



Malnutrition in an elderly demented population living at home

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ABSTRACT

Malnutrition is a frequent complication for elderly demented patients even if they live at their own home with the assistance of a caregiver. The present study evaluates nutritional characteristics of a population of 130 non-institutionalized demented patients. The results show that the mini nutritional assessment (MNA) total score is inversely related with the neuro-psychiatric inventory (NPI) score and that the level of cognitive impairment is related with the nutritional status: patients with mild cognitive impairment (MCI) showed a mean MNA score higher than patients affected by Alzheimer's disease (AD) or vascular dementia (VaD). Moreover, patients depressed, with hallucinations or with behavioral disturbs are more exposed to underfeeding than only cognitively impaired subjects. In conclusion, an appropriated evaluation of nutritional status could prevent and treat nutrition-related problems even in the elderly demented patients living at home.

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1. Introduction

Weight loss and malnutrition are frequent complications in the elderly and become a serious problem in patients affected by dementia, especially if they are hospitalized or institutionalized. In a study which considered more than 10,000 elderly people, the mean prevalence of malnutrition is 1% in community-dwelling healthy elderly persons, 4% in outpatients receiving home care, 5% in patients with AD living at home, 20% in hospitalized patients, and 37% in institutionalized elderly persons (Guigoz et al., 2002).

Malnutrition may have a broad spectrum of possible causes: deficiencies in dietary intake, digestion and absorption, metabolism, excretion, alterations in the metabolic requirements of dietary energy, protein and other macronutrients, related to specific conditions. Cognitive disorders commonly influence the individual's ability to function independently (Del Parigi et al., 2006). The elderly cognitively impaired often does not have the ability to initiate or continue effective feeding strategies (Chang and Roberts, 2008) and is exposed to malnutrition, even if he lives at home with the assistance of a personal caregiver. Malnourished patients are the topic of several published manuscripts reporting nutrition in nursing homes, in hospitals, or in community-dwelling subjects without cognitive impairment. It is less frequent to find this topic applied to elderly people with cognitive problems still living at home. The present study aims to report the risk of malnutrition in this type of subjects.

2. Subjects and methods

From April to September 2005, all patients affected by cognitive disorders and consecutively admitted to the Memory Clinic ambulatory of the San Giovanni Battista Hospital, Geriatric Section, of Torino, were asked to participate in the present observational study. All patients signed an informed consent. If cognitive status did not permit to give the consensus, permission was asked from the relatives.

Inclusion criteria were: presence of cognitive disorders, absence of consciousness disturbs, absence of other systemic illnesses able to cause dementia. Patients referring an economical status under 800 Euros per month were excluded in order to avoid the possibility of undernutrition due to poverty. Patients with dysphagia or parenteral nutrition were excluded, too.

At baseline, demographic data, past and recent clinical data and socioeconomic status were collected. Since the aim of the study was to detect malnourished patients, a physician with at least 5-year experience on elderly clinical problems evaluated the nutritional status using the MNA. The MNA test has been designed and validated to provide a single, rapid assessment of nutritional status in elderly patients in outpatient clinics, hospitals, and nursing homes. The MNA test is composed of simple measurements and brief questions that can be completed in about 10 min (Vellas et al., 1999). Patients with an MNA < 17 usually have low BMI and albumin levels that often reflect protein and caloric undernutrition, while patients with an MNA score between 17 and 23.5 present poor nutritional intake, but without a low albumin or weight loss. Patients with a score higher than 23.5 are normally nourished. In home care patients and nursing home residents, the

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MNA is related to living conditions, meal patterns, and chronic medical conditions.

Moreover, the cognitive status and the presence and grade of behavioral disturbances, that could compromise food intake, were examined using the mini-mental state examination (MMSE) and the NPI, respectively.

The MMSE is a brief examination consisting of eleven questions intended to evaluate an adult patient's level of cognitive functioning. It was introduced in 1975 and designed for use with elderly patients who are able to cooperate at an optimum level with an examiner for only a brief period of time.

The NPI presents 12 behavioral disturbances occurring in demented patients: delusions, hallucinations, dysphoria, anxiety, agitation/aggression, euphoria, disinhibition, irritability/lability, apathy, and aberrant motor activity. The NPI uses a screening strategy to minimize the administration time, examining and scoring only those behavioral domains with positive responses to screening questions. Both frequency and severity of each behavioral disturbance are determined (Cummings et al., 1994).

2.1. Statistical analysis

Statistical analysis has been performed using SPSS 17.0 package for Windows. A descriptive analysis of continuous and categorical variables was performed. All statistical tests were 2-tailed, with $p < 0.05$ indicating statistical significance. Data are presented as means \pm S.D. (or 95% confidence interval) or as percentages in the corresponding categories. The one-way analysis of variance (ANOVA) and the post hoc, pair-wise multiple comparisons (Bonferroni) were used to evaluate MNA, MMSE and NPI score differences.

3. Results

From April to September 2005, 177 patients with different grades of cognitive impairment and consecutively admitted to a Memory Clinic ambulatory have been evaluated and were asked to participate to this study. Of them, 130 accepted the invitation, 89 women and 41 men. Between 47 patients excluded, 32 were not interested and did not give the consensus, one showed dysphagia, two were parenterally nourished, two referred a poor economical status and 10 were accompanied by a paid caregiver, not able to sign the consensus.

Mean age of the sample evaluated was 77.9 ± 7.05 years (range 60–95). Of them, 17.7% were affected by AD, 39.2% by MCI and 43.1% by VaD.

Mean MMSE, NPI and MNA scores of the total sample were 16.5 ± 7.7 , 25.7 ± 18.2 and 19.4 ± 4.9 , respectively. For what it concerns each one of the three types of cognitive impairment evaluated (AD, VaD and MCI), MCI patients were younger, less cognitively compromised and with lower NPI scores, as reported in Table 1. Moreover, MCI patients showed lower levels of malnutrition or behavioral disturbances than AD and VaD patients.

MNA was significantly related with age ($p = 0.01$), with cognitive impairment severity ($p = 0.001$) and with behavioral disturbance severity ($p = 0.001$). Moreover, MNA was significantly

Table 1
General characteristics of the MCI, AD and VaD groups of patients, n (%), mean \pm S.D.

	MCI	AD	VaD	Total
Patients	51 (39.2)	23 (17.7)	56 (43.1)	130 (100)
Females	30 (23)	20 (15.4)	39 (30)	89 (68.5)
Males	21 (16.1)	3 (0.02)	17 (13)	41 (31.5)
Age	77.0 ± 7.4	77.7 ± 6.5	78.8 ± 7.0	77.9 ± 7.1
MNA	21.7 ± 4.1	17.5 ± 4.1	18.3 ± 4.5	19.4 ± 4.9
MMSE	21.4 ± 6.0	15.0 ± 6.6	12.8 ± 7.2	16.5 ± 7.7
NPI	16.7 ± 15.1	33.8 ± 19.1	30.6 ± 17.3	25.7 ± 18.2

Table 2

Relationship between NPI, MMSE, MNA scores, and AD, MCI and VaD (Bonferroni).

Dependent variable	Diagnosis	Diagnosis	Mean difference
NPI	AD	MCI	14.532*
		VaD	4.290
	MCI	AD	-14.532*
		VaD	-10.242*
	VaD	AD	-4.290
		MCI	10.242*
MMSE	AD	MCI	-6.343*
		VaD	2.260
	MCI	AD	6.343*
		VaD	8.602*
	VaD	AD	-2.260
		MCI	-8.602*
MNA	AD	MCI	-4.172*
		VaD	-0.715
	MCI	AD	4.172*
		VaD	3.457*
	VaD	AD	0.715
		MCI	-3.457*

* Significant at $p < 0.05$ level.

different between MCI patients and AD or VaD patients (Table 2). The level of cognitive disorders is related with nutritional status: patients with mild cognitive impairment showed a mean MNA score higher than patients affected by AD or VaD.

One-third (32.3%) of the population examined was assisted by a caregiver at the time of admission to this study (37.7% by a spouse, 36.9% by a son, 5.4% by brothers or sisters, 3.1% by friends, 6.2% by other relatives and 10.7% by paid caregivers). Nutritional status resulted lower in the home-assisted patients by paid caregivers than the non-assisted ones. Adjusting the statistical model for age, NPI severity and MMSE score, the relationship between malnutrition and continuous presence of a caregiver was not statistically significant ($F = 0.567$; $p = NS$).

The MNA total score of the sample examined was inversely related with the NPI total score and, specifically, with hallucinations ($p = 0.001$), depression ($p = 0.001$), nutritional disturbs ($p = 0.001$), wondering ($p = 0.001$) and hostile behavior ($p = 0.01$).

In particular, NPI items significantly different between the three groups of MCI, AD and VaD patients were delusions ($p = 0.015$), hallucinations ($p = 0.009$), agitation/aggression ($p = 0.001$), irritability/lability ($p = 0.011$), aberrant motor activity ($p = 0.020$) and appetite/eating abnormalities ($p = 0.019$). The main differences between MCI, AD and VaD patients are shown in Table 3.

4. Discussion

The presence of malnutrition in demented in-patients is widely accepted by the international literature. Hospitalized demented patients use to have a poorer functional and nutritional status than cognitively normal patients of the same age (Zekry et al., 2008).

The results of the present study focus the attention on demented patients living at home and on their risk of malnutrition. Since it is commonly accepted that home is a protective ambient for elderly people requiring acute cares, especially if they are affected by different types and grades of dementia (Tibaldi et al., 2004), more attention has to be dedicated to nutritional status of demented subjects living at home. Nourhashemi et al. (2005) reported that elderly subjects affected by Alzheimer's disease and living alone had an increased risk of malnutrition and were more likely to have a lower income than those living with others.

Reasons for this under-nutritional status are different and could be addressed to the illness itself and they do not seem related with assistance. Dementia is characterized by disturbance of memory and cognitive dysfunctions often correlated with progression of

Table 3
Relationship between NPI items scores (dependent variable) and AD, MCI and VaD (Bonferroni).

Dependent variable	Diagnosis	Diagnosis	Mean difference
Delusions	AD	MCI	1.821 [†]
		VaD	0.906
	MCI	AD	−1.821 [†]
		VaD	−0.915
	VaD	AD	−0.906
		MCI	0.915
Hallucinations	AD	MCI	1.512
		VaD	0.005
	MCI	AD	−1.512
		VaD	−1.508 [†]
	VaD	AD	−0.005
		MCI	1.508 [†]
Agitation/aggression	AD	MCI	1.574 [†]
		VaD	1.277 [†]
	MCI	AD	−1.574 [†]
		VaD	−0.297
	VaD	AD	−1.277 [†]
		MCI	0.297
Irritability/lability	AD	MCI	1.356 [†]
		VaD	0.649
	MCI	AD	−1.356 [†]
		VaD	−0.707
	VaD	AD	−0.649
		MCI	0.707
Aberrant motor activity	AD	MCI	0.616
		VaD	−1.002
	MCI	AD	−0.616
		VaD	−1.619 [†]
	VaD	AD	1.002
		MCI	1.619 [†]
Appetite/eating abnormalities	AD	MCI	1.238
		VaD	−0.388
	MCI	AD	−1.238
		VaD	−1.626 [†]
	VaD	AD	0.388
		MCI	1.626 [†]

[†]Significant at $p < 0.05$ level.

the disease and behavioral disturbances (Frisoni et al., 1999). These behavioral disturbances are present in 90% of patients; they are moderate or severe in 40% of cases (Gormley and Rizwan, 1998; Devanand, 1999) and contribute, in our opinion, to reduce feeding in these patients. In fact, the results of the present study confirm an inverse relationship between nutritional status and NPI scores. Patients depressed, with hallucinations or with behavioral disturbs are more exposed to home under feeding than only cognitively impaired subjects. Moreover, it is not surprising that mild-cognitively impaired patients are less malnourished than AD or VaD patients.

On the other side, it could be surprising that more than 43% of our population was diagnosed as affected by VaD, while the

prevalence of AD usually reaches 75%, as it is possible to read in the international literature (Qiu et al., 2009). In our opinion, the present result depends by chance, because patients evaluated have been consecutively admitted to the Memory Clinic ambulatory.

This study presents some limitations: it is not a randomized controlled trial and the sample size is not high; nutritional status was evaluated only using MNA, without reporting the energy-intake and patients daily active mobilizations neither biochemical markers, such as albumin, lymphocytes, hemoglobin or total proteins; the study was not performed as a longitudinal one and, thus, it is not possible to report follow-up results.

Although the results of this study cannot strongly support this hypothesis, it seems that during the first stages of dementia, the low feeding depends by the low autonomy, while, in the advanced stages, behavioral disturbances and often impossibility of eating without help assume a central role in the weight loss.

In conclusion, an appropriated evaluation of nutritional status could prevent and treat nutrition related problems even in the elderly demented patients living at home.

Conflict of interest statement

None declared.

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