Relationship of ST-2, Epicardial Fat and Coronary Calcium with Diastolic Dysfunction in Older PWH

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BACKGROUND

- Diastolic dysfunction (DD) is increasingly prevalent among people with HIV (PWH) and is associated with a heightened risk of subsequent heart failure (HF).
- Key mechanisms of HF include left ventricular hypertrophy (LVH), left atrial (LA) abnormalities and cardiac fibrosis.
- Additionally, soluble suppression of tumorigenicity 2 (sST2) has emerged as a potential biomarker for cardiac stress and fibrosis (1).
- However, the roles of epicardial fat (EAT), coronary calcium, and sST2 in predicting DD, particularly in older PWH, remain poorly understood.

METHODS

- A cross-sectional study in Thai PWH aged ≥50 years was conducted.
- Transthoracic echocardiography, and non-contrast cardiac CT were performed to assess diastolic function, coronary calcium (CAC) and epicardial adipose tissue (EAT), respectively.
- Serum sST2 and other lab parameters including HIV-related parameters were measured.
- DD was defined using the PWH specific Characterizing Heart Function on Antiretroviral Therapy (CHART) criteria (2,3)
  - LV ejection fraction >50%
  - Impaired LV relaxation (septal e' <7 cm/s or lateral e' <10 cm/s);
  - Chronically elevated LV filling pressure(LA volume index >28 mL/m^2,
  - LV hypertrophy (LV mass index >95 g/m^2 among women, >115 g/m^2 among men),
  - Concentric LV remodeling (relative wall thickness >0.42)
- Multiple linear and logistic regression were used to assess associations between EAT, CAC score, and sST2 level with relevant echocardiographic parameters and DD.

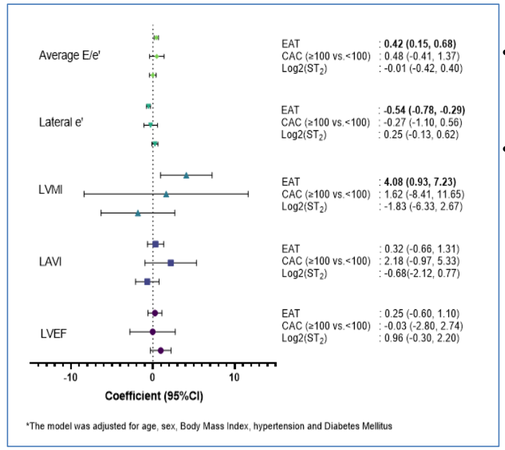
CONCLUSION

- **Increased EAT, but not CAC or sST2, is an independent predictor of DD**
- **EAT levels correlated with LVMI and average E/e' among elderly PWH.**
- **Assessing EAT could be useful for identifying PWH at high risk of DD and prioritizing care delivery.**

Table 1: Associations with EAT, sST2 level and CAC score and diastolic dysfunction.

	DD (using CHART definition)*		
	aOR	(95% CI)	P-value
Minimally adjusted (age, sex)			
log2(ST2) (N=275)	0.75	(0.53, 1.08)	0.12
Epicardial fat per SD increase (N=283)	**1.64**	**(1.25, 2.16)**	**<0.001**
CAC (>=100 vs. <100) (N=283)	1.63	(0.80, 3.31)	0.18
Fully adjusted (age, sex, BMI, hypertension and DM)			
log2(ST2) (N=275)	0.73	(0.51, 1.06)	0.09
Epicardial fat per SD increase (N=283)	**1.49**	**(1.11, 1.99)**	**0.007**
CAC (>=100 vs. <100) (N=283)	1.23	(0.55, 2.71)	0.62
Fully adjusted (age, sex, BMI, hypertension, DM, cholesterol, TG, HCV, smoking, statin use)			
log2(ST2) (N=275)	0.72	(0.49, 1.05)	0.08
Epicardial fat per SD increase (N=283)	**1.52**	**(1.12, 2.04)**	**0.006**
CAC (>=100 vs. <100) (N=283)	1.17	(0.52, 2.64)	0.7

Figure 1: Associations between echocardiographic parameters and EAT, sST2 level and CAC score.



Abbreviations: LVMI, left ventricular mass index; LVMI, left ventricular mass index; LVEF, left ventricular ejection fraction; EAT, epicardial adipose tissue; CAC, coronary calcium; ST2, soluble suppression of tumorigenicity 2

RESULTS

Totally 283 PWH (male 62%, median [IQR] age 54 years [52-59]) were included, 27% had body mass index (BMI) >25 kg/m^2.

41% and 17% had hypertension and diabetes mellitus (DM), respectively.

Median duration of ART was 16 years, with current CD4 and CD4/CD8 ratio at 617 (IQR 477-797) cells/μL and 0.96 (IQR 0.68-1.27), respectively.

DD was detected in 40%; Mean (SD) EAT was 101 (40) cm^3.

After adjusting for age, sex, BMI, hypertension and DM, only increased EAT was positively associated with DD (OR 1.49; 95%CI 1.11-1.99 per 1 SD increase; p=0.007).

- No association was observed between DD and CAC score (OR 0.55-2.71) or sST2 (OR 0.51-1.06).
- Increasing EAT was significantly associated with increasing left ventricular mass index (LVMI) and average E/e', and decreasing lateral e'.
- Although CAC score ≥100 was associated with LAVI after adjusting for age and sex, the association attenuated after adjustment for BMI, hypertension and DM.

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