REFLEXIVE SACCADIES IN ALZHEIMER'S DISEASE USING FMRI

S.L. Wright¹,², M.R. MacAskill¹,², R. Watts¹,³, L. Livingston¹,², B. Deavoll⁴, R. Keenan⁵, J.C. Dalrymple-Alford¹,⁶, T.J. Anderson¹,²

¹Van der Veer Institute, ²Medicine, University of Otago, ³Physics and Astronomy, University of Canterbury, ⁴Canterbury District Health Board, ⁵Christchurch Radiology Group, ⁶Psychology, University of Canterbury, Christchurch, New Zealand

Introduction: Reflexive saccades are normally sub-served by a fronto-parietal network consisting of the frontal eye field (FEF), supplementary eye field (SEF) and parietal eye field (PEF). Alzheimer’s disease (AD) subjects exhibit prolonged latency in this reflexive saccade paradigm.

Aim: The aim of this study was to assess this network in AD compared with controls.

Methods: Fifteen AD and 16 control subjects performed the reflexive task during 3T fMRI. fMRI data were normalised to an elderly template and covaried with grey matter density, age, sex and education to account for atrophy and subject effects upon the BOLD signal. All completed a neuropsychological battery and Montreal Cognitive assessment (MoCA).

Results: Saccades were significantly delayed in AD (AD = 245±90 ms, Control = 210±56 ms) and correlated with MoCA (r=−0.09) and visuospatial scores (r=−0.6). The AD group exhibited less activation in left superior parietal lobule and left occipital gyrus, and greater activity than the Control group in the left hippocampus and right inferior temporal gyrus.

Conclusion: This is the first report of a negative correlation between reflexive saccade latencies and the MoCA and visuospatial domain. The reduced activity in the left superior parietal lobule (PEF) and occipital gyrus in AD, together with prolonged reflexive saccade latencies suggests that the reflexive saccade cortical network is dysfunctional, particularly in the PEF. The finding of increased activity within the temporal lobe in the AD group is interesting, as this automatic task does not require memory or learning.