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" LIPID PROFILE AND ATHEROGENIC INDEX OF PLASMA USED AS A PREDUCTIVE TOOL FOR CARDIOVASCULAR DISEASE RISK IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME AND WITHOUT METABOLIC SYNDROME"

Physiology

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ABSTRACT

Background-The metabolic syndrome and hypertension are important risk factors for development of CVD.Atherogenic lipid profile also contributes to cardiovascular risk.The aim of our study was to investigate the effect of hypertension and metabolic syndrome on cardiovascular risk by Framinghams heart scale by using lipid ratio and AIP in central india population.

Method- The study was carried out in the dept of physiology GMC Bhopal.Our study included 100 age & sex matched subjects aged 30-50 yrs according to JNC-7 .Lipid risk ratios were calculated and 10 yrs general CV risk was assessed by Framinghams heart scale.

Result-cardiovascular risk factors (central obesity,dyslipidemia,dysglycemia and AIP)was significantly high in hypertensives with mets subjects.we found that hypertensives with mets carried higher CVR and Atherogenic risk as compared to hypertesives without mets.AIP was positively correlated with CVR.

Discussion and conclusion- cardiovascular risk factors(central obesity,dyslipidemia,dysglycemia and AIP)are responsible for risk of cardiovascular disease.dyslipidemia and hypertension are components of mets and major risk factors for CHD.AIP and lipid ratios important tool for the prediction and prognosis of CVD.

KEYWORDS

Atherogenic index of plasma(AIP), Metabolic syndrome(Mets),cardiovascular risk(CVR).

INTRODUCTION-

Epidemiological studies are indicates that non communicable disease (NCDs) are the most common cause of death (1). Cardiovascular disease(CVD) is a most common type of NCDs 48% of all NCDs is contributed by CVD(2). Prehypertensions ,Hypertensions ,central obesity,dyslipidemia and diabetes mellitus are common risk factors for cardiovascular disease(3).Some studies also shown that high prevalence of co morbidity is associated with above cardiovascular risk factors(4-6).Increased BMI and central obesity (WC) is associated with high risk of Coronary heart disease(CHD) and Ischaemic heart disease(IHD).The metabolic syndrome and hypertension are important risk factors for development of CVD.Many meta analysis have enlights that association between metabolic syndrome and increase risk CVDs(7-9)

AIMS &OBJECTIVE – The aim of our study was to investigate the effect of hypertension and metabolic syndrome on CVD risk by framinghams heart scale by using lipid ratio and AIP in central india population.

MATERIAL & METHODS –

The study was carried out in the dept of Physiology GMC Bhopal.Our study included 100 age and sex matched subjects aged 30-50 yrs according to JNC-7.Hypertension was defined as SBP ≥140 and/or DBP≥90mmHg.

Brachial artery Blood Pressure was measured three times consecutively after they had rested for 5 minutes.Anthropometric measurment height and weight done by standard procedure.Waist circumference was measured in cm to the nearest 0.5 cm at the end of normal expiration.Serum total cholesterol and triglyceride were measured by CHOD PAP and GPO-PAP method.Serum HDL-c was measured by precipitation method. LDL-C was calculated using Friedwald's formula.

Metabolic syndrome was defined according to national cholesterol education program.NCEP-ATPIII criteria required the presence of at least 3 of the followings-

1 -Abdominal obesity (cm) Male >90 Female >80
2 -Fasting blood glucose(mg/dl) ≥ 100
3 -Hypertension (mmHg) ≥130/≥ 85
4 -High triglyceride(mg/dl) ≥ 150
5 -Low HDL-C (mg/dl) Male <40 Female <50

10yrs general cardiovascular risk was assessed by using Framingham's risk score.

Participants were divided into two groups, Ist group N=50 hypertensives without mets and 2nd group N=50 hypertensives with mets.

Exclusion criteria included known case of dyslipidemia ,CVD and medications affecting lipid metabolism.

DATA ANALYSIS- Statistical analysis was done by SPSS 13.0 software and results were expressed as mean ± SD . Students t test was used to compare parameters between hypertensives with mets and hypertensives without mets subjects.Correlation analysis was done by using karl pearsson's method.P value of less than 0.05 was considered as significant for all statistical tests.

Table 1 Base Line And Biochemical Characteristics

VARIABLES	HYPERTENSIVES (Group 1)	HYPERTENSIVES WITH METS(Group 3)
Mean age	38.30±2.56	40.01±1.64
BMI	24.93±4.23	29.60±1.49
WC	89.50±5.59	98.30±4.85
SBP	142.14±2.98	145.33±3.06
DBP	90.42±0.85	93.44±5.09
FBG	105.72±4.54	110.38±14.28
TC	215.92±14.96	266.77±33.72
TG	134.28±16.31	213.58±24.58
LDL-C	157.78±14.44	193.33±34.47
HDL-C	31.28±3.04	30.72±2.19
AIP	0.33±0.07	0.45±0.23

RESULT- Table no 1 shows baseline and biochemical characteristics of the participants BMI and WC are significantly high in group II as compared to Group I. Both mean SBP and mean DBP high in hypertensive group with mets than without mets. The fasting concentration of plasma glucose ,Total cholesterol,Triglycerides and Low density lipoprotein (LDL-C) were found borderline high in hypertensive patients not having metabolic syndromes.In contrast other lipoproteins we found HDL-C lower side in both group I&II.The statistical analysis revealed significant differences in all the biochemical parameters.

Table -2 Cardiovascular Risk(cvr) And Aip In Hypertensives Without Mets And Hypertensives With Mets

CV RISK CLASS	VARIABLE	HYPERTENSIVES (Group 1)	HYPERTENSIVES WITH METS(Group 2)
<10%	CVR	6.01±2.38	7.32±2.14
	AIP	0.29±0.14	0.36±0.32

10-20%	CVR	14.12±1.42	16.12±2.52
	AIP	0.37±0.18	0.38±0.05
>20%	CVR	30.07±3.32	31.36±6.22
	AIP	0.39±1.13	0.45±0.03

Table no 2- Using Framinghams 10 yrs general cardiovascular risk scale the cardiovascular risk was assessed.Depending on the score obtained study population was classified in to three risk categories <10% ,10-20% and >20%. The observations revealed that higher cardiovascular risk in hypertensives with mets as compared to hypertensives without mets.The observations revealed that hypertensives without metabolic syndrome carried moderate atherogenic risk as compared to hypertensives with metabolic syndrome.It is evident from the observation that association of metabolic syndrome with hypertension increases the atherogenic risk as well as cardiovascular risk. Statistically significant higher values were observed in hypertensives with mets as compared to hypertensives.greater the value of AIP greater was the cardiovascular risk in all cardiovascular risk categories.

Table No 3-correlation Of Various Parameters With 10 Yrs General Cvr In The Hypertensives And Hypertensives With Metabolic Syndrome

PARAMETERS	HYPERTENSIVES	HYPERTENSIVES WITH METS
AGE	0.56	0.59
BMI	0.72	0.78
WC	0.44	0.73
SBP	0.52	0.58
DBP	0.27	0.39
FBG	0.62	0.69
TG	0.76	0.88
HDL-C	-0.68	-0.28
TC	0.35	0.54
LDL-C	0.46	0.58
AIP	0.96	0.97

Table no 3- Correlation of various parameters with 10 yrs general cardiovascular risk in the hypertensives and hypertensives with mets.

All the lipid risk ratios were positively correlated with cardiovascular risk.The atherogenic index of plasma showed highly significant ($p<0.01$) correlation with cardiovascular risk suggesting that AIP is a valuable tool to evaluate cardiovascular disease risk in population.

DISCUSSION-

our study showed that central obesity and other comorbities led to metabolic syndrome in study population.which led to higher SBP ,TG,TC,LDL-C and lower HDL-C .all these abnormalities are responsible for risk of cardiovascular disease and coronary heart disease.This might be due to the fact that dyslipidemia and hypertension had been significantly higher in group II as compared to group I.Our findings are similar with some other studies who showed that obesity effects are mediated through hypertension and dyslipidemia.(10,11).Dyslipidemia is a component of mets and major risk factor for CHD(12). Various studies showed that deranged lipid profile are play key role in process of atherosclerosis.our study showed that dyslipidemia is more prevalent in group II.Various studies supports importance of atherogenic index of plasma in the optimization of the predictive power of the lipid profile.These lipid ratios are used as indicator of cardiovascular risk because they gave information about imbalance between atherogenic and protective lipoproteins.(13)

Our study showed strong correlation between lipid ratios,AIP and other CVD risk factors with cardiovascular disease.Our study confirm those of the Helsinki heart study which has demonstated that cardiovascular risk is even greater when hypertriglyceridemia is present in addition to high lipid ratios.Some studies reported that TG/HDL was a strong predictor of cardiovascular diseases.(14,15)

Framingham's heart study ,Lipid research clinical program follow up study states that increased level of non-HDL-C increases coronary heart disease risk.(16)

We also found that raised non HDL-C was associated with increased predicted risk of developing CHD and CVD.(17)

Atherogenic index of plasma has been stabilised as a biochemical marker of plasma atherogenicity.Dobiasova et all have explained that AIP value of -0.3 to 0.11 are indicates low CV risk,value of 0.11 to 0.21 suggest medium cardiovascular risk and >0.21 indicates high CV risk.(18)

Our study result showed that AIP mean value in hypertensives without mets>0.21 and that it had been higher in subjects with mets.The presence of mets is a strong predictor of future CVD and CVD death(19).Our study reported that mets was associated with 2 times increased risk of CVD ,stroke and 3 times increase in risk of CVD mortality.

CONCLUSION –

Our study showed that mets associated with dyslipidemia in obese hypertensive subjects.we found that mets associated with high cardiovascular risk.We found that study population of central india more prone to develop mets due to life style changes ,new habits and urbanization.

To find out the cardiovascular risk factors(hypertension and dyslipidemia) and treated with pharmacotherapy. we should also advise for low fat diet and regular physical exercise to resolving central obesity and decrease cardiovascular risk.

AIP and Lipid ratios are important tools for the prediction and prognosis of CVD.these tools could be helpfull in decreasing mortality due to CVD and also help in managment of CVD.

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