Lown Right Care

Reducing Overuse and Underuse

Prediabetes Diagnosis: Helpful or Harmful?

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Case Scenario

A 74-year-old man with hypertension, hyperlipidemia, and a body mass index of 35 kg per m^2 presented for a physical examination. His primary care physician ordered a basic metabolic profile. The laboratory report showed that his blood glucose level was 105 mg per dL (5.83 mmol per L), which is high.

After researching online, the patient's daughter told him that he might have a condition called prediabetes. She arranged an appointment with an endocrinologist, who told the patient to check his glucose level twice per week with a home glucose monitor and ordered an A1C measurement, which was 5.9%. The endocrinologist confirmed the diagnosis of prediabetes and told the patient that he was at high risk of developing diabetes mellitus and its complications unless he gets his glucose levels down.

For the next few months, the patient checked his glucose level three times per day, sometimes graphing the results; ate fewer donuts; and tried to walk more. When his glucose numbers did not improve, his endocrinologist prescribed metformin, which caused diarrhea. Frustrated and stressed, the patient returned to his primary care physician for advice.

Clinical Commentary

ORIGINS AND INCIDENCE

Hyperglycemia below the diabetes threshold was not considered a significant illness until 2004, when the American Diabetes Association (ADA) labeled it as prediabetes to increase awareness and prompt physicians to act. Prediabetes was initially defined as a fasting blood glucose level between 110 and 125 mg per dL (6.11 and 6.94 mmol per L) or an A1C of 6% to 6.4%. In 2010, the ADA lowered these thresholds to between 100 and 125 mg per dL (5.55 to 6.94 mmol per L) or 5.7% to 6.4%. The diagnosis of prediabetes has led to increased testing, physician visits, and treatments. In 2012, the cost of treating prediabetes was $44 billion, or 1.6% of all health care costs.[1] In 2017, an estimated 352 million adults had prediabetes, which constitutes 7.3% of the world's adult population.[2] The prevalence is even higher among older people in the United States.[3]

PROGRESSION TO DIABETES

The ADA and other organizations have estimated prediabetes to diabetes conversion rates of 5% to 10% within one year, 25% within five years, and 70% any time after a prediabetes diagnosis.[4] But the reality is more nuanced. Depending on the definition of prediabetes, the conversion rate can be much lower, especially when only people with a fasting blood glucose level between 100 and 110 mg per dL (5.55 and 6.11 mmol per L) are considered.[5]

Older adults also have a much lower rate of progression to diabetes. In a 2019 Swedish study of adults older than 70 years who were followed for 12 years after a diagnosis of prediabetes, 13% progressed to diabetes, and 22% became normoglycemic.[2] In a 2021 U.S. study of adults 71 to 90 years of age, 73% met at least one diagnostic criterion for prediabetes. After six years, 9% had progressed to diabetes, and 13% were normoglycemic.[6] In both studies, there was no difference in mortality between those with prediabetes and those with normal blood glucose levels.

PROGNOSIS

An additional concern about prediabetes is the hyperinflammatory ramifications of insulin resistance, which can lead to microvascular and macrovascular complications. There is no evidence of increased cardiovascular incidence or mortality in people with prediabetes when confounding risk factors are considered.[7] Studies that suggest an increase in microvascular complications use surrogate markers such as albuminuria for kidney disease, retinal fundoscopic changes for ophthalmologic disease, and vagal nerve

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TAKE-HOME MESSAGES FOR RIGHT CARE

- Older adults with prediabetes are less likely to progress to diabetes mellitus than younger adults.
- In a U.S. study of adults 71 to 90 years of age, 73% met at least one diagnostic criterion for prediabetes. After six years, 9% of the group had progressed to diabetes, and 13% were normoglycemic.
- Although the use of metformin in patients with prediabetes delays conversion to diabetes, no studies show that metformin or any other drugs prevents complications.
- A diagnosis of questionable clinical significance could cause psychological distress and lead to additional testing, overtreatment, increased physician visits, and financial hardship.

stimulation markers for neuropathic disease. The only patient-oriented parameter that reaches statistical significance is symptomatic retinopathy, and its incidence is difficult to determine.[5]

It is unclear whether people with prediabetes who progress to diabetes develop complications or severe disease (i.e., an A1C level of greater than 9%). In 1998, the ADA changed the threshold for the diagnosis of diabetes from a fasting blood glucose level of 140 mg per dL (7.77 mmol per L) to 126 mg per dL (6.99 mmol per L). After 10 years, most people with glucose levels of more than 126 mg per dL and less than 140 mg per dL do not progress to higher glucose levels or develop clinical manifestations of diabetes, and treating these patients does not impact vascular complications.[8] Other studies have shown no clear evidence of micro- and macrovascular disease in the A1C range of 6.5% to 7%.[7] If people with mild diabetes do not develop complications, it is even less likely that people with prediabetes will.

TREATMENT

One review suggests that to prevent one case of prediabetes from evolving into diabetes in three years, seven people would have to participate in intensive lifestyle modification and weight loss coaching.[9] However, the cost and feasibility of prolonged weight loss coaching are questionable.[7,10] The Centers for Disease Control and Prevention's (CDC's) National Diabetes Prevention Program states that "…people with prediabetes who take part in a structured lifestyle change program can cut their risk of developing type 2 diabetes by 58% (71% for people over 60 years old)."[11] However, counseling patients about a healthy diet and physical activity should probably be more universally applied, and the benefits stated by the CDC are less applicable to older people with prediabetes.

The use of metformin for prediabetes reduces the conversion to diabetes over three years (number needed to treat = 14).[12] But no studies demonstrate the value of using metformin or other drugs to prevent short- or long-term complications in people with prediabetes. Opportunity costs of prediabetes treatment are also a concern.[13]

HARMS OF PREDIABETES DIAGNOSES

A diagnosis of questionable clinical significance could cause psychological distress and lead to additional testing, overtreatment, increased physician visits, and financial hardship.[1,8] The patient may be so focused on the diagnosis of prediabetes that they neglect other, more salient health and lifestyle choices.[7,10] A diagnosis of prediabetes can lead to treatments with benefits that may not outweigh the harms.[14]

CONCLUSION

Prediabetes is a broadly defined condition that affects a large proportion of the population. Paradoxically, it is common in older people, most of whom do not progress to diabetes. There is no evidence that treating prediabetes with medications decreases mortality, macrovascular complications, or significant microvascular complications. Counseling patients about a healthy diet, physical activity, and weight loss for those who are overweight is worthwhile whether or not a patient is diagnosed with prediabetes.

Patient Perspective

In some ways, prediabetes seems to be a poster child for overtreatment. Interventions for this condition bring little to no benefit to the patient, increase the risk of adverse effects, increase the burden of care, overcrowd the medical system, and create needless expenses. People fear diabetes, and the stress of feeling that you are on the verge of a dangerous condition can have negative consequences. Reassuring this patient that studies indicate prediabetes is unlikely to progress at his age could help dispel these fears. Some patients may also appreciate learning about the evolution of the concept of prediabetes and the historical context of widened disease thresholds.[15]

An interesting aspect of this scenario is that the concern over prediabetes comes from the patient, or a family member in this case, doing research online. Independent research is an important educational tool for patients and should not be discouraged. However, there is little skepticism to be found about a prediabetes diagnosis if you search the term online. Most popular websites follow the CDC guidance of lifestyle coaching and recommend fitness centers that offer lifestyle coaching programs, which are covered by Medicare Part B. Although these programs are beneficial to some patients, they are not for everyone, especially if the patient has limited access to transportation or has concerns about being with groups of people in indoor spaces.

This is a situation in which considering patient values and preferences is critical. The patient has indicated his dissatisfaction with the adverse effects of medication but has an ongoing concern about a weight-related condition. This presents an opportunity for the primary care physician to work with him to design a plan that the patient considers feasible. A nutritionist might also be consulted to help with diet planning. We know that the patient has a daughter who cares about him and is likely to support recommendations for stress reduction, better nutrition, physical activity, and weight loss. She should be engaged in shared decision-making with him and his primary care physician about her father's care. Together, they can collaborate to develop a lifestyle program that fits into the realities of his daily life. In addition to lowering his glucose levels, this also has the potential to improve his hypertension and hyperlipidemia.

Resolution of Case

During his next visit, the patient admitted that his stress level had escalated, he thought about his glucose levels night and day, and he was uncomfortable taking more medications. He had gained 7 lb since the diagnosis, which he blamed on stress eating. His physician spoke to him about the excellent prognosis of prediabetes in patients his age and that with a good diet and physical activity, he will likely not develop diabetes and will be healthier overall. They discussed a diet plan that the patient felt comfortable with and agreed not to check his A1C or blood glucose level for one year.

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