Post-delirium brain pathology – the same or different from AD?

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• Conflicts of interest: None
Cognitive decline

Pathology

Delirium
A central question

The most common problem in acute geriatric medicine...

... a public health challenge costing £23 billion?
Delirium: long-term outcomes

• Systematic review

• Outcomes
  – Death HR 2.0
  – Dementia OR 13

• But selection bias?

• But undiagnosed dementia?
Cognitive trajectories

Fong 2009 Neurology

Davis 2012 Brain
### EClipSE

<table>
<thead>
<tr>
<th>Study</th>
<th>Total sample</th>
<th>Site</th>
<th>Age sample</th>
<th>Years follow-up</th>
<th>Donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vantaa 85+</td>
<td>553</td>
<td>Vantaa, Finland</td>
<td>≥85</td>
<td>10</td>
<td>290 (52%)</td>
</tr>
<tr>
<td>CC75C</td>
<td>2,166</td>
<td>Cambridge, UK</td>
<td>≥75</td>
<td>25</td>
<td>241 (11%)</td>
</tr>
<tr>
<td>CFAS</td>
<td>18,226</td>
<td>UK multicentre</td>
<td>≥65</td>
<td>10</td>
<td>456 (3%)</td>
</tr>
</tbody>
</table>

**Delirium**

Vantaa 85+ retrospective interview, case notes review
CC75C / CFAS retrospective interview
Vantaa 85+ Cohort Study

- Population-based
- Southern Finland
- All residents age ≥85 years
- Recruited 1991
- Cognitive and functional assessment each wave
- 52% autopsy

- Retrospective delirium assessments
Incident dementia

Death / attrition

Hx Delirium

Wave A

No dementia

Dementia

Wave B
### Participant characteristics

<table>
<thead>
<tr>
<th>N</th>
<th>No delirium</th>
<th>Delirium</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>708</td>
<td>279</td>
<td></td>
</tr>
<tr>
<td>Age at death; mean (SD)</td>
<td>89 (6.7)</td>
<td>90 (5.8)</td>
<td>0.03</td>
</tr>
<tr>
<td>Sex; female (%)</td>
<td>472 (66)</td>
<td>210 (75)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Years of education; median (IQR)</td>
<td>9 (6-13)</td>
<td>9 (8-14)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pathology; N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurofibrillary tau</td>
<td>346 (50)</td>
<td>166 (59)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Amyloid plaques</td>
<td>344 (50)</td>
<td>138 (42)</td>
<td>0.62</td>
</tr>
<tr>
<td>Vascular</td>
<td>358 (56)</td>
<td>139 (57)</td>
<td>0.54</td>
</tr>
<tr>
<td>Lewy bodies</td>
<td>67 (10)</td>
<td>27 (10)</td>
<td>0.99</td>
</tr>
</tbody>
</table>
Cognitive decline
Pathology
Delirium
Hypothesis

Accelerated cognitive decline due to delirium... acts independently from classical dementia pathology
Most dementia pathology

Least dementia pathology

MMSE
Most dementia pathology

Least dementia pathology

MMSE

-6 -4 -2 0

A

B

C

D

?
Delirium is a determinant of cognitive decline

Independent but additive to classical dementia pathology
Collaborators

Cambridge
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Hannah Keage
Blossom Stephan

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Terhi Rahkonen
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NIHR CLAHRC for Cambridgeshire and Peterborough

Collaborations for Leadership in Applied Health Research and Care