Cardiovascular Prevention in Asymptomatic Diabetic Patients

The recent paper by Diamond et al. (1) comparing costs and effectiveness of using myocardial perfusion scintigraphy (MPS) as a screening strategy against an unconditional treatment strategy for the prevention of cardiovascular events in asymptomatic diabetic patients using a “back of the envelope” calculation contains fatal errors. Table 1 of their article, page 1916, detailing the cost analysis to the end of year 1, front-loads the entire MPS testing cost ($11.3 billion) into the first year of this multi-year program, when in fact, the benefit from testing accrues into year 2 and beyond without the cost. Instead of looking at the result at the end of year 1, Diamond et al. (1) should have looked at the costs under steady-state conditions. At steady state the number of tests needed each year is equal to the number of new individuals entering the risk pool plus the number of retests needed on the test-negative population. According to the National Diabetes Information Clearinghouse, a service of the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health (2), the prevalence of diabetes in the U.S. in 2005 was 20.8 million, with 14.6 million diagnosed cases, 6.2 million undiagnosed cases, and 1.5 million new cases being diagnosed in individuals 20 years and older each year. According to Diamond et al. (1), there are 11.2 million individuals with a negative test. Although no one has ever proposed retesting all the test-negative individuals on an annual basis, just what interval to use for retesting is not clear from the “Global Dialogue Group for Evaluation of Cardiovascular Risk in Patients with Diabetes” (3), which advocates for retesting individuals with mild stress perfusion defects every 2 years, whereas those with normal perfusion scans undergo “conventional” follow-up. Giri et al. (4) compared the survival curves of 929 diabetic individuals and 3,825 nondiabetic individuals with a normal single-photon emission computed tomography (SPECT) study followed for a mean of 2.5 ± 1.5 years and found that survival was comparable for the first 2 years; thereafter, diabetic patients exhibited a sharp increase in cardiovascular events. Based on this observation, Hachamovitch et al. (5) proposed that the “warranty period” of a normal SPECT scan in diabetics be limited to 2 years. For the purposes of this discussion, let us assume that all test-negative individuals are retested at 2-year intervals. The number of annual retests needed is then 0.5 × 11.2 = 5.6 million tests. At steady state, because everyone has been tested once, the numbers of individuals treated and events expected and prevented will be the same as the projections by Diamond et al. (1) for the end of year 1. These numbers are shown in Table 1.

The marginal cost-effectiveness of the unconditional versus the test-and-treat strategy also would significantly lower the cost of this program. The gross costs of these programs become identical when the price of statins drops 30%, from $2.00/pill to $1.41/pill, but the cost-effectiveness becomes equivalent at $1.89/pill because more events are prevented by the unconditional treatment strategy. These calculations show that although both programs are very expensive, the test-and-treat strategy is currently the more cost-effective, reversing the conclusions by Diamond et al. (1).

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