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Prevalence of Hyperkalemia in Chronic Kidney Disease Patients: A Multicenter Study Based on Real-World Data

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Objectives : Hyperkalemia remains a significant obstacle to the use of renin-angiotensin-aldosterone system inhibitors (RAASi) in patients with chronic kidney disease (CKD) and heart failure (HF). Most existing data originate from controlled trials or Western populations, which limits their generalizability to real-world Asian settings. This study aims to characterize the prevalence and patterns of hyperkalemia across CKD stages using large-scale, multi-institutional Korean data.

Methods : This multicentre, retrospective observational study analyzed 553,418 adult patients with CKD diagnosed between October 2015 and September 2024. CKD was defined as an eGFR <60 mL/min/1.73m² or the presence of proteinuria or hematuria. Patients with prior kidney transplantation or hyperaldosteronism were excluded. The prevalence of hyperkalemia was assessed according to CKD stage, RAASi prescription status, and HF comorbidity.

Results : The prevalence of hyperkalemia among all CKD patients was 11.8%. This increased significantly with advancing CKD stage: 18.2% in Stage 3, 43.1% in Stage 4, and 55.3% in Stage 5 (P<.0001). RAASi users demonstrated 3.1-fold higher hyperkalemia risk compared to non-users (20.4% vs. 6.5%, p<.0001), with severe hyperkalemia (K⁺ ≥6.5 mEq/L) risk being 3.6-fold higher. HF comorbidity was associated with a significantly higher risk (26.0% vs. 10.6%, p<.0001). Among patients with initially normal potassium levels, 9.0% developed hyperkalemia during follow-up, with progression rates correlating with baseline CKD stage. Notably, 14.5% of Stage 3 patients with normal baseline potassium levels progressed to hyperkalemia, with nearly one-third (29.7%) experiencing rapid deterioration within 3 months, highlighting the importance of early intervention.

Conclusions : This large-scale, real-world study demonstrates a substantial hyperkalemia burden in Asian CKD patients, particularly among those with advanced CKD, RAASi treatment, or HF comorbidity. These findings provide critical evidence to inform the development of targeted hyperkalemia management strategies to optimize RAASi utilization and improve clinical outcomes in CKD patients.

Figure1.JPG



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[Table 1.] Prevalence of Hyperkalemia by Baseline CKD Stage

Potassium level	Stage 1 (n = 221,491)	Stage 2 (n = 111,693)	Stage 3 (n = 129,206)	Stage 4 (n = 16,977)	Stage 5 (n = 14,359)	p-value
Normal	21,114 (95.3%)	102,323 (91.6%)	105,666 (81.8%)	9,654 (56.9%)	6,413 (44.7%)	<.0001
Mild/Moderate	8,820 (4.0%)	7,966 (7.1%)	19,134 (14.8%)	5,210 (30.7%)	4,996 (34.8%)	
Severe	1,557 (0.7%)	1,404 (1.3%)	4,406 (3.4%)	2,113 (12.4%)	2,950 (20.5%)	

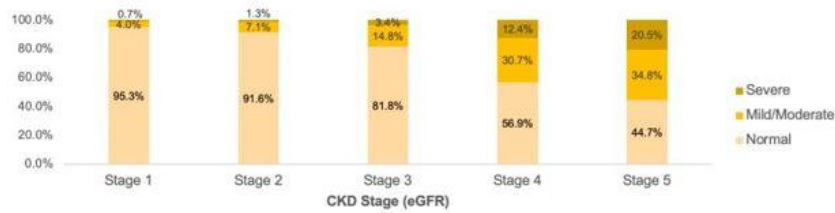


Figure 1. Prevalence of Hyperkalemia by Baseline CKD Stage

Figure1.JPG

[Table 2.] Prevalence of Hyperkalemia by RAASi Prescription Status

Potassium level	RAASi		p-value	RAASi Type	
	User (n = 170,214)	Non-User (n = 331,517)		RASi (n = 156,067)	MRA (n = 43,120)
Normal	135,551 (79.6%)	309,909 (93.5%)	<.0001	125,346 (80.3%)	30,672 (71.1%)
Mild/Moderate	27,180 (16.0%)	17,518 (5.3%)		24,139 (15.5%)	9,557 (22.2%)
Severe	7,483 (4.4%)	4,090 (1.2%)		6,582 (4.2%)	2,891 (6.7%)



Figure 2. Prevalence of Hyperkalemia by RAASi Prescription Status