

# CONVERSION TO DEMENTIA IN THE PATIENTS WITH MILD COGNITIVE IMPAIRMENT

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**Keywords:** mild cognitive impairment, dementia, Alzheimer's disease

**Abstract:** Mild cognitive impairment is a syndrome defined as the cognitive decline greater than the expectancy determined by the age and educational level of the individual, but which does not interfere with the daily activities.(1) The prevalence in the population studies of epidemiological type is between 3-19% in adults over 65 years old. A number of people with mild cognitive impairment remain stable or regain cognitive normality, but more than a half, progress to dementia over the next five years, and that is why a number of authors state that mild cognitive impairment can be considered a risk factor for dementia. The amnesic type of cognitive impairment has an increased risk of conversion to Alzheimer's dementia. Petersen et al. states that 80-95% of the patients with mild cognitive impairment will develop dementia during their life.(1,2)

**Cuvinte cheie:** tulburare cognitivă ușoară, demență Alzheimer

**Rezumat:** Tulburarea cognitivă ușoară este un sindrom care definește declinul cognitiv mai mare decât expectanța determinată de vârsta și nivelul educațional al individului, dar care nu interferă cu activitatea cotidiană (1). Prevalența în studiile populaționale de tip epidemiologic efectuate este între 3-19% la adulții peste 65 ani. O parte din persoanele cu tulburare cognitivă ușoară rămân stabile cognitiv sau redobândesc starea de normalitate, dar mai mult de jumătate progresează spre demență în următorii 5 ani, de aceea o serie de autori afirmă că tulburarea cognitivă ușoară poate fi considerată un factor de risc pentru demență. Tipul amnesic de tulburare cognitivă are un risc crescut de conversie în demența Alzheimer. Petersen et al. afirmă că 80-95% din pacienții cu tulburare cognitivă ușoară dezvoltă demență pe parcursul vieții (1, 2).

## PURPOSE OF THE STUDY

The purpose of the study is to determine whether the mild cognitive impairment (MCI) is a predictor of Alzheimer's dementia in a defined population of Sibiu.

## MATERIALS AND METHODS

We evaluated consecutively a number of 365 patients with mild cognitive impairment for a 3-year period, to observe conversion to dementia in these patients. We considered the type of MCI presented. The evaluation of these patients took place between March 2008 and October 2010, each patient having being evaluated annually for three years. In building up the batch, we took into consideration the inclusion and exclusion criteria. Inclusion criteria: subjects of both sexes aged  $\geq 65$  years, subjects who reported impaired retrieval, retrieval disorders which are highlighted by MMSE screening test in accordance with CDR 0.5 and the subjects' willingness to participate in this assessment. Exclusion criteria: subjects with known diagnosis of dementia, subjects with known diagnosis of stroke or cerebral haemorrhage, subjects with known neurodegenerative disease, mental illness known subjects, subjects with severe somatic diseases, unstable or life-threatening predictable, subjects with hyper or hypothyroidism, subjects with a history or chronic use of ethanol or drug abuse type, subjects who consume daily drugs that can interfere with their alert status.

The diagnosis of mild cognitive impairment was based upon Petersen criteria.(2) We conducted a neuropsychological

evaluation by using the MMSE (Minimental State Examination) and ADL (Activity Daily Living). We established the diagnosis of dementia in accordance with the DSM IV criteria.(3) MMSE test is a screening test of cognitive function and cannot be used as a diagnostic test.(4,5) Additionally, for each dementia diagnosis, we have also used diagnostic criteria: NINCDS-ADRDA for Alzheimer's dementia, NINCDS-AIREN for vascular dementia. We used the Hachinski criteria ( $\leq$  HIS AD 4 <HIS <7, mixed dementia, vascular dementia HIS  $\geq$  7.(3,6,7) to make the distinction between the mixed vascular dementia and Alzheimer. The patients were evaluated annually for a period of three years, with a total of four basic assessments. The diagnosis of mild cognitive impairment was determined from at least two evaluations of each patient.

## RESULTS

The study group was homogenous in terms of gender, out of the 365 evaluated patients, 194 were male patients (53.2%) and 171 were female patients (46.8%). The average age was 73.2 years, with the following age groups distribution: 34.5% in the 65-69 year group, 27.1% in the 70-74 year group, 21.9% in the 75-79 year group, 10.9% in the 80 - 84 year group, and 5.6% over 85 years. In terms of level of education, 27.9% of patients had less than 8 years of study, 44.4% had between 8 -12 years of study and 27.7% had higher education. These three categories regarding the level of education were taken into consideration due to the fact that several studies noted that the low level of education constitutes a risk factor for Alzheimer's

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## CLINICAL ASPECTS

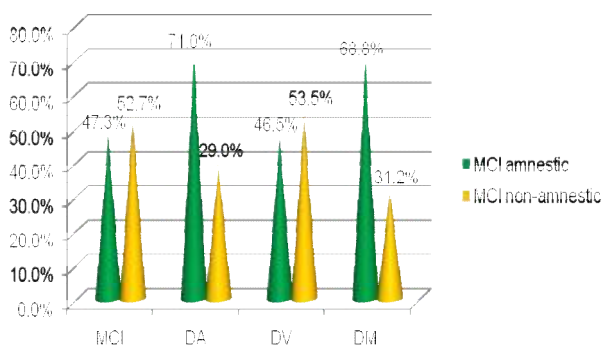
dementia, but also for the mild cognitive impairment and its conversion into dementia.

Out of the total number of 365 evaluated patients, 199 patients (54.5%) had cognitive impairment of amnesic type, while 166 patients (45.5%) had cognitive disorder of non-amnesic type.

The evolution of the patients examined during the 3 years of observation was the following: 56.0% of the patients remained in the stage of mild cognitive impairment (205 patients) and they constituted the residual patients study group throughout the MCI analysis. 18.9% (69 patients) showed progression to Alzheimer dementia, constituting the patients study group with Alzheimer dementia. 11.8% (43 patients) registered progression to vascular dementia and represented the patients study group with vascular dementia. 13.2% (48 patients) had progression toward mixed dementia and formed up the group of patients with mixed dementia.

The remaining MCI patients were initially amnesic MCI patients 97 - (47.3%) and 108 patients (52.7%) had non-amnesic MCI. The patients who developed Alzheimer's dementia came from 49 patients (71.0%) with amnesic MCI and 20 patients (29.0%) with non-amnesic MCI. 20 patients developed vascular dementia (46.5%) of the patients with amnesic MCI, 23 patients (53.5%) of the patients with MCI non - amnesic. Mixed dementia occurred in 33 patients (68.7%) with amnesic MCI and 15 patients (31.3%) with non-amnesic MCI. Thus, out of patients with amnesic MCI, 24.6% progressed towards AD, 10.0%, toward DV and 16.6% towards DM, while MCI patients with non - amnesic had the following development: 12.0% MCI remaining patients, 13.8% had DV, 9.0 % had DM. Observing the origin of the patients who developed different types of dementia, we could notice the following: 71% of the patients who developed Alzheimer's dementia were patients with amnesic MCI and 29% of the patients with non-amnesic MCI, 46.5% of the patients who developed dementia vascular came from patients with amnesic MCI, and 53.5% of the patients with non-amnesic MCI, 68.8% of the patients who developed mixed dementia were from patients with amnesic MCI, and 31.2% from patients with non-amnesic MCI. (Figure no. 1).

**Figure no. 1. Distribution of patients by the type of MCI and developed pathology**



Of the 199 patients with amnesic MCI, 41.7% were women, 58.3% were men, and of the 166 patients with MCI non - amnesic, 53.0% were women, 47.0% were men. (Table. no. 1) The conversion of the analyzed group of patients was different in terms of the period in which the conversion occurred and regarding the developed pathology. Thus, in the first year, 20.2% of the patients had dementia with the following distribution: 11 patients with Alzheimer's dementia (28.9%), 11(28.9%) with vascular dementia and 16 (42.2%) with mixed

dementia. In the second year, 34.6% of the patients had dementia with the following distribution: 29 patients in Alzheimer's dementia (44.6%), 17 vascular dementia patients (26.2%) and 19 mixed dementia patients (29.2%). In the third year, 45.2% of the patients had dementia, with the following distribution: 29 patients with Alzheimer's dementia (34.1%), 43 vascular dementia patients (50.6%) and 13 mixed dementia patients (15.3%).

**Table. no. 1. Distribution of the number of patients by gender and type of MCI**

|                        | Amnesic MCI |     | non-amnesic MCI |     |
|------------------------|-------------|-----|-----------------|-----|
|                        | Women       | Men | Women           | Men |
| MCI remaining patients | 36          | 61  | 51              | 57  |
| AD                     | 27          | 22  | 18              | 2   |
| DV                     | 8           | 12  | 11              | 12  |
| DM                     | 12          | 21  | 8               | 7   |
| Total                  | 83          | 116 | 88              | 78  |

In the analyzed group, the total rate of conversion to dementia was of 43.8%, with different rates for each type of dementia. Overall conversion rate in Alzheimer's dementia was of 18.9% with an average annual conversion rate of 6.3%. The overall conversion rate in vascular dementia was of 11.8% with an average annual conversion rate of 3.9%. The overall conversion rate in mixed dementia was of 13.1% with an average annual conversion rate of 4.4%.

Out of the 39 female patients with amnesic MCI, 7 patients, representing 17.9% have progressed to dementia during the first year, 20 patients representing 51.3% have progressed to dementia in the second year, and 12 patients representing 30.8% have progressed to dementia in the third year. Of the 45 female patients with non-amnesic MCI, 15 patients representing 33.3% have progressed to dementia during the first year, 13 patients representing 28.9% have progressed to dementia in the second year, and 17 patients representing 37.8% have progressed to dementia in the third year.

Of the 61 (74.4%) male patients with amnesic MCI, 10 patients representing 16.4% have progressed to dementia during the first year, 23 patients representing 37.7% have progressed to dementia in the second year, and 28 patients representing 45.9% have progressed to dementia in the third year. Of the 21 male patients with non-amnesic MCI, 6 patients representing 28.6% have progressed to dementia during the first year, 9 patients representing 42.9% have progressed to dementia in the second year and 6 patients representing 28.6% have progressed to dementia in the third year.

The relative risk calculation showed us that this is of 2.15 for females with amnesic MCI. The relative risk for males, associated to MCI amnesic form is of 1.04, while in the case of non-amnesic MCI type, the relative risk presented a much greater difference between sexes, namely 1.04 for females and 0.10 for males.

## DISCUSSIONS

It is recognized that many elderly patients have cognitive impairment, and some of them develop dementia. The systematic screening of the cognitive disorder in the elderly asymptomatic patients is not recommended, because it provides insufficient data.(1,8). The ongoing debates about the MCI type which determines the progression to dementia showed that the amnesic MCI type is less incriminated.(9) Petersen suggests to the American Academy of Neurology that the patients with mild cognitive impairment should be recognized and monitored from the cognitive and functional decline point of view, as they have an increased risk for dementia.(2)

## CLINICAL ASPECTS

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The study has shown the differences in dementia evolution according to the dementia type. Progression of Alzheimer's dementia is linear and depends on the MCI type (2,10). 48.0% of the patients who presented a conversion to dementia, from the analysed group developed Alzheimer's dementia only 20% developed vascular dementia, and respectively 32.0%, mixed dementia. The conversion to dementia was of 14.6% within the analyzed group. The literature data suggest a conversion rate of MCI of 10 to 15% per year.(10,11) In an observational study, A. Busse identifies a conversion rate of 19.8% over a period of 4.3 years. In the same longitudinal study, it is stated that 20% of the patients suffering from dementia in the first 18 months, and 60-65% of the subjects will develop dementia throughout their life.(11)

This study confirms and points out both similar data from the literature regarding the annual conversion, and the presented MCI type.

### CONCLUSIONS

1. The evolution of patients with MCI towards dementia shows an annual linear progression.
2. Patients who had amnesic MCI type showed an increased rate of dementia in general, but especially in Alzheimer's dementia (71%).
3. Female gender association with amnesic MCI type increases the relative risk of Alzheimer's dementia.

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