STUDENTS' CORNER
LETTER TO THE EDITOR

Newest and most promising Type 1 Diabetes treatment

Umm E Salma Banatwala, Rayaan Imran, Muhammad Usman Taufiq

Dear Madam, According to the International Diabetes Federation, Pakistan has the highest diabetes prevalence in the world.[1] Ttype 1 diabetes (T1DM), is a chronic condition where the pancreas makes little or no insulin. Despite extensive research, cure for T1DM has not been found. Typical treatment uses insulin injections, diet modifications, and exercise to manage blood glucose. This letter concisely explains the latest treatment for T1DM.

Conventionally, exogenic insulin substitution was done by testing blood sugar levels after finger pricking. However, modern treatment includes; automated glucose monitoring technology and insulin pumps.

Since T1DM is an autoimmune disease caused by the destruction of β-cells, the replacement of β-cells using allogeneic solid organ pancreas or islet transplantation treats the disease.[2] However, this treatment requires lifelong immunosuppression drugs, that could lead to severe infections or nephrotoxicity. Other approaches include targeting T-cells, B-cells, or specific single antigens of which limitations range from side effects due to cytokine storm or inability to identify the key antigen. Even though immunotherapies further refined targeted inflammatory pathways, there is a lack of evidence as to if they can restore immune tolerance. On the other hand, therapies targeting cell-intrinsic metabolism may enhance β-cell survival but may result in β-cell dysfunction.[2]

Given the grim situation of current T1DM treatments, the artificial pancreas is revolutionary. Specific hybrid artificial pancreas required the patient to count the carbohydrates consumed at mealtime. The modern system uses continuous glucose monitoring technology (a sensor inserted under the skin), delivering insulin via the infusion pump according to the blood glucose level.

The modern MiniMed 780G artificial pancreas is the first insulin delivery system to automatically administer bolus correction insulin dosage every 5 minutes and adjust insulin doses based on glucose levels. This technology can rectify insufficient or skipped pre-meal dosages by providing extra insulin.

A study of 4120 780G users reported that outcomes matched the recommended goals by the American Diabetes Association's Standards while commending its ability to achieve low variability in glycaemic controls.[3] Another prospective study published in 2023 concluded that switching to the 780G improves the restoration of hypoglycaemia awareness and metabolic control.[4] One notable side effect of this system is localized skin infection.[5]

In conclusion, treatment options for T1DM are ever-growing. The artificial pancreas shows promising results with milder side effects compared to other treatments. Further advancements are integral.

Second Year MBBS Student, Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan.

Correspondence: Rayaan Imran. e-mail: rayaanimran2002@gmail.com

ORCID ID. 0000-0003-3326-7142

Disclaimer: None.

Conflict of interest: None.

Funding disclosure: None.

DOI: https://doi.org/10.47391/JPMA.9916

Submission completion date: 05-05-2023

Acceptance date: 05-07-2023

References

1. IDF Diabetes Atlas. Tenth Edition [Online] [Cited 2023 May 1]. Available from: URL: https://diabetesatlas.org/
2. Warshauer JT, Bluestone JA, Anderson MS. New Frontiers in the Treatment of Type 1 Diabetes. Cell Metab 2020; 31: 46–61.
3. Silva J Da, Lepore G, Battelino T, Arrieta A, Castañeda J, Grossman B, et al. Real-World Performance of the MiniMedTM 780G System: First Report of Outcomes from 4120 Users. Diabetes Technol Ther 2022; 24: 113–9.
4. Nattero-Chávez L, Lecumberri Pascual E, De La Calle E, Bayona Cebada A, Ruiz T, Quintero Tobar A, et al. Switching to an advanced hybrid closed-loop system in real-world practice improves hypoglycemia awareness and metabolic control in adults with type 1 diabetes, particularly in those with impaired perception of hypoglycemia symptoms. Diabetes Res Clin Pract 2023: 199: 110627.
5. Contraindications; Risks And Side Effects - Medtronic MiniMed 780G System User's Manual [Page 22] | ManualsLib. [Online] [Cited 2023 May 1]. Available from: URL: https://www.manualslib.com/manual/1971363/Medtronic-Minimed-780g.html?page=22#manual