplantation and haemodialysis of the university hospital centre of Casablanca, Morocco. The study was conducted after an approval from the institutional review hospital board and a written informed consent was obtained from each patient prior to enrollment in the study.

Our study was conducted on 126 ESRD patients (60 men and 66 women; ranging from 18 to 65 years), treated with HD 3 times a week, for at least 4 hours per session. The inclusion criteria were patient's age of 18 years and over, and HD treatment for at least the previous 6 months. Exclusion criteria were: dialysis vintage less than 6 months, major surgery within two weeks, an implantable cardioverter defibrillator or pacemaker, acute intercurrent disease, and language barriers and physical or mental disability making participation unfeasible.

Patient data (age, gender, dialysis vintage, primary kidney disease and co-morbidity) were taken from patient records.

3.1. Diagnosis of PEW

PEW was identified in patients based on diagnostic criteria provided by the International Society of Renal Nutrition and Metabolism expert panel [5]. In our study, patients were assessed for serum albumin < 38 g/dL, BMI < 23 kg/m², muscle wasting 10% over 6 months and dietary energy intake < 25 kcal/kg ideal body weight. In addition, we assessed patients for potential markers of PEW as proposed by ISRNM in terms of body mass and composition measures: total body fat percentage, laboratory markers: serum prealbumin, serum cholesterol and CRP.

We also, proposed to include the SGA as an additional marker for PEW. A more detailed description of this semi-quantitative scoring system (SGA) based on history and physical examination was later published by Detsky et al. [14]. The history focused on

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