Skip This Step When Checking Lipid Levels

Although most guidelines recommend that patients fast before lipid testing, a recent study found no difference between fasting and nonfasting testing for predicting mortality.

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PRACTICE CHANGER

Stop requiring your patients to fast before undergoing lipid testing. Nonfasting total cholesterol (TC), HDL cholesterol, and LDL cholesterol levels are equally predictive of cardiovascular mortality and all-cause mortality.[1]

STRENGTH OF RECOMMENDATION

B: Based on a large, cross-sectional cohort study of adults followed for a mean of 14 years with patient-oriented outcomes.[1]

ILLUSTRATIVE CASE

A 57-year-old man with diabetes refuses to fast before coming to the clinic for lipid testing because he's afraid he'll become hypoglycemic. You have not been able to obtain a lipid panel on him for more than a year, and you want to determine his LDL level. Will a nonfasting lipid panel be useful?

Approximately 71 million adults in the United States have high LDL.[2] The 2013 American College of Cardiology/American Heart Association guidelines recommend fasting cholesterol checks for all adults ages 21 and older for primary prevention of cardiovascular disease.[3] The US Preventive Services Task Force (USPSTF) has long recommended screening cholesterol in adults to prevent atherosclerotic vascular disease.

In 2008, the USPSTF recommended lipid screening for all men ages 35 and older, for all men ages 20 to 35 who are at increased risk for coronary heart disease, and for all women ages 20 and older who are at increased risk for coronary heart disease.[4] The USPSTF recommends TC and HDL as the preferred screening tests and states that these can be performed on fasting or nonfasting samples; however, if LDL is added, a fasting sample is recommended.[4] Other national and international guidelines on cholesterol management also recommend a fasting lipid panel to stratify patients' risk and determine treatment options.[5-7]

LDL usually is reported as a calculated value using the *Friedewald equation* (LDL equals TC minus HDL minus [triglycerides divided by 5]).[8] This calculation is not accurate for patients with triglyceride levels > 400 mg/dL, which has prompted most authorities to recommend a fasting sample. That's because while TC and HDL are not affected by food (and LDL may vary by only 10% or less), triglycerides can fluctuate by 20% to 30%, which would influence the calculation of a nonfasting LDL.[9,10] LDL can be measured directly, but the process is generally expensive and not commonly used.[11]

The CDC estimates that more than 20% of US adults (48 million people) have not had a screening lipid panel in the previous five years.[12] One barrier to screening is that both clinicians and patients often believe that a fasting specimen is required. Yet fasting specimens are difficult to obtain because they often require a separate visit to the clinic, which can result in lost time from work and additional transportation costs.

STUDY SUMMARY

There's no difference between fasting and nonfasting LDL

Doran et al[1] used data from the NHANES III survey to compare the prognostic value of fasting versus nonfasting LDL for all-cause mortality and cardiovascular mortality. NHANES III is a nationally representative cross-sectional survey that was conducted from 1988 to 1994.[13] Doran et al[1] included 16,161 US adults ages 18 and older for whom data on fasting time were available. Participants for whom LDL calculations were not possible (due to

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missing HDL, TC, or triglyceride levels) were excluded. Those with triglycerides ≥ 400 mg/dL were excluded from the primary analysis.

Participants were stratified based on fasting status (≥ 8 hours or < 8 hours) and followed for a mean of 14 years. To control for possible confounders, the researchers used propensity score matching to identify 4,299 pairs of fasting and nonfasting individuals with similar cardiovascular risk factors, including race, smoking history, prior cardiovascular disease, cholesterol medication use, diabetes, elevated TC, low HDL, hypertension, enlarged waist circumference, and low socioeconomic status. After matching, the baseline characteristics of the fasting and nonfasting groups were similar.

The primary outcome was all-cause mortality, and the secondary outcome was cardiovascular mortality. The prognostic value of fasting and nonfasting LDL for these outcomes was evaluated as the area under the receiver operator characteristic (ROC) curve using the Hosmer-Lemeshow C-statistic.[14] (In this case, similar C-statistics indicate that the tests have similar prognostic values.*) Kaplan-Meier curves were used to assess survival. The association of LDL with mortality, after adjustment for potential confounders, was evaluated using Cox proportional hazard models. The groups were divided into tertiles based on LDL levels (< 100 mg/dL, 100-130 mg/dL, and > 130 mg/dL).

As expected, compared to individuals in the first LDL tertile (< 100 mg/dL), those with a higher LDL had an increased risk for all-cause mortality (hazard ratios [HR], 1.61 for the second tertile and 2.10 for the third tertile). The prognostic value of fasting versus nonfasting status for predicting all-cause mortality was similar, as suggested by the C-statistics (0.59 vs 0.58; $P = .73$).

The risk for cardiovascular mortality also increased with increasing LDL tertiles. As was the case with all-cause mortality, the prognostic value of fasting versus nonfasting status was similar for predicting cardiovascular mortality as observed by similar C-statistics (0.64 vs 0.63; $P = .49$). In addition, fasting versus nonfasting C-statistics were similar for both diabetic and nondiabetic patients.

WHAT'S NEW

Results suggest fasting may no longer be necessary

While obtaining a fasting lipid panel is recommended by multiple guidelines and has become traditional practice, the need for fasting originated primarily out of concern for the effect of postprandial triglycerides on calculating LDL. This is the first study that compared the prognostic value of fasting and nonfasting LDL levels for predicting mortality; it demonstrated that they are essentially the same.

CAVEATS

Fasting and nonfasting measurements were taken from different patients

The fasting and nonfasting lipids were not collected from the same individuals. However, to decrease confounding, Doran et al[1] factored in multiple cardiovascular risk factors as covariables.

Another caveat is that individuals with triglyceride levels > 400 mg/dL were excluded. However, investigators ran a sensitivity analysis that included individuals with triglycerides > 400 mg/dL and found no significant difference in C-statistics between the fasting and nonfasting groups.

CHALLENGES TO IMPLEMENTATION

Dropping the requirement to fast goes against established practice

It may be difficult for clinicians to change a longstanding practice of checking fasting lipid profiles, but we see no other barriers to adopting this recommendation. **CR**

* The C-statistic is the probability that predicting the outcome is better than chance and is used to compare the goodness of fit of logistic regression models. Values for this measure range from 0.5 to 1.0. A value of 0.5 indicates that the model is no better than chance at making a prediction of membership in a group and a value of 1.0 indicates that the model perfectly identifies those within a group and those not.

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