Effect of Multidisciplinary Management of CKD on Proteinuria in People with HIV

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BACKGROUND

- Chronic kidney disease (CKD) disproportionally affects people with HIV and is associated with increased mortality.
- As survival of PWH continues to improve with antiretroviral therapy, prevalence of age-associated risk factors for CKD such as diabetes mellitus, hypertension, obesity and polypharmacy also increase.
- Furthermore, significant decreases in renal function can limit availability of options for anti-retroviral therapy.
- Part of the standard of care of CKD in people with HIV is use of angiotensin-converting enzyme inhibitors or aldosterone receptor blockers in cases of clinically significant proteinuria.
- Our study looked at changes in ACE/ARB use and proteinuria over time in a multidisciplinary HIV and nephrology clinic nested in a Ryan White Care Act-funded clinic in New Orleans

METHODS

Study population:

- Clinic patients at the University Medical Center New Orleans (UMCNO) Infectious Diseases Center with HIV, plus either 1) CKD stage 3a or more advanced (excluding those with end-stage renal disease requiring dialysis) or 2) significant proteinuria were eligible to be referred by their HIV primary care providers to the multidisciplinary clinic and hence inclusion in this analysis.
- Patients included in this analysis were evaluated between January 1, 2021 and March 31, 2022.
- Patients were evaluated by both an HIV primary care specialist and a nephrologist at their initial visit. Treatment plans were jointly developed by the two sub-specialists.
- Subsequent follow up visits were with nephrology alone; HIV care was resumed by the patients' HIV primary care provider.

Data collection

- Renal function including glomerular filtration rate (GFR) and spot urine protein/creatinine were collected at baseline and longitudinally as indicated by standard of care.
- Demographic and clinical characteristics of patients referred to the clinic were obtained from the medical record.
- Clinically significant proteinuria was defined as >30 mg/day in diabetic patients and >300 mg/day in non-diabetic patients.

Analysis

- Estimated daily protein loss in mg/day was log transformed given data distribution and compared using T-test for repeated measures.
- EGFR at baseline and end of analysis period were also compared with T-test for repeated measures.
- Assessment of whether ACE/ARB therapy was clinically appropriate was made at baseline and longitudinally to assess adherence with clinical guidelines. Change was assessed between baseline visit and most recent visit.

RESULTS

- A total of 46 patients with HIV and CKD or proteinuria were evaluated during the analysis period by the program.
- Of these patients, 42 had a baseline specimen available for urine spot protein/creatinine.
- Of these, 24 had clinically significant proteinuria at baseline. 12 of these had follow-up spot urine protein/creatinine measurements available for comparison.

Characteristics of patients evaluated in HIV renal disease clinic

	All referred		Proteinuria only	
	N	% of total	N	% of total
Total	46	100%	24	100%
Sex				
Female	7	15.2%	4	16.7%
Male	39	84.8%	20	83.3%
Race				
African-American (non-Hispanic)	35	76.1%	19	79.2%
Caucasian (non-Hispanic)	9	19.6%	4	16.7%
Hispanic	2	4.4%	1	4.1%
Age group				
18-29	0	0%	0	0%
30-39	3	6.5%	3	12.5%
40-49	9	19.6%	5	20.8%
50-59	13	28.3%	6	25.0%
60-69	15	32.6%	7	29.2%
70+	6	13.0%	3	12.5%
Presumptive etiology of renal disease (can have multiple)				
Hypertension	17	40.0%	8	33.3%
Diabetes mellitus	9	19.6%	8	33.3%
HIV	10	21.7%	8	33.3%
Medication	5	10.9%	0	0%
Obstruction	4	8.7%	1	4.2%
Other	5	10.9%	1	4.2%
Unknown	7	15.2%	4	16.7%
Risk factors				
Hypertension	35	76.1%	19	79.2%
Diabetes mellitus	10	21.7%	10	41.7%

- At baseline, 16 patients with clinically significant proteinuria at baseline were already on ACE or ARB therapy.
- At the conclusion of the analysis period, 20 of 24 patients with proteinuria were on an ACE or ARB.
  - Of the remaining 4,
    - One had ACE therapy stopped due to hyperkalemia.
    - One had an ACE started subsequent to analysis period when provider felt BP could tolerate.
    - One had ACE therapy discontinued prior to evaluation due to pregnancy.
    - One had ACE stopped due to hypotensive episodes.

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RESULTS

Change in distribution of estimated protein loss among patients with significant proteinuria

	Baseline		Final	
	N	%	N	%
0-500 (mg/day)	6	25.0	4	33.3
501-1000	6	25.0	3	25.0
1001-2000	6	25.0	3	25.0
2001-3000	2	8.3	0	0.0
3001-4000	1	4.2	0	0.0
4001-5000	0	0.0	0	0.0
5001+	3	12.5	2	16.7
Missing			*12*	

- Among patients with clinically significant proteinuria at baseline, median protein loss was 975 mg/day while median of most recent estimated protein loss was 845 mg/day.
- Mean log proteinuria was 5.86 at baseline, but 6.13 at the end of the study period. T-test for repeated measures was borderline significant at p=0.0503
- Among the 12 patients with clinically significant proteinuria at baseline and a subsequent measurement, 8 showed improvement.
- Of the 20 patients with clinically significant proteinuria at baseline who were taking an ACE/ARB by the end of the analysis period, 8 of 11 with repeat proteinuria measurements showed improvement.

Changes in eGFR, proteinuria and ACE/ARB use during study period

	Baseline	Final	p
Median estimated protein loss (mg/day)	975	845	n/a
Mean log estimated protein loss (mg/day)	5.86	6.13	0.0503
Mean estimated GFR (mL/min)	48.0	48.1	0.27
Percent of patients on ACE/ARB where indicated	67	75	0.10

CONCLUSIONS

- A multidisciplinary model of managing HIV and CKD may increase adherence with management guidelines and limit progression of clinically significant proteinuria and decreases in GFR.
- In general, the natural history of renal disease with proteinuria is to progress over time, so even though the observed change in proteinuria was not significant, the lack of progression suggests there may be benefit to this approach over the long-term.

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