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Letter to the editor

Teplizumab: an FDA- approved drug, marks milestone in treatment of type 1 diabetes

Sir,

Diabetes type-1 is a chronic disease characterized by immune-mediated destruction of insulin-producing beta cells in the pancreas. It progresses through distinct stages at varying rates, with stage 1 being β-cell autoimmunity with normal blood sugar, stage 2 being β-cell autoimmunity with dysglycemia, and stage 3 being symptomatic disease onset.[1]

According to the International Diabetes Federation Atlas 9th edition 2019, approximately 1.98 billion children (aged 0-18 years) and 2.58 billion adolescents (aged 10-19 years) globally have type 1 diabetes.[2]

Currently, the only medication used for T1DM is insulin, which must be continuously injected along with dietary regulation, and Symlin, a synthetic analog of the hormone amylin, which effectively reduces postprandial blood glucose levels in individuals with diabetes.[3]

Recent research has shown that TZIELD (teplizumab-mzwv), a CD3-directed antibody, is a promising therapy for delaying the onset of stage 3 T1D in adults and pediatric patients aged 8 years and older with stage 2 T1D.[4]

Teplizumab is a type of medication that is designed to alter T cells so that the pancreas can produce insulin for longer duration. It is targeted specifically at a molecule known as CD3 present in T- cells. The Fc-nonbinding anti-CD3 monoclonal antibody initiates programmed cell death of human T-cells, thus preventing them from destroying insulin producing beta cells in the pancreas.[5]

A phase 2 clinical trial was conducted to evaluate the efficacy of teplizumab in preventing the onset of type 1 diabetes among high-risk individuals. Seventy-six participants, aged at least 8 years, were enrolled in the study and randomized into two groups: teplizumab (n=44) and placebo (n=32). Participants in the teplizumab group received a 2-week course of treatment, followed by a median follow-up period of 745 days. The incidence of type 1 diabetes was lower in the teplizumab group (43%) compared to the placebo group (72%). The median time to onset of type 1 diabetes was longer in the teplizumab group (48.4 months) compared to the placebo group (24.4 months). Based on these findings, the trial concluded that a 2-week course of teplizumab can delay the onset of type 1 diabetes by an average of 2 years in high-risk patients.[6]

The approval of teplizumab by the FDA is a significant event that marks the beginning of a revolutionary change in the approach to treating type 1 diabetes. Delaying the onset of T1D can help improve quality of life and reduce the risk of complications associated with the disease. The approval is the initial stage in preventing the onset of the disease and potentially even restoring lost cells. Combining therapies could strengthen the response in those who are vulnerable to type 1 diabetes. Furthermore, substituting the insulin-generating cells that were destroyed, such as with beta cells derived from stem cells in combination with teplizumab, might be a successful approach.[7]

Although it might show adverse reactions like skin eruption, leukopenia, and cephalgia, Teplizumab can delay T1D progression to stage 3 by an average of 2 years, with some patients experiencing longer delays.[2] One student in a clinical trial remained diabetes-free for 11 years after treatment with teplizumab.[7] The trial had a small cohort and limited statistical power, and its generalizability to those without first-degree relatives at risk for type 1 diabetes is unclear. However, FDA approval of teplizumab could be a major breakthrough in T1D treatment.

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