REVIEW ARTICLE

Integrative Treatments to Reduce Risk for Cardiovascular Disease

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Abstract

Recognizing the contribution and interrelatedness of lipoprotein risk factors is critical to prioritizing treatment strategies for cardiovascular risk reduction. Lipoprotein factors still dominate risk for developing cardiovascular disease, including myocardial infarction. Some emerging risk factors such as C-reactive protein are gaining acceptance due to recent prospective clinical trials demonstrating clinical benefit in reducing these markers. Other emerging risk factors, including lipoprotein particle size, remain to be validated.

In this second article of a 2-part series, we will begin with a review of formal risk assessment, discussing the contribution of multiple "risky" and "healthy" components that play a part in overall cardiovascular health. Following risk assessment, we will discuss evidence-based integrative therapies that can be used to modify any risky lipoprotein and inflammatory patient profiles, including medications, functional foods, supplements, and lifestyle approaches. The focus is on low-density lipoproteins, high-density lipoproteins, triglycerides, and C-reactive protein.

Understanding the interrelatedness of lipoprotein risk factors, and finding efficient methods of treating multiple risk factors simultaneously, will not only improve the long-term health of patients but will also save on the expenditure of healthcare dollars for unnecessary testing and ineffective treatments. Integrative practitioners who understand the contribution of lifestyle factors, and who have numerous effective treatment options at their disposal, are well positioned to counsel patients on cardiovascular disease prevention.

*Editor's Note: This is the second article in a 2-part series by these authors on lipid management for cardiovascular disease prevention. The first article, "Novel Risk Factors for Cardiovascular Disease: Are Additional Lipid Measures Useful?" ran in the last issue (*IMCJ *7.6: 18-23).*

In the first part of this discussion we explored the measurement and interpretation of biomarkers included in a typical lipid panel: total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides (TGs). We also discussed emerging biomarkers for cardiovascular risk, including measures of LDL-C pattern, size, and density; LDL particle number; lipoprotein(a); apolipoproteins (apoA1 and apoB100 being the most useful); C-reactive protein; and lipoprotein-associated phospholipase A_2.

Some of these emerging biomarkers have been proven to add to, or be more accurate than, traditional risk factors in predicting coronary artery disease and, thus, may be useful in clinical decision-making for both high-risk patients and those with borderline traditional risk factors. This article focuses on treatment of these risk factors.

The Contribution of Multiple Factors to the Risk of Cardiovascular Disease

Although traditional risk factors for cardiovascular disease (CVD) contribute independently to CVD risk, when combined in the same individual they become multiplicative. A good example of this can be found in the INTERHEART study, one of the largest multi-ethnic, case-controlled studies on cardiovascular risk factors. This study helped to inform our collective understanding about the relative contributions of different risk factors to the total burden of cardiovascular disease across the global population. According to INTERHEART findings, the odds ratio for having a myocardial infarction (MI) increases from approximately 2 (ie, a doubling of risk) for smoking, hypertension, and diabetes individually, up to approximately 16 when all 3 of these risk factors are present simultaneously; add dyslipidemia (ie, an elevated low-density lipoprotein, LDL), to the high-density lipoprotein (HDL) ratio, and the odds ratio reaches approximately 48.[1] The odds ratio further increases upon the addition of obesity and psychosocial factors such as depression, approaching an overwhelming 384. In summary, INTERHEART demonstrated that combined risk factors have an effect greater than the individual parts.

The good news is that a holistic approach to comprehensive risk-factor reduction will combine and also become multiplicative. Also according to INTERHEART, adding exercise, frequent fruit/vegetable consumption, and moderate alcohol consumption to the risk profile of a nonsmoker reduces the odds ratio for MI from approximately 0.375 to less than 0.2 (ie, an 80% reduction in risk).[1]

In a systematic review focused on estimating the contribution of lifestyle to overall mortality from CVD (ie, not limited to just risk for MI), researchers estimated the relative risks for CVD mortality to be 0.56 (95% CI, 0.42-0.74; ie, a 44% reduction in risk) for a composite healthy diet, 0.64 (95% CI, 0.58-0.71; a 36% risk reduction) for smoking cessation, 0.76 (95% CI, 0.59-0.98; a 24% risk reduction) for increased physical activity, and 0.80 (95% CI, 0.78-0.83; a 20% risk reduction) for

moderate alcohol intake.[2]

Fortunately, integrative clinicians have the best tools in all medical worlds to provide patients with the critical lifestyle counseling and the necessary natural and pharmacologic treatments to maximally reduce risk on all fronts.

Risk Prediction and Treating to Target

As just shown, for best reducing a patient's risk, it is critical to assess the contribution of multiple, independent risk factors to a person's overall chance of developing CVD and to determine the correct treatment goals based on risk classification. The Framingham Heart Study and resulting 10-year risk-prediction models provide the basis for CVD risk-reduction and treatment guidelines.[3] Risk-prediction models are now routinely available online, in personal digital-assistant applications for day-to-day use and in paper-based quick-reference tools. (See sidebar, CVD Risk-Prediction Models.)

Risk calculation involves assignment of points based on levels of total and LDL cholesterol, blood pressure, smoking status, age, and presence of diabetes; ultimately patients become classified as high, moderate, or low risk, based on a 10-year absolute risk of CVD that is 1 of 3 classifications: at least 20%, between 10% and 20%, or less than 10%. Table 1 details the LDL treatment goals based on risk classification as low, moderate, or high.

Table 1. LDL Treatment Goals Based on 10-Year Absolute Risk Classification[4,5]

Risk Category	LDL Goal
High risk, including (1) known CVD or (2) diabetes with 1 or more major CVD risk factors (10-year risk >20%)	<70 mg/dL
High risk, including (1) no diabetes or known CVD but with 2 or more major CVD risk factors or (2) diabetes without major CVD risk factors (10-year risk >20%)	<100 mg/dL
Moderate risk (10-year risk between 10%-20%)	<130 mg/dL
Low risk (10-year risk <10%)	<160 mg/dL

Low-Density Lipoprotein Cholesterol

LDL-C reduction should still be the top priority for physicians and patients. Lifestyle factors such as decreasing saturated fats and increasing physical activity will not only improve lipid profiles but will reduce the risk of other chronic diseases such as diabetes and cancer.[6,7] Even relatively modest amounts of physical activity—equivalent to brisk walking 30 minutes per day most days of the week—improve total cholesterol (TC) and LDL-C. The estimated benefit of modest exercise is that TC is reduced around 3% to 9%[8] and LDL-C is reduced up to 14%.[8,9] However, to increase HDL-C it is necessary to engage in vigorous or aerobic activity that increases respiratory rate and maximum heart rate above 65% (or >65% maximum perceived effort).[10]

In particular, a Mediterranean-style diet, characterized by monounsaturated fats, high amounts of fruits, vegetables, and grains, very little red meat, and wine in moderation, has been independently shown to be protective against CVD. Importantly, a Mediterranean approach to eating includes attention to fresh foods, slowly savored meals, and small portions. According to epidemiological calculations, making healthy food choices consistent with the Mediterranean diet, along with smoking cessation and physical activity, can prevent 80% of coronary-artery disease.[11] The landmark Lyon Diet Heart Study demonstrated that adherence to a Mediterranean-type diet was protective even if serum lipids were less than optimal.[12]

Yet, for many patients, especially those with 2 or more risk factors, LDL-C reductions with diet and exercise alone may not be sufficient to reduce risk to goal. Functional foods and supplements can add to the LDL-C reductions accomplished with diet and exercise. The benefits are explained below and Table 2 contains a concise list.

CVD Risk-Prediction Models

- The National Cholesterol Education Program's online calculator provides the 10-year Framingham risk score and can be found at http://hp2010.nhlbihin.net/atpiii/calculator.asp?usertype=prof.
- A detailed explanation of the scores can be found at http://www.framinghamheartstudy.org/risk/index.html.
- A free PDA version can be downloaded at http://www.statcoder.com/cardiac.htm.

Reducing LDL-C With Functional Foods

Inclusion of functional foods, defined as foods that have healthful benefits beyond their macro- and micronutrient content, can be an excellent addition to hyperlipidemia protocols. Many studies have looked at the benefits of various foods, including those in supplement form.

Clinically, lipid levels should be rechecked every 3 to 6 months. Additional dietary changes can be added if maximal benefit isn't achieved at each interval; however, eating functional foods should be considered part of lifelong efforts toward a healthier lifestyle, and most of these healthful foods should eaten indefinitely.

Nuts: One specific category of lipid-lowering functional foods is nuts. Early studies on the benefits of nuts resulted in their inclusion in the Portfolio diet, one of the most notable functional-food clinical trials.[13] The Portfolio trial included a "portfolio" of lipid-lowering foods such as soy products; high-fiber grains, fruits, and vegetables; and almonds, as well as use of psyllium. From this trial it was found that, eaten over a month's time, 1 oz of nuts per day of any type, even macadamia nuts,[14] may reduce LDL-C 8% to 20%.[13]

Oat Bran: Fiber plays a key role in an LDL-C-reduction treatment plan. Oat bran fiber— which contains beta-glucan, a polysaccharide-soluble fiber—when eaten for 2 months in the amount of 2.6 g/day can reduce LDL-C up to 26%.[15]

Soy and Sterols/Stanols: Studies on soy have been mixed, with much of the debate over the question of isoflavones. Despite this, there appears to be consistent benefit to substituting animal proteins with soy protein; LDL-C reductions in the range of 10% can be expected with intake of >25 g of soy protein per day.[16] Reducing total saturated fat even further—to less

than 7%—can achieve 9% to 16% reductions in LDL-C.[17] The sterol/stanol margarines and other sterol/stanol-containing products such as orange juice are also useful functional foods with a positive impact on LDL-C. Small daily servings are required—just 2 to 3g of sterols/stanols—and, given sufficient time, LDL-C reductions can be in the range of 9% to 14%.[13,16] While many margarine brands are now transfat free, caution patients to check labels. Sterols can also be found added to functional food products such as orange juice.

Raisins: Raisins are high in fiber and polyphenols. In a recent study, eating 1 cup of raisins daily reduced lipids (LDL 14% and TC 9%) and also decreased systolic blood pressure.[8]

Pomegranate Juice: Small quantities, a mere 40 g/day of this beverage, are all that is needed to improve lipids.[18] Importantly, pomegranate juice does not appear to raise TGs and, thus, would be appropriate even for people with diabetes.

Reducing LDL-C with Supplements

Red Yeast Rice: One of the best-known LDL-C-lowering dietary supplements is red yeast rice, although it is perhaps known as much for recent controversies as for its therapeutic effect. Red yeast rice contains naturally occurring 3-hydroxy-3-methylglutaryl (HMG)-coenzyme A (CoA)-reductase inhibitors including lovastatin and other monacolins.

Earlier this year, results in cardiovascular events were reported from a 5000-person clinical trial of red yeast rice.[19] The red yeast rice-treated group showed absolute and relative LDL-C decreases of 47% and 45%, respectively. Treatment also significantly decreased CV and total mortality by 30% and 33%, respectively; reduced the need for coronary revascularization by one-third; lowered levels of TC, LDL-C, and TGs; and raised levels of HDL-C.[19] Such findings demonstrate concrete benefit equivalent to pharmaceutical statins. Expect to see LDL-C reductions of 22% to 34% with twice-daily 1200 mg doses of red yeast rice.[20, 21] In comparison, on average, statin therapy reduces LDL-C 23.5%.[22]

Artichoke Extract: One promising new LDL treatment is artichoke extract. Artichoke has long been included in naturopathic choleretic formulas and has recently been the subject of a randomized controlled trial. LDL-C decreased 23% over a 6-week period with use of the extract, but this study has not been repeated.[23]

Psyllium Fiber: Over about 8 weeks, psyllium fiber (10-12 g/day) will reduce total cholesterol 3% to 14% and LDL-C 5% to 10%.[24,25]

Policosanol: Next to red yeast rice, the Cuban sugar-cane-extract policosanol is perhaps the next best-known CVD-reduction supplement, but it also is associated with some controversy. Early studies in the 1990s showing benefit (up to a 30% LDL-C reduction) all came from the same research team in Cuba and findings have not been repeated by others.[26-29] Recently, well-designed trials comparing multiple doses of a similar Cuban sugar-cane-extracted product failed to achieve even a 10% reduction in LDL-C.[30] At this time, policosanol does not appear to be a beneficial part of lipid management.

Guggulipid: According to a 2005 meta-analysis, guggulipid, a resin of the mukul myrrh (*Commiphora wightii*) tree used as a traditional Ayurvedic supplement, appears ineffective for lipid reduction.[31]

Table 2. Select Functional Foods and Supplements That Lower LDL Cholesterol

Beneficial Daily Amounts of Functional Foods	LDL-C Reduction Over Variable Times
Nuts (30-50 g)[13, 17]	29%
Oat bran (~1 cup/day; 3 g beta-glucan/day)[11, 15]	6%-26%
Pomegranate juice (40 g)[18]	9%
Raisins (1 cup)[8]	13%
Soy protein (25 g when substituted for animal protein)[13, 32, 33]	10%
Sterol margarines (2-3 g)[13]	9%-14%
Supplements	
Artichoke extract (1800 mg)[23]	23% possible
Psyllium fiber (7g)[24, 25]	5%-10%
Red yeast rice (2400 mg)[20, 21]	22%-34%

High-Density Lipoprotein Cholesterol

Studies suggest that for every 1.0-mg/dL increase in HDL-C, cardiovascular risk is further reduced by 2% to 3%.

Raising HDL-C

The following, listed in order of preferred treatment, can all help to raise HDL-C.

Exercise: Physical activity should be a cornerstone of treatment to increase HDL-C. In a dose- and intensity-dependent manner, exercise increases HDL-C by 5% to 10%, although the mechanisms of this increase are unclear. Some studies attribute the phenomenon to increasing levels of lipoprotein lipase, which assists in reducing the TG content of lipoproteins, thus prolonging the "lifespan" of HDL by reducing its clearance.[34,35] Exercise will also contribute to weight loss, which has an independent positive effect on HDL-C, likely by improving insulin sensitivity. For every 3 kg of weight lost, patients will experience an approximately 1-mg/dL increase in HDL-C.[34] A transient initial drop in HDL-C may be seen when weight loss is first initiated.

Dietary Modifications: Reducing dietary saturated fat not only positively affects the antioxidant activity of HDL, it can also raise HDL cholesterol levels. Replacing saturated fats and trans-fatty acids with monounsaturated fats and omega-3 fats increases HDL-C as well as lowers LDL-C and TGs. Saturated fat should be less than 7% of total calories,[36] and transfats should be minimized—ideally eliminated entirely—as they can decrease HDL-C by approximately 3%.[37]

Alcohol consumption increases HDL-C in a U-shaped manner, with moderate intake increasing HDL-C by 5% to 15%, but its initiation is not recommended due to the potential for abuse. Alcohol also appears to shift the overall lipid density, preferentially increasing numbers of medium and large HDL-C particles (see the previous article in this series for further discussion). In 1 study, people consuming 7 to 13 drinks per week had the least amount of small, dense LDLs, which appeared to decrease their atherogenicity, as explained below.[38] For patients who already

drink, up to 1 drink per day for women and 2 a day for men may be part of an HDL-C-increasing strategy.

Low-carbohydrate diets may also increase HDL-C. In 1 study, HDL-C increased 15% in the low-carb group while no change was seen in the calorically matched high-carb group.[39] Smoking reduces HDL-C 7% to 20%; the good news is that smoking cessation also raises HDL cholesterol by 5% to 10% within 30 to 60 days of quitting.[40]

Niacin: Supplementing with niacin is likely the most effective integrative strategy to increase HDL-C. As well as reliably raising HDL-C by 15% to 35% or more, it reduces LDL-C 5% to 25%. In addition, 1 large prospective study called the Coronary Drug Project followed 8341 men with prior MI who used niacin 1 to 2 g/day during the study; the results demonstrated a 27% reduction in reinfarction within 6 years and an 11% reduction in all mortality after 15 years.[40,41]

As most clinicians know, the barrier to achieving these results with niacin is adherence. Most people experience uncomfortable flushing with niacin doses of 2 to 3 g, the amount needed to achieve maximum benefit—although, unfortunately, even smaller doses can cause flushing. The niacin flush can be prevented or reduced with pretreatment use of an adult dose (325 mg) of aspirin; by taking the niacin concurrently with a low-fat snack; by avoiding alcohol and spicy foods near and shortly after taking niacin; and by having patients gradually increase their doses over a several-week to month-long period (beginning as low as 250 to 500 mg/day, titrated by adding 500 mg/day every week). Inositol hexaniacinate has been promoted as a nonflushing supplement; however, data do not support its efficacy for increasing HDL-C. Extended-release niacin, such as prescription Niaspan, remains the best option for avoiding flushing while retaining the benefits of niacin.

Pharmaceuticals: Additional strategies for raising HDL-C include fibrates (a class of medications), which raise HDL-C approximately 7.5%;[42] estrogen, which raises it 10% to 15%; and statins, which increase HDL-C 7.5%.[22]

Triglycerides

The independent contribution of TGs to cardiovascular risk remains controversial, mostly due to inconsistent data based on fasting TG levels. Interestingly, 3 recent evaluations in large, population-based cohorts suggest that a high nonfasting TG concentration is an independent risk factor for myocardial infarction, ischemic heart disease, and cardiovascular-related death.[43-45] Although the exact mechanism for this increased risk is unknown, postprandial hyperlipemia—an earlier, yet cumulative, step in atherogenesis—is known to contribute to endothelial dysfunction.[46]

Clinically, the interrelatedness of lipid particle-size measurements in cardiovascular risk reduction cannot be ignored. The companion piece to this article (*IMCJ* 7.6: 18-23) stated that TGs directly impact LDL density and size, which may have implications for atherogenicity. TGs have a similar effect on HDL cholesterol. TG-rich HDLs are formed by the action of cholesterol-ester transport protein, forming smaller and denser HDL particles; small, dense HDL particles (HDL-3) are catabolized more quickly from circulation, and thus do not remain involved in reverse-cholesterol transport from the periphery.[41, 47]

In hypertriglyceridemia, the rate of HDL synthesis remains constant while the rate of HDL catabolism increases, resulting in lower circulating HDL cholesterol.[47] Additionally, several studies have demonstrated that HDL-3 has reduced antioxidant action in its ability to protect LDL cholesterol from oxidation; even in healthy individuals, attenuated antioxidant response was proportional to TG concentration in the HDL particle.[48, 49] Because of these interrelationships, treating TGs is paramount to both (1) increasing HDL cholesterol (by reducing its clearance) and (2) maintaining nonoxidized LDL cholesterol (by maintaining a larger, more buoyant HDL pattern).

Reducing TGs

The following, listed in order of preferred treatment, can all help to reduce TGs.

Low-Carb Diets: High-protein, low-carbohydrate diets have been found to have positive effects on reducing risk factors for heart disease, including reducing serum TGs in addition to the beneficial effect on HDL cholesterol mentioned above. Low-carb diets can decrease TGs by 8% to 21%.[50, 51]

Exercise: Physical activity, such as daily brisk 30-minute walks, improves TG nearly 20%.[8]

Fish Oil: One cornerstone to TG reduction is fish oil, which is approved by the US Food and Drug Administration as a prescription for treating hypertriglyceridemia. Doses of 3 to 4 g/day will reduce very elevated TGs by 30% to 50% in about 3 to 6 months' time.[52] Unfortunately for vegetarians, alpha-linolenic acid (ALA) does not appear to be as effective as fish oil for TG reduction. Small amounts of ALA are converted to the omega-3 fatty acids eicosapentaenoic acid and docosahexaenoic acid, which are contained in fish oil. However, it appears that this is not sufficient for a TG-lowering effect.[53] The benefit from fish oil may be largely explained by its effect on very low-density lipoproteins.[54]

Niacin: In the amount of 2 to 3 g/day, niacin can also contribute 20% to 50% to TG reduction.[55]

C-reactive Protein

C-reactive protein (CRP) is a known inflammatory mediator, thought to represent inflammatory processes due to endothelial dysfunction, an early and continuous process in development of CVD.[56-58] CRP is a recognized independent risk factor for the development of clinical CVD and for having a cardiovascular event, adding to Framingham-predicted risk.[59] CRP levels greater than 3.0 mg/L have the greatest impact on CVD risk; however, there appear to be graded increases in risk across all levels of CRP.[59, 60]

Reducing CRP

The following, listed in order of benefit, can all help to reduce CRP.

Statins: Some, but not all, HMG-CoA-reductase inhibitors (statins) have documented ability to reduce CRP, independent of LDL lowering.[60] Furthermore, in the REVERSAL (Reversal of

Atherosclerosis with Aggressive Lipid Lowering) trial performed in patients with known coronary-artery disease, atorvastatin lowered CRP by 36.4% and, combined with the intensive LDL lowering achieved in the trial, resulted in the reduction of atheroma volume, suggesting reversal of coronary-artery disease.[61] According to clinical trial data available to date, CRP reduction appears critical for regression of atheroma volume.[60]

Although the exact mechanisms of statin-induced CRP reduction are unknown, translational science suggests that statin drugs may reduce LDL susceptibility to oxidation by increasing the ratio of LDL-antioxidant capacity to LDL-C; reducing oxidized LDL formation may reduce nuclear factor Kappa B (NF-Kappa B) activation and subsequent CRP formation.[62,63] The effects of CRP lowering, using rosuvastatin, in the primary prevention of cardiovascular events is the focus of the ongoing clinical trial called Justification for the Use of Statins in Primary Prevention: An Intervention Trial Evaluating Rosuvastatin (JUPITER), which is evaluating 15 000 asymptomatic participants with low LDL but elevated CRP.[60]

A High-Antioxidant Diet: In clinical trials, lowering CRP has received little attention except through use of statins; however, preliminary evidence suggests that dietary approaches may also be beneficial. Recently, a small clinical trial of a high-antioxidant-capacity dietary intervention—including mostly whole foods, richly colored fruits and vegetables, berries, wine, and dark chocolate—led to a statistically significant reduction in CRP in as early as 2 weeks, although the CRP reduction in this study was moderate from a clinical perspective (3.0 mg/L reduced to 2.5 mg/L).[64]

Dietary Fiber: Additional clinical trials have investigated the possible benefits of dietary fiber supplementation on CRP reduction. King et al have conducted, with mixed results, 2 clinical trials of blond psyllium (*Plantago ovata*). In the first trial with both normotensive and hypertensive adults, supplementation with blond psyllium at a dose of 30 g/day for 3 weeks resulted in 0.8-mg/L and 0.6-mg/L reductions in CRP, respectively, in normotensive and hypertensive participants, although the reduction in those with hypertension did not reach statistical significance.[65]

In a larger follow-up, King et al conducted a clinical trial of blond psyllium fiber at a dose of 7 to 14 g/day for 3 months in overweight and obese participants; no significant reductions in CRP were detected in this trial.[66] Differences in these studies include the study population as well as the dose of fiber evaluated. Although more trials are needed, these studies suggest that larger doses of fiber may be required for CRP reduction, and any effects may be population-specific.

Smoking: Cessation is critical to reducing CRP in patients who smoke; however, even long-term smoking cessation may not return CRP to the levels of nonsmokers, possibly due to irrevocable endothelial damage.[59,67,68]

Treating the Very High-Risk Patient

Very high-risk patients are those with history of MI, established ischemic heart disease, and/or considerable coronary plaque burden. For patients in this category, treatment strategies should focus on aggressive risk-factor reduction, inclusive of psychosocial factors. Treatment strategies that have evidence for reduction of atheroma volume include aggressive lifestyle modification (eg, a nearly vegan diet and daily yoga practice), combined LDL and CRP reduction using statins, and long-term use of niacin.[61,69,70] Combined niacin and statin therapy can be safely used (in the absence of hepatic disease), although optimal dosing remains to be established. Of note, optimal medical therapy has outperformed percutaneous cardiac interventions such as stenting in multiple clinical trials in the management of stable angina.[71,72]

Therapies for Residual Risk Factors

In the previous companion article, we discussed the constellation of additional biomarkers that can detect residual cardiovascular risk beyond the traditional lipid panel. While the vast majority of cardiovascular protection you can offer a patient is based on treating LDL-C, HDL-C, and TGs, once those goals have been reached—and if residual risk remains—you may wish to direct treatment toward lipid particle number or size or toward other biomarkers.

Therapies that reduce TGs, including niacin, will also increase both high-density and low-density lipoprotein particle size. However, you may wish to place additional emphasis on diet. High-protein (30%), low-carbohydrate (40%) diets appear effective in increasing lipid particle size.[51,73] Also, recall that most LDL-C-reducing therapies will also reduce the number of LDL particles a similar amount.[74]

Recall from our previous article that lipoprotein (a) [Lp(a)] is the lipoprotein associated with familial hyperlipidemia and that high Lp(a) levels put individuals at risk for early CVD. Thus, Lp(a) may be important to risk and should be tested in subpopulations such as young men with strong family histories of CVD. For these men, additional Lp(a) reduction can be achieved in about 8 weeks with 2 to 3 g/day of niacin (a 20%-50% Lp(a) reduction),[75] 2 g/day of L-carnitine (an 8%-12% reduction),[76] and possibly 150 mg/day coenzyme Q10 (reduction unclear).[77] One dietary approach includes nuts, which can contribute 9% to Lp(a) reduction.[17]

Conclusion

Well-known risk factors, including such psychosocial factors as depression, are major contributors to coronary artery disease.[1] On the following page you will find a summary chart, to be used as a clinical reference or patient handout, to assist in your selection of integrative therapies to combat this problem. Choice in therapy depends on degree of risk and corresponding lipid targets, patient preferences, and likely patient adherence to recommended treatments.

As behavioral change and lifestyle modification for patients can take time and multiple reinforcement strategies, it is important that time spent in lifestyle counseling be examined objectively; ie, are recommendations being adopted and are mutually agreed-upon lipid goals being met? Unfortunately, while we share the goal of getting all patients to adopt healthy diets such as the Mediterranean diet, delays in adoption can lead to delayed

risk reduction. It is also critical that the clinician's bias on choice of therapy not enter clinical decision-making; patients should be informed of the risk:benefit ratio on therapies, and on limitations to our knowledge in some areas.

Fortunately, in recent years we have seen an emergence of data on therapies such as red yeast rice that demonstrate changes in hard clinical outcomes: eg, reduced cardiovascular-related mortality.[19] The emergence of research on integrative therapies, combined with expertise in counseling on well-established lifestyle approaches, positions the integrative provider, either in primary or specialty care, to be the preeminent choice in patient-centered care for risk reduction in cardiovascular disease.

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