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Case Report: Marked Glycemic and Systemic Improvement Following Withdrawal of Intensive Pharmacotherapy with a Structured ~23-Hour Fasting (OMAD) Intervention in Long-standing Type 2 Diabetes

Dr. Kavitha PS[1], Dr. Ramana V Krishnan[2]

[1]Co founder, The fasting Studio
[2]Founder, The fasting Studio

Abstract

Background: Management of advanced type 2 diabetes mellitus (T2DM) often involves multi-drug pharmacotherapy targeting multiple metabolic pathways, including pancreatic insulin secretion, peripheral insulin sensitivity, and renal glucose excretion. Despite these approaches, a subset of patients continues to exhibit poor glycemic control, reflecting persistent metabolic dysfunction. Structured fasting protocols represent a metabolic strategy that may influence insulin dynamics, hepatic glucose output, and cellular energy utilization, thereby potentially improving glycemic control.

Case Presentation: A 40-year-old female with a 15-year history of T2DM and severely uncontrolled baseline HbA1c of 16% (estimated mean glucose ~350–400 mg/dL) was managed on intensive pharmacotherapy including Gluciglim (glimepiride-based sulfonylurea), Urodapa (SGLT2 inhibitor), and Piopar (pioglitazone-based insulin sensitizer). Despite this multi-drug regimen targeting multiple metabolic pathways, glycemic control remained significantly inadequate.

A structured intervention was initiated consisting of ~23-hour daily fasting (one-meal-a-day, OMAD), with a single feeding window and no intermediate caloric intake. A supervised and gradual de-escalation of pharmacotherapy was undertaken, resulting in complete withdrawal of all anti-diabetic medications. The patient was maintained on nutraceutical support including trigonelline and chromium.

Results: Serial capillary and CGM glucose measurements over a 40-day period demonstrated a progressive and sustained reduction in glycemic levels, decreasing from approximately ~350–400 mg/dL (while on pharmacotherapy) to a stabilized range of ~90–160 mg/dL (following complete withdrawal of medication). Importantly, both morning fasting and evening fasting glucose measurements were recorded under a continuous fasting state, reflecting sustained metabolic adaptation.

In addition to short-term glucose improvements, there was a significant reduction in HbA1c from 16% to 9.2% indicating improved long-term glycemic control. The patient also demonstrated a reduction in body weight from 72 kg to 67 kg. suggesting improved metabolic efficiency and energy utilization.

Parallel to these metabolic improvements, the patient exhibited marked systemic recovery, including complete resolution of fatigue, lower limb weakness, neuropathic symptoms, gastrointestinal

disturbances, anxiety, and sleep disturbances. Functional capacity improved significantly, with restoration of normal daily activity and endurance.

Conclusion: This case illustrates that a structured ~23-hour fasting intervention, implemented alongside withdrawal of pharmacotherapy, was associated with substantial improvement in glycemic parameters, reduction in HbA1c and body weight, and multi-system clinical recovery in a patient with long-standing T2DM.

Introduction

Type 2 diabetes mellitus is a chronic and progressive metabolic disorder characterized by insulin resistance, impaired insulin secretion, and dysregulated hepatic glucose production. Over time, persistent hyperglycemia leads to systemic metabolic dysfunction affecting multiple organ systems.

Conventional management strategies often involve the use of multiple pharmacological agents targeting different aspects of glucose metabolism. These include sulfonylureas to enhance pancreatic insulin secretion, SGLT2 inhibitors to increase renal glucose excretion, and thiazolidinediones to improve peripheral insulin sensitivity. Despite such multi-pathway interventions, a subset of patients continues to exhibit poor glycemic control, indicating persistent underlying metabolic dysregulation.

Structured fasting protocols have emerged as a metabolic intervention that may influence insulin exposure, hepatic glucose output, and cellular energy utilization. Prolonged fasting states may reduce insulin demand, enhance metabolic flexibility, and shift substrate utilization, thereby potentially improving glycemic regulation.

Case Presentation

A 40-year-old female with a 15-year history of T2DM presented with multiple chronic symptoms affecting several physiological systems. These included:

- Persistent fatigue
- Significant lower limb weakness
- Anxiety and poor sleep quality
- Gastrointestinal disturbances (acidity, bloating, constipation)
- Frozen shoulder with restricted mobility
- Left upper limb paresthesia suggestive of neuropathic involvement
- Recurrent vaginal infections

Baseline Clinical Parameters

- Height: 5’4”
- Weight: 72 kg
- HbA1c: 16%

An HbA1c of 16% corresponds to an estimated average glucose level of approximately 350–400 mg/dL, indicating severe and prolonged hyperglycemia.

Follow-up Clinical Parameters

- Weight: 67 kg
- HbA1c: 9.2%

Prior Pharmacological Status

At presentation, the patient was on intensive multi-drug anti-diabetic therapy consisting of:

- Gluciglim (glimepiride-based sulfonylurea)
- Urodapa (SGLT2 inhibitor)
- Piopar (pioglitazone-based insulin sensitizer)

Despite this pharmacological approach targeting multiple metabolic pathways, glycemic control remained significantly inadequate, with persistently elevated glucose levels.

Medication Withdrawal

A structured and carefully monitored de-escalation protocol was implemented. Anti-diabetic medications were gradually tapered and ultimately fully discontinued, with continuous monitoring of glycemic parameters throughout the process.

Following withdrawal, the patient remained off all pharmacological therapy.

Intervention

Dietary Strategy

The patient followed a structured fasting protocol consisting of approximately 23 hours of daily fasting, with a single meal consumed within a restricted feeding window (OMAD).

No intermediate caloric intake was permitted. This resulted in prolonged periods of low insulin exposure and minimal postprandial metabolic fluctuation.

All glucose measurements recorded during the intervention period—both morning and evening readings—were obtained in a fasting state, reflecting sustained metabolic conditions.

Nutraceutical Support

The patient was supported with nutraceutical agents including:

- Trigonelline, a plant-derived bioactive compound associated with enhanced glucose uptake in skeletal muscle and improved metabolic efficiency
- Chromium, a trace element associated with improved insulin receptor activity and facilitation of cellular glucose transport

These agents were used as supportive adjuncts within the broader metabolic intervention.

Glycemic Trends Over 40-Day Intervention Period

Serial capillary blood glucose measurements were recorded over a 40-day period under the structured ~23-hour fasting protocol. Only morning fasting and evening fasting values were considered.

Glycemic Timeline

During the baseline phase (Day 1–7), the patient exhibited marked glycemic instability, with morning fasting glucose levels ranging from approximately 178 to 325 mg/dL, despite ongoing pharmacotherapy. Several readings exceeded 300 mg/dL, indicating severe hyperglycemia.

This was followed by a peak dysregulation phase (Day 8–19), during which morning fasting values frequently ranged between 250–350 mg/dL, with a maximum recorded value of 351 mg/dL. Evening fasting values during this phase also demonstrated elevated and fluctuating levels, reflecting continued metabolic instability.

During the transitional phase (Day 20–31), gradual reductions in glucose levels were observed. Although variability persisted, early signs of metabolic response became evident, with intermittent improvements in both morning and evening fasting values.

From Day 32–43, a consistent improvement phase emerged. Morning fasting glucose levels declined progressively toward the 150–200 mg/dL range, while evening fasting glucose values were frequently observed within the 90–140 mg/dL range, with several readings approaching near-normal levels.

During the stabilization phase (Day 44–48), glycemic control became more consistent. Morning fasting glucose levels stabilized around 150–160 mg/dL, with the lowest recorded value of 99 mg/dL, while evening fasting glucose values were consistently within the 90–120 mg/dL range.

Overall Glycemic Outcome

- Initial estimated glucose: ~350–400 mg/dL
- Post-intervention:
  - Morning fasting: ~150–160 mg/dL
  - Evening fasting: ~90–120 mg/dL

👉 Overall achieved range: ~90–160 mg/dL

Clinical Outcomes Beyond Glycemic Control

In addition to significant improvement in glycemic parameters, the patient demonstrated marked systemic recovery across multiple physiological domains, indicating a broader metabolic and functional restoration.

Neurological and Energy Profile

At baseline, the patient experienced persistent fatigue and significant lower limb weakness, which substantially limited her daily functioning. She also reported paresthesia in the left upper limb, suggestive of neuropathic involvement.

Following the intervention, there was complete resolution of fatigue and lower limb weakness, with restoration of normal energy levels. The previously reported paresthesia also resolved entirely, indicating improvement in neurological function.

Functional Capacity

A substantial improvement in overall functional capacity was observed. The patient, who previously had reduced activity tolerance, was able to consistently achieve more than 10,000 steps per day, reflecting enhanced endurance and physical resilience.

Additionally, a notable improvement was observed during menstrual cycles. Prior to the intervention, the patient reported severe fatigue during these periods, often requiring prolonged bed rest and inability to carry out routine activities. Following the intervention, she was able to function normally, perform daily household tasks, and remain active without experiencing fatigue, indicating improved physiological stability and energy regulation.

Psychological Health and Sleep

The patient initially reported persistent anxiety and poor sleep quality. Following the intervention, there was complete resolution of anxiety symptoms, accompanied by a significant improvement in sleep qual-

ity.
Sleep became stable and restorative, suggesting improved neuroendocrine balance and reduced physiological stress.

Gastrointestinal Function
The patient had ongoing gastrointestinal disturbances at baseline, including acidity, bloating, and constipation.
These symptoms resolved completely following the intervention, with normalization of digestive function and absence of prior discomfort.

Musculoskeletal Status
The patient presented with a frozen shoulder, associated with restricted mobility and discomfort.
Following the intervention, there was an approximate 70% improvement in mobility and reduction in pain, reflecting significant musculoskeletal recovery.

Infection and Immune Status
The patient had a history of recurrent vaginal infections, suggesting underlying metabolic and immune dysregulation.
Following initiation of the intervention, no further episodes of vaginal infection were observed, indicating improved systemic balance.

Mechanistic Considerations
The intervention involved prolonged fasting, resulting in reduced insulin exposure, improved metabolic efficiency, and enhanced cellular glucose utilization. These changes are associated with improved regulation of circulating glucose levels and systemic metabolic balance.

Discussion
This case demonstrates that severe hyperglycemia persisted despite intensive pharmacotherapy, while a structured ~23-hour fasting protocol resulted in progressive and sustained glycemic improvement. The availability of serial 40-day glucose data supports the presence of a true metabolic adaptation rather than a transient response.
Importantly, the intervention was associated not only with improved glycemic control but also with multi-system clinical recovery, suggesting a broader physiological impact.

Conclusion
In this patient with long-standing type 2 diabetes, implementation of a structured ~23-hour fasting protocol was associated with progressive and sustained improvement in glycemic parameters, reduction in HbA1c and body weight, and recovery across multiple physiological systems, reflecting a broader metabolic adaptation.

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