Innovative Journal of Medical and Health Science
Received 15 Oct 2020 | Accepted 5 Nov 2020 | Published Online 7 Dec 2020

DOI: https://doi.org/10.15520/ijmhs.v10i12.3162
I Jour Med Health Science 10 (12), 1425–1432 (2020)
ISSN (O) 2589-9341 | (P) 2589-9341 IF:1.6

ORIGINAL ARTICLE

Evaluation of Hypertensive crisis presenting to Emergency Room at a Tertiary Care Teaching Hospital focus on initial management

Jasvin Vala[1*] | Sapna Gupta[2] | Jaldipsinh Gohil[3] | Dharmik Mankodia[4] | Meet bhuta[5] | Bhavesh Jarwani[6]

[1]3rd year Resident, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

[2]Associate Professor, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

[3]Senior Resident, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

[4]2nd year Resident, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

[5]1st year Resident, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

[6]Head of department, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India

Abstract

Epidemiological data on the impact of hypertensive crises (emergencies and urgencies) on referral to the Emergency Departments (EDs) are lacking, in spite of the evidence that they may be life-threatening conditions. We performed a study to enroll all patients aged 18 years and over who were admitted to Emergency Department during March to May 2019 for hypertensive crises (systolic blood pressure ≥220 mmHg and/or diastolic blood pressure ≥120 mmHg). We classified patients as affected by either hypertensive emergencies or hypertensive urgencies depending on the presence or the absence of progressive target organ damage, respectively. Out of these 6614 patients admitted from ED during 3 months 462 patients admitted with uncontrolled hypertension, Out of these 114 patients with Hypertensive crisis. Men had higher frequency then women. Most of the patients had one or more Risk factors present. Almost half of patients were presented with Neurological deficit (43.8%), Dyspnoea (28.2%), Chest pain (19.2%), Headache (14.9%), Giddiness (13.1%). Per orally Calcium channel blocker most commonly used while intravenous Labetalol most commonly used.

Keywords: Hypertensive emergency, hypertensive urgency

1 | INTRODUCTION

Hypertensive crisis is defined as acute elevation in blood pressure that can cause rapid end organ damage. It includes both, hypertensive emergencies and urgencies.

or pulmonary edema.

Hypertensive Urgency: Hypertensive urgencies are diagnosed if there is a systolic blood pressure higher than 180 mmHg or a diastolic blood pressure higher than 120 mmHg in an otherwise stable person without clinical or laboratory evidence of acute target

organ damage. Such patient need immediate treatment, preferably in ICU. The diastolic blood pressure needs to reduce within 24-48hours without the use a loading dose. The BP may then be reduced further, gradually, over the next several days. Severe epistaxis, Severe perioperative hypertension, Unstable angina pectoris, Diabetic retinopathy, Preeclampsia, Tyramine ingestion during MAO therapy, Amphetamine or Cocaine intoxication, Hypertension with papilledema, Rapidly progressing renal failure with vitreous haemorrhage are possible complications.

Hypertensive Emergency: Hypertensive emergencies are diagnosed if there is a systolic blood pressure higher than 180 mmHg or a diastolic blood pressure higher than 120 mmHg with the presence of acute target organ damage. Such patient also require admission into an ICU and rapid, but not too rapid. The BP should be maintained at the level for a few days, before lowering it, slowly, still further. Hypertensive encephalopathy, intracranial haemorrhage, acute myocardial infarction, Acute LVF with pulmonary edema, Acute aortic dissection, Eclampsia, Hypertensive crisis in pheochromocytoma are may be seen.

Hypertension is a global health burden affecting 1billion persons all over the world, accounting for 12.8% deaths/year.

In patient with severely or moderately high blood pressure, target end organ damage is very crucial finding. In hypertensive emergencies, mean arterial pressure should be decreased by 20-25% and in other by 15-20%

The treatment of hypertensive urgency consists of a gradual reduction of blood pressure using oral medication, whereas in a hypertensive emergency, intravenous therapy is indicated for a faster reduction in blood pressure.

The reason for uncontrolled hypertension is high due to lack of awareness, knowledge, adherence, and attitudes of patients with hypertension.

2 | METHODOLOGY

Study Design : Open label, Prospective, Observational Study.

The data collection was done after the approval of study protocol from Institutional Review Board, Smt. NHL MMC. Those patients who attended Emergency Medicine Department at Affiliated to NHL MEDICAL COLLEGE; The diagnosis of arterial hypertension was established in accordance with the definition of the World Health Organization, which defines arterial hypertension as the level of systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg in people who are not taking antihypertensive therapy (Anonymous, 1999). Hypertensive crisis is defined as levels of systolic blood pressure ≥180 mmHg and/or diastolic blood pressure ≥120 mmHg in accordance with Guidelines of Joint National Committee (JNC) 8 (10) , American College of Cardiology/American Heart Association High Blood Pressure Guideline (9).

Study Variables and Measurements:

Data on demographics, comorbid conditions, clinical symptoms, blood pressure readings at subsequent time intervals, length of stay, and antihypertensive drug therapy was recorded by trained data collectors. Age and gender were recorded as mentioned at the time of admission. A history of physician-diagnosed diabetes mellitus (DM), chronic kidney disease (CKD), ischemic heart disease (IHD), and stroke was noted from the patient's medical record file. DM was defined as fasting plasma glucose ≥126 mg/dL at a prior visit. CKD was defined as rise in serum creatinine of >1.2 mg/dL for 3 months. Myocardial infarction was diagnosed when blood levels of sensitive and specific biomarkers such as cardiac troponin or CKMB are increased in the clinical setting of acute myocardial ischemia with

Supplementary information The online version of this article (https://doi.org/10.15520/ijmhs.v10i12.3162) contains supplementary material, which is available to authorized users.

Corresponding Author: *Jasvin Vala*
3rd year Resident, Emergency Medicine department, Smt. NHL Municipal Medical college, Ahmedabad, Gujarat, India
Email: Jas.vala13@gmail.com

electrocardiographic changes. stroke was defined as a rapidly developing clinical sign of focal (at times global) disturbance of cerebral function, lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin Acute renal failure was diagnosed when the plasma urea nitrogen (PUN) or serum creatinine did not stabilize within 72 hours. Clinical symptoms were recorded from the initial assessment sheet.

Blood pressure readings, at different time intervals, were recorded from vital sheets for nursing services. Blood pressure was measured using a mercury sphygmomanometer with the patient in sitting position. Hypertensive crisis was defined as a systolic blood pressure >180 mm Hg or a diastolic blood pressure >120 mm Hg.

Antihypertensive treatment was divided into two types: medication given per oral and medications given intravenously.

3 | RESULTS

Demographic characteristics:

A total of 6614 patients presented to the ED during the screening periods over the 3 months study between March to May 2019. Out of these 114 patients were enrolled in our study and 11 patients admitted with Hypertensive urgency and 103 patients presented with Hypertensive emergency.

The median age of enrolled patients was 60 [interquartile range (IQR) 28–82], and the majority were Male, married, with primary school education. The Patient Characteristics are displayed in Table 1.

Patient risk factors:

Risk factors for hypertensive urgency and emergency are shown in Table 2. More than half of patients (n=73) had history of hypertension. Out of these half of patients were non-compliant on antihypertensive drugs. 19% patients were chronic alcoholic. About of one fourth patient were chronic smoker. Overall, Dyslipidaemia was the most common comorbidity in patients presenting with uncontrolled hypertension to the ER with the prevalence of 40.3% followed by Diabetes mellitus 24.5%, and ischemic heart disease, 28.0%.

Clinical presentation and outcome:

The Common presentation in our study was neurological symptoms (n=59). It includes both altered sensorium and neurological deficits. Dyspnoea (28.0%) is 2^{nd} most common symptoms followed by chest pain (19.2%), Headache (14.9%), Giddiness (13.1%), and blurring of vision (3.5%).

Blood Pressure Trends

The Mean systolic blood pressure at time of presentation was 210mm of Hg and mean Diastolic blood pressure was 109 mm of Hg. After administration of Antihypertensive drug after 1 hour Systolic blood pressure was 172 mm of hg and Diastolic was 94mm of Hg. After 24 hour Systolic blood pressure was 140mm of Hg and Diastolic was 86mm of Hg. The trend of blood pressure recorded in the ER is shown in Figures 1 .

Management of Patients with Hypertensive Crisis:

Antihypertensive Medications Used in Management of Patients with Hypertensive Crisis. Calcium channel blocker was the most widely used oral antihypertensive medication in the ER 53(46.49%). Intravenous (IV) Beta Blocker (Labetalol) was the most commonly administered IV medication in ER 26 (22.8%).The mean (SD) drop in SBP in patients with hypertensive crisis who received intravenous medications versus oral medications was 52 (29) mm hg and 41 (27), respectively . The mean drop in DBP in patients with hypertensive crisis who received intravenous versus perioral medications was 23.6 mm hg and 15.8 mm Hg, respectively.

Final Diagnosis

Outcome:

The overall mortality of patients that are admitted in emergency with hypertensive crisis was 19.2. Major numbers of patients were shifted in ICU as they required continuous blood monitoring, required mechanical ventilation etc. While few patients were shifted to ward after stabilization.

4 | DISCUSSION

Discussion The diagnosis and management of hypertensive crisis poses a unique challenge, especially in

TABLE 1: Baseline characteristics of patient with hypertensive crisis

Characteristics	Overall	Emergency	Urgency
Age	60 (28-86)	60 (31-86)	53 (28-70)
SEX			
Male	72	65	8
Female	42	40	3
Marital status			
Married	108	100	10
Unmarried	06	05	01
Education			
College	21	20	1
Secondary school	36	34	2
Primary school	46	40	7
Illiterate	11	10	1

TABLE 2a: Risk factors of patient with hypertensive crisis

Risk factor	Overall	Emergency	Urgency
Alcohol	22 (19.2%)	20 (17.5%)	2 (1.75%)
Chronic smoker	30 (26.3%)	25 (21.9%)	6 (5.2%)
Dyslipidemia	46 (40.3%)	40 (35.0%)	6 (5.2%)
Diabetes	28 (24.5%)	25 (21.9%)	3 (2.6%)

TABLE 2b:

Risk factor	Overall	Emergency	Urgency
Ischemic heart disease	32 (28.0%)	25 (21.9%)	7 (6.1%)
H/o Hypertension			
Overall	73 (64.0%)	66 (57.8%)	6 (5.2%)
Compliance	31 (42.4%)	27 (40.9%)	4 (66.6%)
Non compliance	42 (57.5)	40 (60.6%)	2 (33.3%)

TABLE 3: Clinical Presentation of Hypertensive crisis

Clinical Symptoms	Overall	Emergency	Urgency
Neurological Deficit	50 (43.8%)	50 (43.8%)	-
Dyspnea	32 (28.0%)	31 (27.1%)	1 (0.8%)
Chest pain	22 (19.2%)	19 (16.6%)	3 (2.6%)
Giddiness	15 (13.1%)	11 (9.6%)	4 (3.5%)
Headache	17 (14.9%)	15 (13.1%)	4 (3.5%)
Blurring of vision	4 (3.5%)	2 (1.7%)	2 (1.7%)

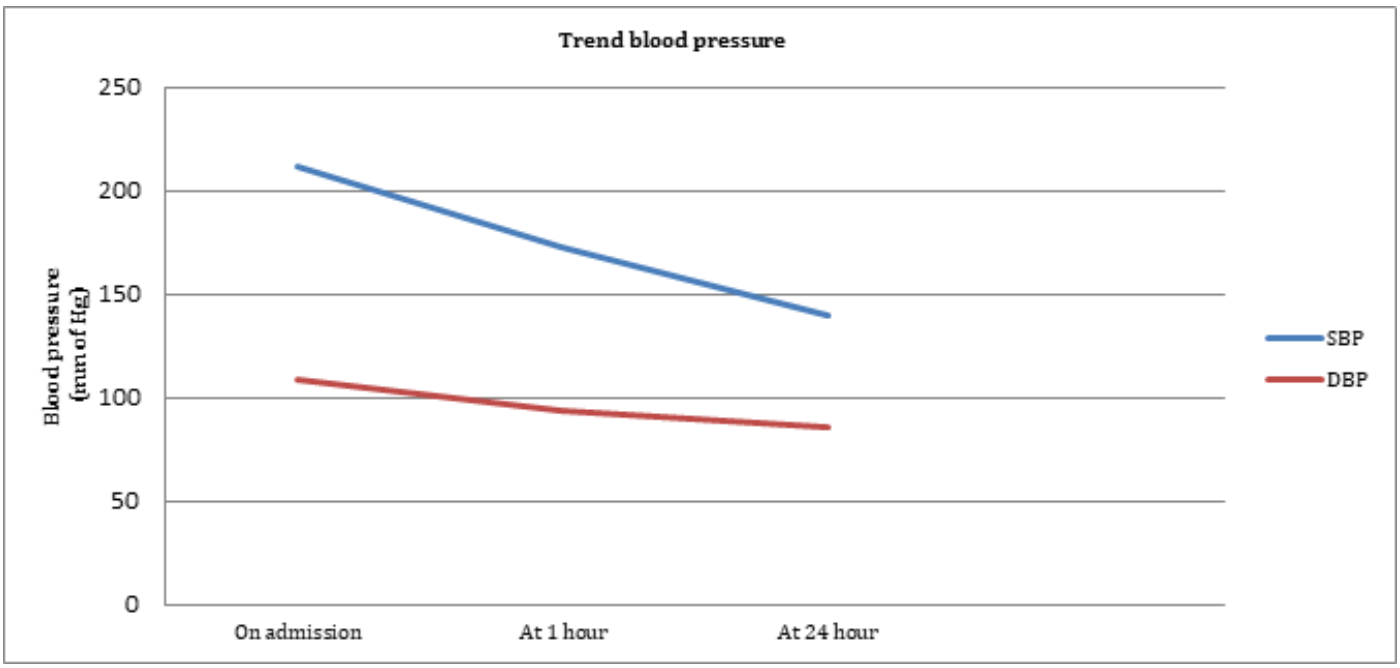

FIGURE 1:

developing countries.

In our study total 114 patients were studied out of there was mean age is 60 years, out of this 63% were males while study in aysha almes et al 46% were males. While in Patrice shao et al had same percentage of males as in our study

Most patients in our study self-reported risk factors for cardiovascular disease (example. Cigarette smoking, lack of physical exercise, sedentary work), along with poor compliance with antihypertensive medications, which has been associated with hypertensive emergency and urgency. These findings are similar to observations made in other Patrice shao et al and aysha almes et al study; in which obesity, history of hypertension, low socioeconomic status, poor health literacy, and lack of compliance with drug treatment were mentioned as factors associated with hypertensive emergency and urgency.

The most common risk factor for this study was dyslipidaemia (46.3%) followed by ischaemic heart disease 2^{nd} most common (28.0%). In aysha almes et al study the findings were same as our study

TABLE 4: Antihypertensive Drugs used in ER

Antihypertensive drugs	Overall	Emergency	Urgency
Inj Labetalol	53 (46.4%)	53	-
Inj Diuretics	18 (15.7%)	18	-
Inj NTG	18 (15.7%)	17	1
Inj CCB	6 (5.2%)	6	-
Sublingual NTG	11 (9.6%)	7	4
Oral ACE	26 (22.8%)	22	4
Oral ARB	14 (12.2%)	10	4

TABLE 5:

	Overall	Emergency	Urgency
Cerebrovascular Accident	58	58	-
CVA- Ischemic	15	15	-
CVA- Hemorrhagic	43	43	-
Acute Renal Failure	7	7	-
Hypertensive encephalopathy	3	3	-
Acute myocardial Infraction	8	8	-
Heart Failure	27	27	-
Unstable Angina	7	-	7
Accelerated HTN	4	-	4

TABLE 6: Outcome of patient

	Overall	Emergency	Urgency
Shift to ward	23 (20.1%)	14 (12.2%)	9 (7.8%)
ICU	65 (57.0%)	63 (55.2%)	2 (1.7%)
Expired	22 (19.2%)	22 (19.2%)	-

dyslipidaemia (43.2%) was most common associated followed by diabetes (37.0%).

The clinical presentation of hypertensive crisis varies depending on pathology. Nearly half of patient of hypertensive emergency presented with altered sensorium and neurological deficit. And patient with Hypertensive urgency presented with Headache and Chest pain. While in aysha almes et al study Headache and dizziness were most common symptoms. In the Patrice shao et al study altered mental status was most common presenting complaints.

CVA was the top ED (51.57%) diagnosis; In CVA Haemorrhagic was more common than Ischaemic. Followed by Heart failure (23.6%), myocardial infraction (7%) and acute renal failure (6.1%). Complications of hypertensive crisis reported in previous studies conducted in Bahrain and Italy were acute coronary syndrome (32%), left ventricular heart failure (38%), and stroke (29.3%) and cerebral infarction (24%), pulmonary edema (23%), and hypertensive encephalopathy (16%).

We observed in this study that sodium nitroprusside was the most potent intravenous antihypertensive in dropping blood pressure. However, it was not the most commonly used drug in this study. Intravenous labetalol (43.6%) was reported as the most frequently used antihypertensive medication for emergency department patients presenting with hypertensive crisis. We also observed that calcium channel blockers have been most commonly used oral antihypertensive patients. In aysha almes et al study same intravenous labtealol was most commonly used.

Out of these 114 patients 20.1 % (n=23) patients were expired, while 19.2% (n=22) patients were shifted to ward and remaining were 57% (n=65) shifted in ICU. Factors contributing to the high mortality might include severity of illness, noncompliance to anti-hypertensive medications and existing comorbidities. In contrast to our study Patrice shao et al study majority of patients 66.5% patients were shifted to ward, while only 1.5% patients were expired as compared to our study it was 20.1%. This difference due to may be sample selection and variation in type of admissions depending on the level of hospital and geographical distribution pattern of that region

The strength of this study is that it reflects prevalence of hypertensive crisis, as well as prevalence of complications as a result of hypertensive crisis among patients. Moreover, this study also reports management of these patients in terms of the treatment received in the ER.

5 | LIMITATIONS

There are few limitations in this study; first, it has limited external validity as the sample is not representative for an entire population. It represents population visiting a single-tertiary care hospital and, hence, it is not representative of the entire population of this region. Second, this retrospective study cannot strongly give a cause and effect association. In addition, available treatment was occasionally restricted due to resource limitations; hence, the observed treatment strategies may be due not to physician preference, but rather medication availability.

6 | CONCLUSION

In our cohort of adult patients with elevated blood pressure, hypertensive crisis was associated with substantial morbidity and mortality, with the most vulnerable being those with hypertensive emergency. The prevalence of hypertensive crisis is high in our subjects.

Per oral calcium channel blocker and intravenous labetalol are the most commonly administered medications in the ER and ward. Acute renal failure is the most common complication developed in hypertensive crisis.

Patients with hypertensive emergencies may require immediate reduction in elevated blood pressure to prevent and arrest progressive end organ damage. The best clinical setting in which to achieve this blood pressure control is in the intensive care unit with use of intravenous hypotensive agents.

The early detection of hypertensive emergencies with multiple target organ damage and appropriate

treatment are key determinants for reducing morbidity and mortality among patients of hypertensive emergencies.

In chronic hypertensive patients, strict blood pressure control by regular BP check-up and good adherence to antihypertensive drugs can reduce the incidence of hypertensive emergencies.

REFERENCES

1. Shao PJ, Sawe HR, Murray BL, Mfinanga JA, Mwafongo V, & Michael, et al.;.
2. Bender SR, Fong MW, Heitz S, Bisognano JD. Characteristics and Management of Patients Presenting to the Emergency Department With Hypertensive Urgency. The Journal of Clinical Hypertension. 2006;8(1):12–18. Available from: https://dx.doi.org/10.1111/j.1524-6175.2005.04898.x. doi:10.1111/j.1524-6175.2005.04898.x.
3. Zampaglione B, Pascale C, Marchisio M. Cavallo-Perin P. Hypertensive urgencies and emergencies: prevalence and clinical presentation. Hypertension. 1996;27(1):144–147.
4. Wang TJ, Vasan RS. Epidemiology of Uncontrolled Hypertension in the United States. Circulation. 2005;112(11):1651–1662. Available from: https://dx.doi.org/10.1161/circulationaha.104.490599. doi:10.1161/circulationaha.104.490599.
5. Rodriguez MA, Kumar SK, Caro MD. Hypertensive Crisis. Cardiology in Review. 2010;18(2):102–107. Available from: https://dx.doi.org/10.1097/crd.0b013e3181c307b7. doi:10.1097/crd.0b013e3181c307b7.
6. ;. Available from: http://thepafp.org/website/wp-content/uploads/2017/05/2014-JNC-8-Hypertension.pdf.
7. Johnson W, Nguyen ML, Patel R. Hypertension Crisis in the Emergency Department. Cardiology Clinics. 2012;30(4):533–543. Available from: https://dx.doi.org/10.1016/j.ccl.2012.07.011. doi:10.1016/j.ccl.2012.07.011.
8. Al-Bannay RA, Husain AA. Hypertensive crisis: clinical presentation, comorbidities, and target organ involvement. Saudi Medical Journal. 2010;31(8):916–920.
9. Williams B, Mancia G, Spiering W. Enrico Agabiti Rosei2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the management of arterial hypertension of the European Society of Cardiology (ESC) and the. European Society of Hypertension;.
10. Almas AA, Ghouse. Ahmed Raza iftikhar Hypertensive Crisis, Burden, Management, and Outcome at a Tertiary Care Center. Karachi.
11. Salkic S, Batic-Mujanovic O, Ljuca F, Brkic S. Clinical presentation of hypertensive crises in emergency medical services. Materia Socio Medica. 2014;26(1):12–16.
12. Whelton PK, Carey RM, Aronow WS. PCNA Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults. J Am Coll Cardiol. 2017;.
13. Aggarwal M, Khan IA. Hypertensive Crisis: Hypertensive Emergencies and Urgencies. Cardiology Clinics. 2006;24(1):135–146. Available from: https://dx.doi.org/10.1016/j.ccl.2005.09.002. doi:10.1016/j.ccl.2005.09.002.
14. Dr. ESC-ESH Guidelines; 2018.
15. Rosen CJ. Vitamin D Insufficiency. New England Journal of Medicine. 2011;364(3):248–254. Available from: https://dx.doi.org/10.1056/nejmcp1009570. doi:10.1056/nejmcp1009570.
16. Chrney SD, Straus;.

How to cite this article: Vala J., Gupta S., Gohil J., Mankodia D., bhuta M., Jarwani B. **Evaluation of Hypertensive crisis presenting to Emergency Room at a Tertiary Care Teaching Hospital focus on initial management**. Innovative Journal of Medical and Health Science. 2020;1425−1432. https://doi.org/10.15520/ijmhs.v10i12.3162