I-124 Evuzamitide PET/CT is More Sensitive than Tc-99m Pyrophosphate for the Diagnosis of Hereditary Transthyretin Cardiac Amyloidosis

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INTRODUCTION

There is a significant need to improve the early diagnosis of ATTR-CA. Although Tc-99m pyrophosphate (PYP) myocardial uptake can non-invasively diagnose ATTR-CA in the correct clinical context reported sensitivity in multi-center studies is ~70%[1]. We sought to determine if PET/CT scanning using I-124 evuzamitide can detect cardiac TTR amyloidosis in subjects with Tc99-PYP not diagnostic for cardiac amyloidosis Perugini grade 0 and grade 1 Tc99-PYP scans) but for whom strong suspicion or endomyocardial biopsy evidence of ATTR-CM exists.

1.Gillmore JD et al. Nonbiopsy Diagnosis of Cardiac Transthyretin Amyloidosis. Circulation. 2016;133(24):2404-2412.

METHODS

We conducted a prospective cohort study among outpatient subjects seen in our cardiac amyloidosis program. Seven subjects underwent whole-body PET/CT using a Siemens Biograph mCT scanner, 5 hours after injection of ~1 mCi I-124 evuzamitide (Attralus, San Francisco). A low dose non-contrast CT scan was acquired first for attenuation correction and co-registration. PET emission sequence was then obtained using five minute PET acquisitions per bed position, with an additional 20 minutes of cardiac acquisition in patients 4-7. PET images are corrected for attenuation, random coincidences, scatter, decay, and prompt gamma emission, and processed using Siemens IRW image analysis software.

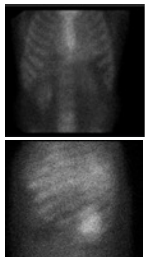
RESULTS

Subject	Age	Gender	Genotype	Perugini grade	SPECT/CT	Endomyocardial biopsy	PET cardiac uptake
1	64	M	Val122Ile	grade 1	Not performed	positive	positive
2	64	M	ALA60	grade 1	Not performed	positive	positive
3	45	M	Glu89Gln	grade 1	No myocardial uptake	Not performed	positive
4	81	M	Val122Ile	grade 0	No myocardial uptake	positive	positive
5	67	M	Thr60Ala	grade 0	Not performed	Not performed	positive
6	65	M	Thr60Ile	grade 1	No myocardial uptake	Not performed	positive
7	60	M	Val122Ile	grade 1	Not performed	positive	positive
8	53	F	Val30Met	grade 1	No myocardial uptake	positive	positive
9	54	M	Val30Met	grade 0	No myocardial uptake	Not performed	negative
10	64	F	Val30Met	grade 0	No myocardial uptake	Not performed	negative

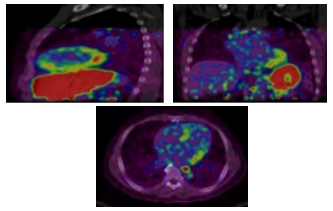
- 8/10 subjects were males, and all had hereditary (variant) genotypes.
- All subjects had negative Tc99-PYP, with Perugini grade 0 or 1.
- 8/10 subjects had PET-CT scans showed cardiac uptake.
- All PET/CT scans ,in which there was a positive cardiac biopsy, were positive

RESULTS (continued)

Subject 1

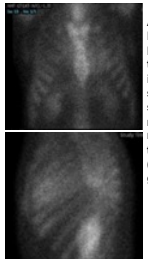


Anterior and Lateral Tc99-PYP scan after three hours of incubation showing no significant myocardial retention of the isotope (Perugini grade 1 scan).

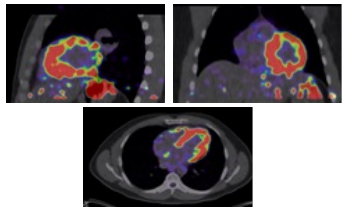


Transaxial, Coronal, and sagittal PET/CT images sh
124 Evuzamitide uptake in the left ventricle and righ
ventricle, left and right atrial uptake, most prominer

Subject 3



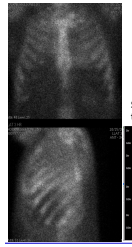
Anterior and Lateral Tc99-PYP scan after three hours of incubation showing no significant myocardial retention of the isotope (Perugini grade 1 scan).



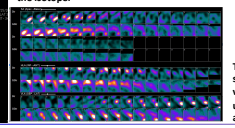
Transaxial, Coronal, and sagittal PET/CT images showing I-124 Evuzamitide uptake in the left ventricle and right ventricle, left and right atrial uptake, most prominently in the basal lateral wall and septum.

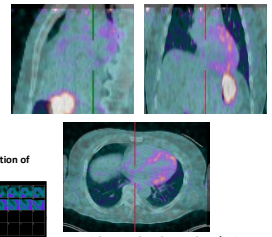
Subject 6

Anterior and Lateral Tc99-PYP scan after three hours of incubation showing no significant myocardial retention of the isotope (Perugini grade 1 scan).



SPECT showing no myocardial retention of the isotope.





Transaxial, Coronal, and sagittal PET/CT images showing I-124 Evuzamitide uptake in the left ventricle and right ventricle, left and right atrial uptake, most prominently in the basal lateral wall and septum.

CONCLUSIONS

PET-CT scanning with 124I-evuzamitide is more sensitive than Tc99M-PYP for detecting transthyretin cardiac amyloidosis in patients with hereditary ATTR-CA.

Limitations and Future Directions

Limitations of this study include:

- Some subjects did not get SPECT/CT and thus could have had some myocardial uptake not seen on planar imaging.
- Data shows a semiquantitative approach currently (+ or -) and quantification is underway.
- No ATTRwt subjects; need to study ATTRwt subjects.

DISCLOSURES

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