

STUDY THE RISK FACTORS AND IN HOSPITAL OUTCOME ASSOCIATED WITH HYPERTENSIVE CRISIS

Manojkumar B K¹, Gavishiddesh Vishwanath Ronad², Chandraprabha S³, Raghu G⁴

Received : 12/06/2022
Received in revised form : 24/07/2022
Accepted : 09/08/2022

Keywords:
Hypertensive crisis,
Risk Factors, in hospital outcome,
Diabetes,
Hypertention, Mortality

Corresponding Author:
Dr. Raghu G,
Email: raghugangadar6@gmail.com
ORCID: 0000-0001-9709-3909

DOI: 10.47009/jamp.2022.4.5.14

Source of Support: Nil,
Conflict of Interest: Nonedeclared

Int J Acad Med Pharm
2022; 4 (5); 60-63



¹Assistant Professor, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences, Karnataka, India.

²Senior Resident, Department of General Medicine, KIMS, Koppal, Karnataka, India.

³Ophthalmologist, General Hospital, Tiptur, Karnataka, India

⁴Assistant Professor, Department of Medicine, Basaveshwara Medical College and Hospital Chitradurga, Karnataka, India

Abstract

Background: Seventh Joint National Committee (JNC-7) recommends treating hypertensive emergencies by reducing mean arterial pressure by 25% in the first hour, then to 160/100-110 mmHg by 2-6 hours, with further gradual normalization of blood pressure within the next 24-48 hours. The objective is to evaluate the risk factors and in hospital outcome associated with Hypertensive Crisis. **Materials and Methods:** This research was done at Adichunchanagiri Hospital and Research Centre, Bellur. Over a period of one and half years. One hundred patients were examined. **Result:** 74% of patients had past history of hypertension. In Hypertensive Emergency, 45.8% of people had hypertension for 5-10 years. In Hypertensive Urgency, it corresponds to 25%. 16.7% of Hypertensive Emergency patients and 36.8% of Hypertensive Urgency patients had history of hypertension for less than 5 years. 59% patient with Hypertensive Crisis had diabetes. Out of 24 patients with Hypertensive Emergency, 5 patients (20.8%) were expired. No mortality was observed in patients of Hypertensive Urgency. The total mortality in Hypertensive Crisis was 5%. **Conclusion:** Hypertensive Crisis was most commonly seen in patients with known history of hypertension. Patients with history of diabetes had increased risk for Hypertensive Crisis. Total mortality observed in Hypertensive crisis was 5%, which was exclusively. Seen in patients with Hypertensive Emergency(20.8%).

INTRODUCTION

Hypertensive Crisis are a heterogeneous group of hypertensive disorders characterized by severe hypertension and acute target-organ damage to the brain, heart, kidney, retina, or blood vessels (previously defined as hypertensive emergency). Typically, BP is 220/130 mm Hg or higher but may be much lower in women with preeclampsia who do not have preexisting hypertension, such that cerebral auto regulation has not been reset.^[1]

A major, often-cited study published by Franco and co-authors, based on the widely used Framingham data concluded that the total life expectancy was 5.1 and 4.9 years longer for normotensive men and women respectively.^[2] It is an important modifiable risk factor particularly for stroke (accounting for 51% of all stroke deaths worldwide), ischemic heart disease (45% of all deaths), chronic kidney disease,

congestive heart failure, aortic aneurysm, and peripheral arterial disease.^[3]

The concept of hypertensive disease as a generalized circulatory disease was taken up by Sir Clifford Allbutt, who termed the condition "hyperpiesia". However hypertension as a medical entity really came into being in 1896 with the invention of the cuff-based sphygmomanometer by Scipione Riva-Rocci in 1896 which allowed blood pressure to be measured in the clinic.^[4]

In 1905, Nikolai Korotkoff improved the technique by describing the Korotkoff sounds.^[5]

The term malignant hypertension was coined by physicians from the Mayo Clinic to describe a syndrome of very high blood pressure, severe retinopathy and inadequate kidney function which usually resulted in death within a year from strokes, heart failure or kidney failure.^[6]

In 1931, John Hay, Professor of Medicine at Liverpool University, classified Hypertension into "malignant" and "benign". It was Framingham Heart

Study, which proved that "benign" hypertension also cause death and cardiovascular disease.^[7]

Historically the treatment for what was called the "hard pulse disease" consisted in reducing the quantity of blood by blood letting or the application of leeches. This was advocated by The Yellow Emperor of China, Cornelius Celsus, Galen, and Hippocrates.^[8] Sodium thiocyanate, was the first chemical used for the treatment for HTN, in 1900 but had many side effects. A major breakthrough was achieved in the 1950s with the discovery of oral diuretics, the first of which was chlorothiazide (Diuril).^[9]

In a study from Switzerland, several potential risk factors for hypertensive crisis, namely female sex, the grade of obesity, the presence of a hypertensive heart disease or a coronary artery disease, the presence of a somatoform disorder, a higher number of prescribed antihypertensive drugs, and most importantly, nonadherence to medication were identified.^[10]

MATERIALS AND METHODS

This study was done on patients with Hypertensive crisis admitted at Adichunchanagiri Hospital and research center, situated at B.G Nagara, Nagamangala Taluk, Karnataka. Duration of study was December 2017 to May 2019. Ethical clearance was obtained from the institutional ethical committee for the present study.

Sample Size: 100 Patients admitted during the specified period were included in the study.

Inclusion Criteria

Patients with SBP of 180mmhg and above or DBP of 120mmhg and above and age > 18yrs.

Exclusion Criteria

Pregnancy, Patients with malignancy, Patients with HIV.

Investigations

Complete blood count, Peripheral blood smear, Routine urine analysis, Direct ophthalmoscope, CT/MRI Brain, USG, ECG 2D Echocardiogram, Cardiac biomarkers, RFT, Arterial Blood Gas, Chest X-ray, Blood sugars - RBS/FBS/ PPBS, Serum electrolytes

Patient was evaluated for hypertensive crisis by history, Physical examination, neurological examination, Patients should also underwent evaluation of cardiovascular and renal status. Computed tomography of the brain was done in the presence of any neurological deficit. Echocardiogram was done in cases of Hypertensive Emergencies with cardiac dysfunction. Patients with

evidence of renal involvement were evaluated with ultrasonography and renal Doppler.

Statistical Methods

The data obtained was entered into MS EXCEL and analysed using SPSS 20.0 and descriptive statistics expressed in terms of percentage, proportions and mean.

RESULTS

Out of 100 patients, 74% of patients had past history of hypertension. It includes 70.8% of Hypertensive Emergency patients and 75% Hypertensive Urgency patients. [Table 1].

In Hypertensive Emergency, 45.8% of people had hypertension for 5-10 years. In Hypertensive Urgency, it corresponds to 25%. 16.7% of Hypertensive Emergency patients and 36.8% of Hypertensive Urgency patients had history of hypertension for less than 5 years. 33.3% of Hypertensive Emergency patients and 28.9% of Hypertensive Urgency patients didn't give their history properly.

59% patient with Hypertensive Crisis had diabetes. Which include 62.5% of Hypertensive Emergency patients and 57.9% of Hypertensive Urgency patients.

Hypertensive Retinopathy changes were present in 70.1% of Hypertensive Emergency patients and 39.4% of Hypertensive Urgency patients. Most common Hypertensive Retinopathy changes in Hypertensive Emergency were grade II (35.4%) followed by grade I (29.5%). Whereas most common Hypertensive Retinopathy changes in Hypertensive Urgency were Grade II (56.7%) followed by Grade I (36.7%). [Table 2]

Out of 100 cases of Hypertensive Crisis, 24 % of patients were diagnosed as Hypertensive Emergency (patients with end organ damage).

The presentation of Hypertensive Emergencies include CVA Ischemic infarction 29.2%, CVA Hemorrhage 16.7 %, ACS STEMI (ST elevation myocardial infarction) 16.7%, ACS Unstable angina 8.3%, Pulmonary edema 8.3%, Malignant hypertension 12.5% and Hypertensive encephalopathy 8.3%. In Malignant hypertension out of 3 patients (12.5%), 2 (8.3%) had Renal involvement. [Table 3]

Out of 24 patients with Hypertensive Emergency, 5 patients (20.8%) were expired. No mortality was observed in patients of Hypertensive Urgency. The total mortality in Hypertensive Crisis was 5%. [Table 4]

Out of 5 patients expired, 3 were females and 2 were males, So the mortality was more among females (30%) than males (13.3%). [Table 5]

Table 1: Hypertension status in patients with Hypertensive Crisis

	Hypertensive Emergency(n=24)	Hypertensive Urgency(n=76)	Total (n=100)	P value
H/O HTN				
Newly detected HTN	7(29.2%)	19(25%)	26(26%)	0.404
Known HTN	17(70.8%)	57(75%)	74(74%)	
HTN Years				
Nil	8(33.3%)	22(28.9%)	30(30%)	0.152
<5yrs	4(16.7%)	28(36.8%)	32(32%)	
5-10yrs	11(45.8%)	19(25%)	30(30%)	
>10yrs	1(4.2%)	3(3.9%)	4(4%)	
HTN Rx				
CCB	9(37.5%)	29(38.2%)	38(38%)	0.293
CCB+BB	2(8.3%)	2(2.6%)	4(4%)	
ARB	2(8.3%)	7(9.2%)	9(9%)	
BB	0(0%)	9(11.8%)	9(9%)	
Drughistory not available	11(45.8%)	29(38.2%)	40(40%)	
Drug compliance				
Present	12(50%)	39(51.3%)	51(51%)	0.910
Absent	12(50%)	37(48.7%)	49(49%)	

Chi-Square/Fisher Exact Test

Table 2: Hypertensive Retinopathy findings in Fundoscopic examination

	Hypertensive Emergency	Hypertensive Urgency	Total
Present	17(70.1%)	30(39.4%)	47(47%)
Grade I	5(29.5%)	11(36.7%)	12(12%)
Grade II	6(35.4%)	17(56.7%)	21(21%)
Grade III	3(17.7%)	2(6.7%)	8(8%)
Grade IV	3(17.7%)	0	6(6%)

Table 3: End Organ Damage present in patients with Hypertensive Crisis

	Hypertensive Emergency	Hypertensive Urgency	Total
CV/Aischemic infarct	7(29.2%)	0(0%)	7(7%)
CVA hemorrhage	4(16.7%)	0(0%)	4(4%)
Hypertensive encephalopathy	2(8.3%)	0(0%)	2(2%)
STEMI	4(16.7%)	0(0%)	4(4%)
Unstable angina	2(8.3%)	0(0%)	2(2%)
LVF-Pulmonary edema	2(8.3%)	0(0%)	2(2%)
Malignant HTN:			
Papilledema with renal involvement	2 (8.3%)	0(0%)	2(2%)
Papilledema without renal involvement	1(4.2%)	0(0%)	1(1%)
Total	24(100%)	76(100%)	100(100%)

Table 4: Outcome in patients with Hypertensive Crisis

	Hypertensive Emergency	Hypertensive Urgency	Total
Discharged	19(79.2%)	76(100%)	95(95%)
Expired	5(20.8%)	0(0%)	5(5%)
Total	24(100%)	76(100%)	100(100%)

Table 5: Outcome distribution in relation to Gender of patients studied

	Gender		Total	P value
	Female	Male		
HypertensiveEmergency				
Discharged	7(70%)	12(85.7%)	19(76.2%)	0.358
Expired	3(30%)	2(13.3%)	5(20.8%)	
Total	10(100%)	14(100.0%)	24(100.0%)	

Table 6: Hypertension status in patients with Hypertensive Crisis

Hypertensive Crisis(%)	Hector GonzalezPacheco et al2013, ^[11]	Santhosh BSalagre et al 2017, ^[12]	Zampaglioneet al 1996, ^[13]	Present Study 2019
Hypertensive emergency(%)	84.9	53.2	72	70.8
Hypertensive urgency(%)	87.1	65.5	92	75

Table 7: Diabetes status in patients with Hypertensive Crisis

Hypertensive Crisis	Jose Fernando Vilela Martin et al2004, ^[14]	Hector GonzalezPacheco et al 2013, ^[11]	Santhosh B Salagre et al 2017, ^[12]	Present Study 2019
Hypertensive emergency(%)	15.4	36.5	12.9	62.5
Hypertensive urgency(%)	26.4	42	39.7	57.9

Mean SBP at presentation was 225.20±14.32 among patients who expired. Mean SBP at presentation was 202.69±21.40 among patients who discharged. Mean DBP at presentation was 132.40±10.53 among patients who expired. Mean DBP at presentation was 124.68±14.42 among patients who discharged. Thus it showed that patients with higher SBP and DBP at presentation had increased mortality rate.

DISCUSSION

Out of the patients with Hypertensive Emergencies 70.8% were already diagnosed with hypertension, of which 50 % were diagnosed for more than 5 years duration and only 50 % were on regular antihypertensive medications with good compliance. Similarly 75% of the patients presented with Hypertensive Urgencies were already diagnosed as hypertensives, of which 28.9% were diagnosed for more than 5 year duration, 51.3 % of them had good compliance to antihypertensive medication.^[14]

All the above-mentioned studies showed that Hypertensive Crisis occurred more commonly in known hypertensives and the present study is comparable with study done by Zampaglione et al.^[13]

The prevalence of Diabetes mellitus in patients diagnosed with Hypertensive Emergencies and Hypertensive Urgencies were 62.5 % and 57.9% respectively and it constitutes a total of 59% of Hypertensive Crisis. The present study showed comparable result with the study done by Pacheco et al.^[11]

In patients with hypertensive crisis end organ damages seen only in hypertensive emergency patients. Most common organ affected in the present study was CNS followed by CVS. CNS manifestations are CVA with ischemic infarct (29.2%), CVA with hemorrhage (16.7%) and Hypertensive encephalopathy (8.3%). Common CVS manifestations include ACS (STEMI) (16.7%) pulmonary edema (8.3%) and Unstable angina (8.3%). Malignant hypertension was present in 12.6% of patients in that 8.4% of patients had renal involvement.

There was 20.8% mortality rate associated with Hypertensive Emergency out of which females had a higher mortality rate than males (30% Vs 13.3%). There was no mortality associated with Hypertensive Urgency in this study. The mean SBP & DBP at the time of presentation of patients, who expired was 225.20±14.32 mmHg and 132.40±14.31 mmHg and the patients who got discharged was 202.69±21.40 mmHg and 124.68±14.42 mmHg. The mean age of maximum mortality was 57.40±20.74 years. In this study mortality was increased in patients who presented with high BP at presentation. The present study was comparable with Santhosh B Salagre et al study.^[12]

CONCLUSION

Hypertensive Crisis was most commonly seen in patients with known history of hypertension. Patients with history of diabetes had increased risk for Hypertensive Crisis. Higher the SBP and DBP at presentation, higher the risk for end organ damage and mortality. In this study, total mortality observed in Hypertensive crisis was 5%, which was exclusively seen in patients with Hypertensive Emergency (20.8%).

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