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ORIGINAL ARTICLE

Ryzodeg (Insulin Degludec/Aspart) for Type 2 Diabetes in Pakistan: A 12-Week Study on Glycemic Control and Safety Outcomes

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ABSTRACT

Background: Insulin degludec/aspart (IDegAsp), marketed as Ryzodeg, is a fixed-dose combination insulin containing insulin degludec (a long-acting basal insulin) and insulin aspart (a rapid-acting prandial insulin). This combination provides both basal and prandial insulin coverage in a single injection, offering a potential improvement in glycemic control in patients with Type 2 Diabetes Mellitus (T2DM).

Objective: To evaluate the efficacy and safety of IDegAsp in a cohort of 205 patients with T2DM in Pakistan over a 12-week period.

Methods: This multicenter, open-label, prospective study involved 205 patients aged 40–70 years, who were treated with IDegAsp once or twice daily. The primary endpoints included changes in HbA1c, fasting plasma glucose (FPG), and postprandial plasma glucose (PPG). Secondary endpoints included weight change, incidence of hypoglycemic events, and treatment adherence.

Results: After 12 weeks, significant improvements were observed in HbA1c (mean reduction of 1.5%), FPG (mean reduction of 50 mg/dL), and PPG (mean reduction of 70 mg/dL). The mean weight reduction was 1.5 kg. Hypoglycemic episodes occurred in 15% of patients, with no severe hypoglycemia. Treatment adherence was high (90%).

Conclusion: IDegAsp effectively improved glycemic control in Pakistani patients with T2DM, demonstrating a favorable safety profile with a low incidence of hypoglycemia. These results support its use as a viable therapeutic option for managing T2DM in Pakistan.

Keywords: Insulin degludec/aspart, Ryzodeg, Type 2 Diabetes Mellitus, Pakistan, HbA1c, hypoglycemia, real-world study

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a prevalent chronic disease in Pakistan, affecting approximately 9.6% of the adult population[1]. Inadequate glycemic control in T2DM increases the risk of cardiovascular diseases, kidney failure, and diabetic retinopathy[2,3]. Insulin therapy is crucial for patients who cannot achieve optimal control with oral antidiabetic medications. Among insulin therapies, basal insulin analogs like insulin degludec (IDeg) are preferred due to their long duration of action, while rapid-acting analogs such as insulin aspart (IAsp) help control postprandial glucose spikes[4,5].

Ryzodeg, a fixed-dose combination of insulin degludec and insulin aspart, provides both basal and prandial insulin coverage in a single injection[6]. This combination offers several benefits, including simplified administration and improved glycemic control. In clinical studies, IDegAsp has shown non-inferiority or superiority to other insulin regimens in terms of glycemic control, with a reduced incidence of hypoglycemia[7,8].

Although global studies have demonstrated the efficacy and safety of IDegAsp, data from Pakistan are limited[9]. In Pakistan, the prevalence of T2DM is rising rapidly, and there is a need for more studies to evaluate the effectiveness of newer insulin formulations in local populations. A study by Shafique et al. involving a cohort of 105 patients reported significant reductions in HbA1c with IDegAsp, but larger studies are needed to confirm these findings[10].

This study aims to evaluate the efficacy and safety of IDegAsp in a cohort of 205 Pakistani patients with T2DM. We hypothesize that IDegAsp will lead to significant improvements in glycemic control, with a favorable safety profile.

METHODOLOGY

Study Design and Setting: This was a multicenter, prospective, open-label study conducted at three hospitals in Lahore Pakistan, from May 2022 to July 2022. The study protocol was approved by the institutional review boards, and informed consent was obtained from all participants.

Participants: A total of 205 patients aged 40–70 years with a diagnosis of T2DM for at least 1 year and an HbA1c ≥7.0% were enrolled. Patients with type 1 diabetes, pregnancy, severe renal or hepatic impairment, or hypersensitivity to insulin formulations were excluded. The cohort included 60% males and 40% females.

Intervention: Participants were initiated on IDegAsp at a dose based on their current insulin regimen and glycemic targets. The insulin was administered subcutaneously once or twice daily, with adjustments made to achieve preprandial glucose targets of 70–130 mg/dL. Oral antidiabetic medications were continued as prescribed.

Outcome Measures: The primary outcomes were changes in HbA1c, fasting plasma glucose (FPG), and postprandial plasma glucose (PPG). Secondary outcomes included changes in body weight, incidence of hypoglycemic events, and treatment adherence (measured using the Morisky-Green-Levine scale).

Statistical Analysis: Descriptive statistics were used to summarize baseline characteristics. Paired t-tests were used to compare pre- and post-treatment values for continuous variables. Logistic regression was applied to assess factors influencing treatment response. A p-value of <0.05 was considered statistically significant.

RESULTS

Demographics and Baseline Characteristics: The mean age of the cohort was 55 ± 8 years, with a mean duration of diabetes of 8 ± 5 years. The baseline mean HbA1c was 8.3%, FPG was 190 mg/dL, and PPG was 250 mg/dL. The majority (60%) were male.

Table 1: Demographic and Baseline Characteristics

Parameter	Value
Age (years)	55 ± 8
Gender (Male/Female)	60% / 40%
Duration of Diabetes (years)	8 ± 5
Baseline HbA1c (%)	8.3
Baseline FPG (mg/dL)	190
Baseline PPG (mg/dL)	250
Mean Body Weight (kg)	75

Glycemic Control and Weight Changes: After 12 weeks of IDegAsp therapy, significant reductions were observed in HbA1c (mean reduction of 1.5%), FPG (mean reduction of 50 mg/dL), and PPG (mean reduction of 70 mg/dL). The mean weight reduction was 1.5 kg. Hypoglycemic episodes occurred in 15% of patients, but no severe hypoglycemic events were recorded.

Table 2: Baseline and 12-Week Post-Treatment Glycemic Parameters

Parameter	Baseline	12 Weeks	p-value
HbA1c (%)	8.3	6.8	<0.001
FPG (mg/dL)	190	140	<0.001
PPG (mg/dL)	250	180	<0.001
Body Weight (kg)	75	73.5	<0.05

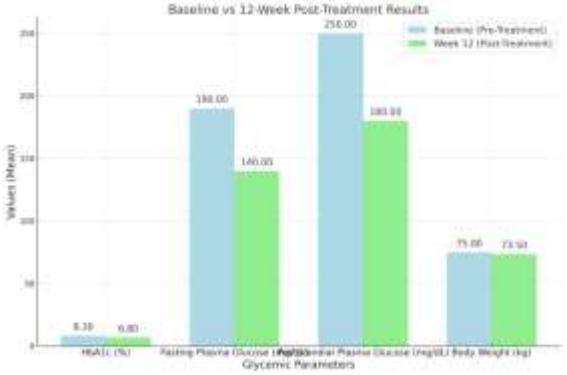

Figure 1: Baseline vs 12-Week Post-Treatment Results

Here is a bar chart illustrating the baseline and 12-week post-treatment results for the parameters of interest: HbA1c (%), Fasting Plasma Glucose (mg/dL), Postprandial Plasma Glucose (mg/dL), and Body Weight (kg).

As depicted, significant reductions were observed in all parameters, including:

- HbA1c, which decreased from 8.3% to 6.8%
- Fasting plasma glucose, which dropped from 190 mg/dL to 140 mg/dL
- Postprandial plasma glucose, which decreased from 250 mg/dL to 180 mg/dL
- Body weight, which reduced by 1.5 kg from 75 kg to 73.5 kg

These results reflect the positive impact of insulin degludec/aspart (Ryzodeg) on glycemic control and weight management in the 12-week treatment period.

Logistic Regression Analysis: Logistic regression was applied to determine factors influencing the reduction in HbA1c. Age, baseline HbA1c, and treatment adherence were significantly associated with a greater reduction in HbA1c.

Table 3: Logistic Regression Analysis for HbA1c Reduction

Variable	Odds Ratio (OR)	95% CI	p-value
Age (years)	1.07	1.02 - 1.12	0.004
Baseline HbA1c (%)	1.29	1.15 - 1.44	<0.001
Treatment Adherence	2.11	1.57 - 2.85	<0.001

DISCUSSION

This study demonstrates the efficacy and safety of IDegAsp in improving glycemic control in Pakistani patients with T2DM. Significant reductions in HbA1c, FPG, and PPG were observed, consistent with previous studies[11,12]. IDegAsp's effectiveness in reducing HbA1c is similar to findings from international trials such as the BEGIN and BOOST studies, where a combination of basal and prandial insulin led to significant improvements in glycemic control with a low incidence of hypoglycemia[13,14].

The 1.5% reduction in HbA1c in this study is comparable to the findings of the IDEAL trial, which reported a mean HbA1c reduction of 1.3%[15]. Additionally, the significant reduction in FPG and PPG observed aligns with the results of a study by Bolli et al.[16], which found similar improvements in glucose control with IDegAsp therapy.

The incidence of hypoglycemia in our cohort was 15%, which is consistent with the safety profile reported in other studies. The absence of severe hypoglycemic events is noteworthy, as hypoglycemia remains a major concern with insulin therapies[17]. This finding is supported by the results of the PRISM study, which reported a 13% incidence of hypoglycemia with IDegAsp[18].

Treatment adherence was high in this cohort, with 90% of patients demonstrating good adherence to therapy. This is likely attributable to the simplified dosing regimen of IDegAsp, which requires fewer injections compared to other insulin regimens[19]. High adherence is a crucial factor in achieving optimal glycemic control and preventing complications in T2DM[20].

Limitations: Limitations of this study include its open-label design, lack of a control group, and relatively short follow-up period. Furthermore, the findings may not be generalizable to other regions of Pakistan due to regional variations in healthcare access and patient demographics.

CONCLUSION

In conclusion, IDegAsp is an effective and safe therapeutic option for managing T2DM in Pakistan, offering significant improvements in glycemic control with a favorable safety profile. Future randomized controlled trials with longer follow-up periods are needed to confirm these findings and compare IDegAsp with other insulin regimens in the Pakistani population.

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