Letter to the Editor

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Status of lipid profile tests according to the last consensus paper
Son konsensüs yayınına göre lipit profili testlerinin durumu

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Atherosclerotic heart diseases and evaluation of the response to treatment. Laboratory experts are obliged to give the results of these tests with high reliability and accuracy.

The tests used for the standard lipid profile are Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein Cholesterol (LDLC), Very Low Density Lipoprotein Cholesterol (VLDLC) and High Density Lipoprotein Cholesterol (HDLC). In 2019, European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) published a consensus article on the selection, use, and limitations of these tests in the Journal of Clinical Chemistry and Laboratory Medicine, and presented a number of recommendations. Some of these suggestions came into use in the guidelines of some countries [1].

LDLC measurement plays a crucial role in the assessment of atherosclerotic cardiovascular diseases (ASCVD) and monitoring the efficacy of treatment [1, 2]. Even individuals with LDLC concentration below 70 mg/dL may experience cardiac events. This shows us that LDLC may not be sufficient alone in the follow-up of these diseases, and brings the need for a standard panel on top of LDLC [3–5].

LDLC can be measured with direct assays or calculated with the Friedewald formula (TC-HDLC-VLDLC). This formula has some limitations. Apart from this calculation, Martin Hopkins equation, which has been developed by using data from a very large database, is also applied in certain centers. This formula is as follows: LDLC = TC – HDLC – TG/correction factor. The correction factor is established by the individual’s TG and Non-HDL cholesterol levels. This formula gives a more accurate result in non-fasting state and very low LDLC concentrations. In addition, the consensus article states that Martin Hopkins formula should be preferred at TG concentrations between 2.0 and 4.5 mmol/L where the accuracy of Friedewald equation is low. It is recommended that both formulas should be avoided when the TG level is above 4.5 mmol/L. In these cases, a direct assay of LDLC is required.

The requirement for fasting in the follow-up of lipid profile has been emphasized for many years. However, in this consensus article published by EFLM, it has been stated that fasting status is not mandatory for measurement of lipid profile markers.

Remnant cholesterol (RC) is among the lipid fractions directly involved in atherosclerotic processes. The cholesterol-rich particles in this fraction penetrate into the intima layer of the arteries and accumulate there, contributing to the atherosclerotic process. RC has been proven to have a significant relationship with atherosclerotic heart diseases. A limited number of homogenous assays have been invented for this test, which is not found in the standard lipid panel. Since RC shows the amount of cholesterol except for those found in LDL and HDL, it is possible to calculate RC by the equation: RC = TC – (HDLC + LDLC). In order to use this equation, LDLC must be measured by direct assay [2].

Lipoprotein (a) is an LDL-like particle, which contains apo (a) besides ApoB. It is recommended that this marker should be measured once in a lifetime at least, besides the...
standard lipid panel [2]. Lp (a) measurements can be repeated in selected patients.

Fasting status is not required for lipid profile tests because fasting samples do not include the average atherogenic lipid profile of the patient in the 24-hour cycle. Opinions supporting the usage of non-fasting lipid profile are being included in the guidelines of certain countries [2, 3]. In our country, necessary information should be provided to clinical biochemistry laboratories on this subject.

Lipid profile tests performed to evaluate response to treatment or to monitor disease progress ought to be studied with the identical methods and ideally in the same laboratory. If there would be an alteration in method or laboratory, clinicians should be informed. LDLC values close to the therapeutic decision threshold should be repeated at least twice with the same method and the average of these values should be given as a result.

The LDLC distributions which had been analyzed in population studies has shown that; 2.5th and 97.5th percentiles, which correspond traditionally to the reference ranges, contain the largest portion of individuals. Therefore, the therapeutic decision limits should be utilized as the threshold, not the percentiles. With the flagging of levels exceeding the threshold values, the better part of the results will reach the clinicians with a flag. Consequently, cholesterol and/or triglyceride levels that require urgent intervention can be overlooked. Accordingly, there may be a requisition for alert values for tests in the lipid profile, especially TG.

In Turkey, there is no consensus among clinical biochemistry laboratory staff regarding lipid panel tests. Even today, non-fasting status is interpreted as a substantial cause of pre-analytical error for lipid panel tests, which leads to false and unnecessary test cancellations. With the arrangements to be made, considering the last consensus article of EFLM, confusion will disappear and there will be a healthier relationship between physicians, patients and laboratory experts.

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**References**


