

EXAMINING CHANGES IN MEDIAL TEMPORAL LOBE DIFFUSIVITY AND METABOLITE FUNCTION AMONG OLDER ADULTS WITH MILD COGNITIVE IMPAIRMENT UNDERGOING TOTAL KNEE REPLACEMENT SURGERY

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Introduction

During a time when researchers are attempting to reduce or cease the progression of Alzheimer's Disease (AD), it is alarming that there is little understanding about the effect of surgery on the neuroanatomical integrity. Numerous older adults, including those with possible early stage AD, frequently obtain elective surgeries in an effort to improve their functional quality of life (e.g., total knee or hip replacement surgery). In an attempt to prolong functioning or improve quality of life, surgery may unknowingly accelerate cognitive decline and neuroanatomical degeneration.

The purpose of the proposed pilot study will be to examine pre to post-changes in neuroanatomical integrity among patients in the prodromal stage of AD (at this stage, patients are diagnosed with 'Mild Cognitive Impairment') undergoing total knee replacement surgery. We hypothesize that individuals with Mild Cognitive Impairment (MCI)^[1] are neuroanatomically and cognitively vulnerable to the effects of surgery. This vulnerability is believed to be partially due to increased susceptibility for ischemic damage to myelin within the mesial temporal lobe. The diathesis stress model and theory of cerebral reserve guide the hypotheses of the proposed investigation.

Experimental

All pre and post surgery scans will be collected using the Siemens 3T Allegra scanner within the McKnight Brain Institute with MR technician's assistance. Pre and post surgery 12 direction diffusion tensor image (DTI) sets will be collected with contiguous 3mm coronal slices obtained through the MTL. Fractional anisotropy maps will be generated and the evaluation of different regions of interest will be completed using a semi-automated shrink technique developed at our. Additional FLAIR (Fluid Attenuated Inversion Recovery) will be obtained to examine the effect of vascular burden on cognitive change among AD and non AD patients. Pre and post surgery single voxel spectroscopy of the anterior 2/3 of the hippocampus will be obtained. Metabolites of interest include Creatine, Choline, myo-Inositol and NAA. Cr/ NAA ratios will be calculated using Area Under the Curve algorithm.

Results and Discussion

This pilot study will be initiated during January of 2006. Results will be published in the December 2006 annual MagLab report.

Conclusions

Not Applicable.

Acknowledgements

Not Applicable.

References

[1] Petersen, R, Archives of Neurology, **56**, 303-308 (1999).