Perspective

Journal of Diabetes Medication & Care

AI-Guided Diabetes Drug Selection: Personalizing Therapy Through Technology

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Received: 01-Jun-2025, Manuscript No. jdmc-26-184890; **Editor assigned:** 03-Jun-2025, PreQC No. jdmc-26-184890 (PQ); **Reviewed:** 18-Jun-2025, QC No. jdmc-26-184890; **Revised:** 21-Jun-2025, Manuscript No. jdmc-26-184890 (R); **Published:** 30-Jun-2025, DOI: 10.37532/jdmc.2025.8(3).303-304

Introduction

The management of diabetes is increasingly complex, with a growing array of pharmacologic options, ranging from traditional oral hypoglycaemias to injectable therapies such as insulin and GLP-1 receptor agonists. Selecting the most effective therapy requires consideration of patient-specific factors, including comorbidities, renal and hepatic function, lifestyle, and risk of hypoglycemia. Artificial intelligence (AI) offers a promising solution by analyzing large datasets to guide individualized drug selection, optimize outcomes, and streamline clinical decision-making [1,2].

Discussion

AI-guided diabetes drug selection leverages machine learning algorithms to process data from electronic health records, continuous glucose monitoring, laboratory results, and demographic information. These systems identify patterns and predict how individual patients are likely to respond to specific medications. By integrating real-time data with evidence-based guidelines, AI can recommend optimal drug combinations, dosing strategies, and therapy adjustments.

One key advantage of AI is its ability to personalize therapy based on multiple interacting factors. For example, a patient with type 2 diabetes, chronic kidney disease, and cardiovascular risk may benefit from an SGLT2 inhibitor, while AI can identify optimal dosing and assess potential drug interactions. Similarly, for patients struggling with weight management, AI may prioritize GLP-1 receptor agonists and provide guidance on integrating adjunct therapies for maximal benefit [3,4].

AI also supports dynamic therapy adjustments. By analyzing trends in glucose patterns, insulin requirements, and medication adherence, algorithms can recommend timely modifications to prevent hypo- or hyperglycemia. This predictive capability enhances safety and reduces the trial-and-error approach often associated with traditional diabetes management [5].

Implementation of AI-guided drug selection can also improve efficiency in clinical practice. It reduces cognitive burden on healthcare providers, shortens decision-making time, and supports evidence-based personalization for diverse patient populations. Importantly, AI tools complement rather than replace clinician judgment, ensuring that recommendations are contextualized to patient preferences and goals.

Conclusion

AI-guided diabetes drug selection represents a significant advancement in personalized medicine, enabling precise, data-driven therapeutic decisions. By integrating patient-specific factors with predictive analytics, AI enhances treatment efficacy, safety, and adherence. As technology evolves and datasets expand, AI has the potential to revolutionize diabetes care, delivering optimized, individualized therapy while supporting clinicians in providing high-quality, patient-centered management.

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