Screening for Hyperglycemia: The Gateway to Diabetes Prevention and Management for All Americans

In the United States, approximately 28 million persons have diabetes—triple the number from 3 decades ago—and one third of Americans with type 2 diabetes mellitus are unaware of their condition (1). The complications from diabetes, including heart disease, stroke, amputations, kidney disease, eye disease, low quality of life, and poor mental health, are manifold and proflig. In addition to its toll on health, diabetes costs the United States $245 billion annually, including $176 billion from direct health care costs (2).

There have been positive improvements in the quality of diabetes care in the United States (3), and consequently, population-level decreases in the rates of complications among persons with diabetes (notably, myocardial infarction, deaths from hyperglycemic crisis, stroke, amputations, and end-stage renal disease) (4). Although the rates of these complications may be decreasing, the residual rates are still high. More importantly, the absolute numbers of persons with diabetes-related complications have increased over time, driven by the growing prevalence of diabetes, and even conservative scenarios project that the number of Americans with diabetes will nearly triple by 2050 (5). This is especially concerning because roughly 1 in 5 health care dollars already go to treating diabetes; 25% of Medicare’s annual budget is used on persons with diabetes; and from 1997 to 2006, diabetes accounted for the single biggest contributor to inflation-adjusted health care spending growth among Medicare beneficiaries (6). In this context, attention to diabetes prevention should be a high priority because even small reductions in the incidence of chronic diseases, such as diabetes, can have a substantial effect on future prevalence of disease (5).

As summarized in the systematic review by Selph and colleagues (7) in this issue, considerable science exists for prevention or delay of type 2 diabetes in persons with prediabetes (impaired glucose tolerance or impaired fasting glucose) through treatment with lifestyle intervention (6 studies), pharmacologic intervention (8 studies), or multifactorial intervention (2 studies). Treatment duration ranged from 6 months to 6 years with follow-up extending up to 23 years, and lifestyle intervention reduced risk for progression to type 2 diabetes by an average of 45%. Most trials of treatment of impaired glucose tolerance or impaired fasting glucose were not sufficiently powered to find effects on all-cause or cardiovascular disease (CVD) mortality, although lifestyle modification was associated with a decreased risk for both outcomes after 23 years in 1 trial. Although lifestyle interventions were not highlighted by Selph and colleagues, they also have been shown to have positive effects on regression from prediabetes to normoglycemia, CVD risk factors (such as weight, blood pressure, lipids, and inflammatory markers), incidence of the metabolic syndrome, urinary incontinence in women, and quality of life.

The strong evidence backing diabetes prevention unequivocally calls for aggressive implementation, and adequate integration of community and clinic resources and infrastructure for delivery of effective lifestyle interventions are imperatively needed. However, 90% of the 86 million Americans with prediabetes are not aware of their condition (8), and the first step to resolving this should be a national policy on screening and detection of prediabetes. Recommendations for prediabetes and diabetes screening have remained unresolved and vary from the position of the American Diabetes Association, which recommends broader screening by targeting everyone aged 45 years or older or persons at high risk for diabetes, to the highly conservative position of the U.S. Preventive Services Task Force (USPSTF), which recommends screening only adults with sustained treated or untreated hypertension. However, the review by Selph and colleagues, done to support an upcoming update of USPSTF recommendations, has concluded that there is moderate certainty that measuring blood glucose to detect prediabetes or diabetes has net benefits and no significant harms in adults at high risk for diabetes. In a draft of these recommendations, the USPSTF broadened its criteria for screening but has not yet finalized recommendations after a public comment period that ended in early November 2014 (www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatement-Draft/screening-for-abnormal-glucose-and-type-2-diabetes-mellitus).

A national policy to screen all persons at high risk for diabetes (closer to the American Diabetes Association policy) would help identify those with undetected diabetes and prediabetes. The initial treatment of these conditions is lifestyle intervention followed by metformin, and evidence for benefits of these treatments exists. Much of the debate around screening for prediabetes and diabetes focuses on the lack of direct evidence from randomized, controlled trials comparing screened with unscreened persons on a hard outcome, such as CVD or mortality. However, such a definitive trial of hyperglycemia screening is infeasible, unrealistic, and arguably unethical given the strong evidence for diabetes prevention among persons with impaired glucose tolerance or impaired fasting glucose. Intriguingly, the USPSTF used evidence from diabetes prevention trials to recommend broad screening for obesity but has been cautious about recommending screening for diabetes. Furthermore, the effect of early identification and treatment on multiple diabetes complications, above and beyond CVD and mortality (such as retinop-
athy, quality of life, and health care costs), should be considered in the big picture. Evidence from studies other than randomized, controlled trials should also play an important role in helping to resolve the screening debate. Systematic reviews of the economics of screening for diabetes or dysglycemia and several published models have concluded that screening for hyperglycemia followed by treatment with lifestyle intervention or metformin among persons with diabetes and prediabetes would be cost-effective (9).

Evidence-based medicine is “a set of principles and methods intended to ensure that, to the greatest extent possible, population-based policies and individual medical decisions are consistent with evidence of effectiveness and benefit” (10). To the greatest extent possible, short of a direct randomized, controlled trial testing of screening on a hard outcome, the overall body of data supports a broad policy, closer to the American Diabetes Association position, for early detection of prediabetes and diabetes. Furthermore, reliable tests exist, the risk associated with screening are small or none, and the cost-effectiveness of screening is well within the justifiable range (9). Detection of prediabetes and diabetes would offer a strategic window of opportunity to intervene on other CVD risk factors in an integrated manner (1). Without screening, 90% of prediabetes cases will remain undetected, and we will continue to miss the opportunity to aggressively implement strategies to prevent diabetes and remain unable to slow the growing costs of managing diabetes and its complications.

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References