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Reflections on the Utility of Imaging for Prevention of Coronary Disease

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The expression of frustration about reluctance to endorse the utility of coronary artery calcification scanning expressed by HS Hecht in the *AJC* raises a fundamental question about the role of imaging techniques for prevention of cardiovascular disease (CVD) (1). Imaging of pathology by these procedures is detecting existing disease and hence it is not surprising that abnormal imaging test results are potent predictors of clinical events. However, it detects already existing disease, not the underlying factors predisposing to its occurrence.

Dr Hecht resents the call for evidence that detecting subclinical disease by imaging tests results in prevention of cardiovascular morbidity and mortality. He argues that the standard risk factor profiles such as the Framingham and various other advocated multivariable risk factor instruments have not been held to the same standard and shown to facilitate CVD prevention. However, while it is true that treatment focused on the multivariable risk has not been directly tested, it has been shown that correction of most of the components of the multivariable risk scores have each been shown to reduce the CVD event rates. Such evidence exists for control of blood pressure, dyslipidemia, and cigarette smoking. Thus it does not take much of a leap of faith to suggest or accept that reduction of multivariable risk will confer a benefit of reducing risk of CVD.

With regard to advocating imaging tests such as coronary artery calcium scanning as the initial screening, it enables a focus of preventive measures on a high risk subgroup of the population reducing the number needed to treat to prevent one CVD event. However, it would likely overlook many candidates for cardiovascular disease who are on their way to developing coronary calcification. Also, given a positive scan it would then be necessary to test for the correctable risk factors that comprise the cardiovascular risk profiles that need to be treated in order to slow the progression of the pathology detected by the imaging. Further, how many clinical cardiovascular events from unstable lesions not yet calcified will have already occurred?

Wouldn't it be better to screen the population for presence of a high multivariable CVD risk and subject those at moderate to high risk to imaging tests because of the expected higher yield of positive scans? A positive scan would then indicate the need for more aggressive treatment of the major modifiable risk factors where treatment has been shown to be of benefit. It would also reduce the number needed to treat to prevent one CVD event in the highly prevalent moderate multivariable risk subgroup of the population from which most of the CVD events emerge.

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Dr Hecht asserts that “It is incumbent on the cardiology community to temper the inflexible need for randomized trials with the reality of 565,000 patients presenting with myocardial infarctions annually as their first symptoms, 95% of whom could be identified as at high risk by CAC screening and aggressively treated to significantly reduce events”. Incidentally, the references he cites do not support the assertion. They indicate that there is a high prevalence of coronary artery calcification among persons who have already had a clinical event and not necessarily all of those eventually destined to have one.

In any event, it is important to understand that access to medical procedures no matter how sophisticated, can only make a modest contribution to the health of the community. Actually, modifying disease promoting behavior has the greatest impact on the health of the population. The US spends more on health care than any other nation in the entire world, yet it does not rank high on population measures of health status. Even where health care is important, many Americans do not receive it, receive it too late, or receive poor quality health care (2).

According to McGinnis, et al (3) there are 5 major population attributes that influence health. In terms of the proportional contribution to premature death, behavioral patterns are the most influential; responsible for 40%, followed by genetic predisposition (30%), social circumstances (15%), health care (10%) and environmental exposure (5%). The top behavioral causes of premature death are unrestrained weight gain, physical inactivity and smoking.

Imaging tests are contributing to our understanding of the way atherogenesis arises and progresses and can provide epidemiological insights about risk factors that contribute to subclinical disease occurrence and progression. They also can be used to focus preventive measures of proven benefit on the large moderately CVD prone subgroup of the population from which most of the events arise.

References

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