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The primary aim of *World Journal of Diabetes* (*WJD*, *World J Diabetes*) is to provide scholars and readers from various fields of diabetes with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJD mainly publishes articles reporting research results and findings obtained in the field of diabetes and covering a wide range of topics including risk factors for diabetes, diabetes complications, experimental diabetes mellitus, type 1 diabetes mellitus, type 2 diabetes mellitus, gestational diabetes, diabetic angiopathies, diabetic cardiomyopathies, diabetic coma, diabetic ketoacidosis, diabetic nephropathies, diabetic neuropathies, Donohue syndrome, fetal macrosomia, and prediabetic state.

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Balancing act: The dilemma of rapid hyperglycemia correction in diabetes management

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Abstract

The global diabetes surge poses a critical public health challenge, emphasizing the need for effective glycemic control. However, rapid correction of chronic hyperglycemia can unexpectedly trigger microvascular complications, necessitating a reevaluation of the speed and intensity of glycemic correction. Theories suggest swift blood sugar reductions may cause inflammation, oxidative stress, and neurovascular changes, resulting in complications. Healthcare providers should cautiously approach aggressive glycemic control, especially in long-standing, poorly controlled diabetes. Preventing and managing these complications requires a personalized, comprehensive approach with education, monitoring, and interdisciplinary care. Diabetes management must balance short and long-term goals, prioritizing overall well-being. This editorial underscores the need for a personalized, nuanced approach, focusing on equilibrium between glycemic control and avoiding overcorrection.

Key Words: Diabetes; Hyperglycemia correction; Management; Microvascular complications; Glucose control

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Core Tip: Rapid glycemia corrections may unexpectedly lead to microvascular complications in diabetes. Balancing glycemic control is crucial in diabetes management. Prioritizing an individualized, comprehensive care approach is essential to ensure long-term well-being.

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INTRODUCTION

The global increase in diabetes prevalence poses an ongoing challenge to public health[1,2]. Despite the well-demonstrated benefits of maintaining blood glucose levels close to normal in preventing or slowing the development of diabetes-related complications, a significant portion of those affected by diabetes struggle to reach their glycemic target goals[3,4]. A recent case report by Huret *et al*[5] discussed a 25-year-old woman who has lived with type 1 diabetes since the age of 9. Initially, her diabetes was unstable but without complications. During an unplanned pregnancy, her hyperglycemia was intensively managed. However, its consequences became evident over the subsequent two years as the patient developed a cascade of microvascular complications, including Charcot neuroarthropathy, proliferative diabetic retinopathy, gastroparesis, bladder voiding disorders, and end-stage renal failure requiring hemodialysis.

This case highlights an infrequently discussed issue in diabetes management: The ramifications of aggressive hyperglycemia correction. While preventing complications and maintaining glycemic control is crucial, the rate and intensity of correction, particularly for patients with a history of chronic hyperglycemia, demand equal consideration. This case highlights the complexity of diabetes management. Patients must navigate between preventing complications and avoiding the perils of overcorrection, which paradoxically leads to a cascade of microvascular complications.

Diabetes management is a multifaceted challenge affecting millions worldwide[6,7]. Prolonged hyperglycemia is closely associated with the development of numerous diabetes-related complications, such as cardiovascular disease, retinopathy, neuropathy, and nephropathy[8,9]. These complications represent the darker aspects of diabetes, impacting both the individual's well-being and healthcare resources. The primary goal is to correct and control chronic hyperglycemia, essential for individuals with diabetes. Naturally, healthcare providers and patients aim for tight glycemic control to reduce complications. However, a paradoxical situation may arise when attempting to correct hyperglycemia too rapidly and intensively. What if this pursuit takes an unexpected turn, yielding paradoxical outcomes? This case reveals a perplexing scenario where rapid correction of chronic hyperglycemia unexpectedly leads to the emergence of microvascular complications.

Microvascular complications following rapid glycemic correction in diabetes are complex and not fully understood [10]. Several theories shed light on this phenomenon. Swift reductions in blood sugar levels can lead to hypoglycemia, potentially damaging small blood vessels and nerves while triggering the release of stress hormones, inflammation, and oxidative stress[11-13]. This neurovascular theory suggests that rapid improvements in blood glucose levels affect the autonomic nervous system, increasing blood flow to extremities, leading to localized inflammation and vascular changes contributing to neuroarthropathy[13,14]. Diabetic neuropathy, commonly affecting the feet and reducing protective sensation and proprioception, raises the risk of unnoticed injury or trauma, especially when exacerbated by rapid glycemic correction. In addition, reperfusion injury can occur when high blood sugar levels are rapidly corrected, causing a sudden increase in blood flow to previously poorly perfused tissues, potentially leading to vascular hyperpermeability [15,16].

It is important to note that the relationship between rapid glycemic correction and these complications is not fully understood, and not all individuals with diabetes who experience rapid improvements in blood glucose control will develop these complications. However, healthcare providers should exercise caution when implementing aggressive glycemic control regimens, particularly in individuals with longstanding poorly controlled diabetes or during the perioperative period[16,17].

Preventing and managing these complications involves a comprehensive approach that includes careful glycemic control, regular medical check-ups, and addressing other risk factors like hypertension, hyperlipidemia, and smoking[18, 19]. Diabetes care should be individualized, recognizing the unique needs of each patient[20]. Regular monitoring of blood glucose levels and overall health is essential to make timely adjustments to the management plan while avoiding abrupt corrections[18]. Patient education is crucial to help patients understand the potential consequences of rapid hyperglycemia correction and actively engage in their care. A collaborative approach involving endocrinologists, nutritionists, diabetes educators, and mental health professionals is necessary to provide comprehensive care. Diabetes management should consider both immediate and long-term goals, striking a balance between short-term and long-term objectives, given the lifelong nature of the condition[21,22].

CONCLUSION

Therefore, diabetes management is an ongoing process, and this case highlights the complexity of diabetes management. Pursuing rapid correction of hyperglycemia, while crucial, may lead to unexpected consequences. A balanced and personalized approach, including patient education, interdisciplinary care, and long-term considerations, is the key to effective diabetes control. Diabetes management is, in fact, a delicate equilibrium between glycemic control and avoiding overcorrection.

FOOTNOTES

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