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Anemia associated with increased risk of mild cognitive impairment

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In a large population-based study of randomly selected participants in Germany, researchers found that participants with anemia, defined as haemoglobin <13 g/dl in men and <12 g/dl in women, showed lower performances in verbal memory and executive functions. Furthermore, mild cognitive impairment (MCI) occurred almost twice more often in participants diagnosed with anemia. This study is published in the *Journal of Alzheimer's Disease*.

Because dementia is the end stage of many years of accumulation of pathological changes in the brain, researchers focus on early stages of cognitive impairment. MCI represents an intermediate and possibly modifiable stage between normal cognitive aging and dementia. Although persons with MCI have an increased risk of developing dementia or Alzheimer's disease (AD), they can also remain stable for many years or even revert to a cognitively normal state over time. This modifiable characteristic makes the concept of MCI a promising target in the prevention of dementia.

What criteria determine MCI? The following four criteria were used to diagnose MCI: First, participants have to report a decline in cognitive performance over the past two years. Second, the participants have to show a cognitive impairment in objective cognitive tasks that is greater than one would expect taking their age and education into consideration. Third, this impairment is not as pronounced as in demented individuals since persons with MCI can perform normal daily living activities or are only slightly impaired in carrying out complex instrumental functions. Fourth, the cognitive impairment is insufficient to fulfil criteria for dementia.

The concept of MCI distinguishes between amnesic MCI (aMCI) and non-amnesic MCI (naMCI). In the former, impairment in the memory domain is evident, most likely reflecting AD pathology. In the latter, impairment in non-memory domains is present, mainly reflecting vascular pathology but also frontotemporal dementia or dementia with Lewy bodies.

The Heinz Nixdorf Recall (Risk Factors, Evaluation of Coronary Calcium and Lifestyle) study is an observational, population-based, prospective study that examined 4,814 participants (50% men) between 2000 and 2003 in the metropolitan Ruhr Area. After five years, a second examination was conducted with 92% of the participants taking part. The publication reports cross-sectional results of the second examination.

First, 163 participants with anemia and 3,870 participants without anemia were included to compare the performance in all cognitive subtests. Interestingly, anemic participants showed more pronounced cardiovascular risk profiles and lower cognitive performance in all administered cognitive subtests. After adjusting for age, anemic participants showed a significantly lower performance specifically in the immediate recall task and the verbal fluency task.

Second, 579 participants diagnosed with MCI (299 participants with aMCI and 280 with naMCI) and 1,438 cognitively normal participants were included to compare the frequency of MCI and MCI subtype diagnosis in anemic and non-anemic participants. MCI occurred almost twice more often in anemic than in non-anemic participants. Similar results were found for MCI subtypes, indicating that low hemoglobin level may contribute to cognitive impairment via different pathways.

These results suggest that anemia is associated with an increased risk of MCI independent of traditional cardiovascular risk factors. The association of anemia and MCI has important clinical relevance because -depending on etiology- anemia can be treated effectively. This might provide means to prevent or delay cognitive decline.

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