COMPARISON LOW-DENSITY LIPOPROTEIN CHOLESTEROL LEVELS CALCULATION USING THE NOVEL METHOD BY MARTIN VS THE FRIEDEWALD EQUATION, IN TYPE 2 DIABETIC PATIENTS

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Background

Low-density lipoprotein cholesterol (LDL-C) is usually estimated using the Friedewald equation. This equation assumes a fixed factor of 5 for the ratio of triglycerides to very low-density lipoprotein cholesterol (TG:VLDL-C); however, the actual TG:VLDL-C ratio varies significantly across the range of triglyceride and cholesterol levels. A new method was proposed by Martin, S and co-workers using NHANES data.

Objectives

We aimed to evaluate the concordance Friedewald formula with the new method for LDL-C estimation from the standard lipid profile using an adjustable factor for the TG:VLDL-C ratio.

Methods

We used the results of 40339 consecutive clinical lipid profiles obtained from 2000 through 2015 from patients of our outpatient clinic, at our hospital lab. The measurements were done mainly in type 2 diabetic - 66.1%. Females were 52% of cases Cholesterol concentrations were directly measured after vertical spin density. LDL-C was measured if triglycerides over 400mg/dl and calculated by Friedewald formula if lower. Data was analysed in SPSS package v20.

TG:VLDL-C ratio tables by Martin et al

Median for the Ratio of Triglycerides to VLDL-c by Non-HDL-c and Triglyceride Strata (180-Cell)

Friedewald formula will tend to underestimate LDL


Results

Diabetic patients had lower LCL-C levels than non diabetics (92 vs 101 mg/dl; p<0.001). Results of LCL-C are highly correlated in all lipid profiles (93% p<0.001) but mean values are 108.3 vs 96.4 mg/dl using Friedewald formula vs the new method. Wilcoxon rank test find significant differences between the 2 methods (p<0.001).

Conclusions

This novel method to estimate LDL-C using an adjustable factor for the TG:VLDL-C ratio produces significant lower values of LDL-C than the Friedewald equation. These findings require external validation, as well as assessment of their clinical importance. The implementation of the new method into clinical practice is particular relevant when triglycerides are higher than 400mg/dl.

Bibliography