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ORIGINAL ARTICLE

Clinical profile of hypertensive crisis presenting as urgency and emergency in an emergency department of eastern Nepal

Samir Kshetri[1], Rabin Bhandari[2], Pramendra Prasad Gupta[3], Ajay Yadav[3], Ritesh Chaudhary[3], Vijay Kumar Shrivastav[4], Rupak Bhandari[5]

[1]MDGP&EM, DM EM Resident, Chitwan Medical College & Teaching Hospital, Bharatpur, Chitwan, Nepal; [2]Professor, [3]Additional Professor, [4]Associate Professor, [5]Assistant Professor, Department of General Practice & Emergency Medicine, BP Koirala Institute of Health Sciences, Dharan, Sunsari, Nepal

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Correspondence:
Dr. Samir Kshetri
MDGP&EM, DM EM Resident
Chitwan Medical College & Teaching Hospital, Bharatpur, Chitwan, Nepal
Email: samirrkshetri@gmail.com

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Abstract

Introduction: Hypertensive crisis (HTN-C) encompasses hypertensive urgency (HTN-U) and hypertensive emergency (HTN-E), distinguished by presence or absence of acute target organ damage, respectively. Early detection and appropriate categorization are critical for reducing morbidity and mortality. This study aimed to assess the proportion of HTN-U among HTN-C cases, examine demographic and clinical profiles, evaluate differences in clinical presentation between HTN-U and HTN-E, and identify risk factors for hypertensive crisis.

Method: This is an observational cross-sectional study of 164 patients presenting with HTN-C in the Emergency Department of a Tertiary Hospital, using non-probability convenience sampling. Clinical and demographic data were analyzed using descriptive and inferential statistics at the 5% level ($p < 0.05$).

Result: Findings revealed that 103 patients (62.8%) were classified as HTN-U, while 61 patients (37.2%) were classified as HTN-E. The study highlighted a mean age of HTN-C was (mean ± SD = 54.09 ± 15.59), with a male predominance of 99 (60.4%) patients. The most common presentation of HTN Urgency were headache vomiting and epistaxis whereas altered level of consciousness, slurring of speech and blurring of vision was common in hypertensive emergency.. Blurring of vision 5 (81.3%) was common in HTN-E. Risk factors for HTN-C included smoking ($p < 0.045$), tobacco ($p < 0.013$), non-compliance with medication ($p < 0.034$), and ayurvedic medicines ($p < 0.016$).

Conclusion: Hypertensive urgency was more prevalent, and hypertensive emergency cases posed greater risks due to neurological complications. Clinical symptoms of HTN-C provide clues to differentiate hypertensive urgency from hypertensive emergency in the emergency department.

Keywords: Hypertensive Crisis (HTN-C), Hypertensive Urgency (HTN-U), Hypertensive Emergency (HTN-E)

INTRODUCTION

Hypertensive crisis is defined as an acute elevation of blood pressure, i.e., Systolic blood pressure (SBP) ≥ 180 mmHg and/or Diastolic blood pressure (DBP) ≥ 120 mmHg, with or without evidence of impending target organ damage.[1,2] Hypertensive crisis has been divided into two groups, i.e., hypertensive emergency (HTN-E) and hypertensive urgency (HTN-U). HTN-E are characterized by severe elevations in blood pressure (≥180/120mmHg), complicated by evidence of impending or progressive target organ dysfunction such as[3]

Hypertensive urgency is defined as severe elevations in blood pressure, i.e., systolic blood pressure ≥ 180 mmHg and/or diastolic blood pressure ≥ 120 mmHg, without acute target organ damage.[1] The lifetime prevalence of hypertensive crisis is estimated as 1% in known hypertensive cases.[4] Previous studies have shown that hypertensive crisis is a common cause for emergency department admission, with an incidence of 0.5 to 3%.[5,6] The literature shows varying proportions of hypertensive urgency to emergency. Various studies by Manal Khudder Abdul Razak, Santosh B Salagre, and Jose Fernando Viela Martin show that hypertensive urgency ranges from 39.2% to 60.4%, whereas hypertensive emergency ranges from 39.6% to 60.8%.[7,8,5]. The treatment of hypertensive urgency consists of gradual reduction of blood pressure, whereas in a hypertensive emergency, intravenous therapy is indicated for a faster reduction in blood pressure.[7] A majority of hypertensive crisis cases are a consequence of inadequate medical treatment.[9] The prompt recognition of a hypertensive crisis with the appropriate diagnostic tests and triage will lead to the adequate reduction of blood pressure, ameliorating the incidence of fatal outcomes.[10] Hypertensive Crisis(HTN-C) is associated with significant morbidity and mortality. There is limited data on Hypertensive crisis from the emergency department in Nepal. HTN-C (HTN-U, HTN-E). There is a gap in the identification and management of HTN-C in the emergency department. Timely identification of the subset needing emergent blood pressure reduction (HTN-E) is thus vital to reduce the subsequent morbidity in the emergency department. This study aimed to assess the proportion of HTN-U among HTN-C cases, examine demographic and clinical profiles, and evaluate differences in clinical presentation between HTN-U and HTN-E.

METHOD

This was a cross-sectional observational study conducted from 2nd June 2020 for 1 year at the BPKIHS Emergency Department in Eastern Nepal. Patients presenting to the emergency department with systolic blood pressure ≥ 180 mmHg and/or DBP ≥ 120 mmHg were included in this study; Australasian triage score (ATS-I) cases who require immediate cardiopulmonary resuscitation and known pregnant women were excluded. Non-probability convenience sampling technique was applied.

According to a study conducted by Abdul Razak,[7] prevalence of hypertensive urgency was 39.2% among hypertensive crisis patients. By using the formula,

$$n = \frac{z^2 \times pq}{(l)^2}$$

where p = 39.2%, q = 100-p, Zα at 95 % CI = 1.96,
I = permissible error; 20% of p = 7.84

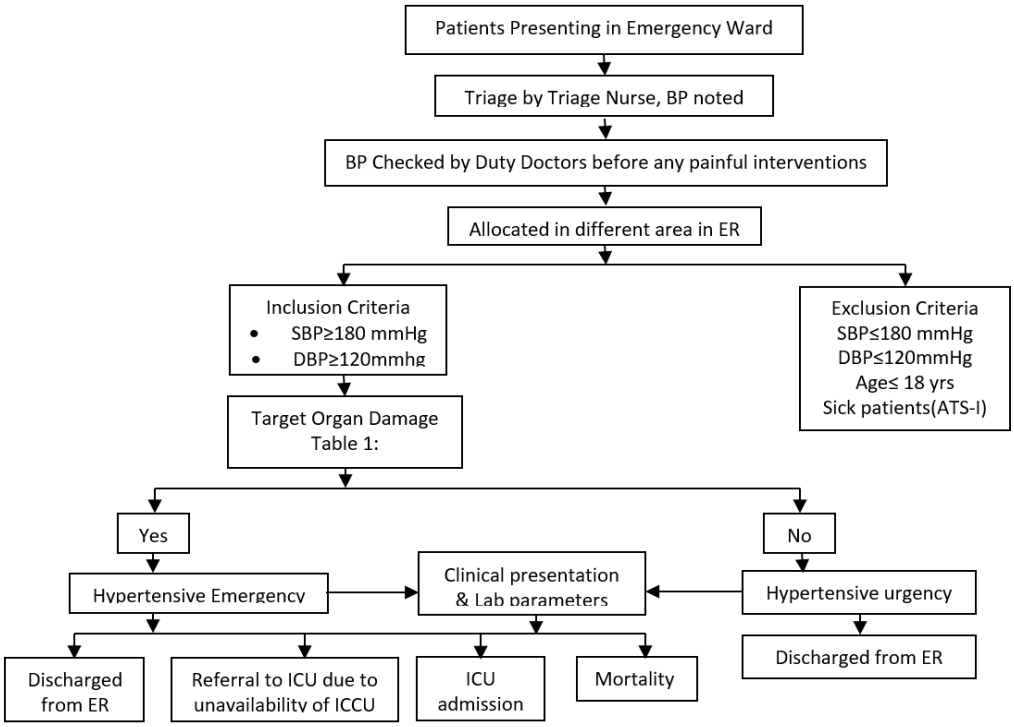

Figure 1. Schematic diagram

$$n = \frac{(1.96)^2 \times 39.2 \times 60.8}{(7.84)^2}$$

= 148.96
= approximately 149
n = 149

Adding 10 % for non-response, Final sample size n = 163.9 = approximately 164.

Ethical approval was obtained from the Institute Review Board, B.P. Koirala Institute of Health Sciences (Reference Number 254/076/077). Verbal and written consent was obtained from the patient or their attendants regarding enrollment in this study.

The study variables were Sociodemographic variables (Age, Sex, Residence, Occupation, Education), Laboratory parameters (Urea, creatinine, General random blood sugar, Non-contrast Computed tomography of the head), Clinical details (Systolic blood pressure, Diastolic blood pressure, risk factors), and Outcome variables (Hypertensive crisis, Hypertensive Urgency, Hypertensive Emergency)

The data were collected into a customized pro forma, entered into Microsoft Excel 2010, and exported to SPSS 16.0. Frequency, Percentage, and mean ± SD were calculated for baseline variables. The chi-square test was used to compare the two categorical variables, and the t-test was used to compare the two numerical variables at the 5 % level of significance.

The patient was triaged using the Australasian triage score, a five-tiered system in which 1 is the most urgent and 5 is the least urgent. ATS-I cases that required immediate intervention were excluded. Vitals were taken, and patients were enrolled based on the inclusion criteria. Blood pressure was checked with an appropriate Aneroid sphygmomanometer (size- 25.4 to 40.6cm), preferably completed in the sitting position (for the majority of patients) and in the supine position for those patients who were unable to sit, and was noted at the triage area. Blood pressure was measured at the triage area by a sister and at the emergency area by a doctor. Similar blood pressure readings were taken in this study.

Required laboratory parameters (ECG, GRBS, Urea, creatinine, Urine RME, NCCT Head) were sent, and the patient was followed up till disposition from the emergency department. (Admission, Referral, Discharge, Death).

Ethical clearance was taken from B.P. Koirala Institute of Health Sciences (Reference Number 254/076/077). Verbal and written consent was taken from patients or patient attendants where appropriate.

RESULT

A total of 164 patients with hypertensive crisis cases were selected who presented to the Emergency Department of BPKIHS. Of 164 cases, 103 (62.8%) were HTN-U and 61 (37.2%) were HTN-E. The mean ± SD age of the HTN-C patients was 54.09 ± 15.59 years. The mean SBP and DBP of HTN-C were 189.76± 19.28 years, 110.49± 12.02 years. The mean age of HTN-U was 54.14±15.325years, and HTN-E was 54.02 ±16.156 years. (Table 1).

The most common presentation of HTN-C was Headache 92 (56%), Vomiting 49 (29.87%), Epistaxis 41 (25%), and Altered level of consciousness 32 (19.51%). A total of 29 (17.69 %) were asymptomatic.

The most common presentation of HTN-U were epistaxis 37(90.2%), headache 72(78.3%), vomiting 34(60.0%), whereas, altered level of consciousness 29(90.6%), slurring of speech 13(61,9%) and blurring of vision 5(81.3%) was common in HTN-E. The clinical presentation was compared between HTN-U and HTN-E, and a statistical association was found with epistaxis (p<0.001), headache (p<0.001), altered level of consciousness(p<0.001), shortness of breath (p<0.001), and asymptomatic (p<0.04). (Table 2)

Out of 164 patients, 99 (60.37%) were male and 65 were female, with a Male: Female ratio of 1.52:1. HTN-C were more common in Urban areas, 95(57.93%), followed by rural areas, 52(31.7%), and semi-urban areas, 17(10.36%). Most of the HTN-C were referred from private clinics and private hospitals, i.e, 90 (54.87%).

Smoking (p< 0.045), Tobacco (p < 0.013), non-compliance to medication (p< 0.034), and Ayurvedic medications (p< 0.034) were associated with hypertensive crisis. (Table 3).

A total of 132 CT scans of the head were formed; 17 cases had an Intracerebral bleed, and 14 cases had an infarct.

A total of 112(68.29%) cases of HTN-C were discharged, 28(17.07%) cases were admitted,18(10.98%) cases were referred, 3(1.82%) cases died, and 3(1.82%) cases went on Leave Against Medical Advice (LAMA). Based on the different conditions, the frequency is given in Figure 1.

HTN-E shows higher systolic and diastolic blood pressure than HTN-U, as shown in the error plot. (Figure 2)

The laboratory parameters of the patients were compared with those of groups presenting with HTN-U and HTN-E, which showed statistically significant associations with urea **(p = <0.001)** and creatinine **(p = <0.001)**.

Most cases of hypertensive emergency corresponded to cerebrovascular lesions 31(51%); intracerebral bleed 17(28%), infarct 14(23%), Acute renal failure; proteinuria 20(33%), retinal hemorrhage 7(11%), Acute Coronary syndrome

Table 1. Clinical Characteristics of patients with HTN-C, HTN-U, HTN-E (n=164)

Variables	Hypertensive crisis n = 164	H- Urgency n = 103	H – Emergency n = 61	P- value (t-test)
Age (mean ± SD)	54.09±15.59	54.14±15.325	54.02±16.156	0.962
SBP	189.76±19.280	187.96 ±18.01	192.79±21.06	0.138
DBP	110.49±12.023	110.19 ±12.52	110.98±11.21	0.677
MAP (mean ± SD)	136.91±10.781	136.11 ± 10.07	137.70 ± 12.21	0.369

Table 2. Association of presentation with HTN-U and HTN-E (n=164)

Variable	H- Urgency n = 103	H – Emergency n = 61	P-value*
Epistaxis	37(90.2%)	4(9.8%)	<0.001
Headache	72(78.3%)	20(21.7%)	<0.001
Vomiting	34(60.0%)	15(30.6%)	0.255
Altered level of consciousness	3(9.4%)	29(90.6%)	<0.001
Slurring of speech	8(38.1%)	13(61.9%)	0.12
Weakness	11(50.0%)	11(50.0%)	0.182
Blurring of vision	1(16.7%)	5(83.3%)	0.17
Shortness of breath	1(11.1%)	8(88.9%)	0.001
Chest pain	4(50.0%)	4(50.0%)	0.442
Asymptomatic	23(89.5%)	6(10.5%)	0.043

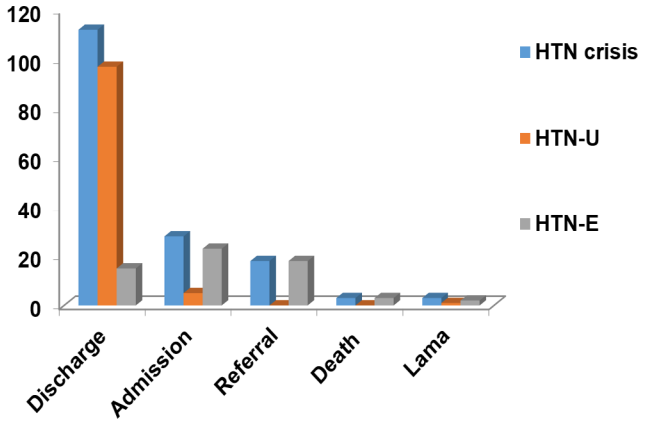

Figure 2. Outcome of a patient who presented with a hypertensive crisis

Table 3. Association of lab variables with HTN-U and HTN-E

Variable	H- Urgency n = 103	H – Emergency n = 61	P- value (t-test)
Urea	34.48±8.98	59.16±59.80	<0.001
Creatinine	0.985±0.22	2.22±2.48	<0.001
Grbs	159.64±39.84	164.51±39.84	0.393

3(5%).

DISCUSSION

The proportion of hypertensive urgency was 103 (62.8%), whereas 61 (37.2%) were hypertensive emergencies. Similar findings were reported by Viela Martin et al. and Santosh et al. (60.4%, 39.6%; 51.67%, 48.33%).[5,8]

In this study, the mean age of patients with hypertensive crisis was (54.09±15.59), for urgency was (54.14±15.325), while hypertensive emergency was (54.02±16.156). The mean age of patients presenting with hypertensive crisis reported in other studies was: 68.8±15.1 years for hypertensive urgency and 69.9±14.3 years for hypertensive emergency.[11] The mean age is 49.9±18.6 years for hypertensive urgency and 59.6±14.8 years for hypertensive emergency.[5]

Also, Salikic et al in 2014 reported that the maximum number of patients with hypertensive crises lay between 60-65 years of age.[12] Thus, in our study, the middle-aged group (36-59 years) dominated the patient population of hypertensive crisis, as compared to older adults (>65 years) in other studies.

Men had a greater frequency of hypertensive crisis than did women. Similar findings were found in Laudari et al.'s study, where the male-to-female ratio was 1.28:1.13. Our study shows that 60% of hypertensive crises occurred in males and 40% of cases occurred in females. Male HTN urgency n =68(68.7%), HTN emergency n = 31(31.3%); Female HTN urgency were n =35(53.8%), HTN emergency n = 30 (46.2%), **(p< 0.05).**

Hypertensive crisis was more in urban areas, with HTN urgency 60 (63.2%) and HTN emergency 35 (36.8%).

Our study reported a high level of systolic and diastolic

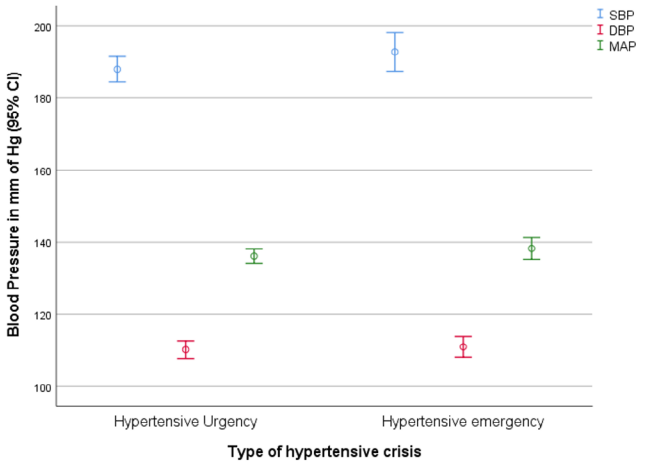

Figure 3. Error plot graph showing the Level of blood pressure in a hypertensive crisis

blood pressure in hypertensive emergency as compared to hypertensive urgency. These findings corroborate those of Salkic et al., Martien et al., and Zampaglione et al., who also reported a significant difference, but only with diastolic pressure, which is known to be greater in patients with hypertensive emergency.[12,14,15] Pinna et al. found no difference in mean blood pressure between the groups.[11]

In our study, smoking **(p < 0.045**), tobacco (p < 0.013), non-compliance to medication (p < 0.034), and ayurvedic medication **(p < 0.016)** were associated with hypertensive crisis. Tobacco has acute and chronic hypertensive actions, such as inhibiting endothelial cyclooxygenase, which leads to a reduction in prostacyclin production and an increase in thromboxane synthesis, potentially causing chronic vasoconstriction and endothelial cell damage.[16,17,18]

Martin et al reported that smoking was associated with hypertensive crisis in 25% of patients, whereas Pinna et al found no significant difference between the proportion of patients who smoked.[5]

Patients who were taking ayurvedic medications **(p < 0.016)** ended up with a hypertensive crisis in the emergency department of BPKIHS. Ayurvedic medicines may be beneficial to health but are not devoid of adverse events, which may be due to adulteration or to inherent constituents such as alkaloids and steroids. Each chemical compound in any ayurvedic preparation should be listed on the manufacturer's label, along with the amount, to support proper dosing and reduce adverse events. Proper counseling by health professionals, especially regarding adverse events, will play an essential role in minimizing harm.[19]

Most of the patients left their antihypertensive medications and ended up with a hypertensive crisis in the emergency department of BPKIHS. This is due to non-adherence to medication, lack of education, and inadequate treatment. A similar result was found in Razak et al, and Salkic et al.[7,12]

The most common presentation of HTN urgency was epistaxis, Headache, vomiting, whereas altered level of

consciousness, blurring of vision, and slurring of speech were common presentations of hypertensive emergency. Viela Martin et al. reported that the most frequent clinical manifestations of hypertensive urgency were headache and dizziness, which are less severe symptoms and are compatible with a lower risk setting. In contrast, neurologic deficit and dyspnea were the most frequent presentations in a hypertensive emergency.[5]

The present study shows that, among Hypertensive emergencies, cerebrovascular lesions were the most common, followed by renal failure and proteinuria. Similar findings were reported in Viela Martin, et al.[5]

In our study, most of the hypertensive urgency cases were discharged, and three instances of hypertensive emergency died in the emergency department of BPKIHS. The cause of death in 3 cases was Intracerebral hemorrhage. This shows that Hypertensive emergency cases present with neurological deficit, more severe as compared to hypertensive urgency. Similar findings were reported in Viela Martin et al.[5]

It was a single-institution study conducted at a tertiary care referral hospital in the Eastern part of Nepal. Furthermore, studies, especially in the emergency department of Nepal, are required to find out more causes of unscheduled visits to the emergency department and risk factors.

CONCLUSION

In our study, hypertensive urgency was more common than hypertensive emergency (1.69: 1). Males were more frequently affected. Smoking, tobacco, non-compliance, and ayurvedic medications were significant risk factors for hypertensive crisis. Non-adherence to drugs is the major factor that can lead the patient to unscheduled visits to the emergency department. Hypertensive emergency presented with neurological deficit, a more severe form as compared to hypertensive urgency, which is apparently less severe.

This study concludes that patients with hypertensive urgency and hypertensive emergency differ in their mode of presentation. Thus, it may help classify Hypertensive crisis into hypertensive urgency and hypertensive emergency during emergency management. As patients with hypertensive crises are more non-adherent to medications, assuring adherence to antihypertensive therapy is one of the most essential aspects to minimize unscheduled visits to the emergency department.

DECLARATIONS

Conflict of Interest

None

Funding

None

Ethical Clearance

Ethical clearance was obtained from BP Koirala Institute of Health Sciences (Ref. No. 254/076/077).

Consent of the Study

Verbal and written consent was taken from patients or patient attendants where appropriate.

Consent of Publication from Authors

All author/s and participants consented to the publication of the findings.

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