The Impact of FLARE

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Overview

1. Background to the FLARE project
2. Research outcomes
3. Where to next
4. The contribution of FLARE to my career
Background: What is VCI?

- Group of cognitive disorders that share a presumed vascular cause
  - Vascular Disease Factors (e.g., stroke & hypertension)
  - Lifestyle Factors (e.g., tobacco use & physical inactivity)

Vascular risk factors can impact anywhere along the trajectory

Stephan et al., Alzheimer’s Research & Therapy, 2009
Research Objectives

• Explore the interrelationships between vascular factors, cognitive decline and dementia using a population based approach

• Develop a predictive model (incorporating vascular markers) for identifying individuals at high risk of future dementia
Data Resources

European Prospective Investigation into Cancer (EPIC-Norfolk, UK)

FLARE Collaborative Network

Cognitive Function and Ageing Study (CFAS, UK)

3-City Study (France)
Data Resources

CFAS, UK
- N=13,004
- 65+ years
- Cognition, health, physical function, blood biomarkers & neuropathology

3C-Study, France
- N=3,442
- 65+ years
- Cognition, vascular related disease, MRI & blood biomarkers

FLARE Collaborative Network

Cognitive Function and Ageing Study (CFAS, UK)

3-City Study (France)
Health Co-morbidity in Individuals with Mild Cognitive Impairment (MCI)

- High incidence of disease co-morbidity in all groups
  - Most MCI cases satisfy criteria for VCIND

10 Conditions (self/informant report)
- Anaemia, Parkinson’s disease, breathing difficulties, angina, hypertension, diabetes mellitus, peripheral vascular disease, transient ischemic attack (TIA), stroke or heart attack
Risk Factors for Progression

- Does disease co-morbidity increase risk of dementia (2-years follow-up) in MCI?

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Unadjusted OR</th>
<th>Adjusted* OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>13.5 (2.6-71.3)</td>
<td>10.6 (2.3-48.7)</td>
</tr>
</tbody>
</table>

*Adjusted for age, sex and education (years)

- Overall, medical co-morbidity does not appear to help distinguish individuals with and without progressive MCI

Stephan et al., Age and Aging, 2011
Risk Models for Mass Prediction
Mobility Research Project

• Focus on the whole non-demented population

• **Research Question** Can we develop a simple tool that can identify those individuals at high risk of future dementia?
## Potential Predictors

### 4 Year Incident Dementia

<table>
<thead>
<tr>
<th>Easily Obtainable</th>
<th>Moderately Easily Obtainable</th>
<th>Difficult to Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td><strong>Psychiatric Co-morbidity</strong></td>
<td><strong>MRI and Ultrasound</strong></td>
</tr>
<tr>
<td>(e.g., age, gender)</td>
<td>(e.g., depression)</td>
<td>(e.g., WMLs, atrophy, IMT)</td>
</tr>
<tr>
<td><strong>Lifestyle</strong></td>
<td><strong>Vascular Health</strong></td>
<td><strong>Blood/Serum</strong></td>
</tr>
<tr>
<td>(e.g., smoking and alcohol use)</td>
<td>(e.g., stroke, obesity, CHD)</td>
<td>(e.g., glycaemia, cholesterol)</td>
</tr>
<tr>
<td><strong>Cognition</strong></td>
<td><strong>Medication History</strong></td>
<td><strong>Genetics</strong></td>
</tr>
<tr>
<td>(e.g., memory and non-memory)</td>
<td>(e.g., psychotropic or statins)</td>
<td>(e.g., APOE e4)</td>
</tr>
<tr>
<td><strong>Functional/Motor Status</strong></td>
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</tbody>
</table>
The Model

• **Simple Risk Model** Age, cognition, functional performance, motor performance and psychotropic medication use
  
  • 3 risk categories: low (2.2% incident cases), moderate (18.3% incident cases) and high (56.3% incident cases)
  • Area Under the Curve (AUC)=0.81 [95%CI: 0.78-0.84]

• Discriminative accuracy was not improved with the addition of MRI, blood or genetic risk markers

Stephan et al., in preparation
Conclusions

• Relatively simple measures can be used to identify individuals at high risk of dementia with reasonable accuracy

• Identification of high-risk individuals is important to better focus prevention and early intervention efforts
Where to Next ...

• New projects for funding and extending collaborations

  • **3-City Study** Develop a risk model where all components are modifiable (Research mobility July 2012)

  • **EPIC-Norfolk** Undertake an MRI programme to determine the association between brain structural changes, health status and cognitive impairment

  • **Research Sabbatical** to the National Institutes of Health in the USA in October 2012 (identified through the French team)
Contribution of FLARE to my Career

• Research progression
  • Publications, conferences and new research projects

• Training and professional development
  • In-depth research and focus on my own topic
  • Project leadership (at home and abroad)

• Inter-disciplinary exchange of ideas through the FLARE Fellow community

• Senior Researcher post (2011) and permanent academic position (Lecturer, 2012)
  • Permanent residency in the UK and British citizenship
Acknowledgements

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  • 3-City Study (Dufouil, Kurth)