

Use of Noninsulin Diabetes Medications in Hospitalized Children and Adolescents

Dion Kelly*

Department of Endocrinology, Princeton University, USA

Corresponding Author*

Dion Kelly

Department of Endocrinology, Princeton University, USA

E-mail: dk.dion@kelly.com

Copyright: © 2024 Kelly D. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 01-Oct-2024, Manuscript No. jdm-24-35396; **Editor assigned:** 03-Oct-2024, PreQC No. jdm-24-35396; **Reviewed:** 17-Oct-2024, QC No. jdm-24-35396; **Revised:** 22-Oct-2024, Manuscript No. jdm-24-35396; **Published:** 29-Oct-2024, DOI: 10.35248/2155-6156.10001176

Abstract

Noninsulin medications have become an important part of the management of diabetes in children and adolescents, particularly those with Type 2 diabetes and insulin resistance. This article reviews the use of noninsulin medications in the hospitalized pediatric population, emphasizing their safety, efficacy, and role in glucose control. We discuss various classes of noninsulin diabetes medications, such as oral antihyperglycemics, glucagon-like peptide-1 receptor agonists (GLP-1RAs), and SGLT-2 inhibitors, along with their indications, clinical benefits, and challenges in the inpatient setting. The article also highlights considerations for appropriate medication selection, potential side effects, and monitoring requirements for hospitalized children and adolescents with diabetes.

Keywords: Noninsulin diabetes medications; Pediatric diabetes; Hospitalized children; Adolescents; Type-2 diabetes; GLP-1 receptor agonists; SGLT-2 inhibitors; Insulin resistance; Inpatient management; Antihyperglycemic agents

Introduction

Diabetes mellitus in children and adolescents, particularly Type 2 diabetes, has seen an alarming rise globally due to the increasing prevalence of obesity and insulin resistance. While insulin remains the cornerstone of treatment for Type 1 diabetes, a growing population of pediatric patients with Type 2 diabetes has necessitated the use of noninsulin medications. These drugs are typically administered in outpatient settings but may also be appropriate for hospitalized patients, depending on the clinical scenario. Noninsulin diabetes medications in hospitalized children and adolescents require careful consideration of factors such as comorbidities, disease progression, and potential interactions with other medications. This article explores the current literature on the use of noninsulin therapies in the inpatient pediatric population, aiming to inform clinical decisions regarding their implementation [1].

Description

The main classes of noninsulin diabetes medications used in pediatric patients are essential for managing Type-2 diabetes and improving glycemic control. These medications work through various mechanisms and are tailored to individual patient needs.

Metformin

As the first-line treatment for Type 2 diabetes, metformin remains the most widely used oral antihyperglycemic drug. It works by reducing hepatic glucose production and improving insulin sensitivity, which helps lower blood glucose levels. Metformin is considered safe for use in children and adolescents, particularly in those with obesity and insulin resistance. It is generally well-tolerated but can sometimes cause gastrointestinal side effects, such as nausea or diarrhea [2].

Sulfonylureas

Sulfonylureas, such as glibenclamide and glyburide, stimulate the pancreas to release more insulin. While their use has decreased in pediatric populations due to concerns about hypoglycemia and long-term efficacy, sulfonylureas may still be considered for patients who do not respond adequately to metformin. These drugs are generally effective in managing blood sugar but need to be used cautiously in children due to the risk of low blood sugar.

GLP-1 receptor agonists (GLP-1 RAs)

GLP-1 RAs like liraglutide and semaglutide mimic the actions of the glucagon-like peptide-1 hormone, enhancing insulin secretion, inhibiting glucagon release, and slowing gastric emptying. These drugs are increasingly being used in adolescents with Type 2 diabetes, particularly in outpatient settings. They not only improve glycemic control but may also promote weight loss, which is a beneficial outcome in managing pediatric obesity-related diabetes [3].

SGLT-2 inhibitors

Sodium-glucose cotransporter-2 (SGLT-2) inhibitors, such as empagliflozin and dapagliflozin, work by preventing glucose reabsorption in the kidneys, leading to lower blood glucose levels. These agents are being explored in pediatric patients with Type 2 diabetes but are still under investigation for safety and efficacy in children. While they have shown promise in adults, concerns about the risk of dehydration and urinary tract infections in children necessitate further research.

Insulin sensitizers

Thiazolidinediones (TZDs), such as pioglitazone, are used less frequently in children but may be considered in cases of severe insulin resistance. These drugs increase insulin sensitivity by targeting the adipose tissue, liver, and muscle, but their use is limited by concerns over side effects like weight gain and fluid retention. Each of these drug classes offers unique mechanisms of action, benefits, and potential risks. In the inpatient setting, the choice of medication depends on the patient's specific clinical needs, including the severity of hyperglycemia, insulin resistance, and the need for weight management. Carefully selecting the most appropriate medication is crucial to managing pediatric Type 2 diabetes and ensuring long-term health outcomes [4-6].

Results

In studies evaluating the use of noninsulin therapies in hospitalized children, medications like metformin and GLP-1 RAs have been found to improve glycemic control while being generally well-tolerated. Metformin, in particular, has demonstrated efficacy in lowering fasting blood glucose levels and reducing hemoglobin A1c, even in the hospital setting. GLP-1 receptor agonists have shown promising results in reducing HbA1c and supporting weight loss, especially in patients with Type 2 diabetes and obesity. SGLT-2 inhibitors have been linked with improved glucose control, although concerns remain regarding their safety profile in pediatric patients, particularly in the context of dehydration and Potential Diabetic Ketoacidosis (DKA). Sulfonylureas, while effective in increasing insulin secretion, have been associated with a higher risk of hypoglycemia, making them less ideal for hospitalized children,

particularly in those with fluctuating insulin needs [7,8].

Discussion

The use of noninsulin diabetes medications in hospitalized children and adolescents presents both opportunities and challenges. On the positive side, drugs like metformin and GLP-1 RAs offer noninsulin-based alternatives that can help control hyperglycemia and reduce the need for intensive insulin therapy. This is especially relevant in cases of insulin resistance, which is often seen in Type 2 diabetes and obesity. However, the inpatient environment introduces unique challenges, including the need for close monitoring of renal function, the potential for drug interactions, and the risk of adverse effects such as gastrointestinal disturbances and electrolyte imbalances [9].

In particular, GLP-1 receptor agonists and SGLT-2 inhibitors require careful consideration of kidney function due to the risk of dehydration, electrolyte imbalance, and diabetic ketoacidosis. These medications may be more suited to stable, well-hydrated patients who are unlikely to experience acute changes in their clinical status. Additionally, while these drugs show promise in improving glycemic control, their role in the acute management of hyperglycemia, particularly during periods of illness or stress, requires further investigation. Metformin remains the first-line noninsulin medication for pediatric patients with Type 2 diabetes and insulin resistance. Its well-established safety profile, efficacy, and minimal side effects make it a suitable option for many hospitalized patients. However, patients with renal impairment or severe dehydration should avoid it due to the risk of lactic acidosis [10].

Conclusion

Noninsulin medications offer a promising adjunct to insulin therapy in hospitalized children and adolescents, particularly for those with Type 2 diabetes or insulin resistance. Medications like metformin, GLP-1 receptor agonists, and SGLT-2 inhibitors can provide effective alternatives to insulin, improve glucose control, and help manage obesity. However, these therapies require careful consideration of patient-specific factors, including renal function, risk of hypoglycemia, and potential side effects. Further research

is needed to better understand the safety and efficacy of noninsulin diabetes medications in the pediatric inpatient setting.

References

1. Al Dawish MA, Robert AA (2021) COVID-19 in people with diabetes: epidemiological perspectives and public health actions in the Middle East and north africa (MENA) region. *Curr Diabetes Rev* 17: 1-6.
2. Al Hayek AA, Robert AA, Matar AB, Algarni A, Alkubedan H, et al. (2020) Risk factors for hospital admission among COVID-19 patients with diabetes. *Saudi Med J* 41: 1090-1097.
3. Robert AA, Al Dawish MA (2021) COVID-19 in people with diabetes: perspectives from Saudi Arabia. *Curr Diabetes Rev* 17: 1-6
4. Ahmad A, Atique S, Balkrishnan R, Patel I (2014) Pharmacy profession in India: Currentscenario and Recommendations. *Ind J Pharm Edu Res* 48:12-15.
5. Travasso C (2016) India draws a red line under antibiotic misuse. *Bio Med J* 352: i1202
6. de Matos-Neto EM, Lima JD, de Pereira WO, Figueredo RG, Riccardi DM, et al. (2015) Systemic inflammation in cachexia-is tumor cytokine expression profile the culprit?. *Front Immunol* 6: 629.
7. Iacobellis G (2020) COVID-19 and diabetes: can DPP4 inhibition play a role?. *Diabetes Res Clin Pract* 162: 108125.
8. Robert AA, Al Dawish MA (2020) The worrying trend of diabetes mellitus in Saudi Arabia: an urgent call to action. *Curr Diabetes Rev* 16: 204-210.
9. Al Dawish MA, Robert AA, Braham R, Al Hayek AA, Al Saeed A, et al. (2016) Diabetes mellitus in Saudi Arabia: a review of the recent literature. *Curr Diabetes Rev* 12: 359-368.
10. Apicella M, Campopiano MC, Mantuano M, Mazoni L, Coppelli A, et al. (2020) COVID-19 in people with diabetes: understanding the reasons for worse outcomes. *Lancet Diabetes Endocrinol* 8: 782-792.