

Rapid, early, sensitive and specific detection and diagnosis of dementia: a new paradigm in magnetic resonance imaging biomarkers for the clinical care pathway.

BACKGROUND

Dementia affects >5% of people over 65 years, and its prevalence further increases with age. According to the Alzheimer Disease International (ADI) World Alzheimer Report 2015, the number of people affected will double every 20 years to 74.7 million by 2030 and 131.5 million in 2050.

Despite the fact that there is significant evidence for the benefits of early diagnostic evaluation, treatment and social support, the rate of diagnosis and treatment in people with dementia varies considerably across the world. Primary care physicians play a major role in the identification, diagnosis and management of patients with dementia, but advanced diagnostic techniques necessitate the involvement of specialists, especially neurologists, preferably in multidisciplinary teams established to facilitate the management of the complex needs of patients and caregivers during the course of the dementia disease.

Diagnostics and assessment of dementia follows a similar pathway in the US/ EU/UK which consists of initial primary care assessment of cognitive function supplemented by imaging of brain structure to confirm diagnosis. Brain scans are already part of the diagnostic pathway for diagnosing dementia once other simpler tests such as the mini mental state exam (MMSE) have ruled out other problems.

NICE (UK) recommends using a magnetic resonance imaging (MRI) scan to help confirm a diagnosis of dementia and the current therapy choices necessitate quick diagnosis and treatment to maximise effectiveness. Unfortunately, conventional MRI biomarkers such as brain volume analysis are more effective when dementia is more advanced and not capable of highlighting small alterations in the brain microstructure required to diagnose dementia early in its development. There is a clear need for a better MRI-based biomarker of dementia to detect the disease earlier than is currently possible.

THE TECHNOLOGY

A team of researchers based at The University of Manchester have developed a completely novel diffusion MRI technology that can characterise and map brain tissue layering and structure and assess its integrity and disruption. Specifically, for dementia, it has been shown to permit the

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rapid assessment and characterisation of microstructural complexity; both in-vivo and non-invasively.

BENEFITS

- Detection of brain tissue changes due to dementia earlier than competing imaging based methods;
- Differentiate between different types of dementia;
- Improved sensitivity and specificity against existing MRI-based biomarkers of dementia such as volumetric measurements.

APPLICATIONS

- The technology is being developed for diagnostic application for dementia

INTELLECTUAL PROPERTY

A patent application is in preparation and we plan to file in 2017.

OPPORTUNITY

The technology will be of interest to medtech and pharmaceutical companies. We would like to collaborate with an industry partner for further preclinical and clinical investigations. We are in the process of establishing a University spin-out company to commercialise this technology.

CONTACT

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