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REVIEW ARTICLE

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The Effect of Liraglutide on Postprandial Hypoglycemia in Non-Bariatric Surgery Patients: A Case Series and Review of Literature

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Introduction

Postprandial hypoglycemia is not an uncommon symptom with various causes and pathophysiology, including: exaggerated insulin response related to rapid glucose absorption like in patients with dumping syndrome post-bariatric, Impaired glucagon sensitivity, Insulin resistant-related hyperinsulinemia, Alcohol, and idiopathic. It affects the patient's quality of life, causing autonomic and neuroglycopenic symptoms. In extreme cases, it might be fatal as well. In late dumping syndrome, the treatment modalities encompass diet modification and medical therapy that could encounter some limitations to end with. Pancreatectomy [1]. In an effort to address these treatment limitations and the side effects associated with current medications, introduced a new approach for managing postprandial hypoglycemia that occurs after gastric bypass surgery [2]. They use GLP-1 analogs and observed a protective effect of these analogs on severe symptoms during post-meal hypoglycemic episodes in five patients. Additionally, in a clinical case successfully employed a GLP-1 analog to treat refractory late dumping syndrome following fundoplication surgery [1]. However, it's worth noting that there is a lack of prospective randomized trials to more definitively establish the role of GLP-1 analogs in the treatment of postprandial hypoglycemia. To our knowledge, there are no published studies on using Liraglutide in patients with postprandial hypoglycemia without a history of bariatric surgery. In this study, we describe the use of a GLP-1 analog in treating postprandial hypoglycemia and resolution of symptoms.

Method

This case series involved six patients who share a similar presentation to the endocrine clinic in the Obesity, Endocrine and Metabolism Center in King Fahad Medical City-Riyadh, Saudi Arabia. All patients with adrenergic symptoms and hypoglycemia documented less than 65 mg/dl, mainly post-meal, within 3-4 hours. We prescribed Liraglutide and other medical treatment regimens to improve their symptoms and follow them up for up to two years.

Results

There are six patients, five females and one male, aged between 22 and 55 years old. They presented with adrenergic symptoms such as sweating, dizziness, hunger, shivering and blurring of vision with documented hypoglycemia less than 65 mg/dl that improved with meal. Of the six patients, four had symptoms triggered by eating, one reported symptoms mainly after stress, and the last had no specific trigger factor. Two patients were started on Acarbose and Diazoxide at doses of 50 mg twice daily and 100 mg Three times daily, respectively, with persistent adrenergic symptoms; those two patients started on Liraglutide 0.6 mg with titration up for a dose of 3 mg daily.

Both had significant improvement in symptoms with decreased frequency and severity of hypoglycemia during the two-year follow-up. Another two patients had persistent symptoms while treated only with Acarbose 50 mg thrice daily. The first patient started on Liraglutide 0.6 mg daily and titrated to a dose of 1.8 mg daily for two years with no improvement of symptoms, but the patient was not compliant with the medication. The other patient reached 3 mg daily with partial improvement of symptoms at two years of follow-up. The last two patients started immediately on Liraglutide. The first one takes 1.8 mg daily and has significantly improved his symptoms since starting the medication until eight months follow up (up to date). The last case received 3 mg daily and showed improvement of his hypoglycemia up to two years follow up.

Discussion

Liraglutide is a drug that belongs to a family of long-acting glucagon-like peptide one (GLP-1) receptor mimetics. It delays gastric emptying after three weeks of continuous treatment. Delayed gastric emptying decreases food intake as a fuller feeling is achieved. The precise mechanism whereby liraglutide delays gastric emptying is not entirely understood. Nonetheless, substantial evidence suggests that GLP-1 receptor agonists, like liraglutide, hinder the process of gastric emptying via central mechanisms mediated by parasympathetic (vagal) afferents [3]. Our case series showed significant improvement in the rate of hypoglycemia without hyperglycemia; inhibition of

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gastric emptying and delay has a role in treating postprandial hypoglycemia without developing significant hyperglycemia that might occur with somatostatin receptor ligand therapy. introduced a theory to elucidate the positive outcomes observed with GLP-1 analogs, suggesting a glucose-stabilizing mechanism [2]. The case study of is consistent with this theory. Their findings suggest that the use of the GLP-1 analog, liraglutide, might have maintained a steady GLP-1 concentration, consequently resolving the insulin-hypoglycemic mismatch issue of their patient [1]. Furthermore, also suggested that natural GLP-1 has a limited duration of activity, whereas externally administered GLP-1 analogs sustain the activation of GLP-1 receptors [2]. This proposition could potentially account for the reduced total insulin levels following liraglutide treatment and the subsequent alleviation of symptoms. In our study, liraglutide was effective in treating postprandial hypoglycemia in non-diabetic patients with no bariatric surgery history. The 14-day continuous glucose monitoring system (CGM) and glucometer (Figure 1&2). Showed marked effects on blood glucose levels.

Table 1: Baseline characteristics of study Subjects (n=6)

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Variant	Mean	SD	%
Age (years)	37.8	9.41	-
Male	1 patient		16.7%
Female	5 patients		83.3%
BMI (kg/m2)	31.8	6.54	-
HbA1c	5.2	0.22	-
Glucose Nadir (mmol/L)	2.7	0.14	-
Other medications:			
Acarbose			67%
Diazoxide			33%

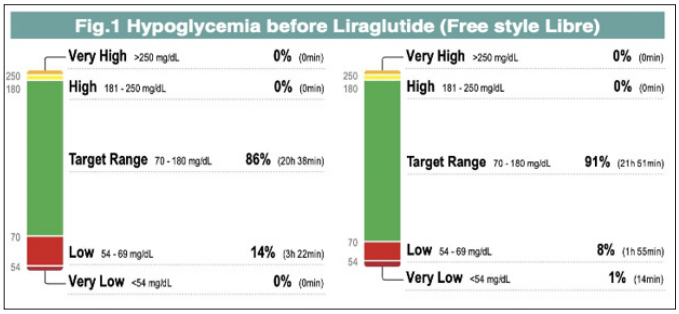

Figure 1: Hypoglycemia Before Liraglutide (Free style Libre)

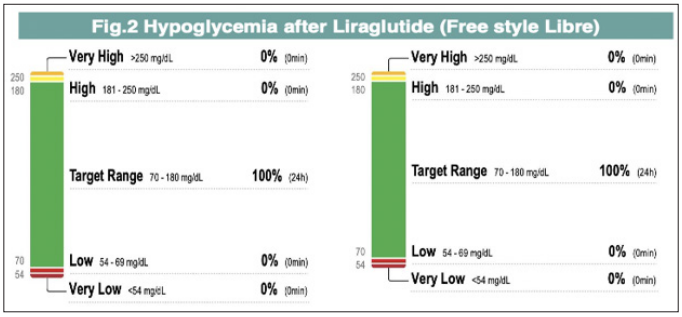

Figure 2: Hypoglycemia After Liraglutide (Free style Libre)

Conclusion

Liraglutide might be a good option for treating postprandial hypoglycemic patients with good clinical outcomes. However, more publications are needed to evaluate the efficacy and long-term follow-up in treating this group of patients.

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