



CHOLESTEROL:

HDL the good
 LDL the bad
 Lp(a) the bad on top of the bad

Sorting Out Cholesterol Testing

By Karen Van Zino, M.D.

It used to be easy. The doctor tells you your cholesterol is too high. Eat fewer eggs and recheck in 3 months. Not so anymore, and thankfully so. We have learned so much since then. Pick up a news magazine or the daily paper and you are bound to find some report on the latest research including a virtual alphabet soup of new cholesterol tests. You're likely to confront HDL, Lp(a), hsCRP, and heaven knows what else along with the old familiar Total Cholesterol.

You are also likely to see these new terms popping up on your latest lipid profile. Lipids are fats (from the Greek *lipos* for fat) and cholesterol is one type of lipid. When lipids are joined with proteins in our body they are referred to as lipoproteins. These lipoproteins are essential for normal bodily function. For example, every cell in our brain is encased in a capsule comprised of lipoprotein.

But whence comes all these odd sounding names. It all has to do with dripping, dripping, and more dripping down a column on a vertical plate. Substances denser dripped more slowly, substances less dense more quickly, and thus were so sorted. As these separate subcategories revealed themselves, like LDL *low density lipoprotein* and HDL *high density lipoprotein* these simple descriptive names stuck. No one has ever demanded biochemists be poets.

LDL was discovered first to be more important than the total cholesterol number predicting disease. It is a very sticky fatty substance and when in excess sticks readily to the lining of blood vessels. Not good for the blood vessel or for us. So now Total Cholesterol is dethroned and LDL is king.

But why were people having heart attacks when their total cholesterol wasn't that bad and their LDL was 'normal'? There had to be more to the story.

And so it went for many years despite these observations and the insistence on LDL as *the* value to follow. HDL wasn't much on the radar screen. When HDL's function as a transport of LDL particles out of the body was discovered the tables changed. It now was shown to be the more predictive number (the higher the better), yet for years this fact was distrusted, scoffed at and generally ignored. Why?

The LAW OF PRIMACY which lawyers are well schooled in (what the jury hears first they remember best) works just as well in the medical world. We learned about LDL first and by golly we believe it best. It took a long time for acceptance of HDL as the stronger of the two predictors. Now we know them as LDL, the bad cholesterol and HDL, the good cholesterol.

This very same story has been repeated with Lp(a). Now how is that for a ridiculous name? It stands for a specific lipoprotein (type 'a') which rides in a sort of saddle on the back of LDL molecules. When it is present in excess it makes the LDL stick to artery walls even faster than usual. Not good again. Yet as the data mounted on its importance for predisposing a person to early stroke there was the usual resistance in acknowledging its importance. Insurance companies wouldn't pay for the test and it was difficult to get even cardiologists to order it. And sure enough in January of 2007 a huge study was released confirming its importance and all of a sudden we see it written up in the NY Times. It has *arrived*.

To recap so far we have: HDL the good
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What more? Enter hs-CRP, the new buzz of the emergency room. Roll in with chest pain and this blood test will be drawn stat and if it is above a certain number your chances of having a heart attack just skyrocketed. CRP, C-reactive protein, has been around for years as a marker for inflammation. If you get pneumonia and your lungs are inflamed as they most certainly are with bacteria invading, total CRP is high. It returns to normal as you get well.

The 'hs'CRP tested for our purpose is 'highly specific' for blood vessel inflammation which is known to be an important risk factor for vascular disease. The more inflamed the lining of an artery wall the stickier that wall lining is. Sort of like Velcro attracting its lipid mate. This is especially inviting for blood clots which are a leading cause of heart attacks. The hs-CRP is measured during lipid work-ups and if it is repeatedly high action to reduce inflammation is recommended. It is a powerful tool.

This discussion couldn't be complete with visiting the lowly TRIGLYCERIDES which got little respect until recently unless they were outrageously elevated. They are the large fatty globules formed in the first step of our digestion of food. The fattier and sweeter the food the higher the triglycerides. In fact if you have a problem with high triglycerides and get your blood drawn after a fatty meal your serum will look like a vanilla milk shake! Not good. Our body has an enzyme (a helper protein) to speed up triglyceride breakdown and usually this metabolism readily takes place. If we lack this enzyme or we overwhelm our stomachs with 3 double bacon cheeseburgers triglyceride levels rise.

For years the general medical community treated only relatively high triglyceride levels. It was generally felt that lower levels were not harmful. Many scientists were suspicious of this thinking and just this past year studies have shown that even modest elevations are damaging. Finally triglycerides are getting their due respect.

A dramatic example from my own life illustrates the point that these tests can give us an important heads up. My friend and then patient Stan had abnormal lipids, a strong family history of heart disease, and had smoked. Given that he was in his early 40s I recommended aggressive treatment. At the time he had no symptoms and declined medication. One evening a few years later he called me to ask about an unusual pain he was having in his wrists. We thought it was from bike riding, but with further questioning he told of chest pain and shortness of breath accompanying the wrist pain.

Stan reluctantly went to the hospital and the next day underwent a 5 vessel CABG, that is a coronary artery bypass graft. I was present in the operating room as his beating heart was held cradled in the surgeon's hands. The memory is unforgettable. He was fortunate not have had a heart attack, although one was certainly threatening. Happily, he is now fully treated, exercises daily and is symptom free. Not all are as fortunate as my friend.

To conclude I would like to leave you with the notion that ALL of these values can be important to your cardio vascular health. Be sure they are checked, most especially if you have risk factors like family history, diabetes, smoking, high blood pressure, or heart disease. Sorting them out ahead of time can save your life.