



## UCLINICAL PROFILE AND OUTCOME OF PATIENTS PRESENTING WITH HYPERTENSIVE EMERGENCIES TO THE EMERGENCY DEPARTMENT OF A TERTIARY CARE CENTRE

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### ABSTRACT

Hypertensive emergencies represent a severe and potentially life-threatening elevation of blood pressure associated with acute target organ damage. This single-centre, hospital-based, cross-sectional observational study evaluated the clinical profile, management, and short-term outcomes of 70 patients presenting with hypertensive emergency to the Emergency Department of a tertiary care hospital over one year. The mean age of participants was  $58.2 \pm 11.2$  years, with male predominance (68.57%). Overweight/obesity was noted in 75.71% of patients (mean BMI  $27.5 \pm 3.59$  kg/m<sup>2</sup>), and 81.4% had a prior history of hypertension. Headache was the most common presenting symptom (90%), followed by chest pain and breathlessness (37.1% each). The mean blood pressure at presentation was 202/132 mmHg. Cardiac involvement was the most frequent target organ damage (47.14%), followed by neurological involvement (27.14%); acute pulmonary oedema (15.71%) and sympathetic crisis (14.29%) were the commonest specific manifestations. Intravenous labetalol was the most frequently used agent (38.57%), followed by nitroglycerin (30.0%). The mean hospital stay was  $4.57 \pm 1.63$  days; 88.57% of patients improved and were discharged, while in-hospital mortality was 11.43%. Hypertensive emergencies predominantly affect middle-aged and elderly patients with pre-existing but poorly controlled hypertension, underscoring the need for early recognition, prompt intravenous antihypertensive therapy, and improved long-term blood pressure control.

**KEYWORDS :** hypertensive emergency, target organ damage, blood pressure, emergency department, clinical outcome

### INTRODUCTION

Hypertension is one of the most common non-communicable diseases globally and a major risk factor for cardiovascular disease, stroke, and premature death [1]. A hypertensive emergency is defined as a severe elevation in blood pressure (systolic  $\geq 180$  mmHg and/or diastolic  $\geq 120$  mmHg) accompanied by acute target organ damage, distinguishing it from hypertensive urgency, which lacks such damage [1,2]. Common forms of organ involvement include hypertensive encephalopathy, acute left ventricular failure with pulmonary oedema, aortic dissection, acute coronary syndrome, intracerebral haemorrhage, and acute kidney injury [2].

Hypertension is a growing public health concern in India, with recent national survey data showing rising prevalence across both urban and rural populations. The exact burden of hypertensive emergencies in India remains uncertain due to limited large-scale epidemiological data, though hospital-based studies suggest they account for a significant proportion of emergency department visits [3]. In the absence of published data describing the clinical profile and outcomes of such patients in this region, the present study was undertaken to systematically document the demographic characteristics, clinical presentation, target organ damage pattern, and short-term outcomes of patients presenting with hypertensive emergencies to a tertiary care emergency department.

**Aims and Objectives:** To assess the clinical profile of patients with hypertensive emergencies, including demographic characteristics, presenting symptoms, pattern of target organ damage, management strategies, and treatment outcomes.

Comparable hospital-based studies from India and other countries have consistently reported a predominance of middle-aged to elderly patients, male preponderance, and cardiac and neurological complications as the leading forms of target organ damage in hypertensive emergency [4-8], reinforcing the need for standardized emergency protocols and prompt intravenous antihypertensive therapy.

### MATERIALS AND METHODS

This single-centre, hospital-based, cross-sectional observational study was conducted over 12 months in the Emergency Department of a tertiary care teaching hospital, following institutional ethical clearance. Seventy adult patients ( $\geq 18$  years) presenting with hypertensive emergency (SBP  $\geq 180$  mmHg and/or DBP  $\geq 120$  mmHg with acute target organ damage) were enrolled by non-probability convenience sampling. Pregnant women, patients with hypertensive urgency (no organ damage), trauma patients, and those not consenting were excluded.

After informed consent, demographic and clinical data, presenting symptoms, vital signs, and comorbidities were recorded on a predesigned proforma. Relevant investigations (ECG, chest X-ray, renal function tests, urine examination, neuroimaging, cardiac enzymes, fundoscopy) were performed as clinically indicated to identify target organ damage. Treatment given, duration of hospital stay, and outcome at discharge were documented. Data were analysed using Stata 17.0; categorical variables were expressed as frequencies/percentages and compared using chi-square/Fisher's exact test, with  $p < 0.05$  considered significant.

### OBSERVATIONS AND RESULTS

Of the 70 patients enrolled, the mean age was  $58.2 \pm 11.2$  years, with the largest proportion in the 41–50-year age group (27.14%). Males constituted 68.57% of the cohort. Overweight (48.57%) and obesity (27.14%) were common, with a mean BMI of  $27.5 \pm 3.59$  kg/m<sup>2</sup>.

**Table 1: Demographic and Anthropometric Profile (n=70)**

| Variable  | Category  | Freq. | %     |
|-----------|-----------|-------|-------|
| Age Group | 31–40 yrs | 3     | 4.29  |
|           | 41–50 yrs | 19    | 27.14 |
|           | 51–60 yrs | 17    | 24.29 |
|           | 61–70 yrs | 17    | 24.29 |
|           | 71–80 yrs | 14    | 20.00 |

|        |            |    |       |
|--------|------------|----|-------|
| Gender | Male       | 48 | 68.57 |
|        | Female     | 22 | 31.43 |
| BMI    | Normal     | 17 | 24.29 |
|        | Overweight | 34 | 48.57 |
|        | Obese      | 19 | 27.14 |

**Source:** Study data (n=70); mean age  $58.2 \pm 11.2$  yrs; mean BMI  $27.5 \pm 3.59$  kg/m<sup>2</sup>

A prior diagnosis of hypertension was present in 81.4% of patients, and 72.9% were already on antihypertensive medication. Diabetes mellitus (17.1%), chronic kidney disease (12.9%), and ischaemic heart disease (8.57%) were the leading comorbidities. Headache was the most common presenting symptom (90.0%), followed by chest pain and breathlessness (37.1% each); 60% of patients had multiple symptoms. The mean blood pressure at admission was  $202 \pm 12.2/132 \pm 5.96$  mmHg.

**Table 2: Presenting Symptoms and Comorbidities (n=70)**

| Variable    | Category             | Freq. | %    |
|-------------|----------------------|-------|------|
| Symptom     | Headache             | 63    | 90.0 |
|             | Chest pain           | 26    | 37.1 |
|             | Breathlessness       | 26    | 37.1 |
|             | Giddiness            | 18    | 25.7 |
|             | Vomiting             | 17    | 24.3 |
| Comorbidity | Diabetes             | 12    | 17.1 |
|             | CKD                  | 9     | 12.9 |
|             | IHD                  | 6     | 8.57 |
| History     | Prior HTN            | 57    | 81.4 |
|             | On antihypertensives | 51    | 72.9 |

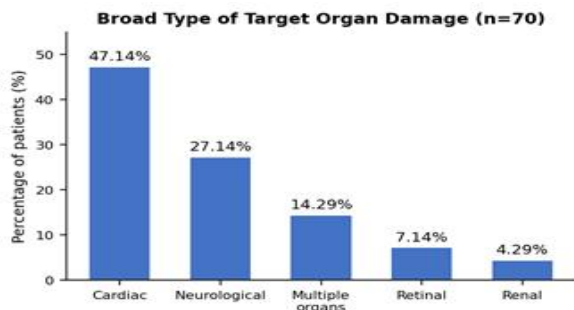
**Source:** Study data (n=70)

Cardiac involvement was the most frequent broad category of target organ damage (47.14%), followed by neurological involvement (27.14%), multiple-organ involvement (14.29%), retinal (7.14%), and renal (4.29%). Among specific manifestations, acute pulmonary oedema (15.71%) and sympathetic crisis (14.29%) were the commonest, followed by acute coronary syndrome (12.86%).

**Table 3: Target Organ Damage (n=70)**

| Category | Type                  | Freq. | %     |
|----------|-----------------------|-------|-------|
| Broad    | Cardiac               | 33    | 47.14 |
|          | Neurological          | 19    | 27.14 |
|          | Multiple organs       | 10    | 14.29 |
|          | Retinal               | 5     | 7.14  |
|          | Renal                 | 3     | 4.29  |
| Specific | Ac. pulmonary oedema  | 11    | 15.71 |
|          | Sympathetic crisis    | 10    | 14.29 |
|          | Ac. coronary syndrome | 9     | 12.86 |
|          | Subarachnoid hge.     | 6     | 8.57  |

**Source:** Study data (n=70)



**Fig 1: Broad Type of Target Organ Damage (n=70)**

Intravenous labetalol was the most commonly used primary treatment (38.57%), followed by nitroglycerin (30.0%), nicardipine (20.0%), and hydralazine (11.43%). The mean

duration of hospital stay was  $4.57 \pm 1.63$  days. Most patients (88.57%) improved and were discharged, while 11.43% died during hospitalisation.

**Table 4: Treatment and Outcome (n=70)**

| Variable  | Category            | Freq. | %     |
|-----------|---------------------|-------|-------|
| Treatment | Labetalol IV        | 27    | 38.57 |
|           | Nitroglycerin IV    | 21    | 30.00 |
|           | Nicardipine IV      | 14    | 20.00 |
|           | Hydralazine IV      | 8     | 11.43 |
| Outcome   | Improved/Discharged | 62    | 88.57 |
|           | Death               | 8     | 11.43 |

**Source:** Study data (n=70); mean hospital stays  $4.57 \pm 1.63$  days

## DISCUSSION

The mean age in this study ( $58.2 \pm 11.2$  years) closely corresponds with Shashibhushan et al. (58.44 years) [8], Murty et al. (60.38 years) [7], and Desta et al. (58.8 years) [3], confirming that hypertensive emergencies predominantly affect middle-aged and elderly individuals. Male predominance (68.57%) was comparable to Murty et al. (72%) [7] and Shashibhushan et al. (69.2%) [8], though Shao et al. reported a slight female predominance (53.2%) [4], suggesting gender patterns may vary by population.

The in-hospital mortality of 11.43% observed here lies within the wide range reported previously — lower than Murty et al. (24%) [7], Goswami et al. (15.4%) [6], and Shao et al. (26.8%) [4], but higher than Shashibhushan et al. (4.2%) [8] — reflecting variation in illness severity, ICU access, and complication rates across settings. Intravenous labetalol and nitroglycerin were the most frequently used agents, consistent with Konuganti et al. [5] and Goswami et al. [6], who similarly reported these as first-line therapy for rapid, controlled blood pressure reduction.

Cardiac involvement (47.14%) was the leading category of target organ damage, followed by neurological involvement (27.14%), broadly consistent with Goswami et al. [6] and Konuganti et al. [5]; however, Murty et al. [7] and Varun et al. [9] reported neurological complications as more predominant (56%), indicating that organ-damage patterns may differ with population risk-factor profiles. Headache was the most frequent presenting symptom (90%), higher than the 39% reported by Desta et al. [3], while multiple concurrent symptoms in 60% of patients reflect the multisystem nature of hypertensive emergency.

A high prevalence of overweight/obesity (75.71% combined) and known but poorly controlled hypertension (81.4% with prior diagnosis, yet presenting in emergency) mirrors findings from Shao et al. [4] and Konuganti et al. [5], highlighting non-adherence to antihypertensive therapy and inadequate follow-up as recurring contributors to hypertensive emergencies even among previously diagnosed patients.

Limitations of this study include its single-centre design, modest sample size (n=70), cross-sectional nature precluding causal inference, and reliance on patient/attendant recall for history of hypertension duration and medication adherence, which may introduce recall bias.

## CONCLUSION

Hypertensive emergencies predominantly affect middle-aged and elderly patients with pre-existing, often poorly controlled hypertension, with cardiac and neurological complications constituting the majority of target organ damage. Prompt intravenous antihypertensive therapy resulted in favourable outcomes in most patients, though in-hospital mortality remained appreciable at 11.43%. Early recognition of

symptoms, aggressive blood pressure control in the emergency setting, and improved long-term adherence to antihypertensive treatment are essential to reducing the burden of hypertensive emergencies and their associated morbidity and mortality.

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