Predictors of hyperkalemia risk after hypertension control with aldosterone blockade according to the presence or absence of chronic kidney disease

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Background

Aldosterone antagonists have proven efficacy for the management of hypertension and reduction of proteinuria; however, they are not widely used because of the risk of hyperkalemia. We assessed the predictors of hyperkalemia risk following hypertension control using aldosterone blockade in the presence or absence of chronic kidney disease (CKD).

Methods

A total of 6,575 patients with hypertension treated between January 1, 2000 and November 30, 2012 were evaluated for the safety of an aldosterone blockade (spironolactone) added to pre-existing blood pressure-lowering regimens. Hyperkalemia was defined as a serum K level ≥ 5.0 mEq/L. All patients used 3 mechanistically complementary antihypertensive agents, including a diuretic and a renin-angiotensin system blocker. Patients were evaluated after 4 and 8 weeks of treatment. The incidence of hyperkalemia, significant renal dysfunction (a reduction of estimated glomerular filtration rate [eGFR] ≥ 30%), and adverse effects were assessed.

Results

The incidence of hyperkalemia in the presence or absence of CKD was 50.4% and 42.6% after 4 weeks (P = 0.001) and 3.8% and 3.0% after 8 weeks, respectively (P = 0.371). A logistic regression analysis revealed medication, CKD, basal hyperkalemia, reduction in eGFR, and diabetes were all predictive of hyperkalemia risk following spironolactone use.

Conclusions

Spironolactone was well tolerated in selected CKD patients. The risks of serious hyperkalemia or significant reduction of eGFR appear to be low. Strict monitoring over the first month of treatment followed by standard surveillance for angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers is suggested.

TABLES

Table 1. Baseline characteristics

Demographic variables	
Male gender	3730 (56.7%)
DM	2323 (39.9%)
CKD stage 3 or 4	869 (13.2%)
Number of antihypertensives	4 (3-5)
Any RAS blockade	1617 (24.6%)
Any diuretics	3545 (53.9%)
Laboratory values	
Serum creatine (mg/dL)	0.93 ± 0.46
eGFR (mL/min/1.73 m^2)	90.5 ± 43.9
Serum Potassium (meq/L)	4.1 ± 0.5

TABLES

Tab 3. Comparisons of baseline characteristics of patients according to the presence or absence of CKD

Characteristics	No CKD (n = 5684)	CKD (n = 891)	P value
Age (year)	64.3 ± 12.3	72.3 ± 11.8	0.001
Sex (male/female)	3342/2342	388/503	0.001
BUN (mg/dL)	13.4 ± 5.6	23.2 ± 12.6	0.001
Cr (mg/dL)	0.8 ± 0.2	1.5 ± 0.9	0.001
eGFR (mL/min/1.73 m^2)	97.3 ± 43.2	47.1 ± 11.7	0.001
Sodium (mEq/L)	139.3 ± 4.4	139.4 ± 4.5	0.655
Potassium (mEq/L)	4.1 ± 0.5	4.2 ± 0.6	0.001
Spironolactone (mg)	42.6 ± 23.4	36.3 ± 23.7	0.001
ACEI (no/yes)	4991/693	734/157	0.001
ARB (no/yes)	5399/285	806/85	0.001
Diuretics (no/yes)	2621/3063	409/482	0.914
polystyrene sulfonate calcium (no/yes)	4367/1317	584/307	0.001

Figure 1. Mean serum potassium levels before and after spironolactone medication.

Figure 1

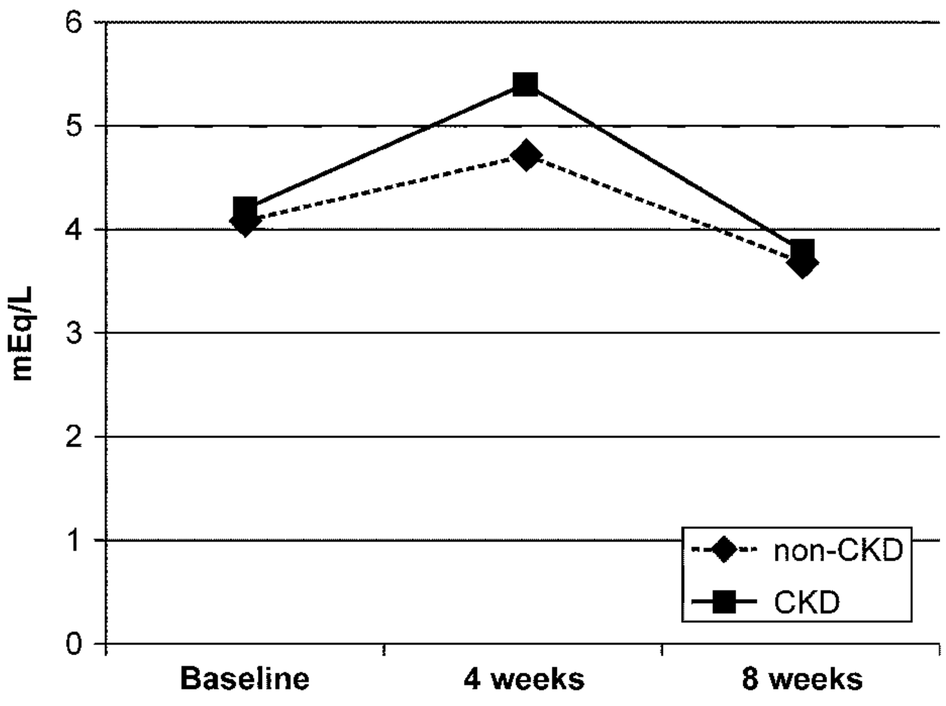


Figure 2. Incidence of basal hyperkalemia before and after spironolactone medication.

Figure 2

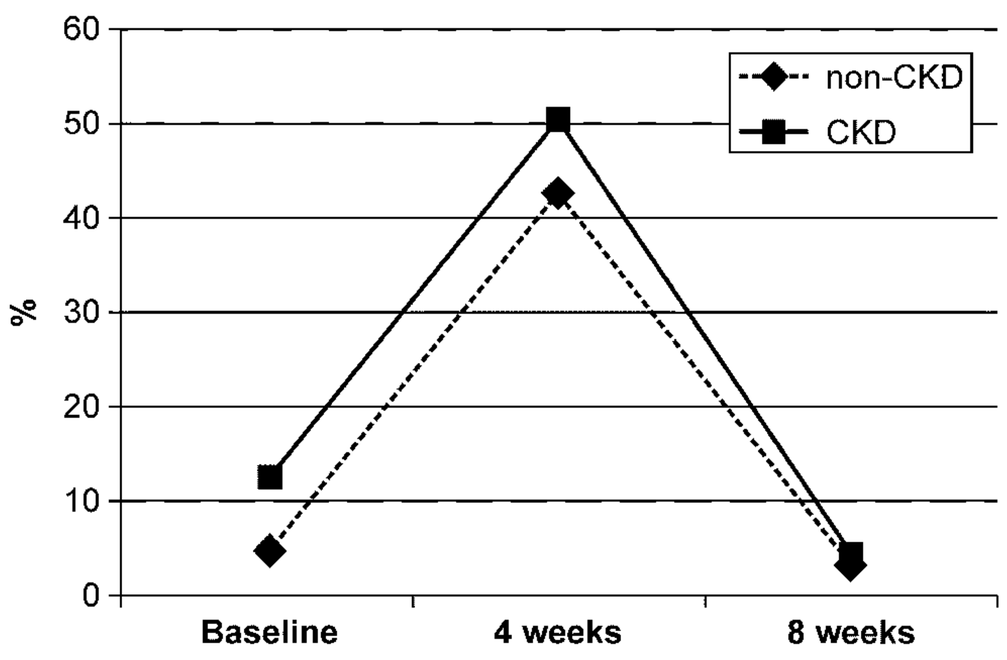
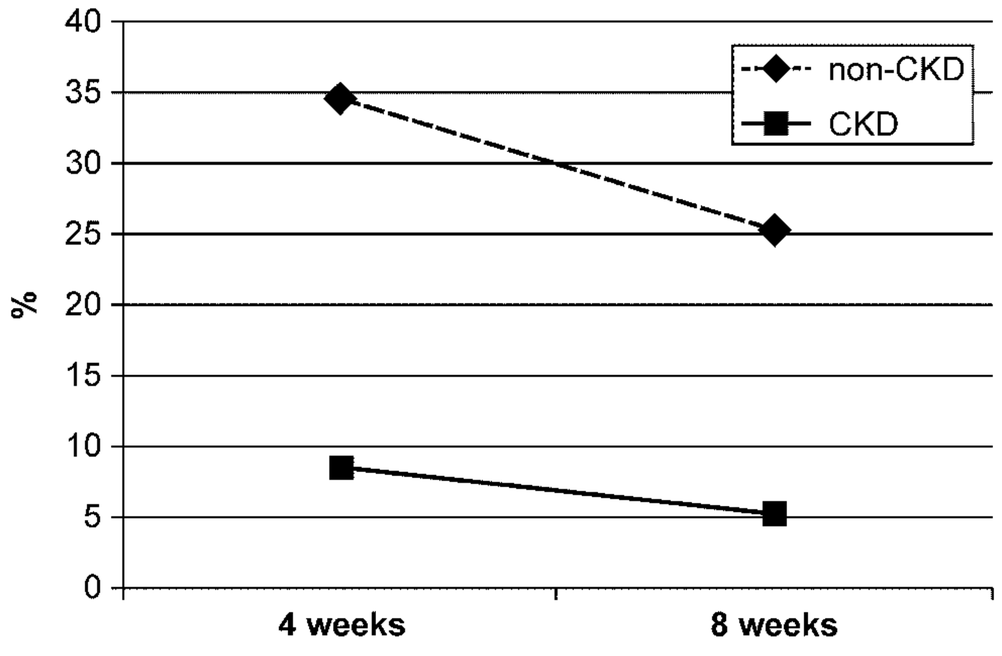


Figure 3. Reduction in eGFR (>30% reduction in eGFR) after spironolactone medication.

Figure 3



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