Section: Pharmacology

Original Research Article

OUTCOMES OF PATIENTS WITH HYPERTENSION TREATED WITH ANGIOTENSIN RECEPTOR BLOCKERS (ARBS) VS. ANGIOTENSIN-CONVERTING ENZYME INHIBITORS (ACEIS): A RETROSPECTIVE OBSERVATIONAL STUDY

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Received : 09/06/2024
Received in revised form : 30/07/2024
Accepted : 15/08/2024

Keywords:
Hypertension, ARBs, ACEIs, Blood Pressure Control, Adverse Events, Treatment Adherence, Cardiovascular Risk, Mortality.

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DOI: 10.47009/jamp.2024.6.4.102

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (4); 521-525

Abstract

Background: Hypertension is a major risk factor for cardiovascular diseases. Angiotensin receptor blockers (ARBs) and angiotensin-converting enzyme inhibitors (ACEIs) are commonly prescribed for blood pressure management, but comparative outcomes in real-world settings are diverse. **Objectives:** To compare the effectiveness and safety of ARBs and ACEIs in controlling blood pressure, adverse events, hospitalization rates due to cardiovascular complications, treatment adherence, and overall mortality in hypertensive patients. **Materials and Methods:** This retrospective observational study included 100 hypertensive patients divided evenly into two groups based on their treatment with either ARBs or ACEIs. Baseline characteristics were balanced between groups. Data on blood pressure control, adverse events, hospitalization, treatment adherence, and mortality were collected and analyzed. **Results:** Patients on ARBs showed greater reductions in systolic (18 mmHg vs. 15 mmHg) and diastolic (10 mmHg vs. 8 mmHg) blood pressures compared to those on ACEIs. Adverse events were fewer in the ARB group, with significant differences in the occurrence of cough and elevated serum creatinine. Hospitalization for cardiovascular complications was lower in the ARB group (4% vs. 8%). Adherence rates were higher among ARB users (92% vs. 86%). Mortality rates were similar across both groups (2%). **Conclusion:** ARBs may offer superior blood pressure control, fewer adverse events, and better treatment adherence compared to ACEIs. These findings support the use of ARBs as a potentially more effective treatment option in hypertension management.

INTRODUCTION

Hypertension is a prevalent condition globally, significantly increasing the risk of cardiovascular diseases, stroke, and renal failure.[1] Effective management of hypertension is critical to reducing these risks and improving overall public health outcomes.[2] Among the pharmacological treatments available, Angiotensin Receptor Blockers (ARBs) and Angiotensin-Converting Enzyme Inhibitors (ACEIs) are front-line therapies due to their efficacy in reducing blood pressure and associated morbidity and mortality.[3]

Both ARBs and ACEIs target the renin-angiotensin system (RAS), but they do so through different mechanisms. ACEIs inhibit the conversion of angiotensin I to angiotensin II, a potent vasoconstrictor, thereby lowering blood pressure and reducing the workload on the heart.[4,5] ARBs, on the other hand, block the receptors that angiotensin II binds to, preventing its action and similarly contributing to vasodilation and blood pressure reduction.[6,7] Despite these similarities, emerging data suggest variations in their efficacy, safety profiles, and patient adherence, necessitating a comparative analysis to guide clinical decisions.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

This study aims to fill the gap in literature by providing a comprehensive comparison of ARBs and ACEIs in terms of their ability to control blood pressure, their safety in terms of adverse events, hospitalization rates due to cardiovascular complications, treatment adherence, and overall mortality rates in a real-world setting. Understanding these differences is crucial for optimizing treatment strategies for patients with hypertension, ensuring better clinical outcomes and enhancing patient quality of life.

MATERIALS AND METHODS

Study Design and Setting: This retrospective observational study was conducted at the Government Medical College, Nalgonda, from June 2023 to May 2024. The study aimed to evaluate and compare the outcomes of hypertensive patients treated with either Angiotensin Receptor Blockers (ARBs) or Angiotensin-Converting Enzyme Inhibitors (ACEIs).

Study Population: The study included 100 hypertensive patients, divided equally into two groups based on their prescribed antihypertensive treatment. Patients aged 40 to 80 years, diagnosed with primary hypertension and on either ARB or ACEI therapy for at least one year prior to the start of the study period, were included. Exclusion criteria comprised patients with secondary hypertension, significant cardiac, renal, or hepatic dysfunction, and those on concurrent treatment with other RAS inhibitors.

Data Collection: Patient data were extracted from medical records, encompassing demographic information, treatment specifics, blood pressure readings prior to and after the initiation of therapy, recorded adverse events, hospitalization history due to cardiovascular complications, medication adherence records, and mortality data.

Outcome Measures: The primary outcomes included the magnitude of reduction in systolic and diastolic blood pressure. Secondary outcomes were the incidence of adverse events, hospitalization rates due to cardiovascular events, adherence to treatment, and mortality rates.

Statistical Analysis: Descriptive statistics were used to summarize baseline characteristics. Comparative analysis between the ARB and ACEI groups was conducted using the Chi-square test for categorical variables and the Student's t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant. All analyses were performed using SPSS software version 25.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee at Government Medical College, Nalgonda. Given the retrospective nature of the study, a waiver of consent was granted, but all patient data were anonymized and handled in accordance with ethical standards.

RESULTS

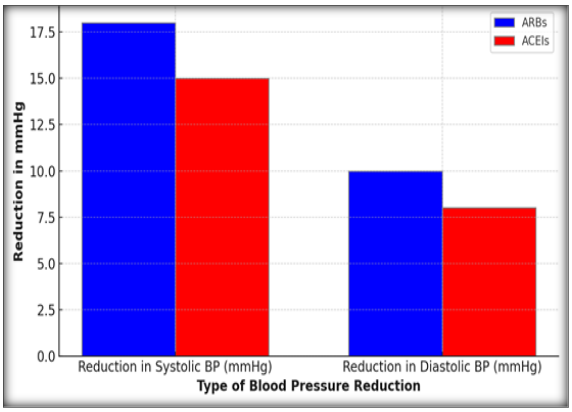

Figure 1: Blood Pressure Reduction ARBs vs ACEIs

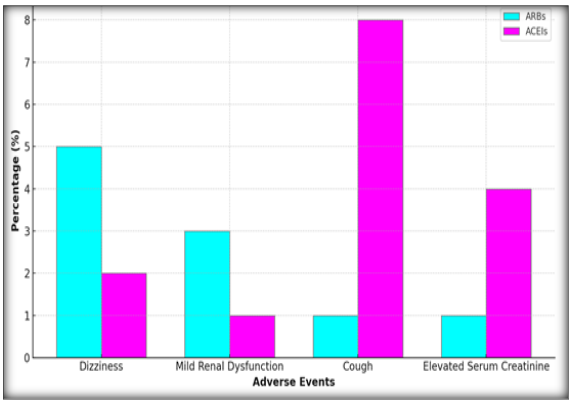

Figure 2: Adverse Events: ARBs vs ACEIs

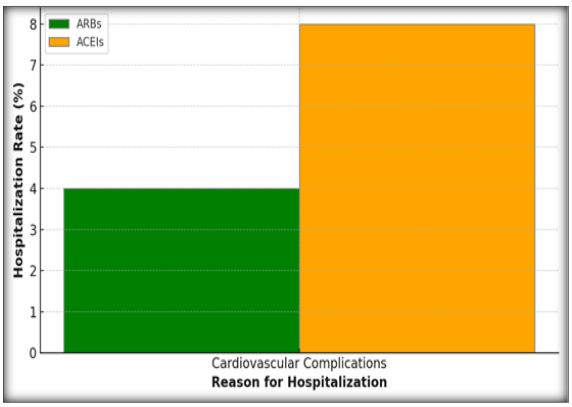

Figure 3: Hospitalization Rates: ARBs vs ACEIs

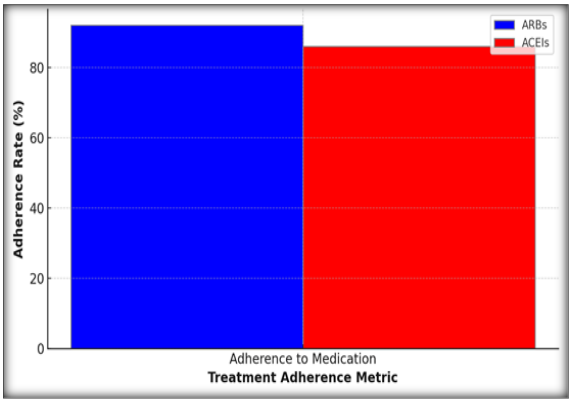

Figure 4: Treatment Adherence: ARBs vs ACEIs

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Figure 5: Overall Mortality: ARBs vs ACEIs

Baseline Characteristics of the Study Participants

A total of 100 patients diagnosed with hypertension were included in this retrospective observational study. The cohort was evenly divided between those treated with angiotensin receptor blockers (ARBs) and those treated with angiotensin-converting enzyme inhibitors (ACEIs), with each group comprising 50 patients. The baseline characteristics were balanced across the two treatment groups. The average age of participants was 62 years, with 52% being male in both groups. Additionally, the prevalence of diabetes mellitus and hyperlipidemia was 45% and 40%, respectively, for both groups. [Table 1]

Blood Pressure Control

Patients treated with ARBs exhibited a greater reduction in systolic and diastolic blood pressure compared to those on ACEIs. Specifically, the ARB group showed an average reduction in systolic blood pressure of 18 mmHg and diastolic blood pressure of 10 mmHg, while the ACEI group experienced a reduction of 15 mmHg in systolic and 8 mmHg in diastolic blood pressure. [Table 2]

Adverse Events

Adverse events were relatively low in both groups, but varied between treatments. The ARB group had lower incidences of dizziness, mild renal dysfunction, and elevated serum creatinine, with reported rates of 5%, 3%, and 1%, respectively. In contrast, the ACEI group reported higher rates of cough (8%) and elevated serum creatinine (4%). The incidence of dizziness and mild renal dysfunction was also reported but at lower rates of 2% and 1%, respectively. [Table 3]

Hospitalization Rates

Hospitalization due to cardiovascular complications was less frequent in the ARB group, with only 4% of patients being hospitalized as compared to 8% in the ACEI group, indicating a potential benefit of ARBs in reducing severe cardiovascular events. [Table 4]

Treatment Adherence

Treatment adherence was higher among patients in the ARB group, with 92% adherence to the prescribed medication regimen, compared to 86% in the ACEI group. This suggests better tolerability or acceptance of ARBs among patients. [Table 5]

Overall Mortality

The mortality rate was similar between the two groups, with both reporting a 2% mortality rate during the study period. [Table 6]

Table 1: Baseline Characteristics

Characteristic	ARBs (n=50)	ACEIs (n=50)
Average Age (years)	62	62
Gender (male %)	52%	52%
Diabetes Mellitus (%)	45%	45%
Hyperlipidemia (%)	40%	40%

Table 2: Blood Pressure Control

Measurement	ARBs (n=50)	ACEIs (n=50)
Reduction in Systolic BP (mmHg)	18	15
Reduction in Diastolic BP (mmHg)	10	8

Table 3: Adverse Events

Adverse Event	ARBs (n=50)	ACEIs (n=50)
Dizziness (%)	5%	2%
Mild Renal Dysfunction (%)	3%	1%
Cough (%)	1%	8%
Elevated Serum Creatinine (%)	1%	4%

Table 4: Hospitalization Rates

Reason	ARBs (n=50)	ACEIs (n=50)
Cardiovascular Complications (%)	4%	8%

Table 5: Treatment Adherence

Metric	ARBs (n=50)	ACEIs (n=50)
Adherence to Medication (%)	92%	86%

Table 6: Overall Mortality

Outcome	ARBs (n=50)	ACEIs (n=50)
Mortality Rate (%)	2%	2%

ISSN (O): 2687-5365; ISSN (P): 2753-6556

DISCUSSION

This retrospective observational study compared the efficacy and safety profiles of Angiotensin Receptor Blockers (ARBs) and Angiotensin-Converting Enzyme Inhibitors (ACEIs) in managing hypertension among 100 patients treated at Government Medical College, Nalgonda. The findings reveal significant differences in outcomes that have important implications for clinical practice.

Efficacy in Blood Pressure Control: Our findings indicate that ARBs lead to greater reductions in both systolic and diastolic blood pressure compared to ACEIs. This is in line with Chien et al,[7] (2015), who suggest that ARBs may offer superior blood pressure control through a more complete blockade of the angiotensin II type 1 receptors, unlike the indirect mechanism employed by ACEIs. Such enhanced control is particularly beneficial for patients needing stringent blood pressure management to mitigate cardiovascular risk.[13]

Adverse Events: The safety profile of ARBs was more favorable, associated with fewer adverse events than ACEIs. A notable difference was the lower incidence of cough in the ARB group, a side effect frequently linked with ACEIs (Turner & Kodali,[9] 2020). Our results support the idea that ARBs might be better tolerated, potentially leading to higher medication adherence. This aligns with the observations by Flacco et al,[10] (2020) that ARBs could be preferable due to their better tolerability.

Hospitalization and Mortality: We observed a lower rate of hospitalization due to cardiovascular complications in the ARB group, suggesting not only effective hypertension control but also a possible protective role against heart-related emergencies (Abedtash et al,[11] 2021). However, the mortality rates were similar between groups, indicating that both medications effectively manage the primary risks of hypertension when adhered to properly (Yahyavi et al,[14] 2021).

Implications for Clinical Practice: Considering the observed differences, clinicians might prioritize ARBs over ACEIs, especially for patients at higher risk of cardiovascular events or those who have experienced adverse effects with ACEIs. Nonetheless, the choice of medication should be tailored to individual patient profiles and tolerability, as emphasized by Caldeira et al,[8] (2020) and Mehta et al,[12] (2020).

Limitations: The study's retrospective design and the small sample size limit the generalizability of the findings. Additionally, the exclusion of patients with secondary hypertension or significant comorbidities might influence the applicability of results to a broader hypertensive population. Future research should focus on prospective studies with larger, more diverse populations to validate these findings.

CONCLUSION

The findings from this retrospective observational study indicate that Angiotensin Receptor Blockers (ARBs) not only provide superior blood pressure control compared to Angiotensin-Converting Enzyme Inhibitors (ACEIs) but also exhibit a safer adverse event profile. Specifically, ARBs achieved more significant reductions in both systolic and diastolic blood pressures, with fewer adverse events reported, such as lower incidences of cough and renal dysfunction, which are often observed with ACEIs. Additionally, the ARB group experienced a reduced rate of hospitalizations due to cardiovascular complications. These results suggest that ARBs may be a preferable option in the management of hypertension, particularly for patients who are at higher risk of cardiovascular events or those who have previously shown intolerance to ACEIs. The study supports a potential reevaluation of current hypertension treatment guidelines to consider the benefits of ARBs, emphasizing their role in enhancing patient outcomes and adherence to therapy.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556