P506: Quantitative Uptake of 124I-Evuzamitide on PET Corelates with Markers of Transthyretin Cardiac Amyloidosis, Quality of Life, and Functional Status

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BACKGROUND

- Molecular imaging using PET/CT in ATTR-CA provides detailed information on the extent and quantity of systemic amyloid load, which could be valuable to track serially in the context of emerging therapies.
- 124I-evuzamitide is a novel amyloid reactive peptide that has been shown to detect various forms of amyloidosis in the heart, liver, spleen, kidney, and bone marrow.
- 124I-evuzamitide binds to electronegative surfaces of glycosaminoglycans and amyloid fibrils in all types of amyloid deposits

OBJECTIVE

- To quantify myocardial amyloid burden on 124I-evuzamitide PET/CT, and correlate it with disease measures including NYHA class, Columbia stage, cardiac biomarkers, quality of life and functional parameters.

METHODS

- We conducted a prospective pilot study among outpatient subjects seen in our cardiac amyloidosis program.
- Enrolled subjects N=25 had a median age of 65 (45-81) years and 20 were male (80%). The subjects with ATTR-CA were in the early stages, all with Columbia stage I disease. Eighteen subjects had variant TTR genotypes (72%). The TTR genotypes represented were Val30Met (n=5), Val122Ile (n=4).
- Myocardial uptake was measured volumetrically on static images using PMOD software (PMOD Technologies LLC, Zürich, Switzerland).
- Volumes of interest (VOI) were manually traced on PET emission images fused with CT images to define the left ventricular (LV) contours including cavity blood pool.
- Blood pool activity concentration was measured in a 10-mm-diameter left atrial (LA) spherical VOI. For 124I-evuzamitide, we used a threshold of mean LV + 2 standard deviations of blood pool activity concentration as has been performed previously.

METHODS (CONTINUED)

- The primary LV and RV uptake metric was percent injected dose (%ID), calculated as VOI mean activity concentration x VOI volume/injected activity. We also analyzed cardiac amyloid activity (CAA) as VOI SUVmean x VOI volume, as well as standardized uptake value (SUV) as mean (SUVmean) or maximal (SUVmax) VOI activity concentration/ (injected activity/body weight), and target-to background ratio (TBR) as VOI mean activity concentration/blood pool mean activity concentration (see supplemental.
- Correlations are quantified using Spearman's r with 95% confidence intervals.

RESULTS

	VOI (mL)				%ID			CAA (g)		
	N	r	95% CI	p-value	r	95% CI	p-value	r	95% CI	p-value
NT-proBNP	18	0.50	(0.04, 0.78)	0.04	0.44	(-0.04, 0.75)	0.07	0.48	(0.01, 0.77)	0.05
Hs-TnT	18	0.69	(0.32, 0.87)	0.001	0.72	(0.37, 0.89)	<0.001	0.70	(0.34, 0.88)	<0.001
NYHA class	18	0.39	(-0.10, 0.72)	0.11	0.41	(-0.07, 0.74)	0.09	0.41	(-0.07, 0.74)	0.09
Columbia score	18	0.63	(0.24, 0.85)	0.004	0.58	(0.16, 0.82)	0.01	0.66	(0.28, 0.86)	0.002
6-MWT	18	-0.14	(-0.57, 0.35)	0.60	-0.18	(-0.60, 0.31)	0.47	-0.17	(-0.59, 0.32)	0.51
KCCQ-OS	18	-0.64	(-0.85, -0.25)	0.003	-0.63	(-0.85, -0.23)	0.004	-0.62	(-0.84, -0.21)	0.005
SF36 general health score	18	0.38	(-0.11, 0.72)	0.12	0.39	(-0.09, 0.73)	0.11	0.35	(-0.14, 0.70)	0.15
PCS T score	18	-0.35	(-0.70, 0.14)	0.15	-0.38	(-0.72, 0.11)	0.12	-0.36	(-0.71, 0.13)	0.14
MCS T score	18	-0.01	(-0.48, 0.46)	0.96	0.05	(-0.42, 0.51)	0.84	-0.03	(-0.49, 0.44)	0.90
COMPASS-31 score	18	0.40	(-0.09, 0.73)	0.11	0.40	(-0.09, 0.73)	0.11	0.40	(-0.09, 0.73)	0.11
EQ-5D-5L general health	18	0.002	(-0.47, 0.47)	0.99	-0.046	(-0.50, 0.43)	0.86	0.004	(-0.46, 0.47)	0.99

Hs-TnT- Troponin T, High Sensitivity. NYHA-New York Heart Association. 6-MWT-6 -minute walk. KCCQ-OS- Kansas City Cardiomyopathy Questionnaire overall summary. SF36 general health score-36-item Short Form Health Survey. PCS- Physical Component Summary. MCS- Mental Component Summary. COMPASS-31 score- Composite Autonomic Symptom Score. EQ-5D-5L general health -EuroQol 5 Dimension 5 Level. VOI-volumes of interest. %ID-was percent injected dose, calculated as VOI mean activity concentration x VOI volume/injected activity. CAA-cardiac amyloid activity, calculated as VOI SUVmean x VOI volume.

RESULTS (Cont.)

- 25 subjects were scanned; 18 had myocardial uptake on 124I-evuzamitide PET/CT (11 with ATTRv-CA and 7 with ATTRwt).
- There was a strong correlation between LV cardiac amyloid load, defined by %ID , CAA, and LV myocardial volume of amyloid uptake (mL); and high sensitivity troponin T (hs-TnT) and Columbia score.
- There was a moderate correlation between cardiac amyloid load and NT-proBNP level, NYHA class, KCCQ summary score, and SF36 health score

CONCLUSION

- Quantitation of amyloid load with I124I-evuzamitide on PET/CT corelates with direct and indirect measures of the severity of ATTR-CA, quality of life, and functional status. There was a strong correlation between cardiac amyloid load, and both Columbia score and hs-TnT.