

AbstractID: 12622 Title: Volumetric reduction of the corpus callosum in Alzheimer's disease

Purpose: This study investigated correlations between regional corpus callosum (CC) atrophy and cognitive measurements in AD subjects at mild disease stages with volumetry. Our aims were to replicate ROI-based findings of reduced volumes of the CC in AD patients relative to mild cognitive impairment (MCI) and to investigate, on a voxel-by-voxel basis, the presence of significant correlations between CC atrophy and cognitive test scores in AD subjects.

Method and Materials: We used the VBM and cross-sectional ROI-based volumetry approach to conduct a detailed assessment of CC volumetric reductions in a probable AD patients (n=40) in comparison to MCI (n=40) and subjective memory impairment (SMI) (n=12) matched for age.

Results: The volumetric reduction of the posterior portion of the CC body, which interconnects cortical regions that are also early affected in AD (mean area at mid intersection, AD=510.7mm², MCI=515.6mm², SMI=603.9mm², relative%ratio: AD=0.27, MCI=0.3, SMI=0.4) such as the superior temporal lobes, is also consistent with results of previous ROI-based morphometric MRI studies. Significant CC atrophy was detected in the anterior-superior portion of the splenium, the isthmus, the anterior and posterior portions of the CC body. Structural abnormalities of the CC splenium may be secondary to an early primary neuronal loss in AD involving parieto-temporal neocortical regions, which are inter-hemispherically connected by this callosal portion.

Conclusions: Our results confirm of diffuse volumetric CC reductions in the AD, and warrant further evaluation of the relevance of atrophic changes in anterior CC portions to the cognitive impairments that characterize the disorder. A cluster of significant positive correlation with MMSE scores was seen on the left anterior CC body. The VBM results reported showed that in predominantly AD subjects, foci of atrophy are present in several portions of the CC, involving the anterior-superior portion of the splenium and the isthmus.