Section: Physiology

Original Research Article

STUDY OF THE IMPORTANCE OF CLINICAL EXAMINATION, E.C.G, AND LIPID PROFILE ESTIMATION IN YOUNG HYPERTENSIVE SUBJECTS

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ABSTRACT

Background: Hypertension and related co-morbidity is a major health problem in India. The burden of non-communicable disease and expenditure associated with increasing complication related to it is a real problem in developing countries like India. Among all the deaths from non-communicable diseases most common preventable causes are Diabetes and Hypertension which can be prevented by life-style modification, proper screening and early treatment. This study aims to identify the associated co-morbidities in young Hypertensive subjects aged between 20 and 50 years by means of Clinical assessment, Electrocardiography and Biochemical assessment. Aim and objectives: To assess the co-morbidities and find out the role of modifiable risk factors of hypertension like obesity, addiction liability, improper food habit, and physical inactivity in this age group is one of the objectives of the present study. **Materials and Methods:** The study was Analytical Cross-Sectional Epidemiological Study conducted at Calcutta Medical College, Kolkata, West Bengal at the department of Physiology on study population of 100 hypertensive patients aged between 20 years and 50 years without any emergency or sought for any urgent intervention. Approval was obtained from Institutional Ethics Committee were included in this study after obtaining consent for study from subjects, general survey, height, weight, Waist Circumference (WC), hip circumference (HC), Blood Pressure (BP), heart rate (HR) were examined along with the clinical examination. For every patient, random CBG was estimated. Lipid profile estimation was done at the Biochemistry department.12 lead ECG was performed for every subject. Microsoft Excel soft-ware and the tabulated data imported to SPSS 20 soft-ware for statistical analysis. Descriptive and cross table analysis with Pearson's Chi-square test done for categorical variables, whereas Descriptive and one way ANOVA were done with continuous variables. **Results:** Most young hypertensives have positive family history and there were no definite presenting symptoms, rather hypertension is an incidental finding in them. Most addicted with early age of initiation, and tobacco is the most common substance of abuse. They are with normal Body Mass Index (BMI) with increased Waist Hip Ratio (WHR). Biochemical abnormalities depicted increased fasting capillary blood glucose, total cholesterol and triglyceride with increasing age, sedentary life-style, and duration of disease. But HDL-Cholesterol level is lower in females than the male subjects in this study and LDL-Cholesterol had significant association with duration of disease only. There is statistically significant increase in Triglyceride level with increasing age, and LDL-Cholesterol level with increased duration of disease. Small number of ECG abnormality reflects that Left Ventricular Hypertrophy (LVH) and Ischemia are the most common abnormal finding, but there were few cases of Ventricular Premature Contractions (VPC) and Axis deviation.

INTRODUCTION

It is well known that hypertension is an isolated risk factor for Cardiovascular and Cerebro-vascular cause of premature deaths in our country. Associated co-morbidities like Diabetes, Dyslipidemia, Obesity, Ventricular hypertrophy, Myocardial Ischemia, etc. give an extra edge to it. Addiction, improper food habit and physical inactivity also increase the risk of obesity, diabetes, dyslipidemia and hypertension. The nicotine concentration in the tobacco of bidi (21.2 mg/g) was significantly greater than the

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tobacco from the commercial filtered (16.3 mg/g) and unfiltered cigarettes (13.5 mg/g).[1,2] Alcohol too has significant role in causation of hypertension.[4] Obesity is also considered as a potential risk factor for hypertension associated co-morbidity. It is well established fact that Metabolic Syndrome is associated with BMI >23.5 Kg/m2 in South East Asian Regional (SEAR) countries and waist circumference >88 cm in females and >102 cm in males with WHR >0.9 in both sexes and is potentially dangerous.[10,8] A low 1, 25-(OH)2-Cholecalciferol and osteoporosis may be associated with hypertension.[12] Hypertensive patients are known to have higher body mass index (BMI), triglyceride level, and insulin resistance compared with normotensive subjects. Although diabetes mellitus is associated with a considerably increased cardiovascular risk, the presence of hypertension in the diabetic individual markedly increases morbidity and mortality. Despite the critical importance of the coexistence of these two diseases, much information regarding their interaction remains unclear and controversial. Nevertheless, much information of theoretical and practical relevance is available, and there is considerable ongoing research exploring the relationship between carbohydrate intolerance and hypertension. It is well appreciated both that coexisting hypertension exacerbates diabetic nephropathy and that diabetic nephropathy somehow results in a markedly increased risk of hypertension.[14] ECG changes related to cardiac co-morbidity associated with hypertension are dependent on degree and duration of hypertension, the ventricular hypertrophy or ischemic stress are two most common presenting features. The principal electrocardiogram (ECG) changes associated with ventricular hypertrophy are increases in QRS amplitude and duration, changes in instantaneous and mean QRS vectors, abnormalities in the ST segment and T waves, and abnormalities in the P wave. A dietary approach to control hypertension with life-style modification by means of increased physical activity significantly reduces the co-morbidity and increases survival. DASH diet was more effective in substantially reducing systolic and diastolic blood pressures, both in people with hypertension and in those without hypertension.[1819] Adherence to treatment increases the survival and reduces cardiovascular morbidity among population aged 35-60 years and the adherence improves with multidrug therapy than mono-therapy though outcome with adherence is better in mono-therapy.[20]

Aims & Objectives

Most of the studies related to hypertension restricted either in the domain of prevalence study or done for older age group as the prevalence increases with the age, but onset of disease in early age increases complications related to co-morbidities. So, to assess the co-morbidities in younger age group between 20 and 50 years and find out the role of modifiable risk factors of hypertension like obesity, addiction liability, improper food habit, and physical inactivity in them is one of the objectives of the present study. Diabetes, Dyslipidemia, Cardiovascular co-morbidities are common lethal conditions associated with hypertension, and these can be determined by testing blood samples in Bio-Chemistry laboratory and doing Electrocardiogram of a subject with hypertension. So, this study aims to perform standardized testing of blood sample from NABL accredited laboratories, and Electrocardiogram with a same machine using globally accepted and standardized criteria for interpretation of cardiovascular co-morbidity.

Specific objectives of this study

1. Examination of young hypertensives to find out important clinical findings.
2. To determine the ECG changes, Dyslipidemia and Diabetes in young Hypertensive subjects if any.
3. To find out contribution of different risk factors

MATERIALS AND METHODS

Place of study: Medical College, Kolkata, West Bengal

Study area

1. Patients attending General OPD of Medical College, Kolkata
2. Department of Physiology, Medical College, Kolkata
3. Department of Biochemistry, Medical College, Kolkata
4. Department of Radiology, Medical College, Kolkata

Study period: January 2014 to April 2015.

Sample size: Determined by applying the formula 4pq/E2

Where p=Prevalence, (21% in India at Present) =0.21 q=1-p=0.79

E=Allowable Error (i.e. 10% in this study) =0.1 So, Sample Size n=4x0.21x0.79/0.01=66.36

Study Population: Hypertensives aged between 20 years and 50 years with the aforementioned criteria who gave consent were assessed. To avoid bias 100 patients will be taken for study.

Inclusion and Exclusion Criteria

Inclusion Criteria

1. Cases of Hypertension (Systolic Blood Pressure 140 mm of Hg or more and/or Diastolic Blood Pressure 90 mm of Hg or more).
2. Age between 20 years and 50 years.
3. Both male and female cases.
4. Persons attending General OPD with hypertension willingly giving consent for the study
5. Cases without any emergency or sought for any urgent intervention.

Exclusion Criteria

1. Cases with h/o CVA, AMI or Nephropathy.

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2. Cases with known cause of secondary hypertension.
3. Cases with symptoms and signs of heart failure.
4. Cases with significant co-morbidities affecting E.C.G or Lipid Profile eg: Heart block, Arrhythmia, Established Congenital Lipid Disorder
5. Patients with Known Chronic Infective Diseases, eg Tuberculosis

Study design: Analytical Cross-Sectional Epidemiological Study

Approval was obtained from the Institutional Ethics Committee of Medical College, Kolkata, Memo No: MC/Kol/IEC/106/11-2013 Dated: 30.11.2013. The first researcher was vaccinated against hepatitis B. Availability of post-exposure prophylaxis (PEP) against Hepatitis B and HIV was ensured. PEP against HIV and Hepatitis B was available at the School of Tropical Medicine, Kolkata.

Data collection

After obtaining consent for study from persons attending Medicine and General OPD of Medical College, Kolkata, were examined for blood pressure to be more or equal to 140 systolic and 90 diastolic between the proposed age group, and subsequently filling up of questionnaire and clinical examination i.e. subject particulars, general survey, height, weight, Waist Circumference (WC), hip circumference (HC), Blood Pressure (BP), heart rate (HR), Random CBG and E.C.G. done on the first day. Date and time for lipid profile estimation and estimation of FCBG were informed on the same day to the subject. Delivery of blood reports to the study population and necessary advice, health education and counseling were given on the spot. Data collection period continued for 11 months.

RESULTS

Table 1: Distribution of the study subjects according to age. (n=100)

Age group	Frequency	Percentage
20-29 Years	21	21.0%
30-39 Years	37	37.0%
40 Years or more	42	42.0%

Table 2: Distribution of the study subjects according to sex. (n=100)

Sex	Frequency	Percentage
Male	**71**	**71.0%**
Female	**29**	**29.0%**

Table 3: Table of continuous variable data of study population. (n=100)

Continuous Variables	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Age	30	20	50	37.06	0.89	8.87
Height	41	141	182	160.89	0.83	8.29
Weight	59	38	97	62.76	1.18	11.82
Body Mass Index	19.37	16.23	35.60	24.22	0.41	4.06
Hip Circumference	48	70	118	92.29	1.01	10.10
Waist Circumference	48	72	120	90.68	1.10	10.95
Waist Hip Ratio	0.25	0.79	1.04	0.93	0	0.04
Systolic Blood Pressure	104	110	214	144.08	1.49	14.92
Diastolic Blood Pressure	60	70	130	92.20	0.83	8.29
Mean Blood Pressure	69.33	88.67	158	109.57	0.89	8.86
Pulse	52	56	108	79.43	1.16	11.6
Total Cholesterol	204	98	302	174.26	4.54	45.43
Triglyceride	325	100	425	198.55	7.91	79.12
HDL-Cholesterol	31	29	60	40.06	.691	6.91
Random CBG	158	80	238	105.64	2.21	22.12
Fasting CBG	125	64	189	97.65	1.62	16.20
QRS Axis	180	-30	150	33.32	3.09	30.85

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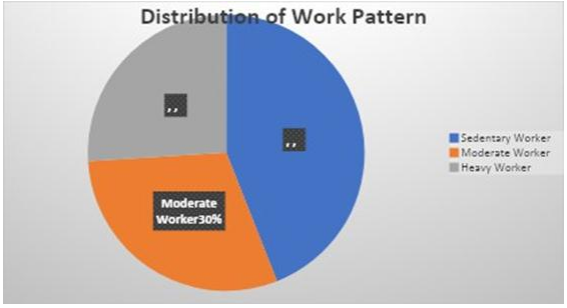

Figure 1: Distribution of work pattern

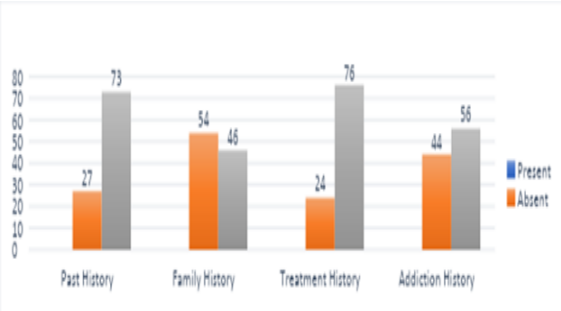

Figure 2: Distribution of the study subjects according to Past History, Family History, Treatment History, and Addiction History. (n=100)

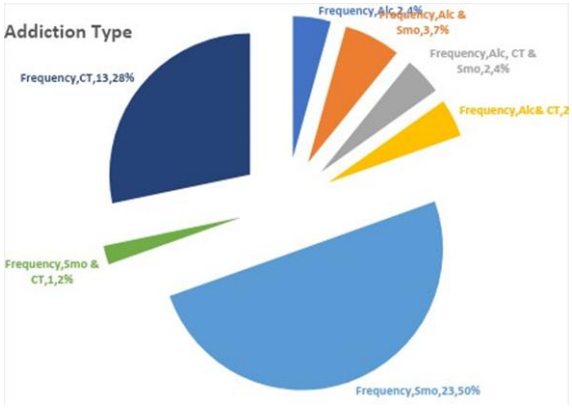

Figure 3: Addiction type

Table 4: Tables of Biochemistry report of the study population

Biochemistry Report	Total Cholesterol (>150 mg/dl as abnormal/High)		Triglyceride (>150 mg/dl as abnormal/High)		HDL-Cholesterol (<40 mg/dl as abnormal/Low)		Fasting CBG (>100 mg/dl as abnormal/IFG)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Abnormal	63	63.0 %	69	69.0%	51	51.0%	34	34.05%
Normal	37	37.0 %	31	31.0%	49	49.05	66	66.05%

Table 5: Cross table analysis of Triglyceride with Age Group, Gender and Work Pattern

			Triglyceride		Total	χ2 -value	df
			High	Normal			
AGE GROUP	20-29 Years	Count	11	10	21	1.877	2
		% within	15.9%	32.3%	21.0%		
	30-39 Years	Count	25	12	37		
		% within	36.2%	38.7%	37.0%		
	40 Years or more	Count	33	9	42		
		% within	47.8%	29.0%	42.0%		
SEX	Male	Count	44	27	71	5.654	1
		% within	63.8%	87.1%	71.0%		
	Female	Count	25	4	29		
		% within	36.2%	12.9%	29.0%		
WORK	Sedentary	Count	33	11	44	4.546	2
		% within	47.8%	35.5%	44.0%		
	Moderate	Count	18	12	30		
		% within	26.1%	38.7%	30.0%		
	Heavy	Count	18	8	26		
		% within	26.1%	25.8%	26.0%		

Table 6: Cross table analysis of Total Cholesterol with Age Group and Work Pattern

			Total Cholesterol		Total	χ2 -value	df
			Increase	Normal			
AGE GROU P	20-29 Years	Count	8	13	21	8.168	2
		% within	12.7%	35.1%	21.0%		
	30-39 Years	Count	28	9	37		
		% within	44.4%	24.3%	37.0%		
	40 Years or more	Count	27	15	42		
		% within	42.9%	40.5%	42.0%		
WOR K	Sedentary	Count	30	14	44	0.937	2
		% within	47.6%	37.8%	44.0%		

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	Moderate	Count	18	12	30		
		% within	28.6%	32.4%	30.0%		
	Heavy	Count	15	11	26		
		% within	23.8%	29.7%	26.0%		

Cholesterol is increased with age and decreased with increased physical activity and this trend is statistically significant.

Table 7: Cross table analysis of HDL-Cholesterol with Age Group, Gender and Work Pattern

	20-29 Years	**Count**	**9**	**12**	**21**		
		% within	17.6%	24.5%	21.0%		
AGE GROUP		Count	18	19	37%		
	30-39 Years				1.273	2	0.529
		% within	35.3%	38.8%	37.0%		
	40 Years or More	Count	24	18	42		
		% within	47.1%	36.7%	42.0%		
	Male	Count	32	39	71		
		% within	62.7%	79.6%	71.0%		
SEX					3.445	1	0.063
	Female	Count	19	10	29		
		% within	37.3%	20.4%	29.0%		
	Sedentary	Count	25	19	44		
		% within	49.0%	38.8%	44.0%		
		Count	16	14	30		
WORK	Moderate				2.297	2	0.317
		% within	31.4%	28.6%	30.0%		
	Heavy	Count	10	16	26		
		% within	19.6%	32.7%	26.0%		

It decreased with increased age, less physical work and in case of female subjects with respect to the comparable group without statistical significance.

Table 8: Cross Table analysis of Fasting Capillary Blood Glucose with Age Group

			Fasting CBG		**Total**	**χ2 -value**	**df**	**p-value**
			Impaired FCBG	**Normal FCBG**				
AGE GROUP	20-29 Years	Count	4	17	21	4.757	2	0.093
		% within	11.8%	25.8%	21.0%			
	30-39 Years	Count	11	26	37			
		% within	32.4%	39.4%	37.0%			
	40 Years or more	Count	19	23	42			
		% within	55.9%	34.8%	42.0%			

The table shows increasing trend of Impaired Fasting Glucose with increased age without any statistical significance.

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Table 9: Table of ECG reports of study population

ECG Reports	LVH		ST-T Change	
	Frequency	Percentage	Frequency	Percentage
Present	10	10.0%	10	10.0%
Absent	90	90.0%	90	90.0%

The number of subjects with Left Ventricular Hypertrophy (LVH) and ST-T Change are same, but not always accompanying each other.

Table 10: Cross Table analysis of Left Ventricular Hypertrophy with Age Group and Duration of disease

			LVH		Total	χ2 - value	df	p-value
			Present	Absent				
AGE GROUP	20-29 Years	Count	2	19	21	7.937	2	0.019
		% within	20.0%	21.1%	21.0%			
	30-39 Years	Count	0	37	37			
		% within	0.0%	41.1%	37.0%			
	40 Years or more	Count	8	34	42			
		% within	80.0%	37.8%	42.0%			
DURATION OF DISEASE	<1 month	Count	1	35	36	13.897	5	0.016
		% within	10.0%	38.9%	36.0%			
	1-12 month	Count	2	22	24			
		% within	20.0%	24.4%	24.0%			
	1-5 Years	Count	0	14	14			
		% within	0.0%	15.6%	14.0%			
	5-10 Years	Count	3	6	9			
		% within	30.0%	6.7%	9.0%			
	>10 Years	Count	4	13	17			
		% within	40.0%	14.4%	17.0%			

The table shows statistically significant presence of LVH in older population and with increased duration of disease.

Table 11: One way ANOVA table for continuous variables

			Sum of Squares	Df	Mean Square	F	Sig.
DUR * BMI	Between Groups	(Combined)	243.00	96	2.53	7.59	.059
	Within Groups		1.00	3	0.33		
	Total		244.00	99			
Age group * TG	Between Groups	(Combined)	48.84	71	0.69	1.97	.024
	Within Groups		9.75	28	0.35		
	Total		58.59	99			
PAST H/O * TG	Between Groups	(Combined)	15.79	71	0.22	1.59	.086
	Within Groups		3.92	28	0.14		
	Total		19.71	99			
Age group * HDL	Between Groups	(Combined)	20.59	25	0.82	1.60	.062
	Within Groups		38.00	74	0.51		
	Total		58.59	99			
SEX * HDL	Between Groups	(Combined)	7.14	25	0.29	1.57	.070
	Within Groups		13.45	74	0.18		
	Total		20.59	99			
	Total		66.76	99			
DUR * LDL	Between Groups	(Combined)	192.42	67	2.87	1.78	.037
	Within Groups		51.58	32	1.61		
	Total		244.00	99			

			Sum of Squares	Df	Mean Square	F	Sig
PAST H/O * LDL	Between Groups	(Combined)	15.04	67	0.22	1.54	.09
	Within Groups		4.67	32	0.15		
	Total		19.71	99			
Age group * BF-F	Between Groups	(Combined)	26.17	34	0.77	1.54	.06
	Within Groups		32.42	65	0.49		
	Total		58.59	99			
SEX * BF-F	Between Groups	(Combined)	9.35	34	0.27	1.59	.05
	Within Groups		11.24	65	0.17		
	Total		20.59	99			
	Within Groups		8.82	40	0.22		
	Total		20.59	99			

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The one way ANOVA table shows that there is statistically significant increase in Triglyceride level with increasing age, and LDL-Cholesterol level with increased duration of disease.

DISCUSSION

The present study [Table-1 & Table-2], shows that, the cases of hypertension is increased with increasing age and 42% of the study population belongs to the highest (>40 Years) age group with Mean Age of 37.06 years, (SD=8.87), and most subjects of our study belongs to Male gender (71%) .

Table-3 shows that, the Mean Height to be 160.89 cm, (SD=8.29), Weight 62.76 kg, (SD=11.82), Pulse 79.43, (SD=11.6). Mean Systolic Blood Pressure 144.08 mm of Hg, (SD=14.92), Diastolic Blood Pressure 92.20 mm of Hg, (SD=8.29), and Mean Blood Pressure

109.57 c mm of Hg, (SD=8.86).

"GLOBAL RECOMMENDATIONS ON PHYSICAL ACTIVITY FOR HEALTH" published by WHO expert committee on 2010 states that lack of physical inactivity is now identified as the fourth leading risk factor for global mortality.[31] Chaya MS, et.al published an article in 2006 hypothesized that long term combined yoga practice increases basal metabolic rate in healthy adults.[19] Centres for Disease Control and Prevention, Atlanta in 2011 recommends that 50-70% increased heart rate signifies moderate-intensity physical activity, whereas

70-85% increased heart rate signifies vigorous-intensity physical activity,] and present study also proves that. According to Fig 1, 44% of study population are less physically active or lead a sedentary life style measured by the above mentioned criteria. Fig 2 depicts, family History and addiction history is present in significantly greater number of cases and low positive treatment history & past History corresponds with the finding that most subjects are newly diagnosed cases. In Fig 3, most have positive family history of hypertension (54%) and 44% are addicted to either smoking (50% of total addicted population) or chewing tobacco (28% of total addicted population). Only 5% are addicted to alcohol and rest 17% are addicted to more than one of the above substances. S MacMahon in a systematic review article in 1987 states that Alcohol causes an elevation in SBP greater than DBP and most studies observed that in subjects consuming 3 drinks/ day, SBP was 3 - 4 mm Hg greater and DBP 1 to 2 mm Hg greater than that in nondrinkers. An increase in consumption over 4 years was associated with a significant increase in BP.[3] Athyros VG, et.al, in 2008 published an article shows that there is association of drinking pattern and alcohol beverage type with the prevalence of metabolic syndrome, diabetes, coronary heart disease, stroke, and peripheral arterial disease in a Mediterranean cohort. Moderate alcohol consumption of spirit lowers the body weight and Metabolic Syndrome whereas heavy drinking increase both (p-value= <0.0001).[49] Howard D. Sesso, et.al, in the year 2008 showed that mild to moderate alcohol consumption decreased incidence of hypertension in women but increased incidence in men, but heavy drinking (>4 drink/day) increases the risk of hypertension in both women and men with deleterious effects on women.[4] Long duration of any addiction especially early onset tobacco and alcohol is associated with hypertension related Cardiovascular and Cerebrovascular co-morbidities stated by Grant BF et al, in 1998.[51] In England, Paola Primatesta in 2001,[52] showed that women who are light smokers show less increase in both SBP & DBP than heavy and non-smokers, whereas in men both SBP & DBP increases with smoking.

In the present study (Table -3) the mean BMI is 24.22 Kg/m2, SD= 4.06, Hip Circumference-

92.29 cm, SD=10.10, Waist Circumference- 90.68 cm, SD= 10.95, and Waist Hip Ratio- 0.93, SD= 0.04. According to table-9 & 10 of the present study, it fails to establish any positive association between hypertension and BMI or Waist Circumference. But 81% of hypertensive subjects have WHR of 0.9 or more. Urvashi Goyal, et al in 2005, showed similar result in her study on semi-urban and urban women of Punjab.[40] WHO "GLOBAL DATA BASE ON BODY MASS INDEX 2012" states that increased Body Mass Index (BMI), and abdominal obesity; that is Hip Circumference (>88 cm in Females and >102 cm in Males) or Waist Hip Ratio (WHR) >0.9 is an important component or risk factor for early onset hypertension.[8]

A study conducted by Yong Liu, et.al in China published on 2011 showed male subjects had significantly greater WC, height and weight than female subjects. WHR value was significantly smaller in males than in females. BMI and WHR were similar in two groups.

Male subjects had higher SBP, DBP & fasting glucose.[14] Young subjects who presented with hypertension had increased BMI, and associated dyslipidemia stated by Brown CD et al in 2000.[24] Hiroki Satoh, et.al in 2010 shows that, hypertensive subjects with increased BMI most commonly presented with biochemical abnormalities, like increased triglyceride and reduced HDL-cholesterol with impaired fasting glucose or glucose tolerance.[22] James R. Sowers, Murray Epstein and Edward D. Frohlich in 2001 published that up to 75% of Cardio Vascular Diseases in diabetes may be attributable to hypertension, leading to recommendations for more aggressive treatment (i.e., reducing blood pressure to, 130/85 mm Hg) in persons with coexistent diabetes and hypertension. Other important risk factors for CVD in these patients include the following: obesity, atherosclerosis, dyslipidaemia, microalbuminuria, endothelial dysfunction, platelet hyper-agreeability, coagulation abnormalities, and "diabetic cardiomyopathy".[26]

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According to ATP III & WHO criteria for Metabolic syndrome, normal range of Total Cholesterol= <200 mg/dl, Triglyceride= <150 mg/dl, HDL-cholesterol= >40 mg/dl and Fasting Blood Glucose= <100 mg/dl.[61]

According to table4, 63% have high total cholesterol (Mean=174.26, SD=45.43) and it increased among older persons with statistical significance (p-value= 0.017) and sedentary persons without significance (p-value= 0.626).

Table 5, 69% presented with increased triglyceride level (Mean=198.55, SD=79.12) with statistically non-significant trend among older age group (p-value= 0.103) in Chi-square test but significant in one way ANOVA table 11 (F= 1.97, p-value= 0.024) and sedentary life-style (p-value= 0.391) but significant increase in Male subjects (p-value= 0.017), table 7, 51% with low HDL-cholesterol (Mean=40.06, SD=6.91) and there was interesting pattern but of no statistical significance. Low HDL-Cholesterol level diagnosed more in older persons (p-value= 0.529), Male sex (p-value= 0.063) and in persons leading sedentary life-style (p-value= 0.317). In one way ANOVA analysis-table 11 there is significant increase in LDL-Cholesterol level with increased duration of disease (F= 1.78, p-value= 0.037) and table 8 --34% with impaired fasting glucose level (FCBG-Mean=97.65, SD=16.20, and RCBG-Mean=105.64, SD=22.12) with statistically non-significant increasing trend with increasing age, of which as per protocol 22 were re-examined for Post-prandial Blood Glucose and seven of them diagnosed as diabetic, they were referred to diabetic clinic for further better management.

Table 6 presents a cross-tabulation of individuals' Total Cholesterol levels (categorized as Increased or Normal) in relation to their Age Group and Work Pattern. It also includes the Chi-square (χ^2) test results to assess statistical significance. There was no significant

association between work pattern and total cholesterol level ($\chi^2 = 0.937$, df = 2, p = 0.626). Thus, variations in physical activity related to work did not show a statistically significant effect on cholesterol levels in this sample.

As per AHA/ACCF/HRS (2014) Left Ventricular Hypertrophy and Ischemia are the common electrocardiographic features of hypertensives, and chamber hypertrophy is duration dependent. AHA/ACCF/HRS recommends Romhilt-Estate score or Sokolow-Lyon index as the standardized protocol for interpretation of the Electrocardiogram related to Chamber hypertrophy.[55] In this study Romhilt-Estate score was followed for increased sensitivity and detected LVH in 10% of Subjects [table 9], and ischemia was also seen in 10% cases [table 9] though the cases were not the same. In table 10, LVH is increased among older persons (p-value= 0.019), and with increased duration of disease (p-value= 0.016) with high statistical significance. Axis deviation is a representation of chamber hypertrophy. In present study only one person presented with left axis deviation and Mean QRS-axis of the study population is 33.320 (with SD=30.85).

CONCLUSION

Summary

This study dealt with younger subjects suffering from a disease of a relatively older age group, and the basic aim was to find out whether the disease hypertension represented with any significant clinical findings, biochemical derangements, or electrocardiographic abnormalities when detected in early age of onset.

100 patients were taken from General OPD of Medical College & Hospital, Kolkata for the study by quota sampling method, then a questionnaire filled-up as per response of the subject, with clinical examination, electrocardiography, and biochemical examination of 12 hours fasting blood sample.

After collecting the data of 100 subjects, tabulation was done using Microsoft Excel soft-ware and the tabulated data imported to SPSS 20 soft-ware for statistical analysis. Descriptive and cross table analysis with Pearson's Chi-square test done for categorical variables, whereas Descriptive and one way ANOVA were done with continuous variables.

To sum-up the study we can state that:

1. Most young hypertensives have positive family history and there were no definite presenting symptoms, rather hypertension is an incidental finding in them.
2. Most addicted with early age of initiation, and tobacco is the most common substance of abuse.
3. They are with normal Body Mass Index (BMI) with increased Waist Hip Ratio (WHR).
4. Most leads a sedentary life-style.
5. Biochemical abnormalities follow the previous studies like increased fasting capillary blood glucose, total cholesterol and triglyceride with increasing age, sedentary life-style, and duration of disease. But HDL-Cholesterol level is lower in females than the male subjects in our study and LDL-Cholesterol had significant association with duration of disease only.
6. E.C.G. done to all subjects with small cases of abnormality reflects that Left Ventricular Hypertrophy (LVH) and Ischemia are the most common abnormal finding, but there were few cases of Ventricular Premature Contractions (VPC) and Axis deviate

Limitations

There are several limitations of the study due to time constraint. The scope for a better study in following topic is there with a better study design.

Limitations are

1. The sample size is less as the allowable error is more, and the sampling method applied was hospital based quota sampling system which is not the representative of the general population.

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2. As the sampling method was hospital based quota sampling system there was a chance of bias.
3. Age group selected was 20-50 years, but best study design should include 18-60 years age group of people.
4. Established diabetic, infectious, and emergency cases were excluded from the study.
5. Long term follow-up not done to correlate the pattern of natural history of disease and its changes associated with early detection and management.
6. Age and gender matched study not done even with best effort to include equal number of male and female subjects due to quota system of sampling. So, there was less female subject leading generation of gender bias to some extent.
7. Persons presented with LVH or ST-T change in E.C.G were referred to Cardiology but mandatory Echocardiography or stress test was not done for confirmation of the E.C.G finding as it was out of the scope of present study design.
8. Questionnaire filled-up by the investigator is dependent upon the verbal response of the subject, so there is chance of recall bias.

REFERENCES

1. Reddy SS, et.al. Estimation of nicotine content in popular Indian brands of smoking and chewing tobacco products, Indian J Dent Res. 2008 Apr-Jun; 19(2):88-91
2. Jain A, et.al. Antioxidant status and smoking habits: relationship with diet, Singapore Med J. 2009 Jun; 50(6):624-7
3. Howard D. Sesso, et.al. Alcohol consumption and the risk of hypertension in women and men. Hypertension. 2008; 51: 1080-1087 Published online before print February 7,2008
4. WHO: Global Database on Body Mass Index
5. Gupta R, et.al. Waist-hip ratio and blood pressure correlation in an urban Indian population. J Indian Med Assoc. 1997 Jul; 95(7):412-5
6. John P. Forman et.al. Hypertension. 2007; 49:1063-1069; Plasma 25-Hydroxyvitamin D Levels and Risk of Incident Hypertension
7. Yong Liu, et.al. Can body mass index, waist circumference, waist-hip ratio and waist-height ratio predict the presence of multiple metabolic risk factors in Chinese subjects? BMC Public Health 2011, 11:35
8. Centers for Disease Control and Prevention, Atlanta, Target Heart Rate and Estimated Maximum Heart Rate, 30-Mar-11
9. Chaya MS, et.al. The effect of long term combined yoga practice on the basal metabolic rate of healthy adults. BMC Complement Altern Med. 2006 Aug 31; 6:28
10. Chantal Gauthier, Geneviève Tavernier, Flavien Charpentier, Dominique Langin, and Hervé Le Marec. Functional β-3 Adrenoceptor in the Human Heart. J. Clin. Invest. The American Society for Clinical Investigation, Inc. Volume 98, Number 2, July 1996, 556–562
11. WHO: Global recommendations on physical activity for health, 2010
12. S.MacMahon. (Systematic Review) Alcohol consumption and hypertension, Hypertension. 1987; 9:111-121
13. Athyros VG, et.al. Association of drinking pattern and alcohol beverage type with the prevalence of metabolic syndrome, diabetes, coronary heart disease, stroke, and peripheral arterial disease in a Mediterranean cohort. Angiology. 2007 Dec-2008 Jan; 58(6):689-97
14. Grant BF, et.al. Age at smoking onset and its association with alcohol consumption and DSM-IV alcohol abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. J Subst Abuse. 1998; 10(1):59-73
15. Paola Primatesta, et.al. Association between Smoking and Blood Pressure: Evidence from the Health Survey for England. Hypertension. 2001;37:187-193
16. Urvashi Goyal, et.al. Contribution of Various Foods to Fat and Fatty Acids Intake among Urban and Semi-Urban Women of Punjab, J. Hum. Ecol., 18(3): 217-220 (2005)
17. Brown CD, et.al. Body mass index and the prevalence of hypertension and dyslipidemia. Obes Res. 2000 Dec; 8(9):605-19
18. Hiroki Satoh, et.al. Body Mass Index can Similarly Predict the Presence of Multiple Cardiovascular Risk Factors in Middle-aged Japanese Subjects as Waist Circumference, Inter Med 49: 977-982, 2010
19. James R. Sowers, Murray Epstein and Edward D. Frohlich Hypertension. 2001; 37:1053-1059 Diabetes, Hypertension, and Cardiovascular Disease: An Update
20. Dan L. Longo, Anthony S. Fauci, Dennis L. Kasper, Stephen L. Hauser, J. Larry Jameson, Joseph Loscalzo. Harrison's Principles of Internal Medicine 18th edition
21. Hypertension diagnosis and treatment guideline, AHA published by group health co-operative2014.

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