Cholesterol Test
Total Cholesterol

Measures the overall cholesterol level in the blood, including both good and bad cholesterol.

Cholesterol levels are assessed through serum analysis. A non-fasting lipid test can be conducted at any time without the need for fasting, whereas a fasting lipid test necessitates a 12-hour fast, allowing only water. Total cholesterol and HDL cholesterol (HDL-C) are directly measured from serum samples.

The Friedewald equation, established in the 1960s, is commonly utilized to estimate LDL cholesterol (LDL-C) for both research and clinical applications. The formula is represented as: LDL-C = (Total cholesterol) − (HDL-C) − (Triglycerides/5), measured in mg/dL. This equation operates under the assumption of a fixed ratio of 5 for fasting triglyceride levels (up to 4.5 mmol/L) to VLDL cholesterol (TG: VLDL-C). Current guidelines from organizations such as the European Society of Cardiology, the European Atherosclerosis Society, and the American Heart Association and American College of Cardiology emphasize the importance of optimizing LDL-C levels.[1]

However, the Friedewald equation has notable limitations:

1. It provides inaccurate LDL-C estimates in patients with hypertriglyceridemia (up to 4.5 mmol/L or 400 mg/dL), necessitating the use of ultracentrifugal single-spin analysis or immunoprecipitation techniques.
2. It tends to underestimate LDL-C levels in individuals with low LDL-C (<25 mg/dL or 0.6 mmol/L).
3. The equation also underestimates intermediate-density lipoprotein (IDL) and certain VLDL remnants, which are recognized as atherogenic.[2]

In a thorough cross-sectional study, Martin et al. introduced a new calculation method that offers greater accuracy than the Friedewald equation, regardless of whether blood samples are taken from fasting or non-fasting individuals. The debate between fasting and non-fasting lipid profiles continues among healthcare professionals, as fasting LDL-C remains the standard for initiating lipid-lowering therapy.[3] This discussion is driven by the influence of recent food intake on triglyceride levels and the limitations associated with the Friedewald equation.

Non-fasting lipid profiles present numerous benefits, such as enhanced clinical accessibility and ease of use for both patients and healthcare professionals. In contrast, fasting lipid profiles necessitate an additional visit from patients, which can be inconvenient for both parties.[4,5] Furthermore, the reliability of fasting lipid profiles is contingent upon patient adherence. Many contemporary guidelines suggest that non-fasting LDL-C is comparably significant to fasting LDL-C. However, a fasting lipid panel is strongly advised for patients

with type 2 diabetes, obesity, those on medications that may influence lipid levels (like thiazides and beta-blockers), and individuals with high alcohol consumption.

According to the joint guidelines from the American College of Cardiology Foundation and the American Heart Association issued in 2010, the assessment of apolipoproteins, lipid particle size, and density is not recommended for evaluating cardiovascular risk (Level III).[6]

References

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