

# MONITORING RENAL FUNCTION IN HIV INFECTION: AN AUDIT TO COMPARE PRACTICE IN A SINGLE DISTRICT GENERAL HOSPITAL OUTPATIENT CLINIC WITH EUROPEAN AIDS CLINICAL SOCIETY (EACS) GUIDELINES

Dr Adele Wolujewicz<sup>1, 2</sup> and Dr Moses Kapembwa<sup>1</sup>

<sup>1</sup>North West London Hospitals NHS Trust <sup>2</sup>Charité School of Medicine, Berlin

## INTRODUCTION: THE PROBLEM

As individuals grow older on antiretroviral therapy, the prevalence of non-infectious complications of HIV infection will continue to rise.

Chronic kidney disease is already common in HIV infection, affecting 5% white Europeans and 40% West Africans.<sup>1</sup>

Causes include HIV-associated nephropathy, immune complex glomerulonephritis, sepsis, comorbidities (e.g. hypertension and diabetes) and antiretroviral therapy: tenofovir can lower the glomerular filtration rate (eGFR) and cause Fanconi syndrome. Indinavir and atazanavir can cause renal stones.

It is essential that measuring renal function is routine in the management of people living with HIV to trigger early intervention. This will reduce the numbers of individuals needing renal replacement therapy and associated costs (£30,000 per patient per year).<sup>2</sup>

Until recently there have been few guidelines on how best to measure renal function in HIV.

## HOW CAN RENAL FUNCTION BE MEASURED?

TESTING FOR PROTEINURIA CAN IDENTIFY INDIVIDUALS WITH RENAL DISEASE  
THERE ARE SEVERAL METHODS:

- urine dipstick testing has poor sensitivity and specificity
- collection of urine over 24 hours is not practical
- urine protein : creatinine ratio (uPCR) detects proteinuria caused by glomerular and tubular disease and correlates well with 24-hour urine protein<sup>3</sup>
- urine albumin : creatinine ratio (uACR) detects mainly glomerular disease
- uPCR and uACR are well-documented and recommended by the National Kidney Foundation<sup>4</sup>

### NORMAL RANGES FOR uPCR and uACR

Proteinuria	UPCR $\leq$ 45 mg/mmol
Microalbuminuria in men	UACR $>$ 2.5 mg/mmol
Microalbuminuria in women	UACR $>$ 3.5 mg/mmol
Nephrotic range macroalbuminuria	UACR $>$ 30.0 mg/mmol

## RESULTS (n = 50)

### DEMOGRAPHICS

50% male  
54% black African  
Median age 42.5 years (range 21–74 years)

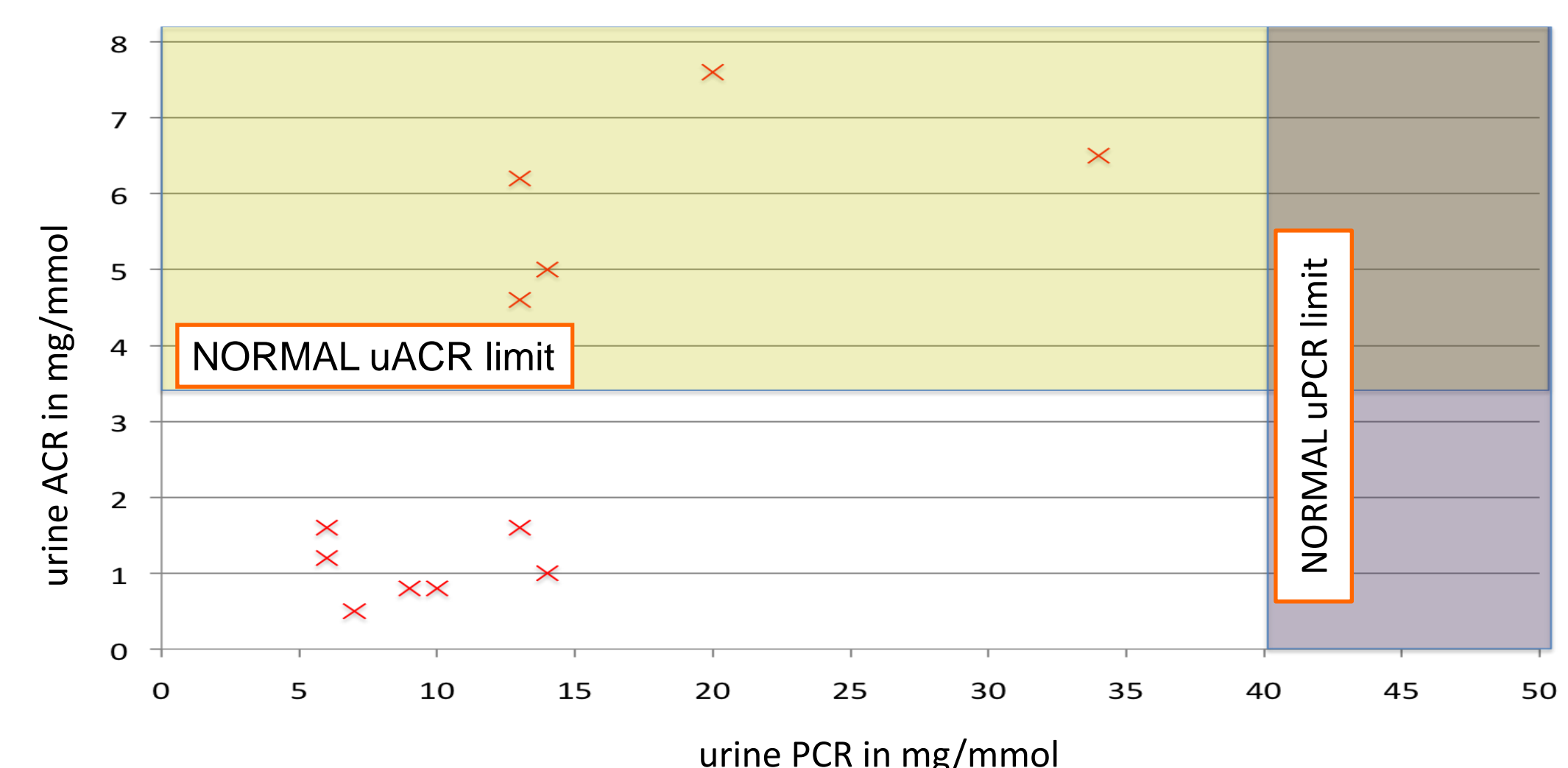
### HIV CHARACTERISTICS

Median CD4 count 421.5 cells/ $\mu$ L (range 136–1194)  
8% had a CD4 count less than 200 cells/ $\mu$ L  
66% had an undetectable viral load  
54% individuals were diagnosed with HIV infection more than 5 years before  
84% were on antiretroviral therapy (ART)  
40% had a previous AIDS-defining illness  
62% of those on ART were on tenofovir-containing regimen

### SCREENING FOR RENAL IMPAIRMENT

84% had urinalysis in the previous year  
57% had proteinuria on at least one occasion  
66% had a glomerular filtration rate measured on schedule as recommended by EACS  
26% had some degree of renal impairment (eGFR less than 90 ml/min $1.73m^2$ )  
92% had a blood pressure recording documented in the previous year  
6 patients did not have uPCR or uACR measured to quantify proteinuria on urinalysis  
2 out of 3 eligible patients were referred to nephrologist  
Only 1 uPCR out of 31 (3.2%) measured was abnormal  
7 out of 14 (50%) uACR measured were abnormal  
5 individuals had an abnormal uACR and a normal SIMULTANEOUS uPCR

This graph shows 5 individuals with discordant uPCR and uACR results:



## WHAT DO THE EACS GUIDELINES RECOMMEND?

Screening in 3 steps:

- URINE DIPSTICK annually: if  $>$  1+ proteinuria then check UPCR or UACR
- BLOOD PRESSURE annually
- eGFR every 3-6 months if on ART or every 6-12 months if not on ART

Once renal disease has been identified there are further recommendations:

Arrange regular follow-up if eGFR  $>$  60 ml/min AND UPCR  $<$  50 mg/mmol or UACR  $<$  30 mg/mmol  
Optimise risk factors  
Stop nephrotoxic drugs and adjust drug doses  
Arrange renal ultrasound if eGFR  $<$  30 ml/min

Consider nephrology referral:

- if eGFR  $<$  30 ml/min
- if uPCR  $>$  100 mg/mmol OR uACR  $>$  70 mg/mmol
- if eGFR 30-59 ml/min AND UPCR OR UACR abnormal WITH haematuria
- if haematuria alone

Results for all 8 individuals with abnormal uPCR or uACR (\*abnormal values)

Sample No.	UPCR in mg/mmol	UACR in mg/mmol	Currently on tenofovir	eGFR in ml/min
2	20	7.6*	N	121
11	244*	Not done	N	96
17	34	6.5*	Y	56
22	14	5.0*	Y	77
26	13	4.6*	Y	113
35	Not done	5.9*	Y	127
44	Not done	3.4*	Y	106
47	13	6.2*	Y	134

## CONCLUSIONS

- Proteinuria is common in individuals with HIV infection
- monitoring renal function in HIV infection can be greatly improved
- uACR seems to be a more sensitive marker of renal disease than uPCR
- uACR is more consistent with glomerular damage
- measuring uPCR alone risks not detecting glomerular disease
- measuring both uACR and uPCR may help to better establish the type of renal disease
- the role of uACR and uPCR in screening in HIV infection needs further evaluation

## AUDIIT AIMS AND OBJECTIVES

To improve management and prevention of renal disease in individuals with HIV infection.  
To retrospectively compare practice in a single HIV centre with current EACS guidelines.

## METHOD

A sample of 50 patients was selected at random from 455 individuals attending Northwick Park HIV outpatient clinic between 1<sup>st</sup> January and 30<sup>th</sup> June 2010.

Data was collected retrospectively from medical records.  
Practice was compared with the EACS guidelines.

## REFERENCES

- Mocroft A, Kirk O, Gatell J, et al. Chronic renal failure among HIV-1-infected patients. *AIDS*. 2007; 21: 1119-1127
- Mandalia S, Mandalia R, Lo G, Chadborn T, Sharott P, et al. (2010) Rising Population Cost for Treating People Living with HIV in the UK, 1997-2013. *PLoS ONE* 5(12): e15677
- Price, C., Newall, R., Boyd, J. Use of Protein:Creatinine Ratio Measurements on Random Urine Samples for Prediction of Significant Proteinuria: A Systematic Review. *Clinical Chemistry* 51: 1577-1586, 2005
- Vassalotti JA, Stevens LA, Levey AS. Testing for chronic kidney disease: a position statement from the National Kidney Foundation. *Am J Kidney Dis* 2007;50:169-80  
The Renal Association Proteinuria guidelines [www.renal.org](http://www.renal.org)