Cognitive trajectory in stroke

Dr Terry Quinn
Stroke Association/CSO Senior Clinical Lecturer

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I am not a:

vascular neurologist with an interest in dementia, subspecialty training in psychiatry and substantial expertise in neuropsychology assessment
I am not a:

vascular neurologist with an interest in dementia, subspecialty training in psychiatry
I am not a:

vascular neurologist with an interest in dementia,
I am not a:

vascular neurologist
I am not a:

neurologist
Cognitive trajectory in stroke

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@DrTerryQuinn
Prevalence of cognitive impairment post stroke: 8-45%
STROKE

Barthel Index

3 – 6 months

Good recovery

Poor recovery
$E(\text{ADL}) = 91.8 - 0.58 \times \text{FUF}$

$E(\text{ADL}) = 75.9 - 1.94 \times \text{FUF}$
In those with no insurance:
annual pre-stroke decline: 0.58 Barthel Index

$$E(ADL) = 91.8 - 0.58*FUF$$

In those with no insurance:
annual post-stroke decline: -1.36 Barthel Index

$$E(ADL) = 75.9 - 1.94*FUF$$
Biomarkers select those most likely to develop dementia.

Conversion to MCI
OR
MCI conversion to dementia
offers an efficient, robust measure of outcome.
Prognostic accuracy of biomarkers in older adults is limited.

Conversion from MCI to dementia is not certain; even after extended follow up.

In older adults mixed patterns of dementia are common.
STROKE

MoCA < 26

No Dementia

Dementia
STROKE

MoCA <26

Dementia

No Dementia
<table>
<thead>
<tr>
<th>Total (n studies)</th>
<th>Demented/ Total</th>
<th>Prev (%)</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All patients with stroke</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital-based</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (3 studies)</td>
<td>112 / 779</td>
<td>14.4</td>
<td>12.0-16.8</td>
</tr>
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<td>Population-based</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total (3 studies)</td>
<td>152 / 1674</td>
<td>9.1</td>
<td>6.9-11.3</td>
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<td><strong>Patients reaching follow-up</strong></td>
<td></td>
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<td>Total (7 studies)</td>
<td>175 / 2057</td>
<td>8.5</td>
<td>7.3-9.7</td>
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Informant assessments for diagnosis of dementia

Informant Questionnaire Cognitive Decline Elderly (IQCODE)

Alzheimer’s Disease 8 questions (AD-8)

Deterioration Cognitive Observe

Blessed Dementia Scale

GP-Cog

Concord Informant Dementia Scale (CIDS)

Symptoms of Dementia Screener (SDS)
**IQCODE** in the last ten years have you noticed a change in X’s ability to:

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Describing 3 differing approaches to informant assessment in stroke care.

McGovern et al
Stroke 2016
Describing 3 differing approaches to informant assessment in stroke care.

IQCODE for diagnosis of pre-stroke dementia

IQCODE for future dementia diagnosis

IQCODE for contemporaneous diagnosis of post stroke dementia

SENS: 0.81
SPEC: 0.82

McGovern et al
Stroke 2016
Describing 3 differing approaches to informant assessment in stroke care.

SENS: TBC
SPEC: TBC

SENS: 0.81
SPEC: 0.82

McGovern et al
Stroke 2016
Describing 3 differing approaches to informant assessment in stroke care.

SENS: TBC
SPEC: TBC

SENS: 0.81
SPEC: 0.82

SENS: 0.60
SPEC: 0.97

McGovern et al
Stroke 2016
♦ Hospital cohorts, all stroke
○ Community cohorts, first ever stroke only
One year estimates
PSD range from: (aprox) 5%-55%

- Hospital cohorts, all stroke
- Community cohorts, first ever stroke only
Hospital cohorts, all stroke

Community cohorts, first ever stroke only

Heterogeneity driven by case mix & methodology

- Inclusion / exclusion criteria
- Bias in outcome assessments (self report)
- Selective attrition for (clinic based) follow up
- Competing risk

Pendlebury et al, Lancet Neurol 2009

Pendlebury Stroke 2015
$E(ADL) = 91.8 - 0.58 \times FUF$

$E(ADL) = 75.9 - 1.94 \times FUF$
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<tr>
<td>‘Alzheimers disease’</td>
<td>-2.5</td>
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30,239 REGARDS participants with completed in-home visits

4,780 Excluded
   - 628 No baseline SIS data
   - 69 Incident stroke before first SIS
   - 2,639 Baseline cognitive impairment (SIS < 5)
   - 1,444 No follow-up SIS

25,459 Eligible for analysis

1,887 Excluded (missing data on covariates)°

23,572 Included in analysis
   - 23,057 With no incident stroke
   - 515 With incident stroke
Global cog screen

Word list learning

Word list delayed recall

Animal fluency
Can we predict trajectory

Is post stroke trajectory ‘fixed’
MMSE trajectories by Stroke

Uncertain/Unknown cause

Small Vessel Occlusion

Large Artery Atherosclerosis

Cardioembolism

Years

0 1 2 3 4 5

0 10 20 30

MMSE

0 1 2 3 4 5 6

0 10 20 30

MMSE

0 1 2 3 4 5 6

0 10 20 30

MMSE
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<th>Rate following further vascular event</th>
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Can we predict trajectory

Is post stroke trajectory ‘fixed’
STROKE

MoCA <26

Associations with PSD
Female sex, education
Diabetes, AF
Recurrent stroke
Delirium, seizures
MTLA, WMD

No Dementia

Dementia
STROKE

MoCA <26

Associations with trajectory
- Female sex, education
- Diabetes, AF
- Recurrent stroke
- Delirium, seizures
- MTLA, WMD

No Dementia

Dementia
Annual rate of MMSE change: -0.04

Sex, smoking, depression have poorer baseline

Independent predictors of decline: age, diabetes

Survivors have better baseline & rate of change
STROKE

MoCA <26

Dementia

No Dementia
Pre-stroke cognition

Predictors of cognitive trajectory

Repeated assessment with responsive tool

Reassess if further event
Pre-stroke cognition

Predictors of cognitive trajectory

Repeated assessment with responsive tool

Reassess if further event

STROKE
Assessing Post-stroke Psychology: A Longitudinal Evaluation
• Embrace the complexity

• Cognition is a dynamic process – keep assessing

• Take a life course approach

• Recognise the limitations in available data

• Avoid cognitive nihilism

• Understanding trajectory may lead to interventions
Cognitive trajectory in stroke

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