



A CLINICAL PROFILE OF HYPERTENSIVE EMERGENCIES WITH RESPECT TO TARGET ORGAN DAMAGE

General Medicine

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ABSTRACT

Background: Hypertension is one of most common non-communicable disease affecting all age groups . Hypertensive emergency is characterized by an acute increase in blood pressure with systolic blood pressure greater than 180 or diastolic blood pressure greater than 110 . There is evidence of an acute target organ damage in hypertensive emergencies . The purpose of this study is to evaluate the clinical profile , and spectrum of target organ injury , as well as their prediction in patients with hypertensive crises. **Methods:** This is a hospital based prospective study done on 100 patients presenting with hypertensive emergencies to Department of General Medicine over a period of two years. The patients clinical and laboratory profile were evaluated. **Results:** The results have shown that males have high incidence of development of hypertensive emergencies and the average age of developing hypertensive emergencies is 62 years .Majority of population included are previously hypertensive .The most common presenting features include neurological deficits , dyspnoea , chest pain , seizures , visual impairment .Type 2 Diabetes Mellitus and hyperlipidemia is associated with patients with hypertensive emergencies. Among the 100 patients , 93 were discharged and there were 7 mortalities. **Conclusion:** Hypertensive emergencies are associated with target organ damage which can be life threatening , thus early identification and strict control of blood pressure is must for all individuals .

KEYWORDS

Hypertension, neurological deficit, blood pressure

INTRODUCTION

Hypertension is one of the most common non-communicable disease affecting people of all classes and ages . The relationship between blood pressure and risk of cardiovascular disease is directly proportional and is independent of other risk factors . Brain , heart , kidneys and eyes are the major organs affected by the hypertension .⁽¹⁾

Hypertensive emergency is defined as extremely elevated blood pressures associated with physical or laboratory findings which indicate acute or ongoing target organ damage . JNC 8 report does not provide any particular hypertension numbers to denote hypertensive emergency. Rather , the term hypertensive crisis refers to an acute increase in blood pressure with systolic blood pressure greater than 180 and diastolic blood pressure greater than 110 .⁽¹⁾

Focal neurological deficits , shortness of breath , chest discomfort , headache , blurring or loss of vision are the most common complaints with which individuals with hypertensive emergencies present to a hospital .^(2,3)

A doctor should perform a through clinical examination and appropriate laboratory investigations in individuals who are presenting with these symptoms and have elevated blood pressure recordings to exclude or confirm hypertensive emergency.

Although great strides have been made in treatment of hypertension , patients still present to hospital in hypertensive crisis and emergencies .This account for more than one forth of all medical emergencies . Hypertensive emergency can be an end result of chronic hypertension , non compliance of drugs , or a new presentation of unrecognized essential hypertension . Hypertensive emergency is characterised by rapid deterioration of target organ and poses an immediate threat to life .⁽⁴⁾

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. This study is done to find out various modes of presentation and clinical profile of hypertensive emergencies in our hospital.

AIMS AND OBJECTIVES :

The purpose of this study is to evaluate the mode of presentations , clinical profile , and spectrum of target organ damage in patients presenting with hypertensive crisis .

METHODS AND MATERIALS :

Patients admitted in Department of General Medicine at Dr.PSIMS & RF over a period of 1 year from November 2021 to November 2022 . After applying the inclusion and exclusion criteria , 100 individuals were included in the study . Patients were followed till they were transferred out of ICU , patient's death or discharge from the ICU .

Study Design: Hospital based prospective study .

Inclusion criteria:

1. Patients above 18 years of age
2. Systolic blood pressure of ≥ 180 mm Hg or Diastolic blood pressure of ≥ 110 mm Hg.
3. Evidence of end organ damage either clinically or through investigative findings .

Exclusion Criteria:

1. Patients less than 18 years of age .
2. Known case of chronic kidney disease .
3. Known case of valvular heart disease .
4. Aortic dissection.

Study protocol :

Over a period of 1 year , information was acquired from 100 patients admitted to the hospital between November 2021 to November 2022 . A patient was asked to remember if he or she had a raised systolic blood pressure of > 180 mm Hg or diastolic blood pressure of > 110 mm Hg , with a history of intense target organ damage . A pertinent history was gathered , which included symptoms , history of hypertension duration , usage of medications .

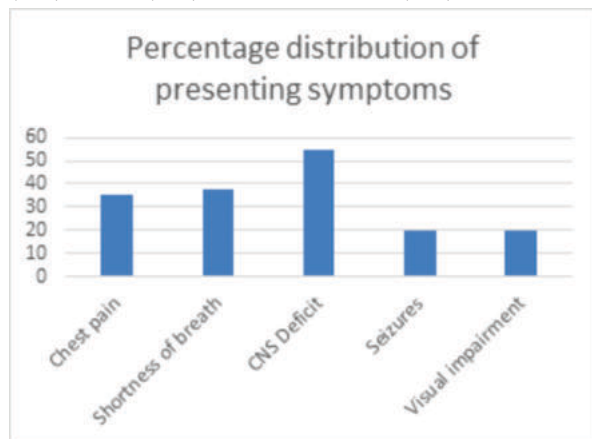
The blood pressure was monitored at the time of admission , at 1 hour and 24 hours after admission and at the time of discharge . Complete blood picture , Erythrocyte sedimentation rate (ESR) , serum glucose , renal function test , serum electrolytes , lipid profile , complete urine examination including microalbuminuria were done in all patients . All patients underwent chest X-ray , ECG , 2D ECHO . Patients having neurological deficits underwent CT-Brain (plain) and those with deranged RFTs underwent ultrasonography of abdomen and pelvis to look for any renal parenchymal changes.

RESULTS :

Among the 100 patients in the study , 72 individuals are men and 28 individuals are women. The mean age of the patients in the study is 62.3 years . Men were present in the age group of 39-80 years and

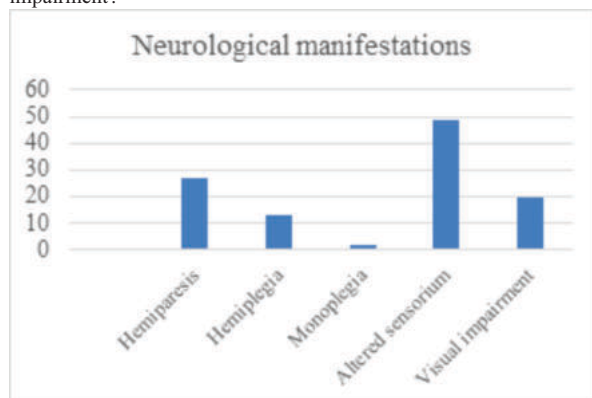
females were in the age group of 44-87 years . Out of 100 patients , 65 patients were known hypertensives , in which 34 patients were using anti-hypertensives and 31 patients have stopped using them . Type 2 diabetes mellitus was present in 24 individuals and dylipidemia was seen in 42 individuals out of total individuals presenting with hypertensive emergencies.

The most common presenting complaints in the study are neurological deficits (55%), followed by shortness of breath (38%) , chest pain (35%) , seizures (20%) and visual disturbances (20%) .



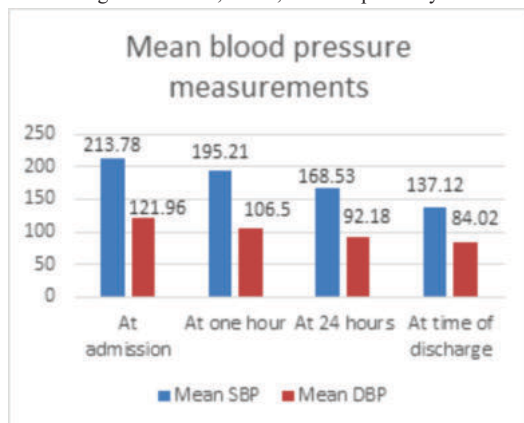
Graph 1 : Percentage distribution of presenting complaints .

Among the 55 patients with neurological deficits , 39 individuals had hemiparesis or hemiplegia , 2 individuals had monoparesis , altered sensorium was seen in 49 individuals and 20 individuals had visual impairment .



Graph 2 : Types Of Neurological Manifestations.

The mean systolic blood pressure at the time of admission was 213.78 and at one hour , at 24 hours and at the time of discharge were 195.21 , 168.53 , 137.12 respectively . The mean diastolic blood pressures at the time of admission was 121.96 and at one hour , at 24 hours and at the time of discharge were 106.5 , 92.18 , 84.02 respectively .



Graph 3 : Mean blood pressure measurements .

Fundus examination revealed papilledema in 19 individuals and hypertensive retinopathy changes were seen in 46 individuals.

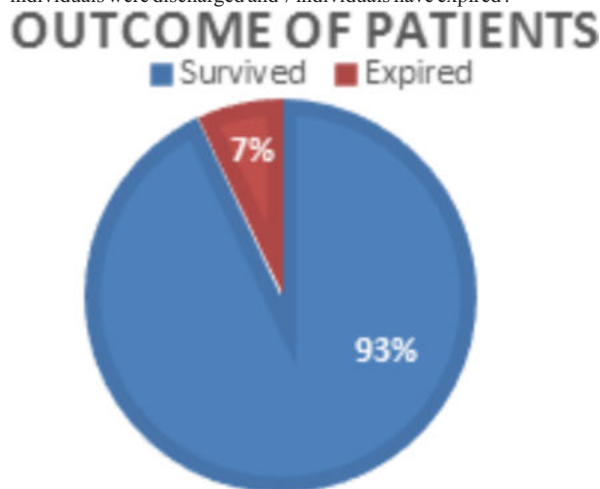
Among the 100 individuals , ECG has shown that Left ventricular hypertrophy (LVH) was present in 32 individuals , ST segment or T wave irregularities were present in 49 individuals and it was normal in 19 individuals . 2D Echo done in 100 individuals in the study has revealed that there was Left ventricular dysfunction in 28 patients, LVH was seen in 33 patients , RWMA was present in 13 patients.

Chest X-ray was normal in 62 patients , pulmonary edema picture was seen in 20 patients , cardiomegaly and pleural effusion was present in 18 and 2 individuals respectively and 7 individuals had the chest X-ray suggestive of consolidation.

CT brain done in 55 individuals presenting with neurological deficits has shown that intracranial hemorrhage was present in 31 individuals and acute infarcts were present in 24 individuals.

Renal function tests have shown that there is elevation of serum urea (>40 mg/dl) in 15 individuals , serum creatinine of > 1.4 mg/dl in 5 individuals and both are elevated in 19 individuals . Electrolyte abnormalities were seen in 37 individuals , in which hypokalemia and hyperkalemia was seen in 14 and 7 individuals respectively and 16 individuals had hyponatremia . Microalbuminuria is present in 28 individuals . Ultrasound KUB was done individuals with deranged RFTs , which showed grade I renal parenchymal changes in 20 individuals , grade II and III in 9 and 2 individuals and was normal in 8 individuals .

Out of 100 individuals presenting with hypertensive emergencies , 93 individuals were discharged and 7 individuals have expired .



Graph 4 : Outcome of patients in the study.

The mean systolic blood pressure was 210 mm Hg in individuals who survived and was 260 mm Hg in individuals who have expired and mean diastolic blood pressure was 120 mm Hg in individuals who have survived and was 140 mm Hg in individuals who have expired .

Out of 93 individuals discharged , 41 individuals have completely recovered at the time of discharge , whereas 51 individuals have partially recovered and 1 individual has not improved at the time of discharge . All 93 individuals were on regular follow up after being discharged from the hospital.

Among the 7 individuals who have expired , the cause of death was cardiorespiratory arrest in 4 individuals , cardiogenic shock in 3 individuals .

DISCUSSION:

In the present clinical study of hypertensive emergencies , the number of males (72%) presenting with hypertensive emergencies were more than the number of females (28%).

A study done by Martin et al on hypertensive crises observed that 55% of patients were males among patients with hypertensive emergencies.⁽⁹⁾ The proportions of males in hypertensive emergencies

were also higher in the study by Zampaglione et al.⁽⁵⁾ This is probably due to an increased susceptibility of males compared with females to hypertension related target organ damage. This possibility is revealed in the Framingham study, which showed that the incidence of coronary arterial disease in men is directly proportional to increasing age.⁽⁶⁾

The mean age of patients presenting with hypertensive emergencies in our study is 62.37 years. Majority of female patients belonged to the postmenopausal age group which shows susceptibility of postmenopausal age end organ damage. This is also due to the fact that postmenopausal female hemodynamics is not very much different from the male profile with regard to blood pressure.⁽⁷⁾

The most common presenting symptoms in the study include neurological deficits (55%) followed by shortness of breath (38%) and chest pain. (35%). This was similar to the study by Martin et al, who in their study found presenting symptoms of neurological deficits, dyspnoea and chest pain in 48%, 25 % and 18 % of their patients respectively.⁽⁵⁾ Zampaglione et al in their study had more patients presenting with chest pain (27 %) followed by shortness of breath (22 %) and neurological deficits (21%).⁽⁵⁾

Neurological deficits in the present study varied from hemiparesis (26.7%) , hemiplegia (12.8%) , altered sensorium (48.51%), monoparesis (1.9%), and visual deficits (19.80%). Altered sensorium and hemiparesis accounted for the largest group of patients with neurological deficit.

Majority of patients in the present study were previously known hypertensives (65 %). Martin et al and noticed a large number of patients, (83%) in their study to be previously diagnosed hypertensives.⁽⁵⁾

Zampaglione et al reports a larger number, with (92%) of known hypertensives among their patients. This evidence confirms that hypertensive emergencies were higher in patients with previously known hypertension. This also shows that patients with hypertension are at a higher risk of developing a hypertensive emergency, more so if they do not adhere to the antihypertensive therapy.⁽³⁾

In the present study 48.48 % among the known hypertensives ignored their hypertensive status and discontinued antihypertensive medications which would have put them at a higher risk for acute target organ damage and hypertensive emergency.

Diabetes mellitus and dyslipidemia were the other risk factors present in the present group of patients. Patients with diabetes mellitus and dyslipidemia were 24 % and 42 % respectively in the present study. The number of patients with diabetes mellitus were 26% in the study done by Martin et al.⁽⁴⁾

These risk factors would have added to premature atherosclerosis and coronary artery disease in these patients predisposing them to acute target organ damage. Prevalence of arterial hypertension in diabetic patients is greater when compared with that in non diabetic patients (40-50% and 20%, respectively).

Metabolic abnormalities (hyperglycemia, hyperinsulinemia, and dyslipidemias) may play a role in the pathogenesis and complications of arterial hypertension, as seen in the present study.

The mean systolic blood pressure was 213.78 ± 19.63 and mean diastolic blood pressure was 121.96 ± 12.26 mm Hg in our study. Martin et al in their study reports a mean systolic blood pressure of 193 ± 26 mm Hg in their patients and a mean diastolic blood pressure of 129 ± 12 mm Hg.⁽⁴⁾

The mean reduction in blood pressure in one hour after admission to the hospital was 18.57 mm Hg of systolic blood pressure and 15.47 mm Hg of diastolic blood pressure. Blood pressure levels at admission were higher in the group of patients who expired compared to those who were discharged from the hospital. The higher levels of blood pressure would have added to more severe target organ damage in these patients, with an adverse outcome. This indicates worse prognosis with a higher levels of blood pressure at presentation.⁽⁸⁾

Evaluation of fundus revealed changes ranging from hypertensive retinopathy to papilloedema in 65.37 percent of patients. Papilloedema

was seen in 18.81% of patients which is an evidence of ongoing target organ damage in these patients. Renal dysfunction in the form of raised serum urea and creatinine were seen in 39 patients.

Hyponatremia was observed in 15.84 % of patients , 13.86 % of the patients had hypokalemia compared to 6.93% with hyperkalemia reflecting secondary aldosteronism from increased renin secretion induced by intra renal ischemia.

Microalbuminuria was seen in 22.77 % of the patients which puts these patients at a higher risk for hypertension related renal disease compared to the patients without proteinuria.

Computed tomography of the brain showed intracerebral haemorrhage as the commonest cause for the neurological target organ damage followed by cerebral infarction. Voltage criteria suggestive of left ventricular hypertrophy on ECG was seen in 31.68 % of patients and 33.66 % had left ventricular hypertrophy by echocardiography.

A study done by Lip GY et al on complications and survival of 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. These findings in a patient in hypertensive emergency situation may help in prognosticating these patients.⁽⁹⁾

Evaluation for target organ damage in patients in the present study showed intracerebral haemorrhage as the commonest cause (30.69 %) followed by left ventricular failure (27.72%), acute ischaemic stroke (24.75 %), unstable angina (11.88 %), acute myocardial infarction with left ventricular failure (7.92 %), hypertensive encephalopathy (2.97%) and malignant hypertension (1.98%).

Zampaglione et al in their study observed target organ damage in the form of Intracerebral haemorrhage (4.5%) left ventricular failure (23 %), Acute ischemic stroke (24 %) in their patients.⁽²⁾ Study by Martin et al shows Intracerebral haemorrhage (17%) , left ventricular failure (25%), Acute ischaemic stroke (39 %) and acute myocardial infarction in (8%) their patients.⁽⁴⁾ A study by Dhadke SV et al was also consistent with the findings.⁽¹⁰⁾ The outcome of the study showed an in-hospital mortality of 7.92 percent among these patients.

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