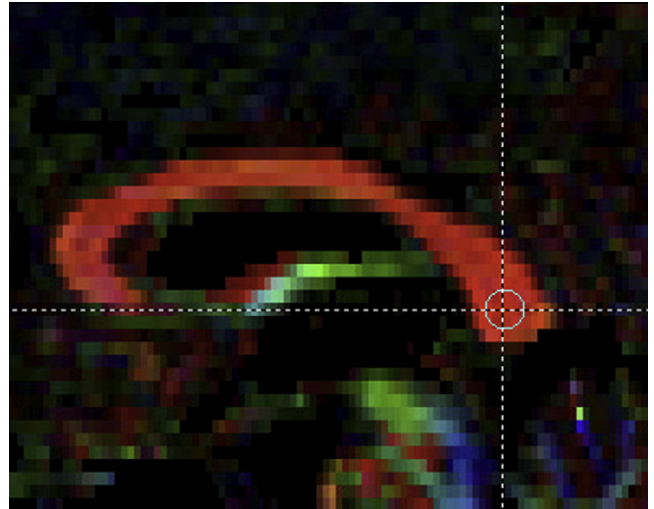
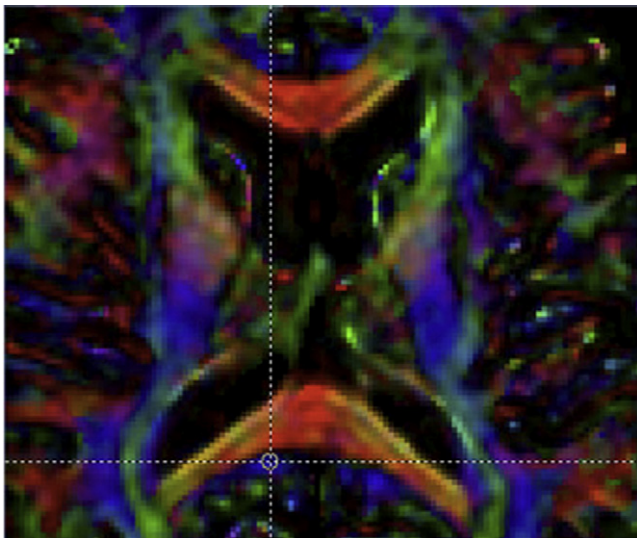


**IC-01-05** **TWELVE-MONTH FOLLOW-UP STUDY OF FRACTIONAL ANISOTROPY CHANGES IN MILD COGNITIVE IMPAIRMENT COMPARED TO HEALTHY ELDERLY SUBJECTS**

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**Background:** Diffusion Tensor Imaging (DTI) demonstrates changes of white matter integrity in the very early stage of Alzheimer's disease (AD). Fractional anisotropy (FA) as a measurement of fiber tract integrity is reduced in patients with AD and patients with mild cognitive impairment (MCI) in intracortical projecting fiber tracts. However, most studies reported cross sectional data. In this study, we aimed to determine the changes of FA in MCI patients and healthy elderly subjects (HC) over 12 months follow-up. **Methods:** Thirteen MCI and 11 HC were enrolled. All subjects underwent neuropsychological testing and high resolution MRI and DTI scans at 3 Tesla at baseline and after 12 months of follow-up. We employed region of interest based measurements of FA in posterior cingulate gyrus (figure in upper row) and corpus callosum subregions (figure in lower row) including splenium and genu. ROI placement was guided by color coded fiber tract maps after coregistration of baseline and follow-up DTI maps. We used repeated measure analysis to determine the difference of FA between baseline and follow up. **Results:** There was no age difference between both groups. There was no significant decline of MMSE over time in MCI and HC groups. There was a significant decline of FA in corpus callosum genu in MCI patients ( $p < 0.016$ ), but not in controls, and a decline of FA in splenium in both groups ( $p < 0.043$ ). There was no significant decline of FA in posterior cingulate gyrus. **Conclusions:** There was significant decline of DTI based measures of white matter tract integrity in the corpus callosum of MCI patients and to a lesser extent in HC subjects. Contrary to our primary hypothesis, there was no decline of white matter integrity over time in the posterior cingulate gyrus. Future studies with longer follow up period and a larger number of subjects are required to confirm these findings.



SATURDAY, JULY 11, 2009

ALZHEIMER'S IMAGING CONSORTIUM PRESENTATIONS

ORAL

IC-02

**IC-02-01** **PREVALENCE OF BETA-AMYLOID PLAQUES IN A NONDEMENTED POPULATION USING [11C]PIB AND PET: IMPACT OF APOE GENOTYPE**

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**Background:** Beta-amyloid plaque accumulation in the brain is a hallmark of Alzheimer's disease (AD) and likely precedes the clinical symptoms. Positron emission tomography (PET) with [11C]PIB allows *in vivo* visualization of beta-amyloid plaques. We used PET PIB to investigate the prevalence of beta-amyloid plaques in a nondemented sample and examined the impact of age and *APOE* genotype. **Methods:** Participants at the Washington University Alzheimer's Disease Research Center who had a Clinical Dementia Rating of 0 (nondemented) were recruited for PET [11C]PIB imaging. MRI-derived regions-of-interest of cerebellum (for nonspecific uptake reference), precuneus, gyrus rectus, lateral temporal cortex, and prefrontal cortex and Logan graphical analysis were used to estimate binding potential (BP). The BP values from these four regions were averaged to create the Mean Cortical BP, or MCBP. PET PIB results were examined as continuous and dichotomous variables: PIB+ (with MCBP > 0.18) or PIB- (MCBP < 0.18). **Results:** The nondemented participants ( $n = 242$ , M/F = 77/165), aged 45 to 89 years had a mean age of 67.0 y (SD = 10.7). Overall, 18.1% of participants were PIB+ and 34.2% were *APOE*  $\epsilon 4$ +. The likelihood of being PIB+ increased with age in years (OR = 1.10, 95%CI = 1.04-1.13,  $p < 0.0001$ ), and with having an *APOE*  $\epsilon 4$  allele ( $p < .0001$ ; one *APOE*  $\epsilon 4$  allele, OR = 6.73, 95%CI = 2.85-15.87,  $p < 0.0001$ ; two *APOE*  $\epsilon 4$  alleles, OR = 34.32, 95%CI = 6.43-183.23) in the adjusted logistic regression analyses. By decades the overall frequency of PIB+ was 6.0% for 50-59 y, 18.0% for 60-69 y, 26.2% for 70-79 y, and 30.3% for 80-89 y. When only *APOE*  $\epsilon 4$  carriers were considered the prevalence of PIB+ scans were much higher reaching 47.4% for 70-79 yr and 71.4% for 80-89 y. **Conclusions:** Beta-amyloid plaque deposition by PET PIB imaging is seen to be present in a large subset of the nondemented elderly with high dependence on age and *APOE* status. Estimates of odds ratios with one or two *APOE*  $\epsilon 4$  alleles were very high at 6.73 and 34.32, respectively, supporting the uniquely powerful influence of this genotype. However, it should be noted that 35% of all PIB+ scans occurred in participants with no *APOE*  $\epsilon 4$  allele, indicating other factors must also be considered.