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BIOMARKERS

PODIUM PRESENTATION

NEUROIMAGING

Neuroimaging Findings in a Racially and Ethnically Diverse Cohort of Oldest-Old Individuals: The LifeAfter90 Study

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Abstract

Background: Neuroimaging biomarkers are important and widely used in dementia research. Such studies, however, are rare in the oldest-old and essentially non-existent in ethnically diverse oldest-old populations where the prevalence of cognitive impairment is greatest and dementia due to multiple pathologies. Here we present initial neuroimaging findings in the LifeAfter90 Study, a racially and ethnically diverse cohort of oldest-old individuals.

Methods: LifeAfter90 is a cohort of long-term members of a health-care system aged 90+ without a dementia diagnosis in their medical record at recruitment and clinical assessments every 6 months. Of the >800 participants enrolled, a subset agreed to brain imaging (MRI and amyloid PET). Hippocampal volume (HV) and white matter hyperintensities (WMH) were normalized to intracranial volume and WMH was log transformed. Amyloid burden was quantified as the mean SUVR values of 4 regions and dichotomized with an SUVR cutpoint of 1.10. Mean neuroimaging marker levels were compared between ethnoracial groups with analysis of covariance adjusting for age.

Results: To date, 99 individuals have undergone an MRI and 90 an amyloid PET scan. The average age at the time of scan was 93 years, 60% of participants were women, and 43% had college education or higher (Table 1). Unadjusted values of neuroimaging findings are in Table 1 and adjusted means in Table 2 and Figure. In our preliminary data, we see 44% amyloid positivity overall. Black individuals have the lowest proportion of amyloid positivity (32%) but among the highest WMH mean volume, whereas Latino individuals have the highest proportion of amyloid positivity (64%) and lowest WMH mean volume. Asian individuals had the highest mean hippocampal volume. Except for SUVR differences in Black vs Latino individuals (p=.04), there were no group differences in mean levels (Figure).

Conclusions: We present neuroimaging findings from a first-of-its kind multi-ethnic cohort study of oldest-old individuals. Although too early to test for differences due to the small number of individuals, we have indications of ethnoracial differences in

levels of neuropathologies consistent with those of younger elderly. Determining the utility of neuroimaging biomarkers for identifying future disease in these individuals is essential for advancing cognitive research.

Table 1. Demographic and Neuroimaging Markers by Race / Ethnicity: The Life After 90 Study

	Race / Ethnicity					Total (N = 99)
	Asian (N = 26)	Black (N = 22)	Latino (N = 14)	Multi/Other (N = 9)	White (N = 28)	
Sex						
Female	14 (53.8%)	14 (63.6%)	12 (85.7%)	6 (66.7%)	13 (46.4%)	59 (59.6%)
Male	12 (46.2%)	8 (36.4%)	2 (14.3%)	3 (33.3%)	15 (53.6%)	40 (40.4%)
Education						
<=High School	5 (20.0%)	6 (27.3%)	7 (50.0%)	0 (0.0%)	6 (21.4%)	24 (24.2%)
Some College	7 (28.0%)	11 (50.0%)	5 (35.7%)	4 (44.4%)	4 (14.3%)	31 (31.3%)
College or Higher	13 (52.0%)	5 (22.7%)	2 (14.3%)	5 (55.6%)	18 (64.3%)	43 (43.4%)
Missing	1 (3.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.0%)
MRI: Age at Scan Date (Years)						
Mean (SD)	93.4 (2.5)	93.6 (2.9)	93.5 (3.4)	92.7 (2.6)	92.7 (1.4)	93.2 (2.5)
MRI: Residual Log WMH Volume						
Mean (SD)	-0.199 (1.142)	0.268 (0.986)	-0.237 (1.239)	0.482 (0.714)	-0.062 (0.853)	-0.000 (1.022)
MRI: Residual Hippocampal Volume						
Mean (SD)	0.160 (0.446)	-0.100 (0.743)	-0.012 (0.579)	-0.052 (0.867)	-0.048 (0.626)	-0.000 (0.626)
PET: Amyloid Beta Positivity						
Negative	16 (64.0%)	13 (68.4%)	5 (35.7%)	4 (50.0%)	12 (50.0%)	50 (55.6%)
Positive	9 (36.0%)	6 (31.6%)	9 (64.3%)	4 (50.0%)	12 (50.0%)	40 (44.4%)
PET: Mean SUVR Values Over 4 Regions						
Mean (SD)	1.104 (0.189)	1.045 (0.156)	1.252 (0.312)	1.093 (0.188)	1.153 (0.217)	1.127 (0.219)

Table 2. Adjusted Means of Neuroimaging Markers by Race / Ethnicity: The Life After 90 Study

	Race / Ethnicity					$F_{ethnicity}$ (p)
	Asian (N = 26)	Black (N = 22)	Latino (N = 14)	Multi/Other (N = 9)	White (N = 28)	
MRI: Residual Log WMH Volume						
Mean	-0.271	0.228	-0.261	0.531	-0.013	1.64 (0.17)
MRI: Residual Hippocampal Volume						
Mean	0.186	-0.110	-0.018	-0.039	-0.035	0.74 (0.56)
PET: Mean SUVR values over 4 regions						
Mean	1.098	1.042	1.244	1.101	1.164	2.24 (0.07)

From analysis of covariance models with neuroimaging marker as the outcome, racial/ethnic group as the independent variable of interest, and adjusted for age

Figure. Neuroimaging Markers By Racial/Ethnic Group in the Life After 90 Study

A. Percent Amyloid Positive (SUVR≥1.1)

B. Adjusted Means - Amyloid PET SUVR (4 regions)

C. Adjusted Means - Residual log WMH

D. Adjusted Means - Residual Hippocampal Volume