

# Quantification of Left Ventricular Amyloid in AL and ATTR Amyloid Cardiomyopathy: A Pilot <sup>124</sup>I-AT-01 (P5+14) PET/CT and Echocardiography Study

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## Introduction

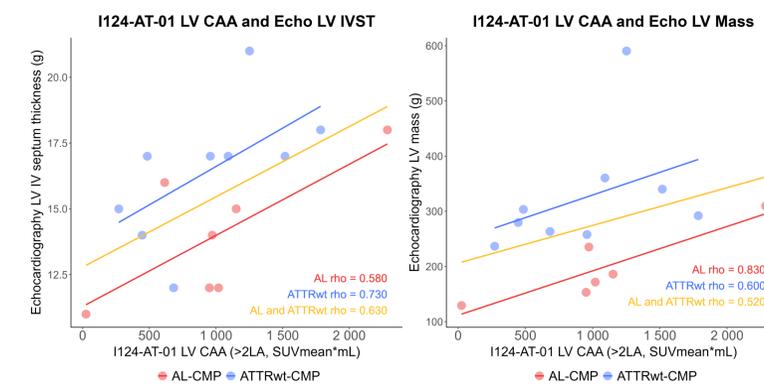
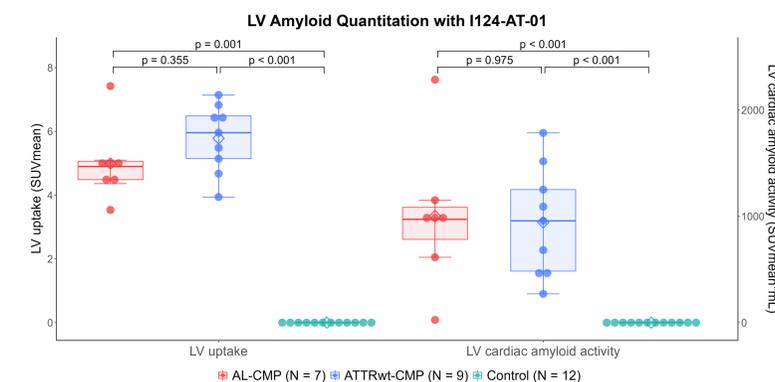
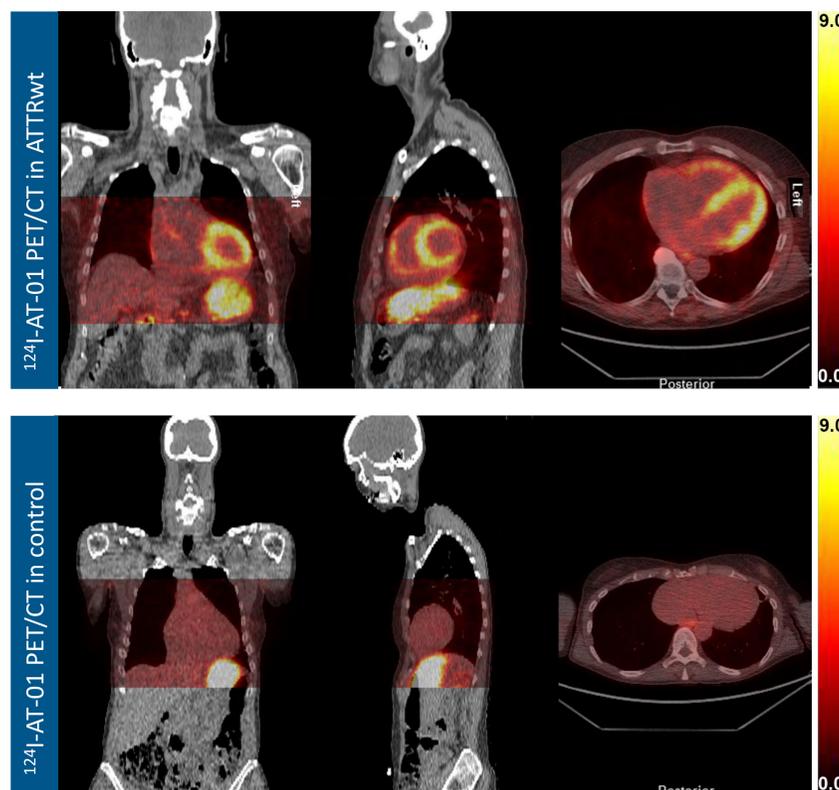
- In light-chain (AL) and transthyretin wild-type (ATTRwt) amyloid cardiomyopathy (CMP), quantitation of cardiac amyloid burden may play an important role in early diagnosis, prognosis, and follow-up, but quantitative methods are still limited.
- The novel amyloid-targeted peptide AT-01 (p5+14) can image multiple amyloid types in mice (as <sup>99m</sup>Tc-AT-01) and in humans (as <sup>124</sup>I-AT-01, Evuzamitide).
- However, the ability of <sup>124</sup>I-AT-01 position emission tomography/computed tomography (PET/CT) to quantify LV amyloid burden in amyloid CMP is still unclear.
- The aims of this ongoing pilot study are to quantify left ventricular (LV) amyloid in AL-CMP and ATTRwt-CMP using PET/CT with <sup>124</sup>I-AT-01 and to correlate uptake metrics to echocardiography metrics.

## Methods

- Subjects with AL-CMP, ATTRwt-CMP, and non-amyloid controls were enrolled from our center.
- AL-CMP and ATTRwt-CMP were diagnosed by standard criteria for AL and ATTRwt amyloidosis, and cardiac involvement was assessed by imaging and/or biopsy.
- All participants underwent PET/CT with <sup>124</sup>I-AT-01 for cardiac uptake analysis (median dose 0.97 mCi).
- LV uptake (in standardized uptake value mean, SUVmean, adjusted for weight and dose) was calculated in the LV myocardial volume, defined as uptake > 2 times mean left atrial blood pool activity, to quantify LV activity concentration.
- LV cardiac amyloid activity (CAA, SUVmean\*ml) was calculated as LV uptake times LV myocardial volume, defined as uptake > 2 times mean left atrial blood pool activity, to quantify LV total activity.
- All participants with AL-CMP or ATTRwt-CMP underwent echocardiogram with interventricular septum thickness measurement and LV mass estimation.
- Data were compared across groups using Dunn test, with Benjamini-Hochberg adjustment for multiple testing.
- Correlation was quantified using Spearman's rho.

## Results

- To date, we included 28 participants: 7 AL-CMP (25%), 9 ATTRwt-CMP (32%), and 12 controls (43%), with median age 70 years (IQR 64 – 76), and 22 males (79%).
- <sup>124</sup>I-AT-01 LV uptake and LV CAA were > 0 in all AL-CMP and ATTRwt-CMP participants, but 0 in all non-amyloid controls.
- Both metrics did not differ between AL-CMP and ATTRwt-CMP.
- <sup>124</sup>I-AT-01 LV uptake and LV CAA were moderately correlated with interventricular septum thickness (rho = 0.53 and 0.63) and LV mass (rho = 0.41 and 0.52).



## Conclusion

- In this study, we found positive <sup>124</sup>I-AT-01 LV uptake and LV CAA in all AL-CMP and ATTRwt-CMP participants, but in none of the controls (100% accuracy, but pilot study).
- <sup>124</sup>I-AT-01 LV mean uptake and LV CAA did not differ between AL-CMP and ATTRwt-CMP participants.
- Both metrics correlated moderately with interventricular septum thickness and LV mass from echocardiography, with stronger correlations for LV amyloid activity.
- <sup>124</sup>I-AT-01 appears to be a valuable tracer to detect and quantify LV amyloid in AL-CMP and ATTRwt-CMP.

## Acknowledgements

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