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A case of adult male with uncontrolled diabetes

A 48-year-old male with a known 2-year history of type 2 diabetes mellitus (T2DM) was presented to the clinic, complaining poor glycemic control and fatigue. He reported feeling sluggish and noticed a decrease in his energy levels, which was affecting his work and daily activities. He was on metformin 500 mg twice daily but had poor adherence to the medication



Medical history

- ⌘ Two-year history of diabetes
- ⌘ Two-year history of hypertension
- ⌘ No history of any surgery
- ⌘ No history of allergy



Personal history

- ⌘ Professor in a college
- ⌘ Physically inactive
- ⌘ Non-vegetarian and often eats unhealthy snacks



Family history

- ⌘ Significant family history of diabetes and cardiovascular diseases
- ⌘ Also, a strong history of obesity in the family

Diagnostic workup



Physical examination



Height
5'4"



Weight
81 kg



BMI
29.4 kg/m²

Body temperature	Heart rate	Blood pressure	Respiration rate	CV system
Normal	80 bpm	131/90 mmHg	18 breaths/min	Normal



Investigations

PARAMETERS

FINDINGS

Resting electrocardiograph

Within normal limits

Laboratory investigations

PARAMETERS

FINDINGS

HbA1c

8.7%

Fasting blood glucose (FBG)

196 mg/dL

Postprandial blood glucose (PPG)

232 mg/dL

Serum creatinine

0.9 mg/dL

Kidney function tests

Within normal limits

Liver function tests

Within normal limits

Lipid profile

Within normal limits

Electrolytes

Within normal limits



Diagnosis

Poorly controlled diabetes with increased HbA1c levels.



MANAGEMENT

Non-pharmacological

- ⌘ **Dietary modifications:** Initially he was advised to follow low calorie, high protein, low fat, and low carbohydrate diet as provided by the registered dietitian. He was asked to limit processed foods, sugary beverages, and excessive amounts of saturated and trans fats.
- ⌘ **Lifestyle modifications:** He was suggested to engage himself in regular exercise such as walking, swimming, cycling, or dancing. He was also advised to aim for at least 150 minutes of moderate-intensity aerobic activity per week, along with muscle-strengthening activities on 2 or more days.
- ⌘ **Education:** To make lasting changes and to control his diabetes and weight, the patient was given counseling regarding the importance of diet and exercise in diabetes management.

Pharmacological

- ⌘ To manage his poor glycemic levels, a second drug was considered in addition to metformin. He was prescribed a fixed-dose combination of metformin 850 mg and glimepiride 1 mg twice daily.
- ⌘ For hypertension, he was asked to continue with previous medication, i.e. amlodipine 5 mg once daily.
- ⌘ The follow-up appointments were scheduled every 3 months.

FOLLOW-UP



- ⌘ A decline in blood glucose parameters was observed; however, the improvement was not significant (Table 1).
- ⌘ Thus, to further manage his diseases, a third agent was added to his medications. He was prescribed sitagliptin 50 mg twice daily in addition to the fixed-dose combination of metformin and glimepiride.
- ⌘ He was counseled about the importance of adhering to lifestyle modifications.

- ⌘ There was substantial decline in blood glucose parameters (Table 1).
- ⌘ He reported a further loss of 3 kg in body weight and his other symptoms such as fatigue and weakness were resolved.
- ⌘ The patient was encouraged to follow the same medication course and lifestyle modifications.
- ⌘ Further, importance of long-term adherence to treatment and lifestyle changes was discussed.

- ⌘ Patient's blood glucose levels improved significantly, and his HbA1c further reduced to 7.2%.
- ⌘ He further lost approximately 2.5 kg of body weight.
- ⌘ The patient was advised to continue the same medications, and the significance of consistent adherence to both medications and lifestyle modifications was reiterated to prevent complications.

Table 1: Clinical and biochemical parameters at presentation and follow-up visits

Parameters	At presentation	At Month 3	At Month 6	At Month 9
Body weight (kg)	81	80	77	74.5
FBG (mg/dL)	196	177	156	129
PPG (mg/dL)	232	213	188	164
HbA1c (%)	8.7	8.4	7.8	7.2

FBG: Fasting blood glucose; PPG: Postprandial blood glucose.



Discussion

Diabetes, a complex, chronic condition, requires holistic management beyond blood sugar control. Oral antidiabetic drugs offer diverse options for T2DM treatment, expanding choices before intensification.¹ Literature substantiates several advantages of glimepiride, encompassing optimal insulin secretion, enhanced beta-cell functionality, weight-neutral effects, absence of cardiovascular risk, and diminished hypoglycemia. Considering these benefits, glimepiride emerges as a promising add-on therapy with metformin for individuals with T2DM.²

The American Association of Clinical Endocrinologists and the American College of Endocrinology (AACE/ACE) guidelines recommend dual-drug therapy as the initial approach for patients with HbA1c $\geq 7.5\%$.¹ International panel experts advise adding a third agent like dipeptidyl peptidase 4 (DPP-4) inhibitors if dual therapy does not achieve target glycemic levels.³ Sitagliptin, a DPP-4 inhibitor, stimulates insulin secretion from pancreatic beta-cells and lowers glucagon concentrations, which is likely to contribute also to lowering blood glucose levels. Furthermore, the data has shown that sitagliptin was effective when used as an add-on combination treatment with metformin and sulfonylurea (SU) therapy.⁴

In this case, the patient with 2-year diabetes history was presented with poor glycemic control and fatigue due to nonadherence to metformin 500 mg twice daily.

Due to the patient's noncompliance and poor glycemic control, he was switched to metformin 850 mg and glimepiride 1 mg in a fixed-dose combination.

After 3 months, there was some improvement, but it was not significant. To enhance disease management, sitagliptin 50 mg twice daily was added to his medication regimen.

After 3 months of triple-drug therapy, HbA1c improved from 8.4% to 7.8%, and the



WHAT ARE THE RECOMMENDATIONS?

- ⌘ The World Health Organization strongly recommend addition of SU for patients with T2DM who do not achieve glycemic control with metformin alone.⁵
- ⌘ According to expert opinion from international panel, if glycemic levels are not achieved with two agents, then consider adding a third agent such as DPP-4 inhibitors.³

DID YOU KNOW?³

Combination therapy can achieve synergistic effects with diverse drug mechanisms, reducing doses, minimizing side effects, and lowering treatment costs.

WHAT DOES EVIDENCE SUGGEST?¹

A study involving 40 type 2 diabetic patients examined the efficacy of adding sitagliptin to metformin and SU combination therapy for those with inadequate glycemic control. The patients' fasting plasma glucose and HbA1c levels were measured at baseline, as well as in 3rd, 6th, and 12th months. The initial HbA1c level was 7.6% (7.0–10.5). After the treatment, the HbA1c level of the patients was 6.8% (5.9–8.7) at 3 months, 6.7% (5.3–7.5) at 6 months, and 6.9% (5.4–9.1) at 12 months ($p < 0.001$ for 0–3 months, $p < 0.001$ for 0–6 months, $p = 0.003$ for 0–12 months). Sitagliptin was found to be a viable and well-tolerated option for diabetes patients with inadequate glycemic control with dual therapy.

patient lost 3 kg of body weight. After 9 months, his HbA1c was reduced to 7.2%, with an additional 2 kg weight loss. At every visit, the patient received counseling regarding lifestyle modifications, including dietary changes, regular physical activity, and medication adherence. The patient tolerated the treatment well and was satisfied.



Expert Views

- ⌘ Managing T2DM requires a multifaceted approach that encompasses lifestyle modifications, medication adherence, and ongoing patient education.
- ⌘ International and national guidelines recommend fixed-dose combinations of multiple antidiabetic agents for enhanced and sustained glycemic control, reducing risks like hypoglycemia and weight gain.
- ⌘ Glimepiride, a SU, in conjunction with metformin can be prescribed to achieve optimal glycemic control while addressing potential weight-related concerns. A third agent like DPP-4 inhibitors can also be added if dual therapy does not achieve target glycemic levels.
- ⌘ Evidence suggests incorporating sitagliptin in the treatment regimen is an effective and well-tolerated choice for individuals with T2DM who struggle to attain sufficient glycemic control with dual therapy.
- ⌘ In the present case, the triple combination therapy exhibited effective glycemic control, as evident by the patients' improved blood glucose levels.

References

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