How additional diagnostic tests influence the initial clinical diagnosis in memory clinic patients

Findings from a tertiary hospital memory clinic

Dr Helen Wu, Dr Maurice Finn, Dr Peter Veitch

Department of Aged Care, Royal North Shore Hospital, Sydney, Australia
Background

• The prevalence of dementia continues to rise
• No effective treatment
• Biomarkers
  • Evidence of abnormal β-amyloid accumulation in the brain
  • Evidence of neuronal injury
Aims

• To analyse among patients referred to a tertiary hospital memory clinic, how often additional diagnostic tests result in an adjustment of the initial diagnosis

• To examine how these additional tests predict follow-up diagnoses in a subgroup of patients
Methods

Diagnostic process in memory clinic

Standard assessment
- History
- Examination
- Cognitive screening
- Lab (FBC, EUC, LFTs, CMP, B12, TFTs)

Additional tests
- Apolipoprotein E (APOE) genotyping
- Brain imaging (MRI, SPECT, PET)
- Neuropsychological assessment (NPA)

Initial diagnosis

Multidisciplinary consultation

Consensus diagnosis
Methods

**Initial Diagnosis**
1. No cognitive abnormality
2. Probable MCI
3. Probable AD
4. Other
5. Uncertain

**Consensus Diagnosis**
1. No cognitive abnormality
2. Probable MCI
3. Probable AD
4. Other

**Follow up Diagnosis**
1. No cognitive abnormality
2. Probable MCI
3. Probable AD
4. Other
Methods

1. Frequency of change in the initial diagnosis

2. Results of additional tests
   • Normal or abnormal
   • APOE genotypes
Results

Mean age 69.0 ± 8.7 years
Female 55%
Memory complaints 97%

185 patients

181 patients

Initial diagnosis

Uncertain
3 (1.7%)

No cognitive abnormality
31 (17.1%)

MCI
104 (57.5%)

AD
24 (13.3%)

Other
19 (10.5%)

Consensus diagnosis

No cognitive abnormality
50 (27.6%)

MCI
88 (48.6%)

AD
24 (13.3%)
Results

% of patients with test performed

- MRI brain: 45.6%
- SPECT brain: 51.9%
- PET brain: 37.6%
- APOE genotype: 77.9%
- NPA: 98.9%

Additional tests

The Venn diagram shows the overlap between NPA, APOE, and Imaging, with a total of 74% overlap.
Results

Favourable APOE genotyping

<table>
<thead>
<tr>
<th>Initial Diagnosis</th>
<th>No change</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCI</td>
<td>84%</td>
<td>0%</td>
</tr>
<tr>
<td>MCI</td>
<td>43.2%</td>
<td>76.9%</td>
</tr>
<tr>
<td>AD</td>
<td>13.6%</td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

$p = 0.03$
Results

Normal NPA

<table>
<thead>
<tr>
<th>Initial Diagnosis</th>
<th>No change (NCI)</th>
<th>Change (MCI)</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85.7%</td>
<td>61.1%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>4.7</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 0.04, p <0.001*
• Brain imaging not significantly associated with a change in diagnosis
Results

- Follow up reassessment
- 25 (24.3%) patients had a change in diagnosis
Results

Normal NPA at baseline

<table>
<thead>
<tr>
<th>Diagnosis at follow up</th>
<th>No change</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCI</td>
<td>82.1</td>
<td>14.3</td>
</tr>
<tr>
<td>MCI</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>AD</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Compared to consensus diagnosis

Abnormal brain imaging and APOE genotyping were not significant

\[ p = 0.006 \]
Limitations

• Single centre study
• Clinical diagnosis made by an experienced geriatrician
• Clinical service
• No validation of diagnoses
• Short follow up period
Conclusion

• Additional test add value to routine clinical assessment
• Single most useful additional test → NPA
• Role of future biomarkers