

A STUDY OF HYPERTENSIVE EMERGENCIES AT VIMS, BALLARI

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Abstract

Background: Hypertensive emergencies (HE) are critical conditions associated with significant disability and high healthcare costs. Even though the mortality rates associated with these emergencies have decreased over the last years, patients with HE are still at a high risk. To study the different etiologies of hypertensive emergencies. To study clinical features in hypertensive emergencies. To study clinical outcomes of hypertensive emergencies. **Materials and Methods:** A cross sectional study was conducted to examine the etiology, clinical feature and outcome of hypertensive emergencies. in VIMS, Ballari. The study was conducted from November 2018 to October 2020 (2 Years). Subjects were enrolled from Department of general medicine, VIMS, Ballari who were undergone admission. The sample size was found to be 50. SPSS was used for analysis. **Result:** Majority of the subjects were under the age group of more than 60 years (30%), followed by 41-50 years (26%), 51-60 years (24%) and 30-40 years (20%). The mean age of the subjects was calculated as 52.37±13.13. Males were more. 72% were known hypertensive patients and the rest were not diagnosed before. Neurological deficits were the most common (48%) presenting symptom followed by dyspnoea (28%) and Chest Pain (24%). mean systolic blood pressure at admission was 222.89±25.46, which was reduced to 198.56±22.48 at one hour, 166.35±20.06 at 24 hours and 135.44±18.82 at discharge. 44% had the ST segment or T wave abnormalities, 20% had LVH and 16% had both the changes. 26 % of the study participants had elevated serum urea, 16% of the study participants had elevated serum creatinine, 12% of the study participants had elevated serum urea and serum creatinine. **Conclusion:** The in-hospital mortality rate was 22% with respect to hypertensive emergencies. Fifth and sixth decades of age group represented majority of the hypertensive emergencies. There is a male predilection for hypertensive emergencies.

INTRODUCTION

Systemic hypertension (HTN) is a common medical condition affecting over 1 billion people worldwide. Hypertension management is among the most common reasons for outpatient physician visits, and the medical treatment of hypertension is the most common reason for chronic medication prescriptions.^[1] Although chronic hypertension is an established risk factor for cardiovascular, cerebrovascular and renal disease, acute elevations in blood pressure can result in acute end organ damage with significant morbidity. Hypertensive emergencies and hypertensive urgencies are commonly encountered by a wide variety of clinicians.^[2]

Hypertensive emergencies (HE) are critical conditions associated with significant disability and

high healthcare costs. Even though the mortality rates associated with these emergencies have decreased over the last years, patients with HE are still at a high risk. Study found that 16% of patients admitted to hospital for a HE had an unplanned readmission within 30 days.^[3-5]

The incidence of HE is constantly increasing reported that the number of visits to the emergency department for HE has more than doubled from 2006 to 2013.^[6] In a large study on 129,914 admissions reported a rising trend in HE hospitalization over 10 years, increasing from 9,511 to 15,479 in parallel with a significant reduction in long-term mortality (from 0.8% to 0.3%).^[7] It is important to differentiate hypertensive emergencies from the classic uncontrolled hypertension without target organ damage, as the management of this entity is completely different. Due to the association

of hypertensive emergencies with various cerebral, cardiac and renal complications, there is an urgent need to recognize this condition so as to reduce the burden associated with it in terms of increased morbidity and mortality in the society. Hence a cross sectional study was done to examine the etiology, clinical feature and outcome of hypertensive emergencies.

MATERIALS AND METHODS

A cross sectional study was conducted to examine the etiology, clinical feature and outcome of hypertensive emergencies. in VIMS, Ballari. The study was conducted from November 2018 to October 2020 (2 Years). Subjects were enrolled from Department of general medicine, VIMS, Ballari who were undergone admission.

Inclusion Criteria

- Subjects willing to give informed consent
- Subject's undergone admission.
- Subjects with age more than or equal to 18 years.

Exclusion Criteria

- Subjects with pregnancy.
- Subjects with age more than 80 years
- Subjects with intracranial space occupying lesion.
- Subjects with valvular heart disease.
- Subjects with contracted kidneys.

Sample size estimation

Hypertensive crises accounted for 1.7% of all clinical emergencies as per study⁶

Sample size was estimated by using the formula:

$$N = Z_{\alpha/2}^2 * P(1-P) / D$$

$$E^2$$

$$= (1.96 * 1.96) / (0.983 * 0.017) * 1.8$$

$$0.05 * 0.05 = 46.22$$

The final sample size was rounded off to 50.

Methodology

A structured proforma was designed to collect the data. It consisted of two parts: The first part included participant's demographic profile, medical history, clinical examinations and laboratory investigations. Second part included details about blood pressure at different intervals. The study was carried out by a single trained and calibrated investigator in department of general medicine at VIMS, Ballari. Demographic data and other information were collected from the medical records or from relatives.

Statistical Analysis

Data collected was entered in a MS Excel sheet. The descriptive and analytical statistics were performed using with the Statistical Package of Social Sciences (SPSS) version 22 software. Percentages, means and standard deviations (SD) were computed for descriptive purposes. Chi Square test was used to compare frequency distributions between the two groups. A p value of less than 0.05 was considered as statistically significant.

RESULTS

As per [Table 1] among the study population (N=50), majority were males (n=37; 74%). The overall male to female ratio is 2.86:1.

As per [Table 2] among the study population, majority of the subjects were under the age group of more than 60 years (30%), followed by 41-50 years (26%), 51-60 years (24%) and 30-40 years (20%). The mean age of the subjects were calculated as 52.37±13.13.

Table 1: Distribution of gender among the study subjects

Gender	Frequency		Percent
	Male	37	74.0
	Female	13	26.0
	Total	50	100.0

Table 2: Distribution of Age among the study subjects

Age - Years	Frequency		Percentage
	30-40	10	20
	41-50	13	26
	51-60	12	24
	>60	15	30
	Total	50	100.0

Table 3: Distribution of presenting symptoms among the study subjects

Presenting Symptoms	Frequency		Percent
	Chest Pain	12	24.0
	Dyspnoea	14	28.0
	Neurological Deficits	24	48.0
	Total	50	100.0

As per [Table 3] neurological deficits were the most common (48%) presenting symptom followed by dyspnoea (28%) and Chest Pain (24%).

Table 4: Distribution of hypertensive status among the study subjects

Hypertensive Status		Frequency	Percent
Hypertensive Status	Known hypertensive	36	72.0
	NOT known hypertensive	14	28.0
	Total	50	100.0

As per [Table 4] majority of the study participants (72%) were known hypertensive patients and the rest were not diagnosed before. Most of the subjects with the known history of hypertension were complaint (77.88%) with respect to the antihypertensive drugs.

Table 5: Systolic blood pressure measurements among the study subjects at various time points

Systolic blood pressure (mm Hg)	N	Mean	Standard Deviation
At admission	50	222.89	25.46
At one hour	50	198.56	22.48
At 24 hours	50	166.35	20.06
At discharge	50	135.44	18.82

As per [Table 5] the mean systolic blood pressure at admission was 222.89 ± 25.46 , which was reduced to 198.56 ± 22.48 at one hour, 166.35 ± 20.06 at 24 hours and 135.44 ± 18.82 at discharge.

Table 6: Chest radiograph findings among the study subjects

Chest radiograph		Frequency	Percent
Chest radiograph	Cardiomegaly	19	38.0
	Pulmonary oedema	4	8.0
	Normal	27	54.0
	Total	50	100.0

As per [Table 6] there were 19 (38%) subjects with cardiomegaly, followed by 4 (8%) subjects with pulmonary oedema. The chest radiograph was normal in 27 (54%) subjects.

Table 7: Distribution of ECG changes among the study subjects

ECG changes		Frequency	Percent
ECG changes	Normal	20	40.0
	LVH	5	10.0
	ST segment or T wave abnormalities	17	34.0
	Both the changes	8	16.0
	Total	50	100.0

As per [Table 7] among the study participants, 44% had the ST segment or T wave abnormalities, 20% had LVH and 16% had both the changes. A total of 10 (20%) participants had a normal ECG.

Table 8: Distribution of the study subjects as per the renal function tests

Renal Function Tests		Frequency	Percent
Renal Function Tests	Normal	23	46.0
	Elevated S.urea and S.creatinine	6	12.0
	Elevated serum creatinine	8	16.0
	Elevated serum urea	13	26.0
	Total	50	100.0

As per [Table 8] a total of 26 % of the study participants had elevated serum urea, 16% of the study participants had elevated serum creatinine, 12% of the study participants had elevated serum urea and serum creatinine. A total of 46% the study participants had normal renal function tests.

Table 9: Distribution of the study subjects as per the electrolyte abnormalities

Electrolyte abnormalities		Frequency	Percent
Electrolyte abnormalities	Normal	18	36.0
	Hyperkalemia	3	6.0
	Hypokalemia	11	22.0
	Hyponatremia	18	36.0
	Total	50	100.0

Among the study participants, 36% had hyponatremia, 22% had hypokalemia, 6% had hyperkalemia. A total of 36% the study participants had normal electrolyte values.

Table 10: Distribution of the study subjects as per the findings of CT of brain

CT of brain		Frequency	Percent
CT of brain	Normal	31	62.0
	Acute Cerebral Infarct	5	10.0
	Intra-cerebral Hemorrhage	12	24.0
	Subarachnoid Hemorrhage	2	4.0
	Total	50	100.0

Among the study participants, 24% had intracerebral hemorrhage, 10% had acute cerebral infarct, 4% had subarachnoid hemorrhage. A total of 62% the study participants had normal CT of brain. Majority of the subjects (78%) got discharged after the treatment. However there were 11(22%) deaths reported among the study participants.

DISCUSSION

The majority of the subjects were males in the study which is in line with earlier studies.^{6,7} Gender is identified as an important predictor for hypertensive emergencies.^[8]

Hypertension is a complex disorder involving multiple organ systems and the primary modifiable risk factor for heart disease, which is the leading cause of death among both men and women. It was observed by many studies that the women are more likely to be pre-hypertensive than men. However the mortality due to hypertensive emergencies is more prevalent in men. There is no scientific plausibility for this. The social variables and the use of tobacco might be the confounding factors which contribute to the higher incidence of hypertensive emergencies in males.^[8,9] The mean age of the subjects in the study was 52.37 ± 13.13 which is comparable with many studies.^[9-11]

Focal neurological deficits, dyspnoea, chestpain, headache, loss of vision, are considered as the commonest symptoms of hypertensive emergencies. The study showed that the most common accompanying symptom in the hypertensive urgency group was headache (22%), then epistaxis (17%) and psychomotor agitation (10%), while in the hypertensive emergency group the most common symptom were chest pain (27%), shortness of breath (22%) and hypertensive encephalopathy (16%).^[11]

Majority of patients in the present study were previously known hypertensives (72%) which is similar with previous studies.^[11,12] Prevalence of HTN in people aged ≥ 20 years by world region and gender in 2000 and 2025 showed that in India in 2000 the combined urban and rural prevalence was 20.6 percent among males and 20.9 percent among females and in 2025 the projected rate will be 22.9 percent among males and 23.6 percent among female.

Majority of the participants (77.88%) with known hypertension were complaint with respect to the antihypertensive drugs which is in line with other Indian studies.^[13] Patients' noncompliance with treatment is considered as a predominant reason for failing to control hypertension. It is also important to note that previous studies found that the patients are predominantly noncompliant to lifestyle modifications such smoking, alcohol, and having table salt and to antihypertensive medication due to reasons such as forgetfulness and avoidance of medication when feeling better.^[13]

The mean systolic blood pressure at admission was 222.89 ± 25.46 which reduced to 135.44 ± 18.82 . The mean diastolic blood pressure at admission was 125.58 ± 15.55 which reduced to 89.93 ± 10.15 . The higher levels of blood pressure would have an added effect on severe target organ damage in these patients, with an adverse outcome. This indicates worse prognosis with a higher levels of blood pressure at presentation.^[14]

Evidence of cardiac injury or infarction, pulmonary edema, acute renal failure, stroke, and/or aortic dissection in the setting of acute rise in blood pressure is considered as end-organ damage. There were 38% subjects with cardiomegaly and 8% subjects with pulmonary oedema in chest radiograph.^[15] Both these conditions are considered as signs of hypertensive crisis. ST segment or T wave abnormalities and LVH were also observed in ECG which denotes the target organ damage. Hypertensive emergency is characterized by an accelerated increase in blood pressure secondary to increase in catecholamines, sympathetic nervous system activity, endothelial dysfunction, renin-angiotensin system activation, or acute stress and is linked with acute end-organ damage.^[16]

The kidney plays a central role in BP regulation, not only as an endocrine organ but also as an organ affected by hypertension, and renal function is a predictor of cardiovascular risk in hypertensive emergencies.^[17] The current study had 23% subjects with elevated serum urea, 16% subjects with elevated serum creatinine and 12% with both elevated S.urea and S.creatinine. A complications and survival of 315 patients with malignant phase hypertension found low median survival time in patients with proteinuria and high serum urea and serum creatinine levels at presentation and if left ventricular hypertrophy was detected on electrocardiogram.^[18]

The current study showed a 22% mortality among the study subjects which is in line with some previous studies.^[19,20] We consider the mortality observed is limited considering the extend of end organ damage and other physiological conditions which can be explained by the timely management. We assume that the major predictors of mortality could be age, undiagnosed and untreated hypertension, non-compliance with respect to the medication and co morbidities.

CONCLUSION

Fifth and sixth decades of age group represented majority of the hypertensive emergencies. There is a male predilection for hypertensive emergencies. Most common clinical presentation of hypertensive emergencies was neurological deficit. Hyponatremia and hypokalemia were observed in patients with hypertensive emergencies. Acute intracerebral haemorrhage is the commonest form of target organ damage encountered in the present study. The in-

hospital mortality rate was 22% with respect to hypertensive emergencies.

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