

# A Comparison between Different GFR-estimations and [<sup>125</sup>I]-Iothalamate, the Gold Standard for GFR-measurement in HIV-infected Patients on HAART



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## Introduction

- Accurate assessment of renal function is increasingly warranted given the aging HIV-infected patient population.
- The accuracy of estimations of glomerular filtration rate (eGFR) however is unknown in HIV-infected patients.
- We compared Cockcroft & Gault- (C&G), Modification of Diet in Renal Disease (MDRD) 4 and 6 parameter-, cystatin C (cysC-) and 24h urine-based eGFR with the gold standard: GFR-measured with [<sup>125</sup>I]-Iothalamate (mGFR).

## Methods

- This is a substudy of the **PREPARE** trial (**PRE**venting **PRO**gression of **AD**ipose tissue **RE**distribution), an ongoing randomized trial comparing continued effective first-line cART including ZDV/3TC, with replacing ZDV/3TC by TDF/FTC, both plus either a NNRTI or a PI.
- 19 patients are included in this substudy assessing renal function during follow-up.
- We currently report the results of comparisons of eGFR and mGFR at baseline.
- mGFR was determined during continuous infusion of [<sup>125</sup>I]-Iothalamate from timed urine collections, corrected for voiding inaccuracies.
- Accuracy and precision of the clearance estimations were calculated by plotting the difference between the estimations and the gold standard.

## Results (1): Baseline characteristics

Total (n)	19
Age (yrs), mean (SD)	46 (8.9)
Sex, male (n)	18
Ethnic origin	
Caucasian	15
Black	3
Hispanic	1
BMI (kg/m <sup>2</sup> ), mean (SD)	23.8 (2.9)
Duration of cART (yrs), mean (SD)	5.9 (2.4)
Baseline CD4 (x10 <sup>6</sup> /L), mean (SD)	579 (238)
Plasma HIV-1 RNA <50 copies/mL (n)	19
3rd drug (n)	
NNRTI	17
PI	2
HBV / HCV positive (n)	0 / 0

## Results (2): Measured and Estimated GFR

Assessment	GFR (mL/min/1.73m <sup>2</sup> ), mean (SD)	Renal function (mL/min) according to NKF K/DOQI-classification				
		1 (≥90)	2 (60-89)	3 (30-59)	4 (15-29)	5 (<15)
mGFR	134 (36)	16	3	0	0	0
eGFR						
24h urine Creat. Clearance	132 (40)	16	2	1	0	0
C&G	134 (47)	15	4	0	0	0
MDRD-4	92 (18)	12	6	1	0	0
MDRD-6	116 (24)	18	1	0	0	0
CysC	93 (22)	12	6	1	0	0

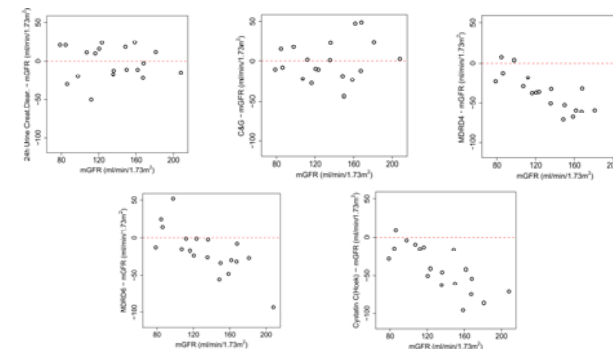
This table describes the mean (SD) GFR values for the mGFR and the various eGFRs, as well as the classification of the participants' renal function according to the NKF K/DOQI-classification. The mean (SD) plasma creatinine and plasma cysC level were 80 (13) μmol/L and 0.87 (0.22) mg/L respectively.

## Results (3): Accuracy & Precision

Estimation	R <sup>2</sup>	Accuracy (mL/min/1.73m <sup>2</sup> )	Precision (mL/min/1.73m <sup>2</sup> )
24h urine Creat. Clearance	0.725	-2	21
C&G	0.741	0	24
MDRD-4	0.376	-42	28
MDRD-6	0.260	-17	31
CysC	0.309	-41	30

R<sup>2</sup> represents the correlation between the estimated GFR and the measured GFR. Accuracy represents the mean deviation of the eGFR from the mGFR. Precision represents the SD from the mean deviation of the eGFR from the mGFR.

## Difference between individual patient GFR-estimations and the Gold Standard



The dotted line represents the reference line: no difference between eGFR and mGFR.

## Conclusions & Interpretation

- The accuracy of the C&G- and the 24h urine-based eGFR was surprisingly good and reasonably estimated true GFR.
- The MDRD-4-, MDRD-6- and the cysC-based eGFR however all underestimated the true GFR. Precision was poor for all estimations.
- These findings concern patients with mostly preserved renal function and suppressed HIV-infection, and may not apply similarly to those with ongoing viral replication and/or more severely compromised renal function.
- Given that cysC has been suggested to be affected by inflammatory conditions in HIV-uninfected persons, further research would seem relevant to assess if the inaccuracy of cysC-based eGFR may be explained by residual HIV-associated immune activation and inflammation.