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ONE MINUTE CONSULT
BRIEF ANSWERS TO SPECIFIC CLINICAL QUESTIONS

Q: Is it time to abandon fasting for routine lipid testing?

A: Yes. The time has come to change the way we think about fasting before routine lipid testing. We now have robust evidence supporting the routine use of nonfasting lipid testing. Fasting lipid testing is rarely needed, but may be considered for patients with very high triglycerides or before starting treatment in patients with genetic lipid disorders. For most patients, nonfasting lipid testing is appropriate: it is evidence-based, safe, valid, and convenient. More widespread adoption of this strategy by US healthcare providers would improve quality of care and patient and clinician satisfaction.

GUIDELINES HAVE CHANGED

In 2014, the US Department of Veterans Affairs practice guidelines recommended nonfasting lipid testing for cardiovascular risk assessment.[1] Other recent clinical guidelines and expert consensus statements from Europe and Canada now also recommend nonfasting lipid testing for most routine clinical evaluations.

Physiologically, we spend most of our lives in the nonfasting state, yet fasting lipid testing was standard practice advocated by earlier clinical guidelines. The rationale for fasting before measuring lipids was to reduce variability and to allow for a more accurate derivation of the low-density lipoprotein cholesterol (LDL-C) concentration using the Friedewald formula. There was also concern that an increase in triglyceride concentrations after consuming a fatty meal would reduce the validity of the results. However, numerous studies have found that the increase in plasma triglycerides after normal food intake is much less than that during a fat-tolerance test, making this less of a concern for most patients.[2,3]

In addition, recent studies suggest that postprandial effects do not diminish and may even strengthen the risk associations of lipids with cardiovascular disease, in particular for triglycerides.[4] Moreover, in certain patients, such as those with metabolic syndrome, diabetes mellitus, or certain genetic abnormalities, fasting can mask abnormalities in triglyceride-rich lipid metabolism, which may only be detected when triglycerides are measured in a nonfasting state. Nonfasting measurements may identify patients with elevated residual risk despite optimal guideline-based treatment.

In 2016, a joint consensus statement of the European Atherosclerosis Society and the European Federation of Clinical Chemistry and Laboratory Medicine[5] recommended nonfasting lipid testing as the new standard for lipid measurement, with fasting lipid testing considered for patients with triglyceride levels over 400 mg/dL (5 mmol/L). The statement also recommends that nonfasting triglyceride levels greater than or equal to 175 mg/dL (2 mmol/L) should be considered elevated as compared with the 150 mg/dL (1.7 mmol/L) traditionally used for fasting panels.

Recently published recommendations for nonfasting lipid testing for routine assessments are summarized in **Table 1**.[1,5–11]

EFFECTS OF THE POSTPRANDIAL STATE ON LIPID LEVELS AND RISK ASSESSMENT

A common concern for clinicians who do not routinely order nonfasting lipid testing is the potential variability in lipid levels and interpretation of these values for treatment

For most patients, nonfasting lipid testing is appropriate, evidence-based, safe, and convenient

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TABLE 1

Guidelines and recommendations that support nonfasting lipid testing

Organization	Recommendations
American Association of Clinical Endocrinologists and American Association of Endocrinology,[19] 2017	Nonfasting testing is acceptable if fasting is impractical
European Atherosclerosis Society and European Federation of Clinical Chemistry and Laboratory Medicine,[5] 2016	Fasting testing not routinely required
Canadian Hypertension Education Program,[6] 2016	Fasting lipid testing no longer required; nonfasting testing equally appropriate
European Society of Cardiology,[8] 2016	Nonfasting testing can be used in patients without severe hypertriglyceridemia
Canadian Cardiovascular Society,[7] 2016	Nonfasting testing is an acceptable alternative to fasting testing
National Institute for Health and Care Excellence (UK),[10] 2014	Fasting testing not necessary
US Department of Veterans Affairs,[1] 2014	Nonfasting testing is recommended
American College of Cardiology and American Heart Association,[9] 2013	Fasting testing is preferred but not mandatory

Fasting for blood work puts diabetic patients at risk of hypoglycemic events en route to testing

decisions. But in most circumstances the differences between fasting and nonfasting measurements are small and are not clinically relevant. Differences in high-density lipoprotein cholesterol (HDL-C) are negligible; slightly lower levels are seen (up to −8 mg/dL) for nonfasting total cholesterol, LDL-C, and non-HDL-C compared with fasting levels; and differences are modest (up to 25 mg/dL higher) for triglycerides.[5] These data should reassure clinicians who rely on lipid levels to guide management decisions.[9]

Cardiovascular risk assessment

Current algorithms for assessing risk of cardiovascular disease use total cholesterol and HDL-C, not triglycerides or LDL-C. Hence, eating has no effect on the risk estimates.

For clinicians who prefer an absolute lipid target for managing risk in patients on lipid-modifying therapy, a nonfasting LDL-C or non-HDL-C (or apolipoprotein B) may be used. The non-HDL-C level is a better risk marker than LDL-C, particularly in patients with low LDL-C or with triglyceride levels of 200 mg/dL or higher.[12] Treatment goals for non-HDL-C are 30 mg/dL higher than for LDL-C (fasting or nonfasting). In addition, for these patients with low LDL-C or high triglycerides, a new LDL-C calculation method has more consistent results for fasting and nonfasting values than the commonly used Friedewald calculation.[12]

EVIDENCE SUPPORTING NONFASTING LIPID TESTING

The adequacy of nonfasting lipid testing for general screening for cardiovascular disease has been verified in large prospective studies over the past several decades.[2,13,14] These studies evaluated cardiovascular event and mortality rates and found consistent associations of nonfasting lipid levels with cardiovascular disease. Studies that included both fasting and nonfasting patient populations found similar or occasionally even greater cardiovascular risk associations for nonfasting lipid measurements (including for LDL-C and triglycerides)

compared with fasting lipid measurements.

The Emerging Risk Factors Collaboration[14] reviewed the data from 68 studies in more than 300,000 people and found that the relationship between lipid levels and incident cardiovascular events was just as strong when nonfasting lipid values were used. In fact, at least 3 large statin trials reviewed (a total of 43,000 people) used nonfasting lipids.[14]

Genetic studies using mendelian randomization have also linked nonfasting triglyceride levels (and remnant cholesterol) to an increased risk of cardiovascular events and of death from any cause.[15,16]

Therefore, the evidence overall suggests that nonfasting lipid measurements are acceptable with respect to risk assessment, and indeed may be preferred in most instances, especially in patients with an atherogenic metabolic milieu that may otherwise be masked by the fasting state.

OTHER BENEFITS OF NONFASTING LIPID TESTING

Nonfasting lipid panels are more economical and safer for certain groups, such as elderly or diabetic patients. A pilot study[17] found that up to 27.1% of patients with diabetes reported experiencing a fasting-evoked hypoglycemic event en route to testing because of fasting for blood work. These events are vastly underreported and add to patient morbidity that can easily be avoided by adopting nonfasting lipid testing.

No study has assessed the cost-effectiveness of fasting vs nonfasting lipid testing. It is common for patients to present for their office appointment without having obtained a fasting lipid panel simply because they forgot to fast and were turned away by the laboratory. Thus, management decisions during the visit are often deferred, and patients must return to the laboratory and reschedule follow-up visits. This is inefficient, increases outpatient waiting times, and also potentially deprives others of access to needed care. Laboratory workflow can also suffer from an influx of early morning visits for fasting tests, decreasing system efficiency. Decreased efficiency in multiple levels of the healthcare system leads to increased costs, burden on healthcare providers, and decreased patient and physician satisfaction.

GETTING WITH THE GUIDELINES

The 2002 National Cholesterol Education Program expert panel report[18] and the 2013 joint cholesterol guidelines of the American College of Cardiology and the American Heart Association[9] both recommended that initial screening should involve fasting lipid testing, but they also allowed measuring nonfasting total cholesterol, HDL-C, and non-HDL-C.[18] And internationally, there has been a shift in practice recommendations toward nonfasting lipids over the past 10 years (**Table 1**).

In 2014, the US Department of Veterans Affairs, the UK National Clinical Guideline Centre, and the Joint British Societies said that fasting is no longer needed for routine testing.[10] In 2016, the European Atherosclerosis Society and the European Federation of Clinical Chemistry and Laboratory Medicine recommended nonfasting lipid testing as the standard of care and provided clinically useful cut points for both fasting and nonfasting lipid measurements.[5]

In most guidelines, the threshold for elevated nonfasting triglycerides was defined as 175 mg/dL (≥ 2 mmol/L) or greater, and this level has been validated prospectively in a large study of US women.[5,19] Repeat measurement of fasting triglycerides may be considered when nonfasting levels are greater than 400 mg/dL,[5] although there is no consensus in the guidelines regarding when or if fasting triglycerides should be remeasured. (In the Danish experience,[5] only 10% of patients have required repeat fasting values). In addition, the 2016 Canadian Hypertension Education Program guidelines[6] removed fasting as a requirement. The 2016 Canadian Cardiovascular Society dyslipidemia guidelines[7] reported that nonfasting lipid testing is a suitable alternative to fasting. Furthermore, the most recent revision of the European Society of Cardiology dyslipidemia guidelines[8] acknowledged that nonfasting lipid panels are acceptable for screening and management of patients without severe hypertriglyceridemia or those with extremely low LDL-C levels.

To date, no study has assessed the predictive value of fasting vs nonfasting lipids in the same individuals

LIMITATIONS OF THE EVIDENCE

To date, no study has assessed the predictive value of fasting vs nonfasting lipid measure-

ments in the same individuals, and there have been no randomized outcomes trials or cost-effectiveness analyses. Ethnic variations in lipoproteins and nonfasting status also need to be investigated as nonfasting lipid testing becomes more universally accepted.

TAKE-HOME POINTS

- Robust evidence supports the routine use of nonfasting lipid testing, with fasting panels reserved potentially for patients with very high triglycerides and before starting treatment in those with genetic lipid disorders.
- For most patients, nonfasting tests are evidence-based, safe, valid, and convenient.
- More widespread adoption of this strategy by US healthcare providers would improve both quality of care and patient-clinician satisfaction.

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