KRESSER INSTITUTE FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Dyslipidemia - Part One

Hey, everybody. In this presentation, we're going to discuss basic screening for dyslipidemia. We could easily spend six months on this topic, but consistent with other sections, the purpose here is to use blood chemistry as a screening tool to identify issues and to give you some basic support for diagnosis, treatment, and referral.

As many of you know, I put together a course a while back called the High Cholesterol Action Plan. Although it was designed initially for the general public, it is also appropriate for clinicians, and you have free access to it as part of your ADAPT enrollment. If you're interested in a deeper dive in this subject matter, you can refer to those materials, and I will likely be doing an advanced module on dyslipidemia in the future, given its importance. I've also written extensively on this subject on my blog, and it's, in fact, how I got my start blogging with The Healthy Skeptic many years ago now. We have an e-book, a free e-book, with great information on this topic, and we'll refer to it in the resources section for this week's training.

Because I've covered this topic in detail elsewhere, I'm going to focus here primarily on how to use the basic lipid panel and other case review blood markers to identify patients who need further screening for heart disease prevention and treatment. If you've read my work on this subject, you know that there are some basic misconceptions that you have to clear up right off the bat.

The first is that heart disease is caused by too much bad cholesterol, i.e., LDL-C, or LDL cholesterol, which is the cholesterol contained inside of low-density lipoproteins. The second is that LDL-C is the most important marker for heart disease risk and the only one you need to track during treatment. The truth is that atherosclerosis is caused by an inflammatory response to sterols in artery walls, and

sterols are delivered by lipoproteins. Thus, the number of lipoproteins in the blood, rather than the amount of cholesterol they carry, is a far greater predictor of heart disease risk.

To use an analogy, let's say your bloodstream is a highway. The lipoproteins are the cars that carry the cholesterol and fats around the body, and the cholesterol and fats are the passengers in the car. For decades, we've been wrongly focused on the number of passengers in the cars, or the amount of cholesterol and LDL particles, in other words, when we should have been paying attention to the number of cars on the road, or the number of lipoproteins in the blood. If there are a lot of cars on the road, or lipoproteins in the blood, they are a lot more likely to crash into the side of the road, or in this analogy, the fragile lining of the arterial epithelium.

1 in 5
Americans has high Lp(a)

Lipoprotein(a) is another very important marker of cardiovascular disease risk that is rarely tested for. Lipoproteins are composed of proteins, apolipoproteins, phospholipids, triglycerides, and cholesterol. Lipoprotein(a) differs from LDL in that it contains an additional protein, apolipoprotein A. Lp(a) levels are strongly influenced by genetics, and it's estimated that one in five Americans has inherited high levels of Lp(a) over 50 mg/dL, which confers greater risk of heart attack. Lp(a) levels below 32 mg/dL are considered normal. Note that there are different ways of measuring Lp(a) that we'll discuss. Milligrams per deciliter is not the best one, but many of the studies that have been done use that measurement, so I'm using it here.

In the Copenhagen Heart Study, they found that people with Lp(a) levels above 50 mg/dL had two- to threefold increased risk for heart attack. A meta-analysis of prospective studies also found a higher risk of coronary heart disease with elevated Lp(a). Lp(a) is the strongest single predictor of coronary heart disease and aortic stenosis, and the association isn't affected by adjustment for classic risk factors. What this means is that high Lp(a), even with normal total cholesterol or normal LDL or HDL, still confers increased risk for heart disease. Lp(a) may be more strongly retained in the arterial wall than LDL. It also transports oxidized phospholipids with proinflammatory activity that are strongly associated with the severity of coronary artery disease.

Two important notes on Lp(a). Although observational studies show strong association between Lp(a) and coronary heart disease, there has not yet been an interventional study that has shown that lowering Lp(a) leads to better outcomes.

Second, with Lp(a), we can test for particle mass and particle number, which is analogous to LDL particle number, or the cholesterol content of Lp(a). The best marker, as you might suspect, is Lp(a) particle number, and this is expressed in nanomoles per liter, not milligrams per deciliter, which is more of a measure of mass. When you're expressing Lp(a) particle number in nanomoles per liter, the optimal value is below 75. Intermediate is 75 to 125, and high risk is above 125.

Two most important markers:
LDL-P and Lp(a)-P

Given this, the two most important lipid markers we're looking at for screening purposes are LDL-P and Lp(a)-P. Unfortunately, neither of these is included in basic lipid panels. LDL-P is available via the NMR LipoProfile and also labs that do advanced lipid testing such as True Health Diagnostics* or Cleveland Heart Labs. Lp(a) is not included in the NMR LipoProfile, unfortunately, but it can be ordered as a single marker through both LabCorp and Quest, and it is included on the True Health Diagnostics* advanced lipid panel.

I talked earlier about the possibility of using True Health Diagnostics*, or THD, as a lab for the case review blood panel. In patients with insurance that will cover it, it's a great option because you can get these advanced lipid markers as part of the case review.

The second option is to add the NMR LipoProfile plus lipoprotein(a) to your case review blood panel. The NMR is $65 through Professional Co-op, and lipoprotein(a) is $19, so they're relatively affordable. You can do this in patients at moderate to high risk for heart disease based on their family history, total cholesterol-to-HDL ratio if you already know that, and this is consistent with current guidelines for running these tests. The downside is that LabCorp and Quest don't offer Lp(a)-P, or particle number in nanomoles per liter, which, as I mentioned, is a better marker than Lp(a) when it is a measure of mass in milligrams per deciliter. Still, we do have lots of research looking at Lp(a) measured as milligrams per deciliter that correlates that marker with heart disease, so it's certainly better than nothing.

The third option would be to do the True Health Diagnostics* panel or NMR plus Lp(a) as follow-up tests for patients whom you identify as moderate to high risk during the case review, so you'd wait to order those as follow-up tests after the case review for those with high total cholesterol-to-HDL ratio, which correlates fairly well with LDL-P, especially if you're using the functional range, and for those with a strong family history with other risk factors such as hypertension, etc.

* **Note:** *True Health Diagnostics is no longer in business. See* **this post** *for the latest updates.*

Each of these options has pros and cons. The first option, just ordering the case review blood panel with True Health Diagnostics*, can maybe be TMI, or too much information, for new practitioners. It might be a bit overwhelming if you don't know what to do with that info. The second option is probably best in terms of the info that you get, but it adds expense, especially if the patient's insurance is not paying, and again, you're measuring Lp(a) in milligrams per deciliter instead of nanomoles per liter, which is better. The third option is the cheapest up front, but you may miss some patients because total cholesterol-to-HDL ratio doesn't perfectly correlate with an increase in LDL-P, and not everyone is aware of their family history. We've mostly done options one and three. If the patient has good insurance that will cover the True Health Diagnostics* panel, we're moving more towards using that initially. THD, unfortunately, doesn't offer all of the markers I use in my case review, so we still have to add a few LabCorp markers, which is kind of a bummer for the patient because there are separate blood draws, so we have primarily stuck with option three until True Health Diagnostics* can add the markers that we want.

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