Hospital Universitario Ramón y Cajal

Renal impairment in people living with HIV or receiving preexposure prophylaxis: a prospective, matched-cohort study.

1005

Maite Julvez, Sergio Serrano, Ana Moreno, Raquel Carrillo, Jose Manuel Del Rey, Carmen Santiuste, Alejandro Vallejo, *Jose Luis Casado*
Hospital Ramón y Cajal; Hospital Gregorio Marañón; Madrid; Spain

BACKGROUND

HIV preexposure prophylaxis (PrEP) with fixed-dose tenofovir disoproxil fumarate (TDF) and emtricitabine has been associated with low rates of renal impairment in clinical trials, and it has been considered less frequent than that observed in people living with HIV (PLWH). The use of **Tenofovir Disoproxil Fumarate (TDF)**, a nucleoside reverse transcriptase inhibitor (NRTI), has been widely used in the treatment of **HIV and also as preexposure prophylaxis (PREP)**. However, concerns about its long-term renal safety have emerged due to its association with renal dysfunction, particularly in individuals with pre-existing risk factors. TDF is known to cause **proximal tubular dysfunction**, which can progress to **chronic kidney disease (CKD)** if not monitored or managed properly. The **DAD Risk Renal Score Short** is a tool used to predict the risk of renal impairment in HIV patients receiving TDF, and it can help to identify individuals at higher risk of renal impairment. Nevertheless, renal toxicity is expected to appear mostly in PLWH, and there are no validated scores to predict the risk of renal toxicity in PrEP recipients.

Thus, the aim of this study was to determine the risk of renal toxicity (eGFR and tubular parameters) in a similar cohort of PLWH and PrEP recipients, and to evaluate the role of DAD risk renal score in predicting renal disease in both populations.

METHODS

Matched-cohort study. Both TDF-treated PLWH and those receiving PREP were matched according to age, sex, serum creatinine, and lack of comorbidities (hypertension, diabetes). The primary outcome was renal impairment, defined as a decrease in estimated glomerular filtration rate (eGFR), an eGFR <60 ml/min per 1.73 m2 (chronic kidney disease -CKD-), or data of proximal tubular renal toxicity (phosphaturia, proteinuria, glycosuria) at 12 months of follow up. DAD renal risk score was used to identify those at the highest risk of renal impairment. The **DAD Risk Renal Score Short** is a predictive model designed to stratify HIV patients' risk of renal function decline during TDF treatment. This score uses several key factors:

Age: Older patients have a naturally lower renal reserve and are more prone to renal decline.

Baseline Kidney Function: Individuals with a reduced baseline eGFR (below 90 mL/min/1.73m²) are at higher risk.

Hypertension: The presence of hypertension increases the likelihood of renal dysfunction, both independently and through the exacerbation of TDF-induced nephrotoxicity.

Diabetes Mellitus: Diabetic nephropathy can worsen the renal impact of TDF.

Duration of HIV Treatment: Longer duration of antiretroviral therapy (ART) increases the risk of cumulative kidney damage.

N= 100

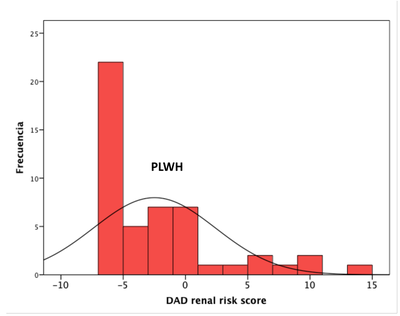
Variables	PLWH	PrEP-recipients	P value
Age (yrs, median)	37 (29-42)	35 (28-45)	0.92
Sex at birth male	50 (100)	50 (100)	NA
Risk practice IDUs HSH Heterosexuality	 5 (10) 38 (76) 7 (14)	 50 (100)	0.8
Baseline CD4+ count (cells/mmc) < 200 cell/mmc	314 (199-497)	-	-
HIV RNA level (Log copies/ml)	4.77 (4.3-5.3)	-	-
Time of HIV infection (months)	14.5 (2.5-16.4)	-	-
Serum			
Baseline serum creatinine (mg/dL)	0.92 (0.78-1.04)	0.92 (0.77-0.99)	0.88
Baseline eGFR (ml/min/1.73 m2)	110.8 (90.9-113)	110.1 (91.2-114)	0.91
Baseline serum phosphate (mg/dL) < 2.7 mg/dL	3.3 (2.9-3.4) 10%	2.6 (2.3-3.2) 2%	0.001
Urine			
Protein-creatinine ratio (mg/g) ≥ 100 mg/gr	77.3 (50-105) 15%	42.2 (10-71) 4%	<0.01
Phosphate tubular reabsorption (PTR, %) < 82%	83.8 (73.2-87) 37%	88.7 (86-92) 5%	<0.01
Glycosuria ≥ 100 gr/L	5%	0	0.67

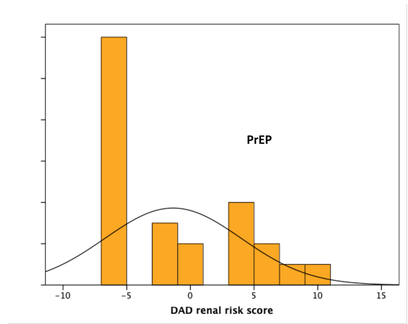
In this matched-cohort study, we showed that TDF-containing PrEP was associated with a similar rate of early renal impairment in comparison with PLWH, despite a lower rate of tubular renal involvement.

The use of the DAD renal risk score could help to identify those in higher risk of renal toxicity even when used in PREP recipients.

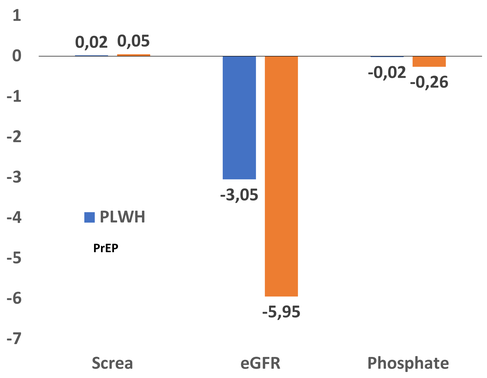
RESULTS

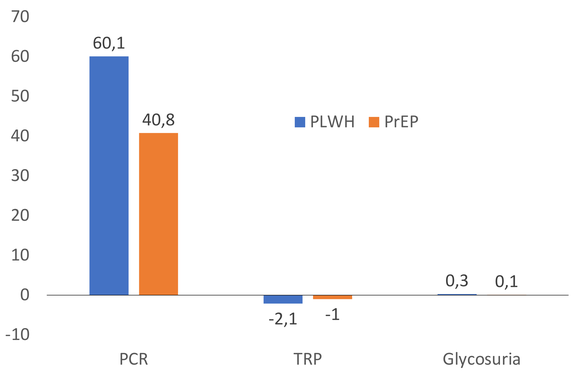
A total of 50 PREP recipients and 50 matched PLWH were selected. DADr median score was -2.4 and -1.8 in PLWH and Prep users respectively (p=NS).





After 12 months there was an eGFR decrease higher in Prep recipients (-5.95 vs -3.05 ml/min), whereas changes in tubular parameters were higher in PLWH (TRP, tubular reabsorption of phosphate, -2.1% vs -1%; protein-to-creatinine ratio, 60.1 vs 40.8 mg/g).

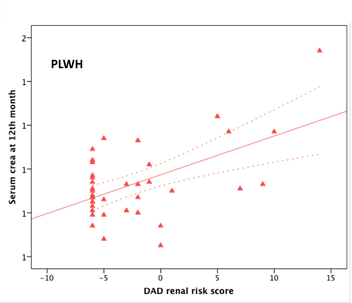


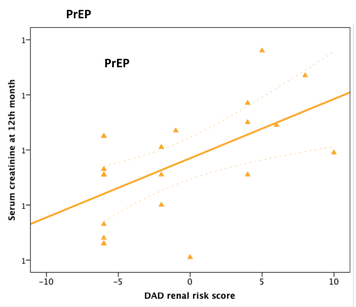


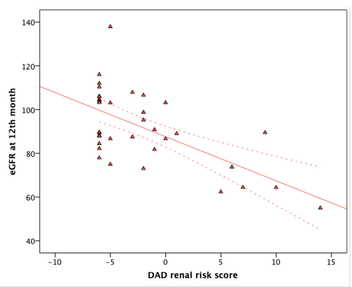
Mail to : jcasado.hrc@gmail.com

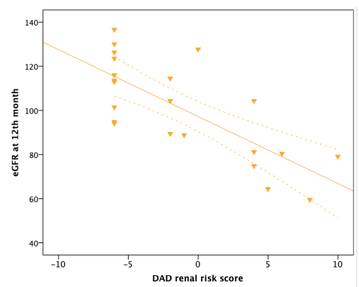
RESULTS

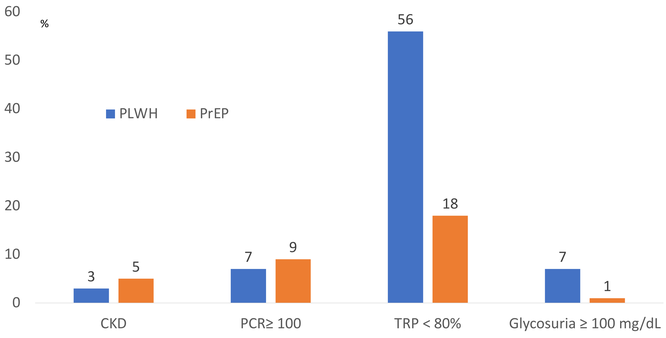
There was a correlation between DAD risk score at baseline and changes in renal function during follow up, that was higher for PREP recipients (serum creatinine and DADr, r=0.588; p=0.006; eGFR and DADr, r=- 0.749; p<0.001) than that observed in PLWH (r=0.553; p=0.01; r=-0.631; p<0.01; respectively).











PLAIN LANGUAGE SUMMARY

This study showed the similar rate of renal toxicity in TDF treated PREP and PLWH, after adjusting by baseline variables and DAD risk renal toxicity. Nevertheless, tubular renal toxicity is higher in PLWH, in relation with HIV-associated baseline tubular parameters.