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To Evaluate the Safety and Efficacy of Repaglinide Plus Voglibose Combination in T2d Patients

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Abstract: ***Background: Type 2 diabetes mellitus (T2DM) requires effective glycemic control to prevent complications. Combining agents with complementary mechanisms may improve outcomes. Objective: To evaluate the safety and efficacy of the repaglinide plus voglibose combination in T2DM patients over one year. Methods: A prospective study was conducted involving 180 T2DM patients receiving repaglinide plus voglibose. Glycemic parameters, including fasting blood glucose (FBG), postprandial blood glucose (PPBG), and HbA1c, were measured at baseline and after 12 months. Safety was assessed by monitoring adverse events and hypoglycemic episodes. Results: Significant reductions were observed in mean FBG (156.8 ± 28.5 to 120.5 ± 22.3 mg/dL), PPBG (240.3 ± 35.7 to 170.7 ± 28.1 mg/dL), and HbA1c (8.2 ± 0.7 to 6.9 ± 0.6%) after 12 months ($p < 0.001$ for all). The combination was well tolerated, with mild hypoglycemia reported in 6.7% of patients and mild gastrointestinal side effects. Conclusion: Repaglinide plus voglibose combination therapy is effective and safe for improving glycemic control in T2DM patients, offering a viable option for optimizing diabetes management.***

Keywords: Type 2 diabetes mellitus, Repaglinide, Voglibose, Combination therapy

1. Introduction

The chronic metabolic disease known as type 2 diabetes mellitus (T2DM) is typified by insulin resistance, decreased insulin production, and the ensuing hyperglycemia [1]. To avoid long-term microvascular and macrovascular problems linked to type 2 diabetes, optimal glycemic management is essential. Combination therapies that target various pathophysiological abnormalities are necessary since many patients are unable to attain their desired glycemic targets with monotherapy, even if there are many antihyperglycemic medicines available [2,3].

Repaglinide, a meglitinide class short-acting insulin secretagogue, efficiently regulates postprandial hyperglycemia by promoting the quick release of insulin from pancreatic β-cells [4]. An alpha-glucosidase inhibitor called voglibose helps to lower postprandial glucose levels by delaying the intestinal absorption of carbohydrates. These two medicines' complementary actions imply that they could work together to improve glycemic control while also offering a potentially advantageous safety profile [5,6].

With an emphasis on glycemic parameter improvements and adverse effect assessment, this study attempts to analyse the safety and effectiveness of the repaglinide + voglibose combination in patients with type 2 diabetes. Clinicians can optimise treatment regimens for improved diabetes management by knowing the combination's therapeutic potential.

2. Materials and Methods

Study Design: This was a prospective observational study conducted over a period of one year to evaluate the safety and efficacy of the combination therapy of repaglinide and voglibose in patients with type 2 diabetes mellitus (T2DM).

Study Population: The study enrolled fewer than 200 adult patients diagnosed with T2DM, who were either inadequately controlled on lifestyle modifications or monotherapy, and required combination therapy for better glycemic control. Patients with significant comorbidities or contraindications to the study drugs were excluded.

Inclusion Criteria:
- Age ≥ 18 years
- Confirmed diagnosis of T2DM
- HbA1c levels above target despite monotherapy or lifestyle intervention
- Willingness to provide informed consent and comply with study procedures

Exclusion Criteria:
- Type 1 diabetes mellitus
- Severe hepatic or renal impairment
- History of hypersensitivity to repaglinide or voglibose
- Pregnant or lactating women

Intervention:
Eligible patients received combination therapy with repaglinide and voglibose as per standard dosing guidelines. Repaglinide was administered before meals, while voglibose was given with meals, with dose adjustments based on glycemic response and tolerability.

Outcome Measures:
- **Efficacy:** Assessed by changes in fasting blood glucose (FBG), postprandial blood glucose (PPBG), and glycated hemoglobin (HbA1c) from baseline to study completion.
- **Safety:** Monitored by recording adverse drug reactions (ADRs), hypoglycemic episodes, and other clinical and laboratory parameters throughout the study duration.

Data Collection and Analysis: Baseline demographic and clinical data were recorded. Follow-up visits were scheduled periodically for monitoring glycemic parameters and safety assessments. Statistical analysis was performed to evaluate the significance of changes in efficacy and safety endpoints.

3. Results

A total of 180 patients with T2DM were enrolled in the study and completed the one-year follow-up. The baseline demographic and clinical characteristics are summarized in Table 1.

Table 1: Baseline Characteristics of Study Patients (n=180)

Parameter	Mean ± SD / n (%)
Age (years)	52.6 ± 9.8
Gender (Male/Female)	102 (56.7%) / 78 (43.3%)
Duration of T2DM (years)	6.4 ± 3.2
Baseline Fasting Blood Glucose (mg/dL)	156.8 ± 28.5
Baseline Postprandial Blood Glucose (mg/dL)	240.3 ± 35.7
Baseline HbA1c (%)	8.2 ± 0.7

After one year of treatment with repaglinide plus voglibose, significant improvements were observed in glycemic parameters (Table 2).

Table 2: Changes in Glycemic Parameters After One Year of Treatment

Parameter	Baseline Mean ± SD	12 Months Mean ± SD	Mean Change	p-value
Fasting Blood Glucose (mg/dL)	156.8 ± 28.5	120.5 ± 22.3	-36.3	<0.001
Postprandial Blood Glucose (mg/dL)	240.3 ± 35.7	170.7 ± 28.1	-69.6	<0.001
HbA1c (%)	8.2 ± 0.7	6.9 ± 0.6	-1.3	<0.001

The combination therapy was well tolerated. Adverse events were mild and transient. Hypoglycemic episodes were reported in 12 patients (6.7%), all of whom were managed effectively without hospitalization.

Table 3: Safety and Adverse Events

Adverse Event	Number of Patients (n=180)	Percentage (%)
Hypoglycemia (mild)	12	6.7
Gastrointestinal discomfort	15	8.3
Other adverse events	5	2.8
Treatment discontinuation due to ADRs	2	1.1

4. Discussion

Over a year, the current trial assessed the safety and effectiveness of the repaglinide plus voglibose combination in individuals with type 2 diabetes mellitus. This combination therapy successfully improves overall glycemic control in T2DM patients, as seen by the notable decreases in fasting blood glucose, postprandial blood glucose, and HbA1c. Due to the complementary mechanisms of action of voglibose, which delays the absorption of carbohydrates and thereby lowers postprandial hyperglycemia, and repaglinide, which increases early-phase insulin secretion, these results are consistent with earlier research that found improved glycemic parameters with this combination.

The safety profile seen in our cohort was supported by research by Nakahama et al. that demonstrated that voglibose added to repaglinide medication significantly improved HbA1c and postprandial glucose levels without significantly increasing the number of hypoglycemia episodes [7]. In a similar vein, Kim et al.'s randomised controlled trial showed that voglibose plus repaglinide was more effective than repaglinide alone at lowering postprandial glucose excursions and enhancing overall metabolic control [8].

Our study's low incidence of hypoglycemia (6.7%) was in line with findings from similar combination treatment trials. This lends credence to the idea that voglibose's gastrointestinal mechanism, in conjunction with repaglinide's short-acting nature, lowers the danger of persistent hypoglycemia, which is frequently linked to other insulin secretagogues such as sulfonylureas. The modest and temporary gastrointestinal side effects were in line with voglibose's recognised adverse effect profile [9,10].

In contrast, gastrointestinal intolerance has been linked to cessation in a greater percentage of patients in certain trials; however, this was not the case in our cohort, perhaps as a result of careful dose titration and patient education. Furthermore, our study offers useful one-year follow-up data, highlighting sustained glycemic advantages and safety, whereas other studies have concentrated on the combination's short-term efficacy [11,12].

To confirm these results across a range of demographics, future studies should concentrate on bigger, multicentric randomised controlled trials. Given the increasing focus on comprehensive diabetes management that goes beyond glucose control, studies addressing the long-term cardiovascular and renal outcomes of this combo medication might also be helpful [13]. Furthermore, research on the cost-effectiveness, quality of life, and patient adherence of repaglinide plus voglibose therapy in actual clinical settings may offer useful information for improving treatment plans [14].

Additionally, investigating the combination's effectiveness in particular groups, such as elderly patients or those with concurrent renal or hepatic impairment, would assist in customising treatment plans. In order to create synergistic multidrug regimens, the possible role of this combination in conjunction with more recent antidiabetic medications such as SGLT2 inhibitors and GLP-1 receptor agonists deserves investigation [15].

5. Conclusion

Repaglinide and voglibose combination therapy significantly improved glycemic control in individuals with type 2 diabetes mellitus, as shown by decreases in HbA1c, postprandial, and fasting blood glucose levels during one year. With a low frequency of moderate hypoglycemia and tolerable gastrointestinal side effects, the therapy was generally well tolerated. These results support the use of repaglinide + voglibose as a supplemental approach to diabetes care by indicating that it is a safe and effective therapeutic option for improving glycemic control in T2DM patients.

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