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A cross sectional comparative study of clinical features, electrocardiography, and echocardiographic features in hypertensive patients with and without medication in a tertiary care hospital.

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List of Abbreviations:

1. ACEIs-Angiotensin converting enzyme inhibitors.
2. ARBs-Angiotensin receptor blockers
3. BMI-Body Mass Index
4. CAD-coronary artery disease
5. CCBs-Calcium channel blockers
6. CCF-Congestive Cardiac Failure
7. CV events-Cardiovascular events
8. CVD-cardiovascular disease
9. CVS-Cardiovascular System
10. DBP-Diastolic Blood Pressure
11. DM-Diabetes Mellitus
12. ECG-Electrocardiography
13. ECHO-Echocardiography
14. FBS-Fasting Blood Sugar
15. HTN-Hypertension
16. HTN-Hypertension
17. IHD-ischemic heart disease
18. ISH-Isolated Systolic Hypertension
19. LAD-Left atrial dilatation
20. LVD-Left ventricular dysfunction.
21. LVH-Left ventricular hypertrophy.
22. MI-Myocardial Infarction
23. PPBS-Post Prandial Blood Sugar
24. PP-Pulse Pressure
25. PVD-Peripheral vascular disease
26. RAS-Renin Angiotensin System
27. SAM-Systolic Anterior Motion
28. SBP-Systolic blood pressure
29. TIA-Transient Ischemic Attack
30. WBC Casts-White Blood Cell Casts

Abstract:

Background: Hypertension can lead to ischaemic heart disease, stroke, peripheral vascular disease, stroke, heart failure, arrhythmia especially atrial fibrillation. Hypertension is major health problem affecting the public globally. Diagnosis is delayed because it is asymptomatic most of the time. Antihypertensive medications also protective against progression of diastolic dysfunction. Lowering blood pressure improves diastolic dysfunction irrespective of type of antihypertensive agent used. Antihypertensive like ACEIs, ARBs, diuretics, CCBs, beta blockers are used for long term therapy in combination or alone. This study is being

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

undertaken to determine clinical features in hypertensive patients with and without medication and to correlate electrocardiographic and echocardiographic features in hypertensive patients with and without medication.

Methods: This cross-sectional comparative study was conducted from January 2020 to June 2021 over a period of 18 months. It included 100 hypertensive patients, out of which 50 patients were on medication and 50 were without medication. The study was approved by the institutional ethical committee, tertiary care centre, Bangalore, India. Patient who fulfilled the inclusion and exclusion criteria were enrolled in the study. A detailed history and clinical examination were carried out in all the subjects who gave informed consent to participate in the study and necessary investigations were recorded.

Results: Majority of the patients in Hypertension with medication group was found to have Giddiness about 56% of them, followed by Fatigue in 48%. In Hypertension without medication group there was Giddiness in 82% of them, followed by Fatigue in 58%. Significant difference was observed in clinical features such as Giddiness, Angina, Palpitation and Sweating between two groups. On ECG, in Hypertension with medication group, 62% had normal ECG, 26% had LVH, 24% had ST-T Changes and 4% had pathological Q waves. In Hypertension without Medication group, 28% had normal ECG, 56% had LVH, 50% had ST-T Changes and 16% had Q waves. There was significant difference in all the ECG Findings between two groups. On ECHO, in Hypertension with medication group, 78% had Concentric LVH, 26% had LVD, 38% had mitral regurgitation, 10% had Pulmonary hypertension, 4% had Regional Wall Motion Abnormality, 18% had Aortic Valve Sclerosis, 14% had Left Atrial Dilatation, 26% had Tricuspid Regurgitation. In Hypertension without medication group, 92% had Concentric LVH, 48% had LVD, 80% had mitral regurgitation, 26% had Pulmonary hypertension, 22% had Regional Wall Motion Abnormality, 36% had Aortic Valve Sclerosis, 36% had Left Atrial Dilatation and 70% had Tricuspid Regurgitation.

Conclusion: From the study it can be concluded that Hypertensives on regular treatment had lower incidence of Cardiac abnormalities as compared to Hypertensives without treatment or on irregular treatment who had higher incidence of Cardiac changes on Clinical examination, Electrocardiography and Echocardiography.

Keywords: Hypertension, Clinical features, Electrocardiography, Echocardiography.

Introduction: Hypertension can lead to ischaemic heart disease, stroke, peripheral vascular disease, stroke, heart failure, arrhythmia especially atrial fibrillation. Hypertension is major health problem affecting the public globally. Diagnosis is delayed because it is asymptomatic most of the time. Left ventricular workload in hypertension is increased which causes left ventricular hypertrophy. LVH increases risk of ventricular arrhythmia and sudden cardiac death [1]. Early initiation of antihypertensive drugs, aggressive BP control is important to prevent irreversible LVH and decreases mortality from cardiovascular disease [2]. Antihypertensive medications also protect against diastolic dysfunction progression. Regardless of the type of antihypertensive medication employed, lowering blood pressure

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

improves diastolic dysfunction [3]. Antihypertensive like ACEIs, ARBs, diuretics, CCBs, beta blockers are used for long term therapy in combination or alone [4]. ACE inhibitors improve systolic and diastolic function while lowering the frequency and severity of heart failure. When hypertension is diagnosed in middle age (generally 30-50 years), the diastolic pressure pattern is frequently high, with normal or elevated systolic pressure [5]. Most hypertension patients are either undertreated or untreated. There is a linear rise in mortality from stroke and CAD from BP levels as low as SBP 115 mmHg and DBP 75 mmHg upward, according to observational studies including more than 1 million people [6]. According to the Framingham Heart Study, blood pressure readings of 130–139/85–89 mmHg are associated with a two-fold increase in cardiovascular disease risk [7].

Hypertension is easily identifiable condition which affects about one billion people all over the world and is controllable with proper follow-up and treatment. Hypertension may lead to heart failure, stroke, MI, arrhythmias, aortic dissection and PVD. The global burden of hypertension is rising to affect 1.5 billion people, about one third of the world's population by the year 2025 due to aging and increasing incidence of obesity. High blood pressure causes about 54% of stroke and 47% of ischemic heart disease worldwide [8]. Half of this disease burden is in people with hypertension; the other half is in people with pre-hypertension.

Most patients with hypertension have no symptoms associated with their high blood pressure and are only diagnosed by physical examination. When symptoms prompt a visit to the doctor, they fall into one of the following categories: 1) The elevated blood pressure itself, 2) The hypertensive vascular disease, 3) The underlying disease in secondary hypertension. Though popularly considered a symptom of elevated arterial pressure, headache is characteristic of only severe hypertension; Such headaches are localised to the occipital region and present when the patient awakens in the morning but decreases spontaneously after few hours. Dizziness, easy fatigability, palpitation, and impotence are some of the other symptoms associated with high blood pressure. Haematuria, epistaxis, blurring of vision due to retinal abnormalities, bouts of weakness or disorientation due to transitory cerebral ischemia, angina pectoris, and dyspnoea due to heart failure are all symptoms of vascular disease. Chest Pain from an aortic dissection or leaky aneurysm is a rare presenting symptom. Secondary hypertension and polyuria, polydipsia and muscle weakness or weight gain, and emotional lability in patients with Cushing’s syndrome are all symptoms of the underlying condition. The patient with a Pheochromocytoma may present with episodic headache, diaphoresis, palpitation, and postural dizziness. Adverse effects of hypertension principally involve the major systems like the cardiovascular system, central nervous system, retina, and the kidneys; also called as target organ damage.

Isolated Systolic Hypertension (ISH) is a major public health concern among the elderly [9]. LVH whether diagnosed by ECG, Echocardiography or Chest X-ray is an ominous manifestation of uncontrolled hypertension and carries a serious prognosis as myocardial infarction. Most of studies suggest that LVH is associated with reduced coronary flow reserve [10,11]. In the elderly, the prevention of congestive heart failure and progression from less severe hypertension is likely more important than in younger people. Acute myocardial infarction (AMI) kills fewer people than strokes. As a result, there are more survivors who

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

are at risk of developing congestive heart failure. Hospitalizations for congestive heart failure are increasing dramatically [12]. According to the Framingham Heart Study, hypertension is a primary contributor to the development of congestive heart failure38. An analysis of large systolic hypertension studies in the elderly found that treatment for a relatively short length of time resulted in a highly statistically significant reduction (48%) in the occurrence of congestive heart failure [13].

In Systolic hypertension in the Elderly Program (SHEP) intervention trial, active antihypertensive therapy was associated with 36% incidence of stroke [14]. Among Japanese American men in Honolulu Heart Program, older age elevated SBP, increased glucose, smoking, LVH by ECG and history of CHD were significantly associated with increased thromboembolic stroke risk [15]. Hypertension was the most important risk factor for intracerebral haemorrhage risk in a case-control analysis from the Melbourne risk factor study [16]. In SHEP there was a 25% reduction in the incidence of TIA with anti-hypertensive therapy. In a subset of Syst-Eur Trial, the vascular dementia project, anti-hypertensive therapy was found to be lower than the incidence of dementia compared with placebo.

Benign arteriolar nephrosclerosis is seen in elderly patients who have been hypertensive for a long time but have not progressed to a malignant form of hypertension. Patients in this age group are frequently discovered to be hypertensive on routine physical examination due to non-specific symptomatology. Vascular retinopathy is linked to high blood pressure as well as significant degeneration of the retinal arteries. The retinal arterioles' major response to systemic hypertension is narrowing. The degree of constriction on the other hand is determined by the quantity of pre-existing replacement fibrosis (involution sclerosis). The fundus picture of hypertensive retinopathy is characterized by; 1) Vasoconstriction, 2) Leakage, c) Arteriosclerosis. Funduscopic findings provide one of the best indications of the duration of hypertension and of prognosis.

Methods: A Cross-sectional, Comparative study was conducted at a tertiary care hospital, Bangalore, India from January 2020 to June 2021 over a period of 18 months. A total of 100 patients were enrolled in the study after satisfying the inclusion and exclusion criteria. Out of 100 hypertensive patients, 50 patients were with medication and 50 were without medication. Inclusion criteria: 1) All hypertensive patients both outpatient and inpatient attending in the tertiary care hospital. Exclusion criteria: 1) Pregnancy, 2) Patients not giving consent to participate in study.

Methodology: The study was approved by the institutional ethical committee. A detailed history and clinical examination were carried out in all the subjects who gave written informed consent to participate in the study and necessary investigations were recorded. Blood Pressure Measurement: The following technique were adopted; 1) Patients were seated in a chair or lying in bed, 2) Measurement of BP only after 5 minutes of rest. 3) Appropriate cuff size was used to ensure accurate measurement. The bladder within the cuff encircled at least 80% of the arm circumference, 4) The measurement of BP was taken with a mercury sphygmomanometer, 5) Both systolic and diastolic blood pressure was recorded. The appearance of sound (Phase I) was used to define SBP. The disappearance of

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

sound (Phase V) was used to define DBP. Pulse pressure was calculated as SBP – DBP, 6) Hypertension was defined as per JNC 8 criteria (Table 1).

Table 1: JNC 8 criteria for hypertension:

CLASSIFICATION	SYSTOLIC BP (mmHg)	DIASTOLIC BP (mmHg)
Normal BP	<120	<80
Prehypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	≥160	≥100

The following investigations were conducted on all these patients: 1) Fasting Blood Sugar (FBS) and Post Prandial Blood Sugar (PPBS), 2) Electrocardiogram (ECG) in all leads, 3) Echocardiogram (2D ECHO, Trans thoracic), 4) Lipid profile, 5) Fundus Examination.

Statistical analysis: Data was entered into Microsoft excel data sheet and was analysed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data was represented as mean and standard deviation. Data was also Graphically represented using bar diagram and column diagram. Chi-square test was used as test of significance to test difference between two proportions. Independent t test was used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively. P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data.

Sample size estimation:

$$n = \frac{2(Z\alpha + Z\beta)^2 \sigma^2}{d^2}$$

$$= \frac{2(7.84)\ 15.4}{(147.7-134.9)^2} = 22.69 \sim 50 \text{ in each group}$$

[Z α=95% CI – 1.96, Z β =80%power- 0.84, σ= standard deviation, d=expected difference between two means (n= 50) in each group] [73].

Results: In HTN with medications group, majority of subjects were in the age group 61 to 70 years (32%) and in HTN without medications, majority of them were in the age group 51 to 60 years (30%). There was no significant difference in age distribution between two groups. Mean Age in HTN with medication Group was 56.52 ± 12.94 and in HTN without medication Group was 62.22 ± 13.09. There was no significant difference in mean Age

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

comparison between two groups. In HTN with medications group 28 (56%) were male, 22 (44%) were female, where as in HTN without medications group both males and female were 25 (50%) each. There was no significant difference in gender distribution between two groups. In HTN with medications group, majority of them had duration of HTN for <5 year and 5 to 10 years. In HTN without medications group, majority of them had duration of HTN for <5 years. There was significant difference in duration of HTN between two groups.

Mean Systolic Blood Pressure (SBP) in HTN with medication Group was 145.04 ± 17.79 and in HTN without medication Group was 160.02 ± 26.96. There was a significant difference in mean SBP in comparison between two groups. Mean Diastolic Blood Pressure (DBP) in HTN with medication Group was 88.36 ± 12.44 and in HTN without medication Group was 100.88 ± 17.34. There was a significant difference in mean DBP in comparison between two groups [Table 2].

There was significant difference in Asymptomatic, Giddiness, Angina, Palpitation and Sweating distribution between two groups. There was no significant difference in Headache, Fatigue, Syncope, Dyspnea, Swelling of limbs, Loss of Conscious and Focal Neurological Deficit distribution between two groups [Table 3].

There was a significant difference in Hyperdynamic Apex and Basal crepitation distribution between two groups. There was no significant difference in Raised Jugular Venous Pressure, Ejection systolic murmur, Systolic murmur in mitral area, Loud second Heart Sound (S2) in Pulmonary area, Pedal oedema, third and fourth heart sounds (S3/S4), Right sided hemiparesis, and left sided hemiparesis distribution between two groups [Table 4].

In HTN with medication group, Fasting blood sugar (FBS) was <126 mg/dl in 74%, 126 to 200 mg/dl in 26% and In HTN without medications group, FBS was <126 mg/dl in 66%, 126 to 200 mg/dl in 34%. There was no significant difference in FBS between two groups. In HTN with medication group, PPBS was <200 mg/dl in 80% and >200mg/dl in 20% and In HTN without medications group, was <200 mg/dl in 72% and >200mg/dl in 28% and There was no significant difference in PPBS between two groups [Table 5].

There was significant difference in HDL levels between two groups. HDL levels were low in non-medicated group. There was no significant difference in Total cholesterol, Triglycerides, LDL between two groups [Table 6].

Table 2: Mean Systolic and Diastolic Blood Pressure Comparison between two groups:

Parameter:	Group				P value
	HTN with medication		HTN without medication		
	Mean	SD	Mean	SD	
Systolic Blood Pressure	145.04	17.79	160.02	26.96	0.001*
Diastolic Blood Pressure	83.36	12.44	100.88	17.34	<0.001*

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

[HTN = Hypertension, SD = Standard deviation]

Table 3: Clinical symptoms distribution between two groups:

Clinical symptom:	Group				P value
	HTN with medication		HTN without medication		
	Frequency	Percent	Frequency	Percent	
Asymptomatic	14	28.00%	5	10.00%	0.022*
Headache	14	28.00%	23	46.00%	0.062
Giddiness	28	56.00%	41	82.00%	0.005*
Fatigue	24	48.00%	29	58.00%	0.316
Syncope	8	16.00%	14	28.00%	0.148
Angina	6	12.00%	15	30.00%	0.027*
Dyspnea	4	8.00%	9	18.00%	0.137
Swelling of limbs	1	2.00%	5	10.00%	0.092
Palpitation	4	8.00%	12	24.00%	0.029*
Loss of Conscious	4	8.00%	5	10.00%	0.727
Focal Neurological Deficit	4	8.00%	9	18.00%	0.137
Sweating	5	10.00%	15	30.00%	0.012*

[HTN = Hypertension]

Table 4: Clinical Examination Findings Distribution between two groups.

Clinical Sign:	Group				P value
	HTN with medication		HTN without medication		
	Frequency	Percent	Frequency	Percent	
Raised Jugular Venous Pressure	2	4.00%	7	14.00%	0.081
Hyperdynamic Apex	4	8.00%	15	30.00%	0.005*
Ejection systolic murmur	4	8.00%	11	22.00%	0.05

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Systolic murmur in mitral area	4	8.00%	11	22.00%	0.05
Loud 2nd Heart Sound (Pulmonary area)	2	4.00%	7	14.00%	0.081
Basal crepitation	2	4.00%	8	16.00%	0.046*
Pedal oedema	2	4.00%	6	12.00%	0.14
S3/S4	1	2.00%	6	12.00%	0.05
Right Sided Hemiparesis	4	8.00%	8	16.00%	0.232
Left Sided Hemiparesis	0	0.00%	1	2.00%	0.32

Table 5: Fasting blood sugar (FBS) and post prandial blood sugar (PPBS) distribution between two groups.

Blood Sugar levels (mg/dl)		Group				P value
		HTN with medications		HTN without medications		
		Frequency	Percent	Frequency	Percent	
FBS	<126 mg/dl	37	74.0%	33	66.0%	0.383
	126 to 200 mg/dl	13	26.0%	17	34.0%	
	>200 mg/dl	0	0.0%	0	0.0%	
PPBS	<200 mg/dl	40	80.0%	36	72.0%	0.349
	>200 mg/dl	10	20.0%	14	28.0%	

Table 6: Lipid Profile comparison between two groups.

Parameter (mg/dl):		Group				P value
		HTN with medications		HTN without medications		
		Frequency	Percent	Frequency	Percent	
Total Cholesterol	<200 mg/dl	39	78.0%	31	62.0%	0.093
	200 to 239 mg/dl	8	16.0%	9	18.0%	
	>240 mg/dl	3	6.0%	10	20.0%	
	<150 mg/dl	39	78.0%	29	58.0%	0.093

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Triglycerides	150 to 199 mg/dl	1	2.0%	3	6.0%	
	200 to 499 mg/dl	10	20.0%	18	36.0%	
LDL	<100 mg/dl	38	76.0%	27	54.0%	0.107
	100 to 129 mg/dl	4	8.0%	3	6.0%	
	130 to 159 mg/dl	2	4.0%	8	16.0%	
	160 to 189 mg/dl	4	8.0%	8	16.0%	
	>190 mg/dl	2	4.0%	4	8.0%	
HDL	>60 mg/dl	0	0.0%	2	4.0%	0.044*
	40 to 60 mg/dl	43	86.0%	33	66.0%	
	<40 mg/dl	7	14.0%	15	30.0%	

About 62% of the patients had Electrocardiography (ECG) within normal limits in HTN with medication Group and 28% of them had ECG within normal limits in HTN without medication Group. There was a significant difference in ECG within normal limits distribution between two groups. About 26% had Left Ventricular Hypertrophy (LVH) changes on ECG as per criteria: {a) Sum of the S-wave in lead V1 and R-wave in lead V6 should not exceed 35 mm normally. If it does, it constitutes presumptive evidence of LVH or b) S-wave in V1 is 20 mm or more in depth or c) R-wave in Lead I is 20 mm or more in height, or in V6 >25 mm or d) R-wave in V6 equals or exceeds the R-wave in V5 or e) Total QRS voltage in all 12 leads is less than 175 mm in normal. Values greater than 175 mm constitute a good criterion of LVH. [25]}. in HTN with medication Group and 56% in HTN without medication Group. There was a significant difference in LVH distribution between two groups. 24% had ST-T Changes in ECG in HTN with medication Group and 50% in HTN without medication Group. There was a significant difference in ST-T Changes in ECG distribution between two groups. About 4% had pathological Q Waves in ECG in HTN with medication Group and 16% in HTN without medication Group. There was a significant difference in pathological Q Waves in ECG distribution between two groups [Table 7].

There was no significant difference Hypertensive retinopathy distribution between two groups [Table 8]. There was a significant difference in Echocardiography (ECHO) within normal limits, Left Ventricular Dysfunction, Sclerosed aortic valve, Mitral Regurgitation, Regional Wall Motion Abnormality, Left Atrial Dilatation, Tricuspid Regurgitation and Pulmonary Hypertension distribution between two groups. There was no significant difference in Concentric Hypertrophy, Aortic Valve Calcified, Left Ventricular Dilatation, Right Atrial Dilatation, Right Ventricular Dilatation, Mitral Stenosis, Aortic Stenosis, Trivial Aortic Regurgitation and Ejection Fraction distribution between two groups [Table 9].

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Table 7: ECG Findings distribution between two groups.

ECG Changes:	Group				P value
	HTN with medication		HTN without medication		
	Frequency	Percent	Frequency	Percent	
ECG within normal limits	31	62.00%	14	28.00%	0.001*
Left Ventricular Hypertrophy	13	26.00%	28	56.00%	0.002*
ST-T Changes in ECG	12	24.00%	25	50.00%	0.007*
Pathological Q Waves in ECG	2	4.00%	8	16.00%	0.046*

Table 8: Fundus Findings Distribution between two groups.

Fundus Examination:		Group				P value
		HTN with medication		HTN without medication		
		Frequency	Percent	Frequency	Percent	
HTN Retinopathy	Nil	39	78.0%	32	64.0%	0.08
	Grade 1	11	22.0%	14	28.0%	
	Grade 2	0	0.0%	4	8.0%	

Table 9: Echocardiography (ECHO) Findings distribution between two groups.

ECHO Finding:	Group				P value
	HTN with medication		HTN without medication		
	Frequency	Percent	Frequency	Percent	
ECHO with Normal Limits	9	18.00%	0	0.00%	0.002*
Left Ventricular Dysfunction	13	26.00%	24	48.00%	0.023*

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Regional Wall Motion Abnormality		2	4.00%	11	22.00%	0.007*
Concentric Hypertrophy		39	78.00%	46	92.00%	0.05
Aortic Valve Sclerosed		9	18.00%	18	36.00%	0.043*
Aortic Valve Calcified		3	6.00%	8	16.00%	0.11
Left Atrial Dilatation		7	14.00%	18	36.00%	0.011*
Left Ventricular Dilatation		3	6.00%	8	16.00%	0.11
Right Atrial Dilatation		1	2.00%	2	4.00%	0.558
Right Ventricular Dilatation		3	6.00%	4	8.00%	0.695
Mitral Regurgitation		19	38.00%	40	80.00%	< 0.001*
Mitral Stenosis		5	10.00%	8	16.00%	0.372
Tricuspid Regurgitation		13	26.00%	35	70.00%	< 0.001*
Aortic Stenosis		1	2.00%	5	10.00%	0.092
Pulmonary Hypertension		5	10.00%	13	26.00%	0.037*
Trivial Aortic Regurgitation		13	26.00%	21	42.00%	0.091
Ejection Fraction (EF)	<40%	0	0.0%	4	8.0%	0.074
	40 to 50%	6	12.0%	9	18.0%	
	>50%	44	88.0%	37	74.0%	
Ejection Fraction (Mean ± SD)		56.42 ± 4.26		54.4 ± 7.61		0.105

Discussion: Hypertension is a serious public health issue. It is a significant, although modifiable factor in the onset of cardiovascular disease. Controlling hypertension reduces the risk of stroke, coronary artery disease, congestive heart failure, end-stage renal disease, peripheral vascular disease, and overall mortality, according to randomized controlled trials. Starting at a blood pressure of 115/75 mm Hg, the chance of acquiring these hypertension-related problems is constant. Despite the inherent health dangers of uncontrolled hypertension, most people have their blood pressure inadequately treated. With the therapy of diastolic hypertension in elderly people, several trials have shown a considerable reduction in morbidity from cardiovascular disease.

In the present study Mean Duration in HTN with Medication Group was 7.3 ± 5.44 and in HTN without Medication Group was 4.1 ± 1.34. There was significant difference in mean Duration comparison between two groups. **Wong SL et al.** in their study observed that mean duration of hypertension was 8.5 ± 6.4 years [17]. In the present study most common clinical feature in medication group was Giddiness (56%), followed by Fatigue (48%). In HTN without medication group was Giddiness (82%), followed by Fatigue (58%). Significant difference was observed in clinical features such as Giddiness, Angina, Palpitation, Focal neurological deficit and sweating between two groups. Symptoms were more in subjects without medication. **Vrinda et al.** study reported 32% of the patients to be symptomatic, and

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

among the symptomatic, headache was the most common presentation (77.97%), however, the age group in this study ranged from 60-65 years [18]. **Alshami A et al.** in their study observed that headache, epistaxis, faintness, psychomotor agitation, chest pain, dyspnea, neurologic deficits, and paresthesia's are the clinical features exhibited in HTN [19]. Sometimes, the patient might complain of epigastric pain and vomiting; therefore, upon investigation, abrupt reflexes of the tendons, and edema of hands, face, or feet can be identified.

Systolic blood pressure is a continuous variable, and its associated risks increases from the lowest to the highest values. This had been shown by the analysis of data from multiple risk factor intervention trial. In the present study Mean Systolic Blood Pressure (SBP) in HTN with medication group was 145.04 ± 17.79 and in HTN without medication Group was 160.02 ± 26.96. Mean Diastolic Blood Pressure (DBP) in HTN with medication Group was 88.36 ± 12.44 and in HTN without medication group was 100.88 ± 17.34. Significant difference was observed in mean SBP and DBP between two groups. In the Systolic hypertension in elderly program (**SHEP**) trial mean blood pressure was 170/77 [20].

In HTN with medication group, 22% had Grade 1 HTN retinopathy and in HTN without medication group, 28% had grade-1 and 8% had grade-2. There was no significant difference on Fundus examination findings between two groups. Increasing severity of hypertension is associated with focal spasm and progressive general narrowing of arterioles as well as the appearance of hemorrhages, exudates, and papilledema. Increasing systolic blood pressure also increases retinopathy along with cardiovascular risks and cerebrovascular risks. **Sandhya Kamath et al.** found Grade II hypertensive retinopathy in 50.5% patients [21].

In HTN with medications group, 22% had Increased Total Cholesterol, 22% had increased Triglycerides, 24% had increased LDL and 14% had decreased HDL and in HTN without medications, 38% had increased Total cholesterol, 42% had increased Triglycerides, 46% had increased LDL and 30% had decreased HDL. Dyslipidemia is as important factor for atherogenesis. Accelerated atherosclerosis is an invariable companion of hypertension. Sandhya Kamath et al. found dyslipidemia in 55.9% [21]. **Kannel W.B. et al**. found out as independent association between hyperlipidemia and hypertension [22]. **Sandhya Kamath et al.** observed increased cardiovascular complications in elderly hypertensives who had dyslipidemia, which is similar to the present study [21], **W. S. Aronow et al.** observed the increased cardiovascular complications in elderly hypertensives who had low HDL cholesterol levels and elevated triglycerides [23] which is similar to the present study.

Coronary heart disease is the major cause of morbidity and mortality in both elderly men and women. Hypertension either systolic/diastolic or isolated systolic hypertension is considered as a major risk factor for coronary heart disease. In HTN With medication group, 62% had normal ECG, 26% had LVH, 24% had ST-T Changes in ECG and 4% Q waves in ECG. In HTN without medication group, 28% had normal ECG, 56% had LVH, 50% had ST-T Changes and 16% had Q waves. There was significant difference in all the ECG Findings between two groups. **Vrinda et al**. found that LVH was the commonest ECG finding in 36.8% of the patients [18]. **Boon D et al**. found prevalence of silent myocardial ischemia in Isolated Systolic Hypertension (ISH) [24].

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

In HTN with medication group, 0% had EF <40%, 12% had EF b/w 40 to 50% and 88% had EF >50%. In HTN without medication group, 8% had EF <40%, 18% had EF between 40 to 50% and 74% had EF >50%. There was no significant difference in Ejection fraction distribution between two groups. In HTN with medication group, 78% had Concentric LVH, 26% had LVD, 38% had mitral regurgitation (MR), 10% had Pulmonary HTN, 4% had Regional Wall Motion Abnormality (RWMA), 18% had Aortic Valve Sclerosed, 14% had Left Atrial Dilation, 26% had Tricuspid Regurgitation (TR). In HTN without medication group, 92% had Concentric LVH, 48% had LVD, 80% had mitral regurgitation, 26% had Pulmonary HTN, 22% had Regional Wall Motion Abnormality, 36% had Aortic Valve Sclerosed, 36% had Left Atrial Dilation and 70% had Tricuspid Regurgitation. **C. Tsioufis et al.** in their study observed that 21% of the 249 had LVH. LVH is reported in nearly 30% untreated hypertensives [25]. **Kanitkar SA et al**. among 76 patients with systolic HTN, 48 patients (63.1%) had diastolic dysfunction, 46 patients (60.5%) had LVH, and 36 patients (47.4%) had systolic dysfunction on 2D echo. Patients with pulse pressure >70 mmHg showed increased incidence of LVH (75.6%) than those with pulse pressure 50-70 mmHg and (46.2%) respectively. There was no significant change in incidence of systolic dysfunction in the two groups [26]. **Doroudi S et al**. in their study among 227 hypertensive patients, aged >60. Overall, 92.5% of the echocardiograms had abnormal findings including but not limited to TR, Diastolic dysfunction, MR, and LVH. There was significant difference between the rate of MR in male and female population [27]. **Devereux RB et al**. in their prospective cohort study among 941 patients aged 55 to 80 years old in the Losartan Intervention for Endpoint Reduction in Hypertension (LIFE) trial with hypertension and electrocardiographic LVH had left ventricular mass measured by echocardiography. 4-year follow-up shows reduction in echocardiographic left ventricular mass index by antihypertensive drug treatment, reduced the incidence of cardiovascular mortality by 38%, stroke by 24%, myocardial infarction by 15% [28]. **Prendergast HM et al.** among 96 African American patients in the database with 2 or more echocardiography findings demonstrating diastolic dysfunction and mean time between echocardiography was 2.6 years. In multivariate analysis use of calcium channel blockers was protective against diastolic dysfunction progression [29].

In our study 8% had right sided hemiparesis in HTN with medication Group and 16% in HTN without medication group. There was no significant difference in right sided hemiparesis distribution between two groups. None had left sided hemiparesis in HTN with medication group and 2% in HTN without medication group. There was no significant difference in left sided hemiparesis distribution between two groups. **Davis BR et al**. reported as 36% reduction in stroke and a 25% reduction in TIA with treatment of ISH on elderly patients over five years [30]. **Sandhya Kamath et al**. reported 21.3% strokes in patients with ISH [21].

Conclusion: From the study it can be concluded that hypertensives on regular treatment had lower incidence of cardiac abnormalities and hypertensive subjects without treatment or on irregular treatment had higher incidence of cardiac changes on clinical examination, ECG and ECHO. Among HTN without medication group, most common Clinical findings was

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

hyperdynamic Apex, most common ECG findings was LVH, and most common ECHO findings was concentric hypertrophy. The study also concludes that regular and adequate treatment of HTN with antihypertensives reduces the incidence of Cardiovascular events.

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Ethics approval and consent to participate: Our case report has been approved by the Institutional Ethics Committee and the consent to participation has been obtained.

Consent for publication: Consent for his/her data, other clinical information consent for publication/reporting in the journal has been obtained for our study. The patient and his/her attenders understand that their names and initials will not be published, and due efforts will be made to conceal their identity. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

Availability of data and materials: The data that support the findings of this study are available from the corresponding author upon reasonable request. Data sharing is not applicable to this article as no new data was created or analyzed in this study. We would like to thank the patients for their co-operation during examination and conduction of the study.

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