Short communication

Application of the new ESPEN definition of malnutrition in geriatric diabetic patients during hospitalization: A multicentric study

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SUMMARY

Background & aims: The European Society for Clinical Nutrition and Metabolism (ESPEN) recently provided new diagnosis criteria of malnutrition and called to confirm those criteria in specific populations. The aims of our study were 1) to determine the prevalence of malnutrition according to the new ESPEN definition in elder hospitalized diabetic patients, and 2) to evaluate whether this new diagnosis of malnutrition predicted clinical outcomes in these patients.
Methods: 1014 hospitalized diabetic patients ($\geq$65 years) from 35 hospitals in Spain were screened for being at risk of malnutrition using the short version of the Mini Nutritional Assessment. Subsequently, at risk individuals were considered malnourished if they met at least one of the two options: 1) body mass index (BMI) < 18.5 kg/m^2, or 2) unintentional weight loss >5% of their body weight with reduced BMI (<20 kg/m^2 in subjects younger than 70 years or <22 kg/m^2 in subjects older than 70 years).
Results: The new ESPEN definition, with MNA-SF as initial screening, identified 68 malnourished geriatric individuals with diabetes (6.73% of the cohort). Additionally, malnutrition lengthened the hospital stay, increased 2.7 times the odds of dying in hospital, and decreased to one third the odds of being discharged home.
Conclusions: Our study confirms that the new ESPEN definition for the diagnosis of malnutrition is a reliable tool that is capable of predicting clinical outcomes in a large population of elder hospitalized individuals with diabetes.

1. Introduction

In 2015, ~60 million of individuals (9.1% of the adult population) were affected by diabetes mellitus (DM) in Europe [1]. Compelling evidence shows worsening of clinical outcomes when diabetes is associated with a poor nutritional status, [2]. Nevertheless, studies assessing the nutritional status in elderly patients with DM are scarce, despite of their increased fragility and susceptibility to DM's deleterious effects. A main reason for this is a lack of consensus on operational definition of malnutrition. It is, therefore, difficult to compare the prevalence rates of malnutrition in diabetic patients across different chronic diseases and in different settings (healthy, institutionalized, hospitalized, home care). Recently, the European Society for Clinical Nutrition and Metabolism (ESPEN) provided

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novel consensus criteria for the diagnosis of malnutrition and called for validation studies that may confirm the new criteria in specific populations [3].

The aims of our study were i) to determine the prevalence of malnutrition according to the new ESPEN definition in 1014 hospitalized diabetic patients (aged ≥ 65 years) recruited from 35 hospitals in Spain, and ii) evaluate if malnutrition at hospital admission predicted clinical outcomes such as length of stay and in-hospital mortality.

2. Materials and methods

2.1. Sample and data collection

The VIDA study is an observational and multicentric study that examines the prevalence of malnutrition in diabetic patients older than 65 years admitted to the internal medicine wards of any of the 35 participating Spanish hospitals. Study design and cohort characteristics have been previously reported [2]. In brief, all patients were included between May 2007 and May 2008 and the nutritional evaluation was carried out within the first 24–72 h of admission. The Clinical Research Ethics Committee (CREC) at the Hospital Universitario La Paz (Madrid. Spain) approved this project.

2.2. Nutritional assessment

All individuals completed both the full and short versions of the Mini Nutritional Assessment (F-MNA and MNA-SF, respectively). The new ESPEN diagnosis of malnutrition is a 2 step process [3]. First, a validated risk screening tool was used to identify individuals 'at risk' of malnutrition. This initial screening was carried out with the MNA-SF [4]. Patients were categorized as having "normal nutritional status" (score ≥ 12), "at risk of malnutrition" (score between 8 and 11), or "malnourished" (score ≤ 7). Individuals in the two latter categories were considered 'at risk' according to the new ESPEN criteria. Second, those "at risk" individuals were considered malnourished if they met at least one of the two options: Option one required a body mass index (BMI) < 18.5 kg/m² to define malnutrition. Option two required the combination of unintentional weight loss >5% of body weight during the last 3 months and reduced BMI (<20 kg/m² in subjects younger than 70 years or <22 kg/m² in those older than 70 years).

2.3. Statistical analysis

Chi-square tests for categorical variables, Student's t-test or Mann–Whitney U-test for continuous data were used to compare groups if appropriate. Odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were determined by univariate logistic regression. In survival models, length of the hospital stay (LOS) was the discrete time variable. The influence of the nutritional status on the probability of being discharged was calculated using Kaplan–Meier analysis. Data were analyzed using R version 3.1.3 (http://www.r-project.org) and the level of significance was set at 0.05.

3. Results

3.1. Prevalence of malnutrition in geriatric diabetic patients

We used the MNA-SF to nutritionally-assess 1014 hospitalized diabetic patients whose length of hospital stay was known (Table 1). Individuals were considered as malnourished or at risk of malnutrition according to the new ESPEN consensus [3]. Impaired nutritional status showed a sex-dependent variation and more

Table 1
Prevalence rates of malnutrition in geriatric diabetic patients according to the new ESPEN consensus.

	All	Men	Women	p
	n = 1014	n = 504	n = 510	
Whole population				
Age (years)	77.9 (6.92)	77.0 (6.62)	78.9 (7.07)	<0.001
BMI (kg/m2)	27.9 (5.76)	27.0 (4.74)	28.8 (6.49)	<0.001
Weight (kg)	72.7 (15.7)	75.6 (13.9)	69.8 (16.8)	<0.001
MNA-SF: Normal	403 (39.8%)	225 (44.7%)	178 (35.0%)	0.004
MNA-SF: Risk of malnutrition	378 (37.4%)	179 (35.6%)	199 (39.1%)	
MNA-SF: Malnutrition	231 (22.8%)	99 (19.7%)	132 (25.9%)	
Low BMI	123 (12.2%)	62 (12.3%)	61 (12.0%)	0.953
Unintentional WL	241 (23.8%)	123 (24.4%)	118 (23.1%)	0.689
BMI<18.5 kg/m²	31 (3.07%)	15 (2.98%)	16 (3.15%)	1.000
At risk (MNA-SF) population				
Age (years)	78.7 (6.81)	78.1 (6.60)	79.3 (6.94)	0.028
BMI (kg/m2)	27.0 (6.04)	25.4 (4.64)	28.4 (6.70)	<0.001
Weight (kg)	69.9 (15.8)	71.3 (13.7)	68.8 (17.3)	0.045
Low BMI	113 (18.6%)	59 (21.2%)	54 (16.4%)	0.153
Unintentional WL	239 (39.2%)	122 (43.9%)	117 (35.3%)	0.039
1.BMI < 18.5 kg/m²	30 (4.93%)	15 (5.40%)	15 (4.55%)	0.769
2.Low BMI + Unintentional WL	56 (9.20%)	37 (13.3%)	19 (5.74%)	0.002
Whole population				
Malnourished ESPEN (1 & 2)	68 (6.73%)	40 (7.95%)	28 (5.51%)	0.155

Data are mean(SD) for continuous and n(%) for categorical variables within the indicated population.
p: p-value for the difference between men and women.
BMI: Body Mass Index.
MNA-SF: Mini Nutritional Assessment- Short Form.
Low BMI: BMI <20 kg/m2 (<70 years) or <22 kg/m2 (> = 70 years).
WL: Weight Loss.
Unintentional WL: Weight loss greater than 5% of body weight during the last 3 months.

women than men appeared to be at risk (65% vs. 55.3%, respectively, p = 0.002).

Individuals who fulfilled the ESPEN criterion of being at risk were further examined for potential malnutrition. In this subset of individuals the percentage of men and women who presented low BMI was similar. However, more men than women lost more than 5% of body weight during the last 3 months. The new ESPEN consensus presents two possible paths for the diagnosis of malnutrition. The first option that is an extremely low BMI (<18.5 kg/m²) was met by the 4.93% of the individuals at risk and no sex-effect was observed. To the contrary, the second option of unintentional weight loss combined with low BMI was met by 13.3% of the men at risk compared to the 5.74% of their women at risk (p for the difference = 0.002). Overall, assessments according to the new ESPEN definition with MNA-SF as initial screening returned 68 malnourished geriatric individuals with diabetes (6.73% of the complete cohort). We did not observe differences between men and women.

3.2. Clinical outcomes according to ESPEN nutritional status

There were 981 patients with recorded hospital outcome. The average LOS among the 35 hospitals was 12.6 ± 10.7 days (mean ± SD), ranging from 1 to 101 days. No sex differences were detected, and the frequencies of the different LOS are shown in Fig. 1A. Survival analysis showed that being malnourished was associated with longer LOS and increased probability of remaining hospitalized at any studied time (Fig. 1B). Likewise, sex-specific survival models revealed that a correct nutritional status reduced median LOS, compared to LOS of malnourished patients of both