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RESEARCH ARTICLE

CLINICAL SPECTRUM OF HYPERTENSIVE EMERGENCIES WITH SPECIAL REFERENCE TO FASTING LIPID PROFILE

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Abstract

Background: Hypertensive emergencies are severe clinical condition in which sudden increase in arterial blood pressure can lead to acute vascular damage of vital organs. Hypertension and dyslipidemia often co-exist. Dyslipidemia worsens the prognosis in hypertensive emergency patients. So this study aimed to study the clinical profile and spectrum of target organ involved in patients with hypertensive emergencies with special reference to fasting lipid profile.

Materials and method: This study is a hospital based cross sectional study carried in 60 patients admitted in medicine ward of JMCH fulfilling the eligible criteria. All patients are subjected to clinical workout with detailed history, examination and also lipid profile value. Lipid profile of study group are compared with lipid profile of 60 normotensive patients

Results: The most common presenting complaint in the study is weakness of limbs (75%) followed by headache (46.66%), vomiting, dyspnoea. The most common spectrum of neurological end organ damage is ICH (46.66%) followed by cerebral infarct (23.33%), least common is SAH. Triglyceride, cholesterol, LDL and VLDL level in hypertensive emergencies are significantly higher ($p < 0.05$) than in normotensive patients.

Conclusion: The commonest clinical presentation in hypertensive emergency is neurological deficit. Fasting lipid profile is significantly deranged in hypertensive emergencies.

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Introduction:-

Hypertension is one of the leading causes of death and it remains one of the biggest health and economic issues facing the world.^{1,2} ACC/AHA guidelines 2017 classifies blood pressure criteria as normal (SBP < 120 mmHg and DBP < 80 mmHg), elevated (SBP 120 – 129 mmHg and DBP < 80 mmHg), stage 1 hypertension (SBP 130 – 139 mmHg and DBP 80-89 mmHg), stage 2 hypertension (SBP \geq 140 mmHg or DBP \geq 90 mmHg). Hypertensive emergency is defined as severe elevations in BP (> 180/120 mmHg) Hypertensive emergency is defined as severe elevations in BP (> 180/120 mmHg) associated with evidence of new or worsening target organ damage to the brain,

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heart, retina or blood vessels. Hypertensive urgencies are defined as severe elevation in BP (>180/120 mmHg) with no evidence of target organ damage.³ Hypertensive emergencies are severe clinical condition in which sudden increase in arterial blood pressure can lead to acute vascular damage of vital organs. Hypertension and dyslipidemia often co-exist. Dyslipidemia worsens the prognosis in hypertensive emergency patients. Dyslipidemia is more common in untreated hypertensives than normotensives, and abnormality in lipid levels increase as BP increases.^{4,5}

Aims And Objectives:-

1. To describe the clinical profile and spectrum of target organ involvement in patients with hypertensive emergencies admitted in Medicine Wards of JMCH.
2. To assess the fasting lipid profile of patients with hypertensive emergency and its association with fasting lipid profile of normotensive patients.
3. To determine the correlation between fasting lipid profile and systolic blood pressure of hypertensive emergency patients.

Materials and Methods:-

It was a cross sectional observational study conducted in the Department of Medicine, Jorhat Medical College & Hospital over a period of 1 year (1st July 2020 to 30th June 2021). About 60 patients were studied during this period of study. Consecutive sampling was done, cases were selected taking into account both inclusion and exclusion criteria.

Inclusion criteria:

Systolic BP \geq 180 mmHg and/or Diastolic BP \geq 120 mmHg as per 2017 ACC/AHA Guidelines.

Patient with clinically or laboratory diagnosed end organ damage

Patients of all genders and age above 18 years

Exclusion criteria:

1. Patients with valvular heart disease, pregnancy induced hypertension, chronic kidney disease, endocrine disorder, intake of drugs like cocaine and monoamine oxidase inhibitors.
2. Patients with other secondary causes of hypertension
3. Patients/ legally acceptable representatives not giving informed consent.

Sample size:

60 as per last 3 years records of average number of patients in hypertensive emergency fulfilling the inclusion criteria admitted to Medicine Ward, JMCH.

Control group:

60 age and sex matched normotensive patients.

Ethical consideration:

Ethical Clearance was obtained from the Institutional Ethics Committee (H) of Jorhat Medical College & Hospital. Written informed consent was obtained from every participant/ legal representatives.

Results:-

Table 1:- Distribution of patients according to target organ damage.

Target organ damage	Number of patients	Percentage (%)
Intracerebral hemorrhage	28	46.66%
Cerebral infarct	14	23.33%
Acute left ventricular failure	7	11.67%
Acute myocardial infarction	6	10%

Subarachnoid hemorrhage	5	8.33%
Unstable angina	4	6.66%
Impaired renal function test	22	33.67%

Figure 1:- Bar diagram showing distribution of target organ damage.

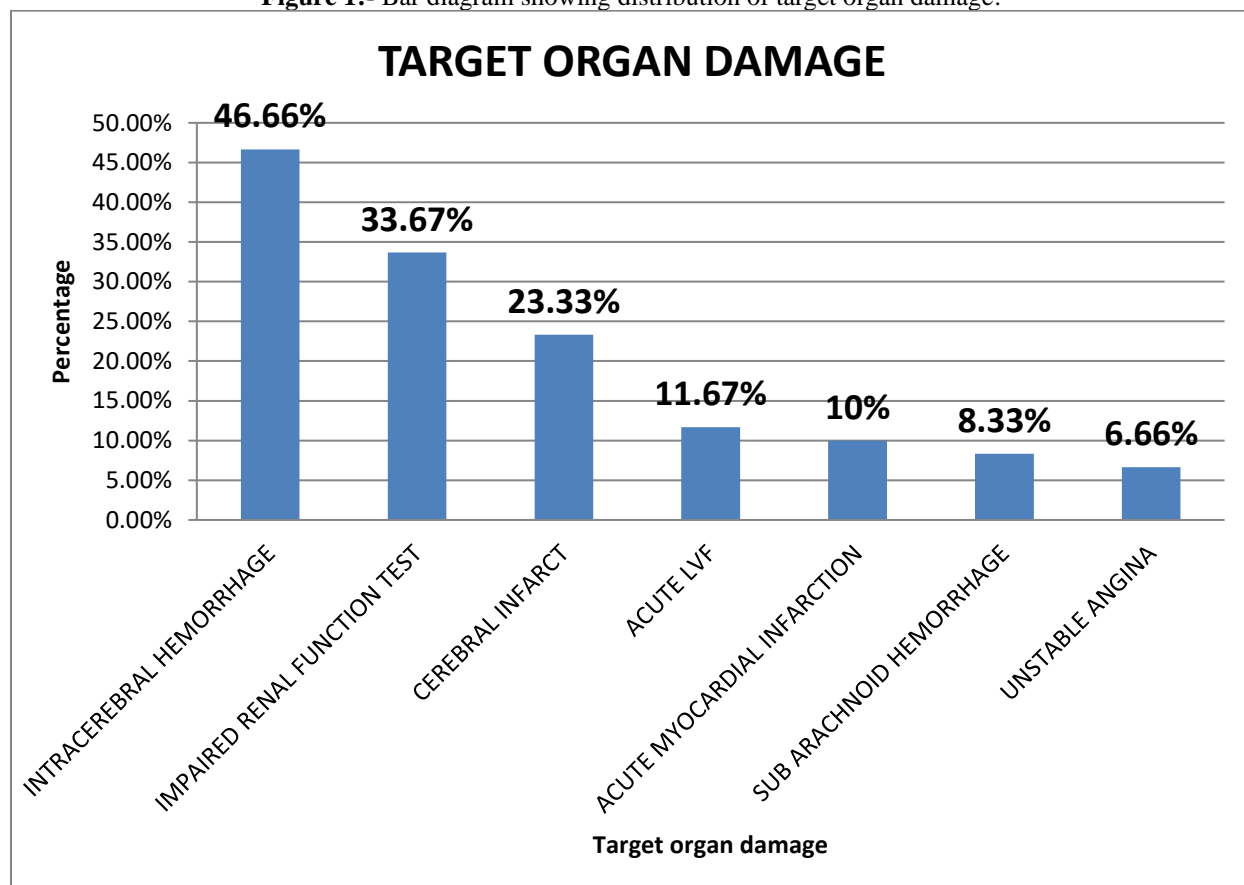


Table 2:- Comparison of Mean \pm SD of fasting lipid profile in hypertensive emergencies and normotensive group.

Parameters	Mean \pm SD		95% Confidence interval	p value
	Hypertensive emergency	Normotensive patient		
Cholesterol	206.5 \pm 24.71	149.72 \pm 29.63	-66.6434 to -46.9166	<0.0001
Triglyceride	183.23 \pm 37.12	108.33 \pm 32.03	-87.4343 to -62.3657	<0.0001
HDL	35.53 \pm 5.36	44.51 \pm 8.50	6.4110 to 11.5490	<0.0001
LDL	133.52 \pm 24.47	83.92 \pm 27.24	- 58.9612 to -40.2388	<0.0001
VLDL	36.43 \pm 7.65	21.55 \pm 6.46	- 17.4398 to -12.3202	<0.0001

Table 3:- Correlation between systolic blood pressure of hypertensive emergency patients and their fasting lipid profile.

Fasting lipid profile	Systolic blood pressure (mmHg)	
	Correlation (r)	p value
Total cholesterol	0.3196	0.01
Triglyceride	0.1880	0.16

HDL	-0.3502	0.003
LDL	0.3388	0.01
VLDL	0.1892	0.16

In our study, 63.33% of study populations were male and 36.67% of study populations were female with male: female ratio of 1.72:1. Maximum number of patients belonged to age group 50 – 60 years. Mean age of patients was 58.73 years. 23 (38.33%) patients were smokers and rest 61.67% patients were non smokers. All female patients were non-smokers. 17 patients (28.33%) were known diabetic on medication. 37 patients (61.67%) were known hypertensive; among these patients 21 patients were on regular medication but rest were on irregular antihypertensive medication. Most common mode of presentation was found to be weakness of limbs (75%) followed by headache (46.66%), vomiting (43.33%), dyspnoea (38.33%), chest discomfort (26.66%), convulsion (13.33%) and visual deficit (10%). Patients with neurological manifestations, 43 (71.66%) presented with hemiplegia, 2 patients had monoparesis, 22 patients (36.66%) were in altered sensorium, 8 patients (13.33%) had history of seizure at the time of presentation and 6 patients (10%) had blurring of vision. Intracerebral hemorrhage (46.66%) was the most common target organ involved among patients of hypertensive emergency, followed by cerebral infarct (23.33%), left ventricular failure (11.67%), acute myocardial infarction (10%) and unstable angina (6.66%). 22 patients (33.67%) had impaired renal function test. 37 patients had abnormal ECG tracing and echocardiography was also done in every study subjects. Fundoscopic examination showed normal fundus in 18 patients (30%), 13 patients had grade 1 changes, 10 patients had grade 2 changes, 3 patients had grade 3 changes and 13 patients had grade papilloedema. Fundus could not be visualized in 3 patients because of local lesion. Mean \pm SD of serum levels of total cholesterol, triglyceride, LDL and VLDL were 206.5 \pm 24.71mg/dl, 183.23 \pm 37.12 mg/dl, 133.52 \pm 24.47 mg/dl and 36.43 \pm 7.65 mg/dl respectively in hypertensive emergency patients, while in normotensive patients, they were 149.72 \pm 29.63 mg/dl, 108.33 \pm 32.03 mg/dl, 83.92 \pm 27.24 mg/dl and 21.55 \pm 6.46 mg/dl respectively, which were significantly higher in hypertensive emergency patients ($p < 0.0001$). The serum HDL was significantly lower ($p < 0.001$) in hypertensive emergency patients (35.53 \pm 5.36mg/dl) than in normotensive patients (44.51 \pm 8.50 mg/dl). Total cholesterol and LDL showed a significant positive correlation with systolic blood pressure of hypertensive emergency subjects with r value $r = 0.31$, $p = 0.01$ and $r = 0.34$, $p = 0.01$ respectively. HDL showed significant negative moderate correlation with SBP ($r = -0.35$, $p = 0.003$).

Discussion:-

In our study we have observed male preponderance among patients with hypertensive emergency. 38 (63.33%) patients were male and female constituted lesser number i.e. 22 (36.67%) patients with male: female ratio of 1.72:1. Our findings were near similar to a study done in RNT Medical College in 100 hypertensive emergency patients by Dave et al,⁶ Martinet al⁷. In our study we analyzed presenting symptoms and found 45 patients (75%) presented with limb weakness, 28 (46.66%) patients presented with headache as accompanying complaint, 26 (43.33%) patients presented with vomiting, 23 (38.33%) patients had dyspnoea, 22 (36.66%) patients had chest pain, 8 (13.33%) patients had seizure and 6 patients (10%) presented with blurring of vision. Our findings were near similar to results observed by Dave et al⁶, Salkic S et al⁸. Among patients with neurological deficit, 43 number of patients presented with hemiparesis and 2 number of patients presented with monoparesis. Among them, 22 number of patients presented in altered sensorium. Martin et al also found similar observation.⁹ It was observed in our study that majority of patients (81.67%) of hypertensive emergency group had HDL level below 40 mg/dl, 16.66% patients had HDL level in normal range (40 – 60) mg/dl and 1(1.67%) patient was found to have HDL level above 60 mg/dl. HDL level estimation of normotensive patients showed that 41 (68.33%) patients had HDL level within normal range, whereas 16 patients had HDL level below 40mg/dl and 3 (5%) patients had above 60 mg/dl. Also we evaluated LDL and found that majority of patients of hypertensive emergency group had deranged level of LDL as compared to normotensive patients which was statistically significant ($p < 0.05$). Among hypertensive emergency patients, 25 (41.67%) patients had LDL level range 100 – 129 mg/dl, 22 (36.67%) patients had values in the range 130-159mg/dl, followed by 15% patients with LDL values in the range 160 – 189 mg/dl. Only 4 (5%) patients had LDL values lower than 100mg/dl. In contrary, LDL estimation in normotensive patients showed that majority of patients i.e. 46 (76.67%) patients had LDL level at desirable level below 100mg/dl, 11 (18.33%) patients had LDL value in the range 100-129mg/dl, 2 (3.33%) patients had LDL level in the range 130-159mg/dl and 1 (1.67%) patients had LDL level in the range 160 – 189mg/dl.

We also calculated mean \pm SD of serum levels of total cholesterol, triglyceride, LDL and VLDL and found 206.5 \pm 24.71mg/dl, 183.23 \pm 37.12 mg/dl, 133.52 \pm 24.47 mg/dl and 36.43 \pm 7.65 mg/dl respectively in hypertensive

emergency cases, while in normotensive patients, they were 149.72 ± 29.63 mg/dl, 108.33 ± 32.03 mg/dl, 83.92 ± 27.24 mg/dl and 21.55 ± 6.46 mg/dl respectively, which were significantly higher in hypertensive emergency patients ($p < 0.0001$). The serum HDL was significantly lower ($p < 0.001$) in hypertensive emergency patients (35.53 ± 5.36 mg/dl) than in normotensive patients (44.51 ± 8.50 mg/dl). We also made an attempt to determine the correlation between fasting lipid profile and systolic blood pressure (SBP) of patients in hypertensive emergency group and found that among lipid profile, total cholesterol and LDL showed a significant positive correlation with systolic blood pressure with r value as $r = 0.31$, $p = 0.01$ and $r = 0.34$, $p = 0.01$ respectively. HDL showed significant negative moderate correlation with systolic blood pressure ($r = -0.35$, $p = 0.003$). Triglyceride and VLDL had positive correlation with systolic blood pressure which was not significant ($p = 0.16$). Our study is near similar to a case control study conducted by Sarwar MS et al¹⁰. (2014) who also found that serum total cholesterol (TC), triglyceride (TG), LDL, VLDL, TC/HDL, LDL/HDL were significantly higher ($p < 0.05$) whereas the level of HDL cholesterol was significantly lower in hypertensive patients as compared to control subjects ($p < 0.05$) and also Adamu UG et al¹¹ also found similar result.

Limitations

1. The duration of hypertension in different patients was not taken into account. This could have changed the extent of end organ damage.
2. Sample size was small and the study was done in a single centre. So the study population may not be adequately represented. Moreover, less number of patients visited the hospital due to ongoing COVID 19 pandemic crisis.
3. Correlation of lipid profile with diastolic blood pressure was not determined.
4. Dietary history was not taken in our study.

Conclusion:-

In our study, which included 60 hypertensive emergency patients, it was found that majority of patients presenting in hypertensive emergency belonged to elderly age group i.e. 5th and 6th decade. Males outnumbered females in our study. Acute intracerebral haemorrhage was the commonest form of target organ damage encountered in our study. Presence of dyslipidemia increases the chance of developing hypertensive emergencies. There is a need to increase the awareness for early detection and treatment of these two conditions to reduce further morbidity and mortality.

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