## IC-P-002 IMPACT OF MORPHOLOGICALLY DISTINCT AMYLOID ß (Aß) DEPOSITS ON 18F-FLORBETABEN (FBB) PET SCANS

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**Background:** Morphologically distinct Aß deposits, such as diffuse or neuritic Aß plaques (DIFF, NEUR), and vascular Aß (VASC) may be present in Alzheimer's disease (AD). FBB has been validated as a biomarker of NEUR. It was the aim of this project to investigate the impact of the different forms of Aß deposits on FBB PET scans. **Methods:** Brain tissue was collected from 87 end-of-life patients (64 AD patients) who underwent a FBB PET scan before death. Aß immunohistochemistry (IHC) was used for assessment of VASC. Aß IHC and Bielschowsky silver stain were used for assessment of NEUR and DIFF in frontal, occipital, anterior cingulate and posterior cingulate cortices. Cortical SUVRs were obtained in all ROIs using cerebellar grey matter as reference region. A linear regression model was fitted for each ROI as: $SUVR=a_0+a_n \times n+a_d \times d+a_v \times v$, where $a_0$, $a_n$, $a_d$, $a_v$ are constants, and n=NEUR, d=DIFF and v=VASC. n, d, and v were assigned two values: 0=Ab absent; 1=Ab present. **Results:** In ROIs with high frequency of Aß (frontal, posterior cingulate), both DIFF (a=0.32 and 0.42) and NEUR (a=0.27 and 0.21) contributed significantly to the SUVR. In regions with low frequency of Aß (occipital, anterior cingulate), only DIFF contributed significantly to the SUVR (a=0.24 and 0.55). Presence of VASC contributed significantly to the SUVR only in the occipital region (a=0.13). **Conclusions:** There was a significant impact of DIFF and VASC on FBB SUVR in brain regions characterized by low Ab load. These results underline the importance of measuring the topographic distribution of Ab aggregates and suggest the potential utility of FBB in detecting both DIFF and VASC Aß deposits.

Table
Coefficient values from the fitted models to each regional SUVR for each type of amyloid deposition (p values)

| Region | $a_{diffuse}$ | $a_{neuritic}$ | $a_{vascular}$ |
|---|---|---|---|
| Frontal | 0.32 (0.001)* | 0.27 (0.002)* | 0.09 (0.22) |
| Posterior cingulate | 0.42 ($<10^{-4}$)* | 0.21 (0.01)* | -0.03 (0.77) |
| Occipital | 0.24 (0.0001)* | 0.10 (0.07) | 0.13 (0.01)* |
| Anterior cingulate | 0.55 ($<10^{-4}$)* | 0.09 (0.37) | -0.02 (0.85) |

* Statistically significant (p<0.05). Coefficient values>0 indicate contribution to SUVR

## IC-P-003 AUGMENTING AMYLOID PET INTERPRETATIONS WITH QUANTITATIVE INFORMATION IMPROVES CONSISTENCY OF CEREBRAL AMYLOID DETECTION

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**Background:** Establishing reliable methods for interpreting the presence or absence of elevated cerebral amyloid plaque on PET scans is increasingly important for radiologists with the greater availability of molecular PET imaging in clinical practice. We examined the value of adding quantitative amyloid PET information to the interpretation of amyloid-PET scans. **Methods:** A total of 60 nondemented (CDR 0) adults over age 65 (mean age 73.6 years) were evaluated with amyloid-PET imaging using florbetapir as part of screening for a Alzheimer's disease prevention study at the University of Kansas Alzheimer's Disease Center. Images were first interpreted visually (Visual Read) as either 'elevated' or 'not elevated' using FDA-approved methods by two different raters. Images were then re-evaluated after the reader considered quantitative analyses (VisualQuant Read) using MIMneuro software to compare the image to a standard atlas. We examined the frequency of interpretation changes after quantitative information was considered and whether this information improved the inter-rater agreement of interpretations. We also examined how the Visual Reads and VisualQuant Reads compare to a purely quantitative read where a scan was determined to be elevated based on an SUVR>1.1 in six regions of interest (anterior cingulate, inferior medial frontal, lateral temporal, posterior cingulate, precuneus, and superior parietal). Simple percent agreement and Cohen's kappa were used to measure agreement. **Results:** 60 scans were interpreted by two blinded raters. The initial Visual Read was changed after the introduction of quantitative information in 6.7% (n=4) of scans for Rater 1 and 11.7% (n=7) for Rater 2. Initial Visual Reads were changed from non-elevated to elevated in 9 of the 11 (81.8%) scans that were changed. Agreement of reads across raters was 90% (54 of 60; Kappa=0.75) for Visual Reads and increased to 95% (n=57, Kappa=0.89) for the VisualQuant Reads. Quantitative only assessments (SUVR >1.1) were concordant with VisualReads (86.7% for Rater 2 and 90.0% for Rater 1) but concordance was higher with the VisualQuant Reads (95.0% - 96.7%). **Conclusions:** Augmenting the radiological interpretation of amyloid PET scans with quantitative information appears to improve the consistency in interpretations for the early detection of the presence of cerebral amyloid accumulation.

## IC-P-004 THE ASSOCIATION BETWEEN AMYLOID BURDEN AND LANGUAGE OUTCOMES IN THE WISCONSIN REGISTRY FOR ALZHEIMER'S PREVENTION (WRAP)

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**Background:** The early diagnosis of Alzheimer's Disease (AD) depends upon clinical manifestations of difficulties with learning and memory which negatively impact activities of daily living (Dubois et al., 2007). Beta-amyloid (1-42) (A$\beta$42) accumulation, may be a first major stage of presymptomatic AD (Sperling et al., 2011). Language deficits, based on retrospective analysis and prospective cohort studies, may also be present years or decades before diagnosis (Snowdon et al, 1996; Garrard et al 2005; Forbes-McKay