Mini Nutritional Assessment and Alzheimer Patients

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Weight loss, behavioral problems, and food disorders are common in patients with Alzheimer disease. Recently, White et al. [1] found that weight loss was present in 36% of Alzheimer disease patients compared with 18% in controls. These changes in weight occur not only in patients with severe dementia, but may precede dementia. Barrett-Connor et al. [2] followed 134 older men and 165 women for 20 years in a longitudinal study on aging, and found weight loss before the onset of Alzheimer disease. Many attempts have been made in the past few years to understand this weight loss in Alzheimer patients. Barrett-Connor and colleagues found no evidence of a higher resting metabolic rate in non-institutionalized Alzheimer patients [3]. More recently, Poehlman et al. [4] did not find any differences in daily energy expenditure in Alzheimer patients compared with healthy controls. However, Grundman et al. [5] found that low body weight in Alzheimer disease is associated with mesial temporal cortical atrophy.

The ELSA Study

The ELSA study is a longitudinal study on a population of Alzheimer patients. Age at entry was 74.6 ± 7.0 years; 32.5% of the subjects were men and 67.5% women; 23% lived alone, 71% with their family, and 6% were in institutions. The mean mini-mental state (MMSE) assessment score at entry was 14.9 ± 6, and none of the patients had more than two abnormalities at the activities of daily living (ADL) scale. The mean Mini Nutritional Assessment (MNA) score was 24.
Table 1. Weight loss in Alzheimer disease: the ELSA study

<table>
<thead>
<tr>
<th>Weight loss (&gt;4%)</th>
<th>Jo</th>
<th>J12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (n = 42)</td>
<td>Yes (n = 34)</td>
</tr>
<tr>
<td>MMSE</td>
<td>16.2 ± 6</td>
<td>13.4 ± 7.1*</td>
</tr>
<tr>
<td>MNA</td>
<td>24 ± 2.3</td>
<td>24.7 ± 2</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>61.4 ± 13</td>
<td>62.5 ± 13</td>
</tr>
<tr>
<td>Energy intake (kcal)</td>
<td>2,013 ± 652</td>
<td>1,909 ± 473</td>
</tr>
<tr>
<td>C-Reactive protein (mg %)</td>
<td>4.4 ± 4.3</td>
<td>4.1 ± 3.7</td>
</tr>
<tr>
<td>Serum albumin (g/l)</td>
<td>44.9 ± 4</td>
<td>43.3 ± 4.6</td>
</tr>
</tbody>
</table>

MMSE = Mini mental state examination score; MNA = Mini Nutritional Assessment score.
* \( p < 0.05 \)
** \( p < 0.01 \)

± 2.3; 57% had an MNA of >23.5, 37% between 17 and 23.5, and 6% of <17. The mean energy intake in this population was 2,013 ± 652 kcal; however, 25% had an energy intake of <1,500 kcal/day. None of these people had inflammatory disease, and the mean plasma C-reactive protein concentration was 4.4 ± 4.3 mg/dl.

Over a one-year period of follow-up, we found a clinically significant weight loss (>4%); [6] in 44.2% of these Alzheimer patients; 13% had a weight loss of >10%. As can be seen in Tables 1 and 2, weight loss was related to a significant decrease in the MNA score over a one-year period, from 24.7 ± 2 to 22.4 ± 3.6 \( (p < 0.05) \) in those who experienced a weight loss of >4%, and from 23.8 ± 7 to 20.9 ± 3.5 \( (p < 0.05) \) for those who experienced a weight loss of >10%.

However, we did not find any change in serum albumin in these patients. It seems that the MNA (but not the serum albumin) is useful in following nutritional status in these Alzheimer patients. We also found that weight changes were correlated with the Zaritt score, which classifies the burden of the disease on the family [7]. Recently, Fredman & Daly [8] found that weight change is an indicator of caregiver stress in Alzheimer patients. Like other teams, we found no difference in energy expenditure in Alzheimer patients who experienced weight loss compared with those who did not [9, 10]. It also seems that when we take the burden on the family into consideration, the severity of dementia alone is not related to the MNA score. For example, we found an MNA score of 21.2 ± 4.0 in patients with an MMSE score of <5 compared with 23.6 ± 2.2 in those with a score of >5. However, the MNA appears to be related to eating behavior in Alzheimer patients.
Table 2. Weight loss in Alzheimer disease: the ELSA study

<table>
<thead>
<tr>
<th>Weight loss (&gt;10%)</th>
<th>Jo</th>
<th>J12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (n = 42)</td>
<td>Yes (n = 10)</td>
</tr>
<tr>
<td>MMSE</td>
<td>16.2 ± 6</td>
<td>12.7 ± 6*</td>
</tr>
<tr>
<td>MNA (kg)</td>
<td>24 ± 2.3</td>
<td>23.8 ± 7</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>61.4 ± 13</td>
<td>59.3 ± 14</td>
</tr>
<tr>
<td>Energy intake (kcal)</td>
<td>2,013 ± 652</td>
<td>1,941 ± 482</td>
</tr>
<tr>
<td>C-Reactive protein (mg %)</td>
<td>4.4 ± 4.3</td>
<td>5.8 ± 6.5</td>
</tr>
<tr>
<td>Serum albumin (g/l)</td>
<td>44.9 ± 4</td>
<td>40.1 ± 5</td>
</tr>
</tbody>
</table>

MMSE = Mini mental state examination score; MNA = Mini Nutritional Assessment score.
* p < 0.05.
** p < 0.01.

We found that of those with an MMSE score of <10, 22.9% needed to be fed intermittently, 8.8% puckered their lips preventing food entry, 11.8% needed coaxing or would not eat, 14.7% use fingers instead of utensils, and 2.9% accepted only liquid food.

MNA Score in Alzheimer Disease Inpatients

Special care units appear to be beneficial for Alzheimer disease patients. Two years ago, we started an EC-funded study on Alzheimer disease special care units in Europe: a case-control study on quality of life for patients and family. Involved in this study are special care units in nursing homes in Italy (Brescia) and Sweden (Karolinska Institute), while in France, we elected to study the Toulouse acute care unit for Alzheimer patients [12–15], one of the first acute care units for Alzheimer patients in Europe. Alzheimer patients are admitted to this unit from their home, from nursing homes, or from the hospital emergency department for complications related or unrelated to Alzheimer disease. We provide medical management for Alzheimer patients, while patients with other conditions only have an assessment of cognitive function.

Table 3 summarizes our data on the first 118 Alzheimer disease patients in 1996; 59% were women, mean age 78.6 ± 8.3 years, 70% came from home, and 20% from nursing homes. The mean MNA score was 19.6 ± 4.9, lower than in Alzheimer patients living in the community as determined in the ELSA study.
and 32% had food intakes lower than two thirds of the RDA. Other studies have found that the nutritional status of Alzheimer disease patients is better in special care units than in regular care facilities [14]. Cause of death in Alzheimer disease patients is mainly bronchopneumonia (64%) [16]. We think that if we can improve nutritional status and immunologic function in such patients, we should be able to decrease the risk of such infections.

**Conclusions**

In conclusion, weight loss and malnutrition are frequent in Alzheimer patients. The MNA is easy to use and useful in these patients, though some of the questions need to be answered by the caregiver. MNA (but not albumin) is correlated with weight loss in Alzheimer patients. The severity of dementia is a risk factor for malnutrition, but in those living at home, MNA score and MMSE are not correlated. It seems possible to prevent malnutrition and weight loss in many Alzheimer patients. For these reasons, we have started a European-funded program on nutrition health promotion and Alzheimer disease for health professionals and caregivers. This program will be translated into 11 languages and disseminated throughout Europe.
References


Discussion

*Dr. Chumlea:* In your work where the MNA was done in Alzheimer patients, obviously the answers to the MNA were from a caregiver?

*Dr. Vellas:* For some of the questions.

*Dr. Chumlea:* That’s fine. My recommendation though is that if you are going to collect MNA questions about a patient from the caregiver, then one should also administer the MNA independently to the caregiver: if the caregiver had an MNA of, say 23, there might be a relation between the nutrition of the caregiver and the nutrition of the patient. So it might be beneficial – in some of those instances at least – to look at those relations.

*Dr. Vellas:* That’s true, especially because we know that Alzheimer disease is a disease of the family. For many aspects of the disease – for example depression or quality of life – we have found that the problems of the patient are shared by the caregiver. Maybe it is the same with nutrition.

To answer the question about subjective assessment, what we need to do is to teach physicians and others how to use MNA. If elderly people cannot respond to the subjective questions, health professionals need to decide the answer on the basis of their own impres-
sions – that’s the way it works, the MNA is validated like that. Many of the problems in using the MNA are caused by lack of education in its use.

Dr. Morley: When you looked at your Alzheimer patients, did you look to see how many of those at home were wanderers, and how that affected both their nutritional status and the question of caregiver abuse? We find two major reasons for weight loss in Alzheimer patients: one is anorexia, but the other is a smaller group of people who wander all the time – they just do not stop going. Those people use a lot of energy, but they are also very burdensome to the caregiver and this may be part of the correlation with the caregiver burden that you see.

Dr. Vellas: In our population, we have people with mild to moderate dementia, and we don’t have any with wandering problems. The only significant correlation was with the burden on the family.

Dr. Arnaud-Battandier: If you had to develop a nutritional program, what would you recommend?

Dr. Vellas: Our hypothesis is that weight loss in Alzheimer patients is mostly a consequence of a poor intake at some point in the disease. For example, at the onset of the disease, an elderly person living alone will often purchase and prepare less food. If we can detect malnutrition at this time, for example by using the MNA, and give help to the patient, our hypothesis is that we could decrease weight loss in this population.

Dr. Rubenstein: As a general statement, both cancer patients and Alzheimer patients are ideal patients for nutritional screening, and nutritional intervention trials are needed in both groups – that is really important. One confounding dilemma though, particularly in the USA, is that when people are getting to the end stages of a disease, there is difficulty in accepting this. I noticed from your data on Alzheimer disease that pneumonia was far and away the commonest cause of death. However, many people get pneumonia when they are tube fed. So there is confounding between overaggressive nutritional supplementation and getting pneumonia from a normal end-stage process. I wonder whether you have tried to differentiate those processes in your study? At some point it is acceptable to let somebody die, but in the USA we sometimes have trouble with that.

Dr. Vellas: In the ELSA study, we only had people with mild dementia, but in our special care unit we admit many people with severe dementia and this is one of our worst problems. What should we do with severely demented people who don’t want to eat? If there is a solution, we think it is prevention: maintaining the nutritional status as long as possible by nutritional intervention.

Dr. Morley: I agree. There was a recent article from an Italian group [1] where they showed that with good feeding and good care in a nursing home, weight loss does not occur in Alzheimer patients. In our experience this is associated with a good quality of life. The secret is to do it early and to prevent weight loss rather than to come late in the day. When it is late, it is usually too late.

Reference