nutrition research update

Brought to you by The Egg Nutrition Center   **May 2008**

research round-up: turning to ratios to predict coronary heart disease risk

Controversy exists regarding what is the best method for identifying those who are at increased risk for coronary heart disease (CHD). A new research review, "The LDL to HDL Cholesterol Ratio as a Valuable Tool to Evaluate Coronary Heart Disease Risk,"(1) published in the February issue of the *Journal of the American College of Nutrition*, evaluates the efficacy, feasibility and practicality of current and future CHD risk predictors. The review outlines both the rationale and public health need to shift to the LDL-C/HDL-C ratio from LDL-C alone to better predict CHD risk.

old predictors of CHD going gently into that good night

National Cholesterol Education Program Adult Treatment Panel (ATP) III guidelines recommend specific target levels of LDL-cholesterol and HDL-cholesterol for evaluating cardiovascular disease (CHD) risk and the effectiveness of lipid-lowering therapies.(2) While ATP III guidelines recognize that ratios such as the total cholesterol/HDL-cholesterol ratio can be powerful predictors of CHD risk, ATP III does not define the total cholesterol/HDL-cholesterol ratio as a specific lipid target of therapy. The new review suggests that conventional wisdom and scientific consensus is shifting focus to newer, stronger predictors of CHD risk — namely the LDL-C/HDL-C ratio and apolipoproteins (apo).

a word from don

Past science recommended limiting dietary cholesterol as a way to reduce LDL-C levels and the subsequent risk of CHD. However, emerging scientific evidence shows that lipid ratios are better predictors of CHD risk, and that in healthy adults, dietary cholesterol from eggs does not affect the LDL-C/HDL-C ratio. Those findings are consistent with epidemiological evidence that eggs do not impact CHD risk.

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apolipoprotein — a case of the ends not justifying the means

Studies show apolipoprotein B and the ratio of apo B/apo A-1 to be the most accurate predictors of risk and the best measurements for evaluating treatment.[3,4,5,6,7] However, while the predictive value of the apoB/apo A-1 ratio is strong, the review suggests the use of this ratio is not practical at this time because:

1. Major insurance carriers consider apo B "experimental" and will not reimburse policyholders for this test, and clinical centers are not yet equipped to measure apo levels.
2. Time, money and resources have been spent on educating the public on cholesterol terminology, and replacing that with new terminology on apolipoproteins could result in confusion.
3. Using the apo B/apo A-1 ratio would introduce new concepts to the NCEP guidelines, which would go against NCEP's central principle of using new knowledge *to build on existing* practice guidelines.

shining the spotlight on the predictive value of the LDL-C/HDL-C ratio

The LDL-C/HDL-C ratio is gaining scientific support as the leading predictive method that is both practical and cost efficient. Several large epidemiological and clinical studies have found the LDL-C/HDL-C ratio to be an excellent predictive CHD tool — more accurate than LDL or HDL alone. And, the LDL-C/HDL-C ratio is a measure that is easily obtained from a standard lipid profile test, which is covered by insurance companies.[8,9,10]

illustrating the effect of dietary cholesterol on LDL-C/HDL-C ratio

The LDL-C/HDL-C ratio's strength for predicting CHD over that of LDL-C alone is best illustrated through the effect of dietary cholesterol. Studies that looked at dietary cholesterol's effect on both LDL-C and HDL-C showed an absolute increase in both lipoproteins with little change in the LDL-C/HDL-C ratio. In fact, when eggs were used in feeding studies — one egg contains 213 mg of cholesterol — there was an increase in the large, less atherogenic LDL-C particles and a significant decrease in the small, atherogenic LDL-C particles[11,12] — further support that eggs are not a significant contributor to coronary heart disease.

that's a fact

Cardiovascular disease continues to be the number one killer of Americans, but misinformation persists. A recent survey by the Egg Nutrition Center shows that 24 percent of Americans still avoid eggs for fear of dietary cholesterol, even though more than 30 years of research have concluded that healthy adults can enjoy eggs without significantly impacting their risk of heart disease.

feedback

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in other science news

- Research reported in the *Journal of the American Medical Association* compared the performance of different lipid measures to predict coronary heart disease.(13)
  - The study evaluated various lipid measures including the total cholesterol, HDL-C, LDL-C, non-HDL-C, apo A-1, apo B, and three lipid ratios (apo B/apo A-1, total cholesterol/HDL-C and LDL-C/HDL-C).
  - Results showed the overall performance of the apo B/apo A-1 ratio for predicting coronary heart disease was comparable with that of traditional lipid ratios.

- New research reported in the February 2008 *Journal of Nutrition* evaluated the contribution of dietary cholesterol from eggs in a carbohydrate-restricted diet (CRD).(14)
  - Subjects consumed a CRD (10-15% energy from carbohydrate) and were randomly allocated to an EGG group [intake of 3 eggs per day (640 mg/d additional dietary cholesterol)] or SUB group [equivalent amount of egg substitute (0 mg/d dietary cholesterol) per day] for 12 weeks.
  - LDL-C as well as LDL-C/HDL-C did not change during the intervention. In contrast, the EGG group had a significant increase in HDL-C while there were no changes in HDL-C for the SUB group.

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