Original Research Article

TO STUDY PATIENTS OF SYSTEMIC HYPERTENSION THROUGH A STANDARD RISK FACTOR CHART

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Abstract

Background & Methods: The aim of the study is to study patients of systemic hypertension through a standard risk factor chart. cases of systemic hypertension were screened through standards in the age group of 12-40 years diagnosed to have hypertension, when blood pressure exceeded 140/90 mmHg.

Results: In patients with stage 1 systemic hypertension 54.5 % patients showed abnormal BAFMD (Brachial artery flow mediated dilatation) (<10%), while in patients with stage 2 hypertension 88.2% patients showed abnormal BAFMD (<10%). 41.1 % of patients with stage 2 hypertension showed abnormal BAFMD (< 7.5%), while 6.1 % of patients with stage 1 hypertension showed abnormal BAFMD (< 7.5%).

Conclusion: In our study 66% patients were in stage 1 Hypertension and 34% patients were in stage 2 Hypertension. 33.3% of total male population and 36.3% of total female population had stage-2 hypertension. Study of endothelial dysfunction by flow mediated dilatation of brachial artery by ultrasound Doppler is an easily available test, and may be used while evaluating risk factors for systemic hypertension.

Keywords: systemic, hypertension & risk.

Study Design: cross-sectional prospective study.

1. Introduction

Measurement of endothelial function in patients has recently emerged as a useful tool for atherosclerosis research. In the setting of cardiovascular disease (CVD) risk factors, the endothelium loses its normal regulatory functions[1]. Clinical syndromes such as stable and unstable angina, acute myocardial infarction, claudication, and stroke relate, in part, to a loss of endothelial control of vascular tone, thrombosis, and the composition of the vascular wall. Recent studies have shown that the severity of endothelial dysfunction relates to the risk for an initial or recurrent cardiovascular event. Finally, a growing number of interventions known to reduce cardiovascular risk also improve endothelial function. This work has

prompted speculation that endothelial function serves as a "barometer" for cardiovascular health that can be used for patient care and evaluation of new therapeutic strategies[2].

Arteries consist of three layers: the innermost intima, the media, and the outermost adventitia. The intima is comprised of a single layer of endothelial cells embedded in an extracellular matrix. The internal elastic lamina separates the intima from the media. The media consists of smooth muscle cells, elastic lamina, bundles of collagen fibers, and elastic fibrils, all embedded in an extracellular matrix[3]. The adventitia is the most variable layer, containing dense fibro elastic tissue, nutrient vessels, and nerves.

The actual composition of each of these layers varies with the type of blood vessel. Large, conduit arteries are typically referred to as elastic arteries, because of their high ratio of elastic lamina to smooth muscle cells. Muscular arteries are generally smaller and have a prevalence of smooth muscle cells, whereas arterioles consist of only one to two layers of smooth muscles cells. Capillaries are the smallest vessels, made up of a single layer of endothelial cells that are occasionally opposed to pericytes – smooth muscle-like cells that serve a contractile and synergistic nutritive function[4]. The venous system has a similar architecture to that of the arterial system, the main difference being the orientation and mass of the smooth muscle cells within the wall[5].

Physiologically, the two best understood cell types in the vascular system are the endothelial and vascular smooth muscle cells (VSMCs). The endothelial cells are generally oriented with the direction of blood flow parallel to the main axis of the vessel. Endothelial cells are held together by junctional complexes that regulate permeability and control cell-to-cell communication[6]. The smooth muscle cell is a spindle-shaped cell whose orientation varies with the type of artery, but is generally helical in large, elastic arteries and concentric in muscular arteries. Vascular smooth muscle cells contain three types of filaments: thick (myosin), thin (actin), and intermediate[7].

2. Material and Methods

This study was conducted at Tertiary Care Centre of M.P., on 50 consecutive young cases of systemic hypertension were screened through standards in the age group of 12-40 years diagnosed to have hypertension, when blood pressure exceeded 140/90 mmHg, were taken for further study. Subjects fasted for at least 8 hours before the study and they were studied in a quiet, temperature controlled room. In addition, subjects did not exercise, didn't ingest substances that might affect flow mediated dilatation such as coffee, high fat food, and vitamin C or use tobacco for at least 4 to 6 hour before the study.

Inclusion criteria:
1. Age: 12 to 40 years.
2. Both sexes.
3. Patients with or without antihypertensive therapy.

Exclusion criteria
1. Hypertensive patients age less than 12 yrs and more than 40 yrs.
2. Pregnancy induced hypertension patients.

3. Drug induced hypertension patients.
4. Seriously ill patients.

3. Result

Table No. 1: Distribution of patients of Systemic Hypertension according to BMI:

BMI* (in Kg/m^2)	Male	Females	Total
Underweight (< 18.5)	4(10.25%)	1(9.1%)	5(10%)
Normal (18.5-22.9)	9(23.09%)	2(18.18%)	11(22%)
Over weight (23-24.9)	18(46.15%)	5(45.45%)	23(46%)
Obese class -1 (25-29.9)	8(20.51%)	3(27.27%)	11(22%)
Obese class -2 (≥ 30)	0	0	0
Total	**39**	**11**	**50**

In our study group 22% of patients were obese, and 46% patients were overweight. 20.51% of males and 27.27% of females were obese. 68% of patients were having BMI ≥ 23 Kg /m^2. Mean BMI of all patients was 21.29 ± 2.46 kg/m^2

Table No. 2: Distribution of patients according to blood pressure:

Blood Pressure (mmHg) (According to JNC-VII classification)	Male	Females	Total
Pre-hypertension SBP 120-139 DBP 80-89	0	0	0
Stage 1 HTN SBP 140-159 DBP 90-99	26(66.7%)	7(63.6%)	33(66%)
Stage 2 HTN SBP ≥ 160 DBP ≥ 100	13(33.3%)	4(36.3%)	17(34%)

Total	39	11	50

In our study 66% patients were in stage 1 Hypertension and 34% patients were in stage 2 Hypertension. 33.3% of total male population and 36.3% of total female population had stage-2 hypertension.

Table No.3: Distribution of patients of Systemic Hypertension according to habit of smoking/tobacco chewing/snuffing (N-50)

Habit of smoking	Male	Females	Total
Smoker	17(43.5%)	0 (0%)	17(34%)
Non-smoker	22(56.5%)	11 (100%)	33(66%)
Total	39	11	50

34% patients were smokers; out of them all were males.

Table No. 4: Showing relation of BAFMD* with Blood pressure in patients of Systemic Hypertension (N-50)

Blood Pressure	BAFMD (Brachial artery flow mediated dilatation)			Normal response (FMD $\geq$ 10%)
	Abnormal response			
	FMD < 7.5%	FMD 7.5%-<10	Total (<10%)	
Stage 1 HTN (n=33) SBP 140-159 DBP 90-99	2(6.1%)	16(48.5%)	18(54.5%)	15(45.5%)
Stage 2 HTN (n=17) SBP $\geq$ 160 DBP $\geq$ 100	7(41.1%)	8(47.1%)	15(88.2%)	2(11.8%)

In patients with stage 1 systemic hypertension 54.5 % patients showed abnormal BAFMD (<10%), while in patients with stage 2 hypertension 88.2% patients showed abnormal BAFMD (<10%). 41.1 % of patients with stage 2 hypertension showed abnormal BAFMD (< 7.5%), while 6.1 % of patients with stage 1 hypertension showed abnormal BAFMD (< 7.5%).

4. Discussion

Studied effect of isolated systolic hypertension on endothelial dysfunction and aortic stiffness, also concluded that FMD was lower in older patients as compare to younger patients. So, advanced age is the predictor of impaired endothelial function[8].

Mean Systolic Blood Pressure of patients with normal BAFMD was 152.47±5.89 mm Hg and mean systolic blood pressure with abnormal BAFMD was 157.64±8.11 mm Hg. On statistical analysis with t-test, it was found statistically significant (P value 0.024) [9].

In our study, hypertension is associated with increase prevalence of endothelial dysfunction as well as there is direct relationship between degree of hypertension and endothelial dysfunction[10]. It has also been observed that, higher the blood pressure more is the degree of impaired endothelial function, inverse correlation in between FMD and systolic BP (p<0.01).

In a study, mean systolic blood pressure in patients with abnormal FMD was 146.9 ± 24.2 mm Hg; and mean SBP in patients with normal FMD was 144.2 ± 21.9 mm Hg, which was statistically significant (p-0.002) [11].

Yavuz et al[12] in 2008 studied 30 elderly and 36 younger age subjects free from major cardiovascular risk factors and concluded that endothelial function detected by FMD declines with increasing age in healthy human subjects. People aged 24-39 years also shows that higher the age, more is the endothelial dysfunction.

5. Conclusion

In our study 66% patients were in stage 1 Hypertension and 34% patients were in stage 2 Hypertension. 33.3% of total male population and 36.3% of total female population had stage-2 hypertension. Study of endothelial dysfunction by flow mediated dilatation of brachial artery by ultrasound Doppler is an easily available test, and may be used while evaluating risk factors for systemic hypertension.

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