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Original Research Article

Correlation of total cholesterol, TG & HDL in population of Uttarakhand

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ABSTRACT

Objective: We aimed to provide correlation of Total Cholesterol, TG & HDL in population of Uttarakhand.
Materials and Methods: 300 patients who came to Medicine OPD in Shri Mahant Indresh Hospital. Fasting Serum samples taken for lipid profile in patients coming to medicine OPD and run on VITROS 5600/7600 which is based on dry chemistry.
Results: With 300 patients of more than 83 were females & 217 were males.
For both males & females age mean & SD for HDL was 32.03±13.69 & for females 30.06±11.83.
For males & females age mean & SD for Total Cholesterol 114.5±23.24 & 114.1±23.53 & Age mean & SD for triglycerides for males & females.130.1±62.74 & 137.1±79.78.
Only raised and unraised values for HDL & TG were significant with p value 0.0013 of HDL & p value 0.0001 of triglycerides.
Conclusion: TG/HDL ratio was associated with cardio-metabolic risk factors which should be done in each individual for follow up.

1. Introduction

Cholesterol, triglycerides and HDL are important constituents of lipid fraction of the human body.[1] Cholesterol is an unsaturated alcohol of the steroid family of compounds & it is a sterol that is exclusive to animals never found in plants. It is essential for the normal function of all animal cells and is an integral component of cell membrane. Vitamin D, Bile acids, mineralocorticoids, glucocorticoids and sex hormones are important substances synthesized from cholesterol.[2]

High density lipoprotein (HDL) cholesterol is known as good cholesterol because it helps to remove other forms of cholesterol from blood stream. Higher levels of HDL cholesterol are associated with a lower risk of heart disease.

Cholesterol and triglycerides being non polar lipid substances (insoluble in water) need to be transported in the plasma associated with various lipoprotein particles. Plasma lipoprotein are separated by different fractions by electrophoresis. Depending on the density (ultrcentrifugation) or on electrophoretic mobility the lipoproteins is classified into major groups – chylomicrons, VLDL, LDL, HDL.

HDL & LDL lipoproteins are tiny packages in our blood, with fat lipid on the inside and proteins on the outside which carry cholesterol throughout our body.

Since the levels of plasma lipids have bell shaped distribution in general population, the definition of either a high or low value of these substances remained in arbitrary statistical decision. High values have traditionally considered as those in the 90^{th} & 95^{th} percentiles and low

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values were considered to be those below 5th percentiles. The NIH concensus conference has recently revised the values concerning cholesterol in view of clear evidence of an increased risk of coronary atherosclerosis in persons falling in 75^{th} to 90^{th} percentiles.[1]

1.1. Total cholesterol ranges

1. Desirable level: less than 200 mg/dl
2. Borderline high level: 200-239mg/dl
3. High level: 240 mg/dl and above.[3,4]

1.2. HDL cholesterol

1. Below 40 mg/dl(men): poor
2. Below 50 mg/dl (women): poor
3. 40-59 mg/dl (men): Better
4. 50-59 mg/dl(women): Better
5. 60 mg/dl and above: Best[3–5]

1.3. Tryglycerides

1. Desirable: below 150 mg/dl
2. Borderline high: 150-199 mg/dl
3. High: 200-499 mg/dl
4. Very high: 500 mg/dl and above

LDL (bad) cholesterol is the main engine of the cholesterol build up and blockage in our arteries.[3]

HDL (good) cholesterol helps to prevent heart disease by removing cholesterol from our arteries and send it to liver for elimination.[6]

2. Aims & Objective

We aimed to provide correlation of Total Cholesterol, TG & HDL in population of Uttarakhand.

3. Materials and Methods

300 patients who came to Medicine OPD in Shri Mahant Indresh Hospital. Fasting Serum samples taken for lipid profile in patients coming to medicine OPD and run on VITROS 5600/7600 which is based on dry chemistry.

4. Results

We took 300 patients with low total cholesterol around 100-125 mg/dl. In those patients triglycerides and HDL levels were also taken to determine the ratio and to produce p & t value for significance.

83 patients were females and rest 217 were males. For both males & females age mean & SD for HDL was 32.03±13.69 & 30.06±11.83.

For males & females age mean & SD for Total Cholesterol 114.5±23.24 & 114.1±23.53 & Age mean & SD for triglycerides for males & females.130.1±62.74 & 137.1±79.78.

Only raised and unraised HDL & TG was significant with p value 0.0013 of HDL & p value 0.0001 of triglycerides & t value was 3.24 & 17.47.

Significance of only TG and HDL is important as both these parameters in lipid profile are important parameters.

5. Discussion

Cholesterol and triglycerides attract clinical attention when present in abnormal concentrations. Increased or decreased levels usually occurs because of abnormalities in either synthesis, degradation and transport of their associated lipoprotein particles. Increased or decreased both are associated with terms like hyperlipoproteinemia or hypolipoproteinemia.

Hyperlipoproteinemia is a common disorder. It results from inability to break down lipids or fats in our body specially cholesterol and triglycerides. Causes of hyperlipoproteinemia can be primary or secondary. Primary is often genetic & Secondary is the result of other health conditions like diabetes, hypothyroidism, pancreatitis, certain lifestyle choices. Hyperlipoproteinemia has increased association with increased risk of atherosclerotic cardiovascular disease. Clinical manifestations are ischaemic vascular disease, acute pancreatitis, xanthomas and xanthelesma.

Hypolipoproteinemia is term referred for low levels of lipids in the blood. Low lipid levels is caused by rare conditions like thyroid, anemia, undernutrition, cancer, chronic infection, impaired absorbtion of foods from digestive tract. Associated genetic disorders include abetalipoproteinemia, familial hypobetalipoproteinemia and chylomicron retention disease.

In Uttarakhand around 300 patients were followed in which all samples in which we received low cholesterol around 100-125 mg/dl were taken. Then Tryiglycerides and HDL levels were also followed. All we could determine was in uttarakhand patient is generally having low cholesterol levels. That is positive for people of uttarakhand as low total cholesterol & low HDL protects population of Uttarakhand from ischaemic vascular diseases, Diabetes Mellitus.

But worst part is Uttarakhand has increased number of Myocardial infarction therefore it is our priority to find out the actual cause of Myocardial infarction.

There are so many questions in each persons mind – first why is the ratio of TG to HDL cholesterol a better predictor of LDL size than either parameter alone? It has been firmly established that VLDL concentration assessed by fasting TG levels is a major determinant of LDL size. However three mechanism contribute to transformation of LDL and HDL particles postprandiol hypertriglyceridemia, cholesteryl ester transfer protein activity, and hepatic lipase activity. All induce a decrease in HDL and are abnormal in type 2 diabetes.[7–11] Thus for a fasting TG level a lower HDL cholesterol level suggests that any of these three

Table 1:

Parameter	Male Mean±SD	Female Mean±SD	T Value	P Value	Significant
HDL	32.03±13.69	30.06±11.83	1.1439	0.2537	NS(P≥0.05)
T. Cholesterol	114.5±23.24	114.1±23.53	0.1311	0.8958	NS(P≥0.05)

Table 2:

Parameter	Male Mean±SD	Female Mean±SD	T Value	P Value	Significant
HDL	32.03±13.69	30.06±11.83	1.1439	0.2537	NS(P≥0.05)
TG	130.1±62.74	137.1±79.78	0.785	0.4331	NS(P≥0.05)

Table 3

Parameter	Male Mean±SD	Female Mean±SD	T Value	P Value	Significant
TG	130.1±62.74	137.1±79.78	0.785	0.4331	NS(P≥0.05)
T.Cholestrol	114.5±23.24	114.1±23.53	0.1311	0.8958	NS(P≥0.05)

Table 4:

Parameter	Raised Mean±SD	Unraised Mean±SD	T Value	P Value	Significant
HDL	72±10.48	30.13±10.91	3.2485	0.0013	S(P≤0.05)
TG	215.9±80.77	103.2±27.61	17.4705	0.0001	S(P≤0.05)

mechanisms is distributing lipoprotein metabolism more markedly. Therefore, any given fasting TG level can be associated with lower HDL cholesterol level and small LDL particles. 2^{nd} question relates to the relevance of TG-to HDL cholesterol ratio with regard to coronary risk. Three lines of evidence reported in non diabetic subjects support its use. A case control study has recently concluded that ratio of TG to HDL is a strong predictor of myocardial infarction with a risk factor adjusted relative risk of 16 in highest versus lowest quarantile.[12]

6. Source of Funding

None.

7. Conflict of Interest

None.

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