

Clinical Profile and Outcome of Hypertensive Emergencies at a Tertiary Care Hospital

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Abstract

Background: Hypertensive emergencies refers to a large spectrum of clinical presentations secondary to uncontrolled blood pressure (BP) with subsequent progressive or impending end-organ dysfunction. Hypertensive emergency (HE) needs early differentiation from hypertensive urgency (HU) for early institution of successful management. Oral AHTT with diuretics, renin-angiotensin-aldosterone system inhibitors and/or calcium channel blockers are indicated to achieve BP control in patients of HU. Our study would be helpful in understanding the spectrum of clinical presentation and outcome of HE especially related to cardiovascular, central nervous and renal systems in our tertiary care centre along with assessment of its occurrence and causes. **Material and Methods:** Inclusion Criteria are all patients above 18 years of age having Systolic BP>180mmHg & Diastolic BP>120mmHg with clinico-biochemical evidence of end-organ damage (EOD). Exclusion Criteria are pregnancy, Known cases of Chronic renal failure, Valvular heart disease, Known cases of secondary hypertension. **Results:** This hospital-based, prospective, observational study was conducted in the on 81 OPD/IPD/Emergency patients of/in the Department of Internal Medicine, Teerthanker Mahaveer Medical College and Research Centre. In our study 35.8% of study subjects were above 60 years. 44.4% were female, most common presenting symptom was left/ right weakness 25.9%, 44.4% of subjects CVA was the clinical diagnosis. Out of 31 subjects in whom CT scan for head was done, 22.2% had hemorrhage while 13.5% had infarct. 16% of subjects showed cardiac hypertrophy on 2D-ECHO. The mean systolic blood pressure was high at admission and significantly decreased with each follow up at 1, 2 and 3 months. **Conclusion:** Acute elevation in blood pressure is a common presentation in emergency department. Patients need aggressive and controlled reduction in blood pressure using intravenous antihypertensive therapy for preventing the associated morbidity and mortality secondary to end-organ damage especially strokes and myocardial complications.

Keywords: Hypertension, Hypertensive Urgency, Hypertensive Emergency, Cerebral Vascular Accident.

Introduction

Hypertensive emergencies refers to a large spectrum of clinical presentations secondary to uncontrolled blood pressure (BP) with subsequent progressive or impending end-organ dysfunction.^[1] Hypertensive encephalopathy, cerebrovascular accident (CVA)/cerebral infarction, subarachnoid hemorrhage (SAH), and intracranial hemorrhage (ICH) are the various neurological complications of uncontrolled BP while myocardial ischemia/infarction (MI), acute left ventricular dysfunction (LVF), acute pulmonary edema (PE), and aortic dissection (AD) are the cardiovascular complications arising due to uncontrolled BP. Hypertensive emergency (HE) needs early differentiation from hypertensive urgency (HU) for early institution of successful management. HE is characterized by high BP with manifestation of end-organ failure as ARF (especially proteinuria), retinopathy, MHA, left ventricular failure (LVF) and encephalopathy.^[2,3] On the contrary, HU does not encompass end-organ damage manifestations with uncontrolled BP.^[4,5] Though hypertension (HTN) is increasing in prevalence in the Western population, significant decline is noted in the HE owing to antihypertensive therapy (AHTT). However, in the developing countries like India, lack of widespread availability of AHTT is responsible for increasing number of HE cases along with HTN cases.^[6] The major risk factors for uncontrolled BP are male sex, coexisting diabetes and poor compliance to AHTT. Oral AHTT with diuretics, renin-angiotensin-aldosterone system inhibitors and/or calcium channel blockers are indicated to achieve BP control in patients of HU.^[7] Our study would be helpful in understanding the spectrum of clinical presentation and outcome of HE especially related to cardiovascular, central nervous and renal systems in our tertiary care center along with assessment of its occurrence and causes.

AIM

- To study the clinical profile and outcome of patients presenting with Hypertensive Emergency at our tertiary care hospital.

OBJECTIVES

- To study the clinical presentation of patients with hypertensive emergencies related to cardiovascular, neurological, and renal system.
- Analyzing the occurrence of Hypertensive Emergencies in our tertiary care hospital and the reasons thereof.
- To study the outcome of patients with hypertensive emergencies.

Methodology**Inclusion criteria**

All patients above 18 years of age having Systolic BP>180mmHg & Diastolic BP>120mmHg 12 with clinico-biochemical evidence of end-organ damage (EOD).

Exclusion criteria

- Pregnancy
- Known cases of Chronic renal failure, Valvular heart disease
- Known cases of secondary hypertension.

RESULTS**Table 1: Distribution of Cases based on Age**

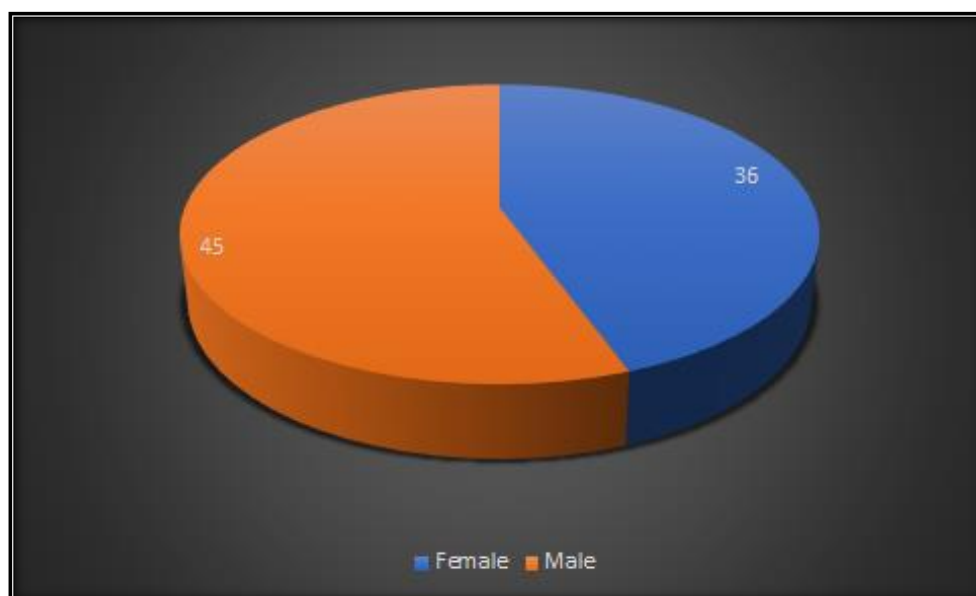
| Age (Years) | Frequency (n=81) | Percentage (%) |
|-------------|------------------|----------------|
| <41 | 8 | 9.9 |
| 41-50 | 18 | 22.2 |
| 51-60 | 26 | 32.1 |
| > 60 | 29 | 35.8 |

35.8% of study subjects were above 60 years followed by 32.1% in the age group 51-60 years, 22.2% in the age group 41-50 years and only 9.9% of subjects were below 40 years of age.

Table 2: Distribution of Cases based on Gender

| Gender | Frequency (n=81) | Percentage (%) |
|--------|------------------|----------------|
| Female | 36 | 44.4 |
| Male | 45 | 55.6 |

Out of 81 study subjects, 55.6% were male while 44.4% subjects were female.

**Table 3: Distribution of Cases based on Chief Complaint**

| Chief complaints | Frequency (n=81) | Percentage (%) |
|------------------------|------------------|----------------|
| Altered sensorium | 18 | 22.2 |
| Chest pain | 4 | 4.9 |
| Decreased urine output | 13 | 16 |
| Headache | 2 | 2.5 |
| Palpitation | 1 | 1.2 |
| Shortness of breath | 19 | 23.5 |
| Slurring of speech | 1 | 1.2 |
| Vomiting | 2 | 2.5 |
| Weakness (Left/Right) | 21 | 25.9 |

The most common chief complaint was left or right sided weakness seen in 25.9% of subjects followed by shortness of breath (23.5%), altered sensorium (22.2%), decreased urine output (16%), chest pain (4.9%), and headache & vomiting in 2.5% of subjects each.

Table 4: Distribution of Cases based on Grade of Albuminuria

| Albumin in Urine | Frequency (n=81) | Percentage (%) |
|------------------|------------------|----------------|
| 0 | 67 | 82.7 |
| 1 | 10 | 12.3 |
| 2 | 3 | 3.7 |
| 3 | 1 | 1.2 |

82.7% of subjects had no albuminuria while 12.3% had grade 1, 3.7% had grade 2 and 1.2% had grade 3 of albuminuria.

Table 5: Distribution of Cases based on Grade of Medical Renal Disease on Ultrasonography of Abdomen

| USG - MRD (Grade) | Frequency (n=81) | Percentage (%) |
|-------------------|------------------|----------------|
| 0 | 57 | 70.4 |
| 1 | 4 | 4.9 |
| 2 | 9 | 11.1 |
| 3 | 9 | 11.1 |
| 4 | 2 | 2.5 |

70.4% of subjects had no signs of medical renal disease on ultrasonography while 11.1% had grade 2 and grade 3 each, 4.9% had grade 1 and 2.5% had grade 4 medical renal disease on ultrasonography.

Table 6: Distribution of Cases based on CT Scan Head Findings

| CT Scan Findings | Frequency (n=81) | Percentage (%) |
|------------------|------------------|----------------|
| Not Done | 50 | 61.7 |
| Haemorrhage | 18 | 22.2 |
| Infarct | 11 | 13.5 |
| WNL | 2 | 2.5 |

Out of 31 subjects in whom CT scan for head was done, 22.2% had hemorrhage while 13.5% had infarct.

Table 7: Distribution of Cases based on Cardiac Hypertrophy on 2D-ECHO

| 2D- ECHO Hypertrophy | Frequency (n=81) | Percentage (%) |
|----------------------|------------------|----------------|
| No | 68 | 84.0 |
| Yes | 13 | 16.0 |

16% of subjects showed cardiac hypertrophy on 2D-ECHO.

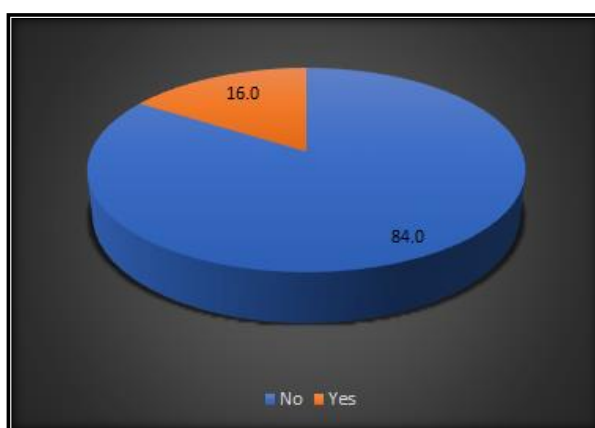


Table 8: Distribution of Cases based on Major System Involvement on Final Diagnosis

| Final Diagnosis | Frequency (n=81) | Percentage (%) |
|------------------------|------------------|----------------|
| CKD | 19 | 23.5 |
| CHF & CKD | 2 | 2.5 |
| CHF with DCMP & CKD | 1 | 1.2 |
| CHF | 19 | 23.5 |
| Hypertensive emergency | 2 | 2.5 |
| CVA | 36 | 44.4 |
| Hypertensive urgency | 2 | 2.5 |

In 44.4% of subjects CVA was the clinical diagnosis followed by CKD (23.5%) and CHF (23.5%).

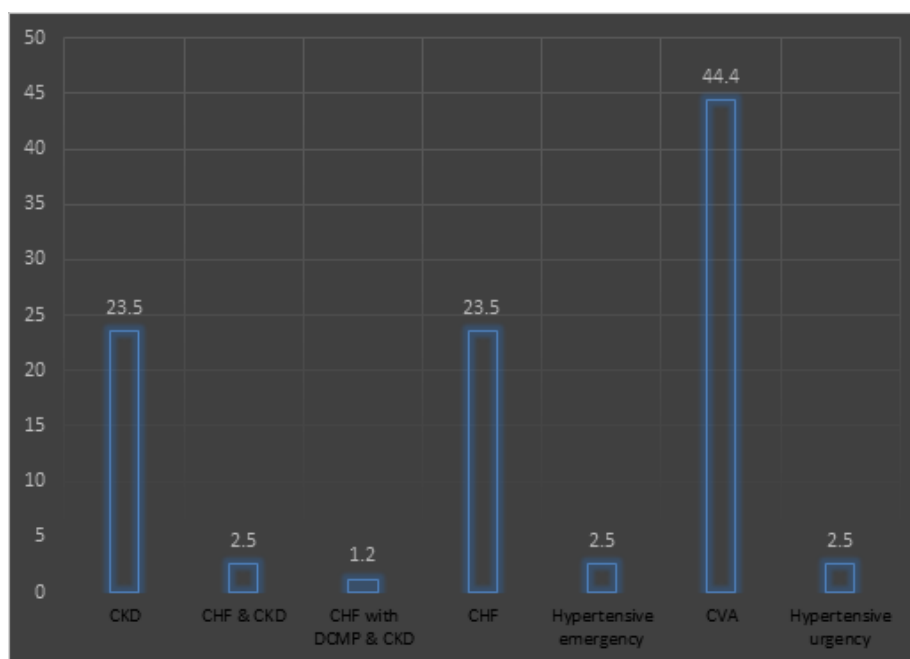


Table 9: Mean values of various demographic, clinical and biochemical parameters among Cases

| Characteristic | N | Mean | SD |
|--------------------|----|--------|---------|
| Age | 81 | 57.98 | 14.926 |
| Duration (IN DAYS) | 81 | 7.14 | 16.816 |
| Pulse (bpm) | 81 | 91.58 | 17.944 |
| Blood urea | 81 | 102.54 | 100.432 |
| S creatinine | 80 | 3.3736 | 4.38394 |
| SBP | 81 | 201.85 | 23.658 |
| DBP | 81 | 128.64 | 9.444 |
| SBP_1month | 81 | 142.35 | 12.903 |
| DBP_1month | 81 | 88.27 | 9.326 |
| SBP_2month | 81 | 132.91 | 10.845 |

| | | | |
|------------|----|--------|-------|
| DBP_2month | 81 | 85.41 | 7.039 |
| SBP_3month | 81 | 126.64 | 9.663 |
| DBP_3month | 81 | 79.63 | 7.976 |

DISCUSSION

This hospital-based, prospective, observational study was conducted in the on 81 OPD/IPD/Emergency patients of/in the Department of Internal Medicine, Teerthanker Mahaveer Medical College and Research Centre, Moradabad over a period of 18months in our study 35.8% of study subjects were above 60 years followed by 32.1% in the age group 51-60 years, 22.2% in the age group 41-50 years and only 9.9% of subjects were below 40 years of age. Out of 81 study subjects, 55.6% were male while 44.4% subjects were female.

Bahloul et al (2021) in their retrospective study on 346 elderly patients >80years of age had female dominance (54.9%).^[6] More than 50% of the patients in study group had uncontrolled BP with dyslipidemia as the major CVS risk factor (43.6%) followed by DM (35.5%). 82.7% of subjects had hypertension and approximately 44.4% of HE patients had stroke, 23.5% had coexisting cardiovascular disease while 13.6% had coexisting diabetes, only 1 subject had Chronic Kidney Disease. The patients with HE was commonest in 5th & 6th decades of age with male predominance. The commonest symptom in their study was shortness of breath & weakness on one side of body with equal representation (23.5% each) followed by decreased urinary output (14.8%) and altered sensorium (13.6%).

Prabhakaran et al (2020) in their prospective study over a period of 6months on patients with HE observed higher incidence of HE in males & those with history of HTN with neurological deficit, dyspnoea, chest pain being the commonest presentations. 82.7% of subjects had no albuminuria while 12.3% had grade 1, 3.7% had grade 2 and 1.2% had grade 3 of albuminuria.^[8]

Andrade et al (2017) in their study evaluating biochemical and metabolic parameters in patients with hypertensive crisis observed higher occurrence of HE among elderly individuals and known hypertensives. Similarly, dyslipidemia, glycemia, low HDL levels & hypokalemia were higher in HE compared to HU. Serum creatinine levels were found higher in the hypertensive crisis group associated with significantly lower GFR was lower in HE compared to HU.^[9] In majority of subjects (96.4%), fundoscopic eye examination showed no signs of retinopathy.

Manjhar et al,^[4] (2017) in their study on 200 patients with hypertensive crisis including 72% HE and 28% HU evaluating the risk factors and spectrum of EOD observed that HE patients are more likely to be older, sedentary, smoker and non-adherent to AHTT. Retinopathy was the commonest manifestation in this study (66%) followed by neurological (39%) and CVS (34%) manifestations. In majority of subjects (84%), ECG examination was found to be normal while 8.6% of subjects had LVH. 70.4% of subjects had no signs of medical renal disease on ultrasonography while 11.1% had grade 2 and grade 3 each, 4.9% had grade 1 and 2.5% had grade 4 medical renal disease on ultrasonography. Out of 31 subjects in whom CT scan for head was done, 22.2% had hemorrhage while 13.5% had infarct. 16% of subjects showed cardiac hypertrophy on 2D-ECHO. In 44.4% of subjects CVA was the clinical diagnosis followed by CKD (23.5%), CHF (19.8%) and CAD (3.7%).

The mean systolic blood pressure was high at admission and significantly decreased with each follow up at 1, 2 and 3 months. This difference between systolic blood pressure at admission in comparison to systolic blood pressure at 1, 2 and 3 months was statistically significant with p-value less than 0.05. The mean diastolic blood pressure was high at admission and significantly decreased with each follow up at 1, 2 and 3 months. This difference between diastolic blood pressure at admission in comparison to diastolic blood pressure at 1, 2 and 3 months was statistically significant with p-value less than 0.05.

Acute elevation in blood pressure is a common presentation in emergency department. Significant proportion of these patients present with signs and symptoms of end-organ damage especially neurological, cardiovascular & renal manifestations, when it is referred to as hypertensive emergency. Patients need aggressive and controlled reduction in blood pressure using intravenous antihypertensive therapy for preventing the associated morbidity and mortality secondary to end-organ damage especially strokes and myocardial complications. Strict adherence of antihypertensive therapy and patient motivation form a major part of the treatment plan in these patients on discharge from intensive care units.

Limitations of the Study

- Hospital-based, single centre study.
- Small sample volume.
- Management was not included in our study
- Evaluation of risk factors leading to hypertensive emergency was not studied.

CONCLUSION

Based on the observations in our study, we can conclude the following: Majority of patients presenting with hypertensive emergency are >40years of age with 7th decade being the commonest age-group to be affected. Males outnumber females in hypertensive emergency patients. Majority of patients presenting with HE are known hypertensive with some of them having DM as the co-morbidity. Shortness of breath and unilateral body weakness are the commonest presenting symptoms in patients presenting with hypertensive emergency. Though significant

number of patients presenting with hypertensive emergency have albuminuria, raised blood urea & serum creatinine but very few patients have retinopathy the time of presentation. Significant number of patients presenting with hypertensive emergency have ECG & ECHO changes suggesting cardiac ischemia/left ventricular hypertrophy/dilatation, signs of renal medical disease on ultrasonography and signs of stroke on brain CT/MRI scan. Neurological manifestations predominate in patients presenting with hypertensive emergency followed by cardiovascular and renal manifestations. Majority of HE patients demonstrated good response to anti-hypertensive treatment therapy within 3-months of appropriate treatment.

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