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Non-HDL-C or Apolipoprotein-B versus LDL-C Screening for Evaluation and Treatment of Atherosclerotic Cardiovascular Disease

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Abstract

Lipid Guidelines
- In 2013 guidelines by the American College of Cardiology and American Heart Association, by Stone et al. (2013) were released. These guidelines brought about a departure from the previous guidelines, eliminating goals for LDL-C. Instead of LDL-C therapeutic goals, on the basis of a large consistent body of evidence, 4 major statin benefit groups were identified for whom the ASCVD risk reduction clearly outweighs the risk of adverse events.
- Secord prevention strategy in individuals with clinical ASCVD
- 2) Primary prevention in individuals with elevations of LDL-C ≥ 190 mg/dL.
- 3) Primary prevention in individuals with diabetes 40-75 years of age who have LDL-C >70-190 mg/dL.
- 4) Primary prevention in individuals without diabetes and with estimated 10-year ASCVD risk ≥ 7.5%. 40 to 75 years of age with LDL-C ≥ 70-190 mg/dL.
- Two other prominent guidelines, from the International Atherosclerosis Society (IAS) and the National Lipid Association (NLA), also recommend lowering non-HDL-C levels to prevent ASCVD. However, evidence shows that non-HDL-C is atherogenic like LDL-C, both guidelines also contain an additionally recommended goal for non-HDL-C.

Introduction

ASCVD is the most common cause of death worldwide. In 2010, ASCVD accounted for approximately 16 million deaths, 40% of all deaths in the world (Kasper et al., 2015).

Lipid Biomarkers
- LDL-C has been the mainstay biomarker and pharmacologic target to prevent ASCVD. However, new research has provided evidence that other lipid biomarkers better represent the risk of ASCVD and cardiovascular events.
- A meta-analysis conducted by Boekholdt et al. (2012) compared lipid biomarker levels in patients treated with statins with risk of cardiovascular events. The adjusted hazard ratios (HRs) for major CV events per 1 SD increase were 1.13 (95% CI 1.10-1.17) for LDL-C, 1.16 (95% CI 1.13-1.19) for non-HDL-C, and 1.15 (95% CI 1.11-1.18) for apoB. These HRs were higher for non-HDL-C than LDL-C (P=0.002) and apoB (P=0.02). This data led the authors to conclude that among statin treated patients, non-HDL-C had a stronger association with risk of major cardiovascular events than LDL-C and apolipoprotein B (Boekholdt et al., 2012, p. 1307).

Research Questions
- What are the current guidelines for ASCVD treatment and prevention in adults 21-75 years of age?
- In the rural primary care setting, where state-of-the-art laboratory equipment is unavailable, the use of which lipid biomarker is most efficacious in assessing ASCVD risk in male and female adults 21-75 years of age?

Applicability to Clinical Practice

Lipid Guidelines
- Treatment goals suggested by the NLA and IAS facilitate effective communication between the patient and clinician
- Treatment goals provide an easily understandable means to discuss progress towards effective therapy. This will maximize long-term adherence by the patient to the treatment strategy.

Lipid Biomarkers
- Non-HDL-C is the most efficacious lipid biomarker to assess risk of ASCVD and to evaluate successful treatment in rural primary care medicine.
- Non-HDL-C simplifies results for both the clinician and the patient, is universally available, has low cost, does not require testing, and has been proven by research to be efficacious.
- Non-HDL-C does not require additional laboratory equipment or studies besides the already standardized lipid profile panels. Non-HDL-C testing is simple, calculates as the difference of 2 table and easily measured parameters, total cholesterol and HDL-C.

Discussion

Treatment Goals
- The ACC/AHA Guidelines on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults, by Stone et al. (2013), is one of the most widely used guideline by clinicians in the United States. The most recent report published in 2013 brought about departures from past reports and a different approach than guidelines from other cardiovascular associations. These guidelines were the first to exclude treatment goals for LDL-C. Rather than using the concentration of lipids in the blood to determine the treatment goals, the ACC/AHA guidelines use the intensity of statin therapy as the goal of treatment.
- These new guidelines, and the absence of cholesterol targets, started a debate amongst clinicians and researchers. Guidelines by the International Atherosclerosis Society (Expert Lipid Panel of the International Atherosclerosis Society Panel members, 2014), the National Lipid Association (Jacobson et al., 2015), and previous ATP guidelines all included LDL-C treatment goals.

Lipid Biomarkers
- Up until recently all the attention has been paid to LDL-C, so-called "bad cholesterol". All previous guidelines used the concentration of LDL-C in the blood to determine the type of intervention and assess for successful treatment. LDL-C is now firmly entrenched in the minds of patients and clinicians alike as the primary marker for cardiovascular health.
- Boekholdt et al. (2012) found that non-HDL-C is more strongly associated with cardiovascular events than LDL-C and apoB.
- Research by Pischon et al. (2005) and Sniderman et al. (2011) found that apoB was the superior lipid biomarker, but that non-HDL-C was also more strongly correlated with CHD than LDL-C.

References


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