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COGNITIVE DECLINE IN ALZHEIMER'S DISEASE IS ASSOCIATED WITH REDUCTION IN TOTAL NEOCORTICAL VOLUME. Peter R. Mouton, Michael E. Calhoun, Gloria Dal Forno, Lee J. Martin, Donald L. Price, and Claudia H. Kawas, The Johns Hopkins University School of Medicine, Baltimore, Maryland

Relationships between cognitive functions and neocortical volume in aged controls and cases of dementia were investigated using unbiased stereological methods. Subjects included 20 consecutive cases (14 males, six females) from the Baltimore Longitudinal Study on Aging (BLSA) and Alzheimer's Disease Research Center (ADRC), all of whom were regularly tested with the Mini-Mental State Examination (MMSE). Using a tissue slicer, the entire left forebrain was sectioned in the transverse plane into 10-20 1-cm-thick slabs, with the first cut made at random within the first 1 cm of the frontal pole. High-contrast images of each slab were made for stereological analyses. Based on histopathological analyses using two established criteria for AD, cases were divided into four groups: control [n=5; AD pathology(-), dementia(-)]; definite AD [n=8; AD pathology(+), dementia(+)]; questionable AD [n=3; AD pathology(+), dementia(-)]; and non-AD dementia [n=4; AD pathology(-), dementia(+)]. The results of ANOVA testing showed significantly lower mean neocortical volume for the AD group as compared to controls ($p < 0.01$). Within the AD group, there was significant concordance between each individual's final MMSE score and the postmortem neocortical volume [$r=0.91$ ($p < 0.002$), $R^2=0.83$]; similar findings were not seen within other groups. These data provide support for a quantitative association between cognitive decline in AD and total neocortical volume. Further studies of the BLSA and ADRC cohorts that combine neocortical volume estimation with *in vivo* resonance imaging may lead to improved diagnostic accuracy for AD.