COMPARATIVE EFFECTIVENESS OF ANGIOTENSIN-CONVERTING ENZYME INHIBITORS VERSUS ANGIOTENSIN RECEPTOR BLOCKERS FOR MAJOR RENAL OUTCOMES: A 15-YEAR NATIONWIDE COHORT STUDY

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Introduction and Aims

Angiotensin converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) are considered to have similar renoprotective effects for patients with diabetes and chronic kidney disease, so far there has been no consensus about the priority for these treatments. This study aimed to compare ACEIs with ARBs for major renal outcomes and survival in a nationally representative cohort.

Material and Methods

This study utilized data in the Longitudinal Cohort of Diabetes Patients from the National Health Insurance Research Database of Taiwan. Enrolled participants should be 18 years or older, with continuous use of antihypertensive treatments for at least 90 days. Claims data including age, gender, comorbidities, income, occupation, geographic location, and outpatient prescriptions were obtained for each participant. The primary outcome was long-term dialysis, and the secondary outcomes were acute kidney injury, hyperkalemia, and death. Cox proportional hazards models were used to estimate the hazard ratios (HRs) and 95% confidence intervals (CIs) for study outcomes compared ACEIs with ARBs. Subgroup analyses and tests for interaction were conducted to examine whether treatment effects varied among participants with different characteristics.

Results

34043 (58.9%) patients received ACEI therapy and 23772 (41.1%) patients received ARB therapy (Figure 1). During a mean follow-up time of 8 years, there were 1548 long-term dialysis, 506 deaths, 393 acute kidney injury, and 1751 hyperkalemia. No differences were found comparing ACEIs with ARBs (Table 1) for long-term dialysis (HR 0.93, 95% CI 0.83 to 1.03), acute kidney injury (1.07, 0.85 to 1.35), hyperkalemia (1.02, 0.92 to 1.14), and death (1.17, 0.98 to 1.40). Comparing ACEIs with ARBs, the adjusted HR for long-term dialysis decreased among the participants with cardiovascular disease (HR 0.80, 95 % CI 0.66 to 0.97), chronic kidney disease (0.81, 0.71 to 0.93), or CCI scores of 6 or higher (0.83, 0.72 to 0.96). There were interactions between the class of renin-angiotensin system blocker and sex, cardiovascular disease, chronic kidney disease, or year of index date for the outcome of long-term dialysis.

Conclusion

This study shows no differences for long-term renal outcomes and mortality between ACEIs and ARBs in the whole study population. However, ACEIs might provide better renoprotective effects than ARBs in patients with more underlying comorbidities, especially cardiovascular disease and chronic kidney disease.

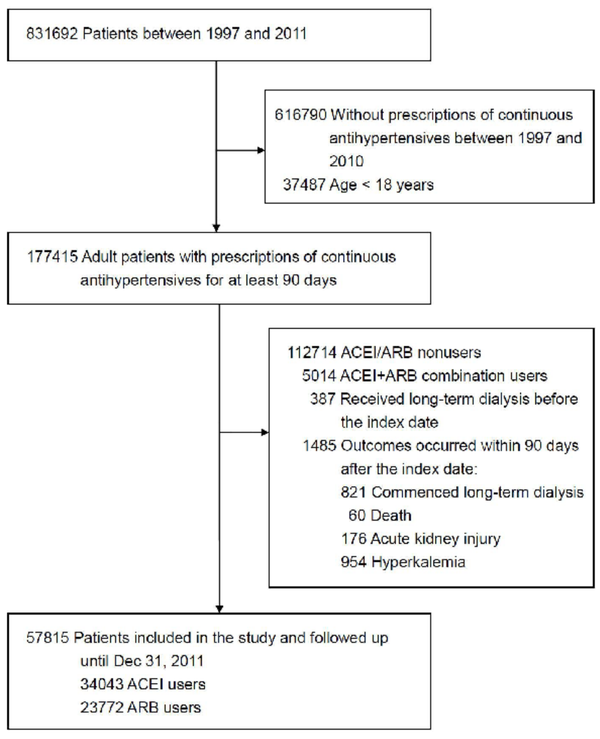

Figure 1. Summary of patient selection.
ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker.

Table 1. Incidence rates and hazard ratios for study outcomes compared ACEI therapy with ARB therapy

	Events, No.		Incidence Rate per 1000 Patient-Years		Hazard Ratio (95% Confidence Interval)	
Outcome	ACEI	ARB	ACEI	ARB	Crude	Fully adjusted[a]
Long-term dialysis	975	573	3.45	3.26	1.04 (0.93 – 1.15)	0.93 (0.83 – 1.03)
Acute kidney injury	269	124	0.95	0.70	1.25 (1.01 – 1.55)[b]	1.07 (0.85 – 1.35)
Hyperkalemia	1183	568	4.18	3.23	1.22 (1.11 – 1.35)[b]	1.02 (0.92 – 1.14)
Death	263	243	0.92	1.38	0.65 (0.54 – 0.77)[b]	1.17 (0.98 – 1.40)

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker.
[a]Cox proportional hazards model adjusted for age, sex, cardiovascular disease, chronic kidney disease, hepatic disease, cancer, Charlson comorbidity index, geographic location, occupation, income, and year of index date.
[b]$P \leq 0.05$.

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