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COMPARISION BETWEEN FASTING AND NONFASTING LIPID PROFILE LEVELS

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ABSTRACT

Introduction: Recent research updates recommendation of non-fasting sample an alternative of fasting sample estimation of plasma lipid profiles. Recommended in normal healthy patients along with disease conditions like cardiovascular risk assessment, patient admitted with acute coronary syndrome, diabetic.

The objective is verification of non-fasting samples recommendation for plasma lipid estimation in localized population

Material and Methods: Study in Tertiary Care hospital 150 patients attending for general check-up and patient on treatment with history of Diabetes (DM) /Hypertension (HTN). Group 1: General check-up (n=75) Group 2: Diabetes mellitus/Hypertension (n=75) patient. Statistics analysis Cholesterol, Triglycerides and High density lipoprotein (HDL) for all the patients, Using Ortho Clinical Diagnostics Vitros 250 analyzer and reagents.

Results: Group1: Fasting /Post prandial **Cholesterol** No variation mean: 180.89±37.18/172.30±33.62, p=0.145,_**Triglyceride** Significant variation mean: 164.85±99.46/200.85±111.14, p= 0.043, positive r^2=0.935significant variation **HDL-** mean 42.89±8.77/41.64±8.68 p=0.3914.

Group2: Fasting /Post prandial **Cholesterol** mean: 156.42±46.77/147.61± 46.76 p=0.3082, **Triglyceride** mean: 172.48.33 ±104.37/217.56±116.12 Significant variation r^2=0.748, p=0.023 **HDL-** mean: 39.71±9.27/37.71±9.59, p=0.256 no variation.

Conclusion: Study concludes significant variation in triglyceride levels in fasting and non-fasting state, Patient coming for general checkup and without any co morbid condition can go for non-fasting levels most of time patients are in non-fasting. Cardiac risk assessment prefer fasting lipid profile & with co morbid condition should prefer fasting state as some diseases and drug have effect on lipid profile.

KEYWORDS : lipid profile, Fasting, Non Fasting

Introduction

Recent research updates on recommendation of non-fasting sample as an alternative of fasting sample for estimation of plasma lipid profiles. Recommended in normal healthy patients along with disease conditions like cardiovascular risk assessment, patient admitted with acute coronary syndrome, diabetic. Even it is recommended in children, geriatric and patients on stable drug therapy.

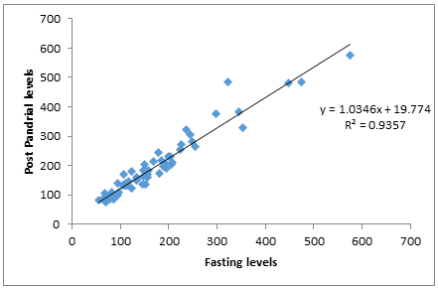
The objective is verification of non-fasting samples recommendation for plasma lipid estimation in localized population

Material and Methods

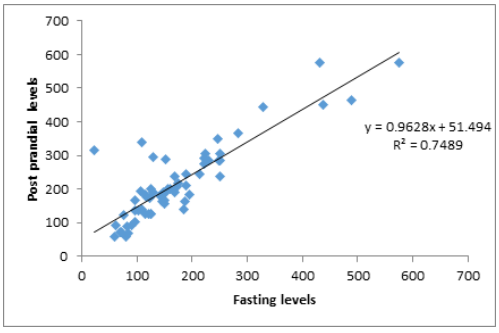
Study conducted in Tertiary Care hospital on 150 patients attending for general check-up and patient on treatment with history of Diabetes (DM) /Hypertension (HTN). Prospective study of lipid profile in fasting and non-fasting state, Group 1: General check-up (n=75) Group 2: Diabetes mellitus/Hypertension (n=75) patient. As a part of the study we have performed Cholesterol, Triglycerides and High density lipoprotein (HDL) for all the patients, Using Ortho Clinical Diagnostics Vitros 250 analyzer and reagents.

Results

Group1: Fasting /Post prandial Values **Cholesterol** no significant variation mean: 180.89±37.18/172.30±33.62, p=0.145,_**Triglyceride** Significant variation mean: 164.85±99.46/200.85±111.14, p= 0.043, positive r^2=0.935 in Graph -1 **HDL-** mean 42.89±8.77/41.64±8.68 p=0.3914 no significance variation.



Group2: Fasting /Post prandial **Cholesterol** no significant variation mean: 156.42±46.77/147.61± 46.76 p=0.3082, **Triglyceride** mean: 172.48.33 ±104.37/217.56±116.12 Significant variation r^2=0.748, Graph -2 p=0.023 **HDL-** mean: 39.71±9.27/37.71±9.59, p=0.256 no significant variation.



Discussion:

Serum lipid profile is measured for cardiovascular risk prediction and has now become almost a routine test. The test includes four basic parameters: total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. It is usually done in fasting blood specimen. Fasting refers to 12–14 h overnight complete dietary restriction with the exception of water and medication. This may hold true due to two main reasons: (1) post prandial triglycerides remain elevated for several hours [1], (2) most reference values for serum lipids are established on fasting blood specimen. NCEP [2] and European guidelines [3] also recommend doing lipid profile in fasting blood specimen for assessment of cardiovascular risk. However, these guidelines allow total and HDL cholesterol in the non-fasting specimen as these lipids are not much different in fasting and non-fasting specimens. In addition, non-HDL cholesterol (total cholesterol − HDL cholesterol), a secondary target of therapy in adult treatment panel III, may also be used in the non-fasting state [2].

Basically fasting state is essential for triglycerides estimation because as mentioned above it remains high for several hours after meal and the Friedewald equation, used for calculation of LDL cholesterol (LDL cholesterol = total cholesterol − HDL cholesterol − [triglycerides/5]), uses fasting triglycerides value. If non-fasting triglycerides value is used in this equation the LDL cholesterol, the primary target of lipid lowering therapy, will be underestimated. However, this problem can

be overcome to some extent by using direct LDL cholesterol estimation as this can be done in non-fasting specimen. Unfortunately, this method for direct measurement sometimes also gives underestimation of LDL cholesterol [4, 5]. This may misclassify many individuals into a lower NCEP category and thereby these individuals may miss drug intervention for prevention of cardiovascular events. Moreover, the lack of association of non-fasting direct LDL cholesterol with cardiovascular disease in women raises questions regarding the clinical utility of a direct assay for LDL cholesterol in non-fasting sample [5]. Further, direct assays are costly and so add to health care cost.

During the last few years efforts have been made to simplify blood sampling by replacing fasting lipid profile with non-fasting lipid profile as it has been found that lipids, lipoproteins and apolipoproteins were not much different in fasting and non-fasting state with the exception of triglycerides which were higher in non-fasting state and all these were associated with cardiovascular risk prediction [6]. However, a fasting sample is preferred if cardiovascular disease (CVD) risk assessment is based on total cholesterol, LDL cholesterol or non-HDL cholesterol but HDL cholesterol, triglycerides, total/HDL cholesterol ratio and apolipoprotein A-1 predict CVD when measured non-fasting [7]. The most interesting part is that non-fasting triglycerides levels may be even better predictor of cardiovascular risk as compared to fasting triglycerides [8, 9]. Although the terms non-fasting and postprandial can be considered synonyms but there is some difference as non-fasting sample means blood draw at any time without knowledge of the time of previous meal while post prandial implies a sample at a fixed time after a standard meal. Moreover, triglycerides increase step wise after fat diet, therefore, non-fasting triglycerides would vary depending on time after meal with highest levels 4–5 h post prandial [9]. Further, the cut off levels of non-fasting triglycerides for cardiovascular risk have not yet been defined. It is important to compare serum lipid profile in fasting and at different time interval after a representative meal in terms of prediction of cardiovascular risk. As is true for fasting triglycerides, postprandial lipemia can be affected by ethnicity, alcohol consumption, and menopausal status, and thus these factors should be considered in clinical practice [10].

In 2009, the Danish Society for Clinical Biochemistry recommended that routine lipid profiles be measured in non-fasting blood samples with the option of doing a repeat test if triglycerides were above 4 mmol/L (350 mg/dL), and this has been standard clinical practice in Denmark since then. Similarly, in 2014 UK NICE guidelines recommended this practice.

In contrast, the 2013 American College of Cardiology/American Heart Association (ACC/AHA) Task Force on Practice Guidelines recommended that a fasting blood sample is "preferred" for lipid testing, although a nonfasting blood sample could be used.

Conclusion:

Our study concludes significant variation in triglyceride levels in fasting and non-fasting state, so patient coming for general checkup and without any co morbid condition can go for non-fasting levels as most of the time patients are in non-fasting. In case of cardiac risk assessment prefer fasting lipid profile & with co morbid condition should prefer fasting state as some diseases and drug have effect on lipid profile. The cut off levels of non-fasting triglycerides for cardiovascular risk have not yet been defined. It is important to compare serum lipid profile in fasting and at different time interval after a representative meal in terms of prediction of cardiovascular risk.

REFERENCES:

1. Campose H, Khoo C, Sacks FM. Diurnal and acute pattern of postprandial apolipoprotein B-48 in VLDL, IDL and LDL from normolipidemic human. Atherosclerosis. 2005;181:345–351. doi: 10.1016/j.atherosclerosis.2004.12.045. [PubMed] [CrossRef]
2. Third report of the National Cholesterol Education Program (NCEP) Expert panel on detection, evaluation and treatment of high blood cholesterol in adults (adult treatment panel III) final report. Circulation. 2002;106:3143–3421. [PubMed]
3. Backer G, Ambrosioni E, Borch-Johnson K, Brotons C, et al. European guidelines on cardiovascular disease and prevention in clinical practice. Atherosclerosis. 2003;171:145–155. doi: 10.1016/j.atherosclerosis.2003.10.001. [PubMed] [CrossRef]
4. Sahu S, Chawla R, Uppal B. Comparison of two methods of estimation of low density lipoprotein cholesterol, the direct versus Friedewald estimation. Indian J Clin Biochem. 2005;20:54–61. doi: 10.1007/BF02867401. [PMC free article] [PubMed] [CrossRef]
5. Mora S, Rifai N, Buring JE, Ridker PM. Comparison of LDL cholesterol concentration by Friedewald calculation and direct measurement in relation to cardiovascular events in 27,331 women. Clin Chem. 2009;55:888–894. doi: 10.1373/clinchem.2008.117929. [PMC free article] [PubMed] [CrossRef]
6. Nordestgaard BG, Langsted A, Freiberg JJ. Nonfasting hyperlipidemia and cardiovascular disease. Curr Drug Targets. 2009;10:54–61. doi: 10.2174/138945009787846434. [PubMed] [CrossRef]
7. Mora S, Rifai N, Burring JE, Ridker PM. Fasting compared with nonfasting lipids and Apolipoproeins for predicting incident cardiovascular events. Circulation. 2008;118:993–1001. doi: 10.1161/CIRCULATIONAHA.108.777334. [PMC free article] [PubMed] [CrossRef]
8. Bansal S, Buring JE, Rifai N, Mora S, Sacks FM, Ridker PM. Fasting compared with nonfasting triglycerides and risk of cardiovascular events in women. JAMA. 2007;298:309–316. doi: 10.1001/jama.298.3.309. [PubMed] [CrossRef]
9. Nordestgaard BG, Benn M, Schnohr P, Tybjaerg-Hansen A. Nonfasting triglycerides and risk of myocardial infarction, ischemic heart disease and death in men and women. JAMA. 2007;298:299–308. doi: 10.1001/jama.298.3.299. [PubMed] [CrossRef]
10. Ridker PM. Fasting versus nonfasting triglycerides and prediction of cardiovascular risk: do we need to revisit the oral triglyceride tolerance test? Clin Chem. 2008;54:11–13. doi: 10.1373/clinchem.2007.097907.[PubMed] [CrossRef]