



General Medicine

ASSESSMENT OF CONTROL OF BP IN CKD PATIENTS WITH HYPERTENSION ON HEMODIALYSIS BY USING ABPM IN INDIAN POPULATION

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ABSTRACT

Background: Hypertension is a highly prevalent comorbidity in patients with chronic kidney disease (CKD) and is a leading cause of cardiovascular morbidity and mortality. In India, the coexistence of CKD and hypertension is increasing, particularly among patients receiving hemodialysis. Conventional in-clinic blood pressure (BP) monitoring often fails to represent true BP control due to white-coat and masked hypertension. Ambulatory Blood Pressure Monitoring (ABPM) offers a more accurate and comprehensive method for assessing BP variability and control. **Objectives:** To assess BP control in CKD patients with hypertension undergoing maintenance hemodialysis using 24-hour ABPM and evaluate its role in guiding antihypertensive therapy in the Indian population. **Methods:** A prospective observational study was conducted among 80 hypertensive CKD patients on maintenance hemodialysis at Tirath Ram Shah Charitable Hospital, Delhi, from March 2023 to February 2025. All participants underwent 24-hour ABPM in the interdialytic period using an oscillometric monitor programmed for 30-minute daytime and hourly nighttime readings. Demographic data, comorbidities, and treatment details were recorded. BP readings were analyzed for mean systolic and diastolic levels, dipping status, and requirement of therapy modification. **Results:** The mean age of patients was 56.2 ± 11.8 years; males comprised 65%. Diabetes mellitus (48%) and ischemic heart disease (20%) were common comorbidities. Based on ABPM results, 42.5% of patients exhibited controlled BP, while 57.5% demonstrated poor control. Non-dipping nocturnal BP pattern was present in 68% of patients. ABPM findings necessitated adjustment of antihypertensive therapy in 39% of participants. Poor BP control was significantly associated with advancing age and target organ damage. **Conclusion:** ABPM provides superior insight into BP variability among CKD patients on hemodialysis compared with conventional readings. Integration of ABPM into routine monitoring can optimize antihypertensive management and potentially improve renal and cardiovascular outcomes.

KEYWORDS : Chronic Kidney Disease, Hypertension, Hemodialysis, Ambulatory Blood Pressure Monitoring, Indian Population.

INTRODUCTION

Hypertension remains a predominant modifiable risk factor for cardiovascular morbidity and mortality and is intricately associated with the development and progression of CKD. In India, hypertension contributes significantly to premature deaths, with the NFHS-5 reporting a prevalence of 24% in men and 21% in women. Among CKD patients, its prevalence rises steeply as GFR declines, reaching over 80% in advanced stages. Conventional in-clinic BP measurements are limited by white-coat and masked hypertension, poor reproducibility, and inability to capture diurnal variation. ABPM overcomes these shortcomings by recording BP over 24 hours, allowing evaluation of circadian rhythm, nocturnal dipping, and BP load.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Medicine, Tirath Ram Shah Charitable Hospital, New Delhi, from March 2023 to February 2025. Eighty consecutive hypertensive CKD patients undergoing maintenance hemodialysis for at least one month were enrolled after informed consent. ABPM was performed using a validated oscillometric device during the interdialytic period. BP was automatically recorded every 30 minutes during the day and hourly at night. Data were analyzed using SPSS, with $p < 0.05$ considered significant.

RESULTS

Of 80 patients (52 males, 28 females; mean age 56.2 ± 11.8 years), diabetes mellitus (48%) and ischemic heart disease (20%) were the most common comorbidities. Mean 24-hour BP was $142.4 \pm 14.7 / 88.6 \pm 9.2$ mmHg, and 68% showed a non-dipping pattern. Based on ABPM, 42.5% had controlled BP while 57.5% were uncontrolled. Therapeutic modifications were required in 39% of patients. Poor BP control correlated with age and target organ damage ($p < 0.05$).

DISCUSSION

This study underscores the importance of ABPM in detecting true BP patterns in CKD patients on hemodialysis. Over half of the patients had uncontrolled BP despite apparently normal clinic readings. Non-dipping patterns were prevalent, reflecting autonomic dysfunction and fluid overload in CKD. ABPM also revealed masked and white-coat hypertension, emphasizing its diagnostic value. These findings agree with studies by Agarwal et al. and Hermida et al., supporting ABPM as a superior predictor of cardiovascular outcomes.

CONCLUSION

ABPM should be integrated into the routine assessment of hypertensive CKD patients on hemodialysis. It detects non-dipping and masked hypertension, providing valuable insights for individualized therapy adjustments and improved cardiovascular and renal outcomes.

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