Exploring the Clinical Outcomes of End-Organ Damage in Hypertensive Emergency: A National Perspective

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Background: The number of emergency department visits for hypertensive emergency has been increasing and was reported to be 496,894 visits in 2013 1. Current recommendations are to admit these patients to the ICU and start on intravenous blood pressure-lowering medications. This study aims to assess the prevalence of each end organ damage and their effects on the outcomes during hospitalization.

Methods: This study analyzed data from the 2016-2020 National Inpatient Sample (NIS) database, focusing on adult hospital admissions. We utilized International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes to identify cases of hypertensive emergency (I16.1) and other relevant comorbidities. The primary objective was to assess the prevalence of end-organ damage and its impact on mortality. We employed multivariable logistic regression to adjust for demographics, comorbidities and other potential confounders.

Results: Our comprehensive analysis included 1,032,860 hospitalizations due to hypertensive emergencies, with a notable increase in prevalence from 1,149 to 10,255 cases per 1 million patients between 2016 and 2020. The mean age of the cohort was 62.10 (± 15.97 years), with females constituting 50.7% and whites 44.97%. The most common chronic comorbidities identified were chronic kidney disease (CKD) at 44.87%, diabetes mellitus (DM) at 44.22%, coronary artery disease (CAD) at 42.49%, and congestive heart failure (CHF) at 42.46%. Among end-organ damages, acute kidney injury was most prevalent (33.37%), followed by acute heart failure/pulmonary edema (26.38%), Acute Coronary Syndromes (ACS) (15.33%), ischemic stroke (11.55%), hemorrhagic stroke (9.79%), hypertensive encephalopathy (5.30%), and aortic dissection (1.11%). In patients with hypertensive emergencies, the in-hospital mortality rate was 3.9%, and the median length of stay was 5.96 days (range: 5.91 - 6.01). Subgroup analysis revealed the highest mortality rates in patients with hemorrhagic stroke (20.0%), followed by those with aortic dissection (7.1%). Consistently, hemorrhagic stroke (OR 11.45, 95% CI 10.83-12.10, $p<0.001$) and aortic dissection (OR 3.11, 95% CI 2.54-3.80, $p<0.001$) emerged as the most significant predictors of increased in-hospital mortality after adjusting for demographics, comorbidities, and various types of end-organ damage.

Conclusions: This study highlights a significant ongoing rise in hospital admissions due to hypertensive emergencies from 2016 to 2020, emphasizing the increasing burden of this condition. Our findings demonstrate prevalent comorbidities, end-organ damages and notable mortality rates among patients admitted with hypertensive emergencies. The study emphasizes the need for personalized patient care, underscoring the vital role of early detection and outpatient management of hypertension to prevent the onset of hypertensive emergencies and improve patient outcomes. With the rising incidence of hypertensive emergencies, it is imperative for healthcare systems to evolve, adopting new protocols and refining risk stratification criteria to effectively meet these emerging challenges.