Background

Cognitive frailty is a recent concept defined as a cognitive dysfunction in older adults suffering from physical frailty. Cognitive frailty, distinct form dementia, could be classified as a non-amnestic mild cognitive impairment with a predominance of impairments in the executive function and memory speed processing. The main intervention to treat or prevent cognitive frailty, is the treatment of the causes of frailty. Indeed cognitive frailty is improved when the frailty status in older adults improves.

The relationship between frailty and cognitive dysfunction is best described in the presence of slow gait speed (GS). The assessment of habitual walking speed (over a 4-meter walking track) identifies older adults as being frail, and is a main risk factor for the development of cognitive impairment. This well-established relationship remains unclear regarding the physio-pathological pathways, and explanations remain obscure. One main hypothesis is that body composition parameters (fat mass and muscle mass) are behind this relationship, being gait speed merely a confusion factor. Indeed many pathways link low muscle mass and increased fat mass with cognitive decline like insulin resistance, vitamin D, leptin, inflammation, cardiovascular disease and its risk factors in between others.

Research questions

Are body composition parameters behind the presence of cognitive frailty?

Is the strong association between gait speed and cognitive dysfunction independent or mediated by body composition parameters?

Which body parameter is best associated with the presence of cognitive frailty?

Gait speed, body composition, and dementia. The EPIDOS-Toulouse Cohort (article 1)

Study sample: 647 patients without cognitive decline with full cognitive assessment at 7 years. Logistic regression models assessed the association of gait speed, total lean and fat mass, with dementia-risk.

Only slower GS and advanced age were associated factors with dementia risk. In this study total lean and fat mass were not associated factors with dementia risk.

Association of a 7-years percentage change in fat mass and muscle mass with subsequent cognitive dysfunction. The EPIDOS-Toulouse Cohort (article 3)

Study sample: 181 women. Fat and muscle mass were assessed at baseline and at 7 years along with a full cognitive assessment.

Table 2: Association of percentage change in lean mass and fat mass with subsequent cognitive dysfunction.

<table>
<thead>
<tr>
<th>Variable</th>
<th>%Cohort</th>
<th>%ALAF</th>
<th>%ALAF2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean mass</td>
<td>-0.48%</td>
<td>0.20%</td>
<td>0.24%</td>
</tr>
<tr>
<td>Fat mass</td>
<td>0.04%</td>
<td>0.09%</td>
<td>0.09%</td>
</tr>
</tbody>
</table>

Only advanced age was associated with cognitive dysfunction, this association could not be found for percentage-change variables of fat and muscle mass.

Body composition and cognitive decline. Results from the MAPT study (drafting of article 4 in progress)

Study sample: 169 participants with body composition parameters from the MAPT study.

No sarcopenia definition was found to be associated with cognitive dysfunction. When fat mass was included in the definitions (ALAF and Residuals) a positive association was found in bivariate analysis.

Sarcopenia and cognitive dysfunction. Results from the EPIDOS cohort (article 2)

Study sample: 3025 women aged 75 years and older. Different sarcopenia definitions, and GS were assessed as associated factors with cognitive decline (Short Portable Mental Status Questionnaire).

Although gait speed was associated with cognitive dysfunction, this association could not be demonstrated for the different sarcopenia definitions.

Perspectives

• Two analysis plans have been accepted to perform longitudinal analysis in the INCHIANTI and the HEALTH ABC studies. Baseline body composition parameters are ascertainment the same cognitive decline over time (by the means of MMSE). The preliminary analysis performed using the INCHIANTI database (over 3 years) confirm the findings of the EPIDOS study (article 5).

• Physio-pathological pathways will be explored in the MAPT study in a sub-sample of participants that accepted to have an annual body composition assessment and in the subsample with amyloid PET-imaging.

Original Publication


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