VIEWPOINT

Addressing the Burden of Diabetes

Elizabeth R. Seaquist, MD
Division of Endocrinology and Diabetes, University of Minnesota, Minneapolis.

Author Reading at jama.com

The prevalence of diabetes continues to increase around the globe. In 2010, an estimated 26 million individuals in the United States had diabetes and 79 million persons older than 20 years had prediabetes.[1] If the current epidemic is not addressed, the US Centers for Disease Control and Prevention estimates that as many as 1 in 3 people in the United States could have diabetes by the year 2050.[2]

Although much of the increase in disease prevalence is due to an increase in the number of people with type 2 diabetes, recent evidence shows an increase in diagnoses of type 1 diabetes as well.[3] Prevention strategies that include lifestyle changes and modest weight reduction have been shown to be effective in patients at risk for type 2 diabetes, but such strategies are not yet available for patients with type 1 diabetes.

Diabetes also has significant economic consequences. In 2012, 1 in 5 health care dollars was spent to support the care of patients with diabetes at a total estimated cost of $245 billion.[4] Many of these costs are associated with the long-term complications of the disease, but there is hope that costs can be contained as access to care to prevent diabetes complications becomes more widely available. The good news is that this appears to be happening. A recent report based on data from the National Health Interview Survey, the National Hospital Discharge Survey, the US Renal Data System, and the US National Vital Statistics System found that the rates for 5 diabetes complications declined between 1990 and 2010, with a 68% reduction in acute myocardial infarction among persons with diabetes.[5]

The challenge is that even though the risk of complications is decreasing in people with established diabetes, more people are being diagnosed with the disease, leading to stabilization of the overall prevalence of complications. Reduction of diabetes disease burden will require early identification of those at risk, implementation of effective preventive strategies, and ongoing management of metabolic factors known to contribute to the development of diabetes complications.

One metabolic factor that is important in the development of diabetes complications is glucose control. Studies performed more than a decade ago among patients with both type 1 and type 2 diabetes (ie, the Diabetes Control and Complications Trial and the UK Prospective Diabetes Study, respectively) have shown that treatment strategies that result in levels of hemoglobin A_{1c} of 7.0% to 7.5% are associated with a reduction in the microvascular complications of diabetes compared with higher hemoglobin A_{1c} targets. As a result, many professional groups, including the American Diabetes Association,[6] recommend a target hemoglobin A_{1c} level of approximately 7.0% for most patients. To achieve this level of glycemic control requires a careful balance of good dietary and lifestyle choices, including regular exercise and weight loss in those who are overweight, as well as pharmacological therapy.

Metformin is generally recommended as the initial drug for patients with type 2 diabetes, but most patients eventually require a second, third, or even fourth drug to achieve target glycemic control. Practitioners now have many drugs to offer to patients who can no longer maintain good glycemic control with metformin in combination with dietary and lifestyle management, but the choice of additional drug therapy is usually based on a review of adverse effects and cost, rather than evidence.

Glycemia Reduction Approaches in Diabetes (NCT01794143), a comparative effectiveness trial funded by the National Institutes of Health, is currently enrolling patients to determine which of 4 available drug classes is most effective at maintaining a hemoglobin A_{1c} level of less than 7.5% in combination with metformin in patients having type 2 diabetes for less than 10 years. Drugs to be compared include glargine insulin, glimepiride, sitagliptin, and liraglutide. Developing a rational treatment strategy for patients with type 2 diabetes requires a stronger evidence base for therapeutic decisions.

One of the most concerning adverse effects of diabetes treatments is hypoglycemia, which is a consequence of exogenous insulin or stimulation of endogenous insulin secretion by sulfonylureas or glinides. Hypoglycemia may induce palpitations, sweating, and hunger, and if left untreated, can lead to coma, seizures, and death. Hypoglycemia is more common among patients with type 1 diabetes, and its incidence increases with diabetes duration.[7]

However, because so many more people with diabetes have type 2 diabetes, practitioners will see more cases of iatrogenic hypoglycemia in patients with this form of the disease. Patients older than 80 years are at particular risk for severe hypoglycemia (an event that requires the assistance of another), as evidenced by their high rates of emergency department visits and subsequent hospitalizations for this event.[8] An association between severe hypoglycemia and mortality after the event has been shown in study participants with type 2 diabetes who are at increased risk for cardiovascular disease.[9]

Because the risk of hypoglycemia increases with intensification of therapy targeted to achieve lower hemoglobin A_{1c} levels, these targets may need to be individualized based on factors such as the risk of hypoglycemia. Aiming for a hemoglobin A_{1c} level above 7.5% or even 8.0% may be more appropriate for elderly patients with multiple comorbidities, but clinical trials are necessary to validate this recommendation.

In the Action to Control Cardiovascular Risk in Diabetes trial, the risk of mortality was highest in par-

Corresponding Author: Elizabeth R. Seaquist, MD, Division of Endocrinology and Diabetes, University of Minnesota, MMC 101, 420 Delaware St SE, Minneapolis, MN 55455 (seaqu001@umn.edu).

ticipants who were unable to achieve target glycemic control goals, irrespective of randomization to the standard or intensive treatment group.[10] These data suggest that failure to achieve hemoglobin A_{1c} target levels may be a marker of poor outcome, although it is unknown if inability to implement a treatment protocol or poor metabolic response to prescribed medications is the underlying cause.

Addressing the epidemic of diabetes will involve reducing the effects of the disease on patient outcomes and quality of life, as well as lowering cost to the health care system. Ultimately, this will require new strategies to prevent the disease in those at risk and cure those who have already developed diabetes. More research is necessary to understand the pathogenesis of all forms of the disease to address the root causes.

Until then, physicians, other health care professionals, and patients must focus on implementing evidence-based prevention and treatment approaches in determining how to best use the currently available tools. Diabetes is a devastating disease, but its burden can be reduced with appropriate management and individualized care.

ARTICLE INFORMATION

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