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Using Calcium Scoring for Cardiovascular Risk Prediction

NEWEST EVIDENCE-BASED GUIDELINES FOR HEART DISEASE PREVENTION AND THE CHANGES FROM THE PREVIOUS GUIDELINES ISSUED.

You are listening to ReachMD, The Channel for Medical Professionals. Hi, this is Dr. Thomas Bersot, President of the National Lipid Association and I would like to welcome you to Lipid Luminations hosted by Dr. Larry Kaskel and presented by the National Lipid Association. Joining me today is Dr. Carl Orringer, a visiting associate professor of medicine at Case Western Reserve University School of Medicine and a practicing cardiologist in Cleveland, Ohio and is here to discuss the newest evidence-based guidelines for heart disease prevention and the changes from the previous guidelines issued.

DR. LARRY KASKEL:

Dr. Orringer, welcome to Lipid Luminations

DR. CARL ORRINGER:

Thank you Larry.

DR. LARRY KASKEL:

Like to have you start off if you could review for us some of the basic principles that the NCEP has put out as guidelines for CHD risk assessment and treatment.

DR. CARL ORRINGER:

Well, the National Cholesterol Education Program Adult Treatment Panel III recommends accounting traditional risk factors and these include cigarette smoking, hypertension or on treatment for high blood pressure, low HDL cholesterol, which means less than 40 mg/dL, a family history of premature coronary disease in first-degree relatives and premature means under the age of 55 in men or under the age of 65 in women and age, which is greater than or equal to age 45 in men and greater than or equal to age 55 in women and then Framingham risk scoring is advocated for those individuals who have 2 or more risk factors that we just discussed and then statistical modelling is used to estimate the likelihood of coronary events and lipid management recommendations are made based on the principle of matching treatment intensity to estimated risk level. So there are easily obtainable tables, the Vascular Biology Working

Group for example has tables on their website where you can basically plug any of these risk factors into those tables, you come up with a number of points and then based upon the number of points, a person's 10-year risk of developing a myocardial infarction or coronary death is estimated based upon the number of points that a male or a female patient has and then the Adult Treatment Panel III used those point systems to basically help physicians to know what intensity of treatment should be used for LDL cholesterol and so the very high risk category, for example, those who have had recent acute coronary syndromes or the patients who have coronary heart disease with diabetes or coronary heart disease and multiple risk factors, the LDL goal is less than 70. Those who have stable coronary disease or coronary risk equivalent states, the LDL cholesterol goal is less than 100, but with an optional goal less than 70. Those who have just 2 risk factors, but a 10% to 20% Framingham risk, the LDL cholesterol goal is less than 100. Moderate risk where they have 2 risk factors, but a Framingham risk less than 10%, the LDL goal is less than 130 and then those who have either 0 or 1 risk factor, the LDL goal is considered to be less than 160. So that's kind of an overview of the National Cholesterol Education Program Adult Treatment Panel III guidelines that has come out over the last few years.

DR. LARRY KASKEL:

And I know there is a newer approach 2007 evidence-based guidelines for heart disease prevention in women. Can you comment on that?

DR. CARL ORRINGER:

Sure. Well, actually it's been suggested that women should be treated in a somewhat different fashion. The expert panel riding group actually published this in circulation 2007 and they classified women as being either at high risk, at risk, or low risk. Low risk means Framingham risk score less than 10%, healthy lifestyle, and no risk factors. At risk means, at least 1 major risk factor like cigarette smoking, poor diet, physical inactivity, obesity, family history of early heart disease, hypertension, or lipid disorder. So that's if you have one or more of those risk factors or if you have evidence of subclinical vascular disease like an elevated coronary calcium score or increased carotid intima-media thickness on imaging of the carotid arteries or if the patient has metabolic syndrome or just a poor exercise capacity, any of those would be considered to be placing a female patient at risk. Now, then is the high risk group and those are patients who have established coronary disease, those who have documented cerebrovascular disease, peripheral vascular disease, abdominal aortic aneurysms, or type 2 diabetes, or chronic renal disease, or using Framingham risk scoring greater than 20% 10-year risk, those are considered to be high-risk patients, and then once you classify your female patients according to those risk levels, it is then suggested according to these updated guidelines in 2007 that those patients who are assessed as being not at high risk basically if their cholesterol is elevated or if their blood pressure is elevated, you should get those under control and then only after that should you consider other recommendations such as raising HDL, treating triglycerides, and aspirin if women are greater than age 65. Now if the high-risk status is present as we talked about those with coronary disease, cerebrovascular, peripheral vascular disease, abdominal aortic aneurysm, diabetes, renal disease, or 10-year risk greater than 20%, the question is then did the patient have a recent coronary event. If they had a recent coronary event, it is suggested that the patient should be referred to rehab and intensive medical therapy should be undertaken. If they have not had a recent event, it is then suggested that their LDL cholesterol should be lowered, blood pressure should be treated, omega-3 fatty acid should be considered and another important point was that if depression is present, it is recommended that depression be aggressively sought after and treated. So this is little bit in variance with National Cholesterol Education Program guideline in that they have 3 levels of risk and then they treat according to whether high risk status is present or high risk status is absent, but in the end, the idea here is count risk factors, treat blood pressure, treat cholesterol, and treat in accordance with what is presumed to be the patient's risk factor burden.

DR. LARRY KASKEL:

Well, Dr. Orringer, what do you see as some of the major limitations that these approaches have in predicting someone's CHD risk?

DR. CARL ORRINGER:

Well, you know, there are few basic limitations. First of all, the risk modelling from Framingham is based upon a Caucasian middle class New England population and not everyone in the world is Caucasian middle class New Englander. Secondly, Framingham risk scoring overestimates risk in various groups like Japanese-American, native American, and Hispanics and then it is suggested that you should use re-calibration formulas in those patients and of course since many doctors don't even do Framingham risk scoring, the thought they are going to do re-calibration formula is I think wishful thinking. Now, some say well may be Framingham risk scoring should just be done as advocated by the National Cholesterol Education Program III and you know that's an interesting thought, but in reality there have been no randomized controlled clinical trial that show actually the Framingham risk scoring based approach improves clinical outcomes. Some will say well may be Framingham risk scoring should be used because of its non-predictive power for coronary events. The problem is the Framingham risk scoring is reasonably good to predict coronary risk in groups of patients with various levels of risk factor, but not necessarily in the patient sitting across from you and that's the issue. If a patient comes to you, they want to know if they are at risk for disease and you are giving them recommendations based upon groups with presumably similar characteristics, but in fact every patient is different.

DR. LARRY KASKEL:

If you have just tuned in, you are listening to Lipid Luminations on ReachMD XM 160, The Channel for Medical Professionals. I am Dr. Larry Kaskel and I am talking with Dr. Carl Orringer, a visiting associate professor of medicine at Case Western Reserve University School of Medicine and a practicing cardiologist in Cleveland, Ohio and we are talking about newer evidence-based guidelines for heart disease prevention.

Dr. Orringer, I recently heard you give a talk at the National Lipid Association meetings in Seattle and you talked about the educate program, which you were pretty involved with and I was wondering if you could tell our listeners who were not able to hear that talk a little bit about the program.

DR. CARL ORRINGER:

Well, you know, there has been a paradigm shift now in consideration of the use of coronary risk factors. The traditional approach has been that we assess risk factors, we then make decisions with regard to therapy for prevention, but there is a new paradigm that we are now considering and this was actually suggested by Scott Grundy in circulation of 2008 in a recent editorial that he did and his suggestion was we might want to think about assessing risk factors, which you then use to select patients for imaging, non-invasive imaging like coronary calcium scoring or carotid intima-media thickness measurement, assess plaque burden, and then once you assess plaque burden, determine the intensity of therapy that is used for prevention and that is kind of the idea that we have used in employing a coronary calcium scoring based approach for our aggressive prevention program at University Hospital Case Medical Center. In fact, there are 4 pretty compelling reasons to measure coronary calcium score and coronary risk assessment. First of all, it definitively diagnoses and quantifies coronary atherosclerosis. You don't get coronary calcium for reasons other than atherosclerosis. Secondly, it provides accurate prognostic information for risk of coronary death and non-fatal MI. Third, at every level of Framingham risk, the knowledge of coronary calcium provides additional predictive information for the patient who is at risk, and finally at age and coronary risk prediction in type 2 diabetics and in various under-represented groups such as minorities, younger patients, and females and so we have some very clear information that we derive from coronary calcium scoring. For example, a paper that was presented in the Journal of the American College of Cardiology in 2007 which was the American College of Cardiology foundation and American Heart Association Expert Consensus document on coronary calcium scoring pointed out that in the group of over 8000 asymptomatic patients with more than 1 risk factor, a coronary calcium score of basically 1 to 99 was associated with a 0.4% annual risk of coronary heart disease at death or non-fatal myocardial infarction. If the calcium score is 100 to 399, your annual risk is 1.3% or 13% 10-year risk, and if your coronary calcium score is 400 or greater, you are considered to be in a high-risk group, a 2.4% annual risk, which is basically a coronary risk equivalent state and the beauty of this is that you as a physician make treatment decisions based upon whether or not atherosclerosis is present. You are not doing it based upon whether risk factors for atherosclerosis are present; you are doing it based upon whether the disease is actually present. But the question you have to think is why has calcium scoring not been more widely

applied for coronary risk prediction, the probable reason for that is that the National Cholesterol Education Program, and other scoring systems have advocated traditional risk factor based models. Secondly, there is a generally a widespread lack of availability of coronary calcium scoring in most primary care settings. Third, there really have been no clear-cut physician guidelines for patient management based upon coronary calcium scores, and finally, it's expensive in most places and it's not covered by insurance. So, with that in mind then, I was very interested to see a paper that was presented in American Journal of Cardiology supplement in 2006 which described the Screening for Heart Attack Prevention and Education program or the so called SHAPE program in which they suggested that asymptomatic men over the age of 45 and women over the age of 55 who did not have any manifestations of coronary disease or coronary risk equivalent states undergo atherosclerosis testing. Those who had negative tests were treated in a more modest fashion with milder LDL cholesterol goals and those who had clear evidence of coronary atherosclerosis were treated more aggressively with lower LDL cholesterol goals and those who had coronary risk equivalent states, it was suggested that they should undergo noninvasive testing, and when the testing was abnormal, even consideration was given to recommending coronary angiography.

DR. LARRY KASKEL:

On that note, I would like to thank Dr. Carl Orringer very much for coming on the show.

DR. CARL ORRINGER:

Thank you very much Larry.

Thank you for listening to Lipid Luminations presented by the National Lipid Association. For more information, visit www.lipid.org.