Factors Linked to Reduced Myocardial Flow Reserve in HIV Using ^{82}Rb Positron Emission Tomography

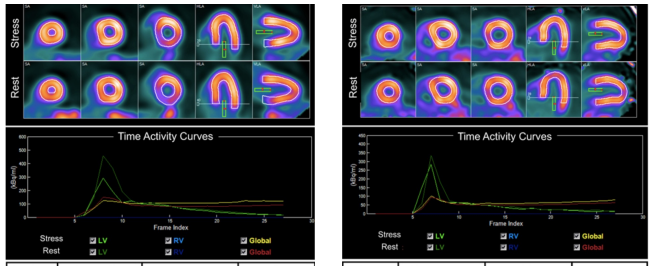
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Abstract 00795

BACKGROUND

- Despite effective use of antiretroviral therapy, people with HIV (PWH) continue to demonstrate a greater risk of coronary artery disease (CAD) due to factors including chronic inflammation and endothelial dysfunction.
- Even in the absence of overt epicardial disease, coronary microvascular dysfunction (CMD) is believed to contribute to cardiovascular morbidity and mortality.
- ^{82}Rb positron emission tomography (PET) is an established technique for evaluating myocardial perfusion, from which myocardial flow reserve (MFR) can be derived for the purpose of evaluating CMD burden.
- This retrospective study sought to examine the association between HIV-related parameters and MFR in PWH.



Region	Stress MBF (mL/min/g)	Rest MBF (mL/min/g)	MFR
LAD	2.77	1.11	2.50
LCx	2.58	1.15	2.24
RCA	2.78	0.87	3.20
Global	2.71	1.04	2.60

Region	Stress MBF (mL/min/g)	Rest MBF (mL/min/g)	MFR
LAD	1.37	1.06	1.28
LCx	1.37	1.24	1.10
RCA	1.22	1.02	1.19
Global	1.32	1.08	1.22

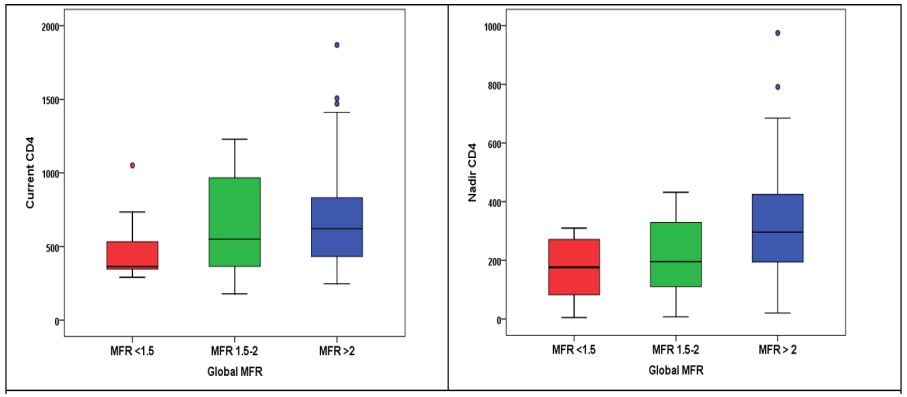
Rb PET in Reduced Myocardial Blood Flow (MBF) vs Normal MBF^

METHODS

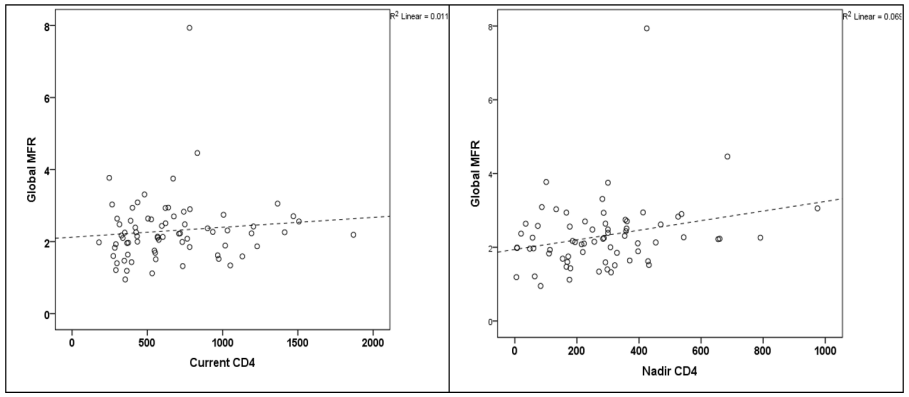
- 72 PWH underwent dynamic ^{82}Rb PET imaging using a hybrid PET 64-slice CT scanner (Discovery 690, GE Healthcare) at Yale New Haven Hospital between Nov 2016 and Apr 2022.
- Global MFR was determined using stress/rest myocardial blood flow (MBF) and stratified into three categories: low (≤1.5), borderline (1.5-2.0), or normal (>2.0).
- HIV-related data were obtained from electronic medical records (within 6 months prior and up to 3 months following date of scan).
- Correlation between clinical and HIV parameters and MFR was evaluated using Mann-Whitney U test and Spearman correlation.

In addition to chronic kidney disease and coronary artery disease, people with HIV who have lower CD4+ T-cells or low nadir CD4+ T-cells may be at higher risk of coronary microvascular disease.

Association between Myocardial Flow Reserve (MFR), current and nadir blood CD4+ T-cell counts



MFR value vs. current CD4 and nadir CD4



MFR value vs. current and nadir CD4

RESULTS

HIV+ Participants' Characteristics (N=72)	
Age	59 (53, 64)
Sex, n (%)	
Male	45 (63)
Female	27 (37)
CD4+ T-cell count	572 (371, 820)
CD8+ T-cell count	713 (438, 981)
CD4/CD8	0.91 (0.67, 1.21)
Plasma HIV suppression (<50 cps/ml), n (%)	66 (92)
Nadir CD4+ T-cell count	284 (160, 366)
Congestive Heart Failure, n (%)	12 (17)
Myocardial Flow Rate (MFR)	2.21 (1.84, 2.63)
MFR group by level, n (%)	
Low (<1.5)	9 (13)
Intermediate (1.5-2)	18 (25)
Normal (>2)	45 (62)

- In the entire group, a lower MFR was associated with chronic kidney disease (CKD, p=0.024) and CAD (p=0.025), but not with age, sex, BMI, viral suppression, hypertension, diabetes mellitus, hyperlipidemia, congestive heart disease, prior stroke or peripheral vascular disease.
- Compared to PWH with normal MFR, those with low MFR had lower CD4+ T-cell counts (median 364 [IQR 333,634] vs. 621 [IQR 429,866], p=0.040) and nadir CD4+ T-cell counts (median 176 [IQR 74,285] vs. 296 [IQR 192,432], p=0.017).

CONCLUSION & FUTURE DIRECTION

- In addition to CKD and CAD, PWH with lower CD4+ or low nadir CD4+ T-cell counts may be at higher risk of CMD.
- Future evaluations of coronary disease using ^{82}Rb PET among PWH will include HIV-uninfected controls.

ACKNOWLEDGMENTS

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^Feher A, Boutagy NE, Oikonomou EK, Thorn S, Liu YH, Miller EJ, Sinusas AJ, Hinchcliff M. Impaired Myocardial Flow Reserve on ^{82}Rubidium Positron Emission Tomography/Computed Tomography in Patients With Systemic Sclerosis. J Rheumatol. 2021 Oct;48(10):1574-1582.