A REVIEW OF NONINVASIVE METHODS USED IN THE ASSESSMENT OF ATHEROSCLEROSIS (PART 3)

Coronary Artery Calcium Using CT Tomography

I want to continue with our series of ways to help identify atherosclerosis in the body in order to better classify one's risk of a cardiovascular event or death. We already talked about using duplex ultrasound to measure carotid intima-media thickness and CT angiogram of the heart arteries. Now we are going to talk about using CT scan to identify the amount of calcium in the heart arteries (CAC scoring).

First of all, I want to make a general comment. As a heart surgeon think I have a unique perspective on coronary artery disease as I have seen and felt literally thousands of heart arteries. A cardiologist never sees the heart other than by an x-ray. The difference between a heart surgeon (cardiothoracic surgeon) and a cardiologist is often confusing to many people. Basically, a cardiac surgeon cuts and feels the heart in order to do a procedure and a cardiologist relies on x-rays only.

I also think it is important to say one thing about coronary artery atherosclerotic disease. Contrary to popular beliefs, when narrowing of the artery occurs, it occurs from inside the artery wall and pushes the inner layer called the intima outwards narrowing the artery. In other words, the cholesterol plaques do not start on the surface of the artery where the blood flows. Early plaques, which are most prone to rupture, contain little or no calcium. As the plaque matures, it may acquire calcium. Think of it in the context as how bone develops. A young child has soft bones that are more pliable and less prone to fractures as compared to adult bones that are most rigid and are calcified. Instead, the cholesterol must be driven into the artery walls in what are called lipoproteins. To understand this whole concept, you can go to my website at www.lipidcenter.com which is now considered one of the best websites available for understanding this concept.

Now with these facts out of the way, we can talk about using CT scan to assess the amount of calcium in the atherosclerotic plaques in the artery. This is not a way to identify blockages in the artery. It is only a way to assess if there is coronary atherosclerosis. Like I said earlier, many plaques have little or no calcium which then would be interpreted a normal. study In 2007, the American College of Cardiology and American Heart Association published a " Clinical Consensus Document on Coronary Artery Calcium Scoring Using Computerized Tomography". This paper was extremely thorough and gave final recommendations when this modality should be used. It is certainly overused by physicians and in fact will not be paid for by any private insurance or Medicare. When patients are evaluated as to risk of future cardiovascular events, they are stratified into low risk, moderate risk, and high risk. Low risk being a 0-10% chance over a 10 year period, moderate risk 10-20% and high risk being 20% or greater. According to the expert committee, the only group may be considered for CAC scoring is the intermediate risk group. I will

include the exact quote:
"The Committee judged that it may be reasonable to consider use of CAC measurement in such patients based on available evidence that demonstrates incremental risk prediction information in this selected (intermediate risk) patient group. This conclusion is based on the possibility that such patient might be reclassified to a higher risk status based on high CAC score, and subsequent patient management may be modified". In addition, "CAC data are strongest for Caucasian, non-Hispanic men. The Committee recommends caution in extrapolating CAC data derived from studies in white men to women and to ethnic minorities".

The other problems is that not all centers have the same equipment and when they are being read by the doctor, there is tremendous observer variability. Ideally, if patients are going to get CAC scoring, they should be performed at the same place and looked at by the same person as the prior study. The clinical role of CAC scoring is not defined yet: however, it does offer promise as a screening tool or as a precursor to invasive angiography. At this point, further trials need to be done before it can be recommended for everyone.