

CASE REPORT

Cyclic Keto Important Tool to Manage Type 2 Diabetes

Priti Nanda

Nanda P. Cyclic Keto Important Tool to Manage Type 2 Diabetes. Int J Diabetes Manag. 2021;1(1):15-19.

Abstract

India is a capital of Diabetes and in the last 25 years the increase in diabetics in India has been very steep. Diabetes is a part of metabolic syndrome and is a very fast spreading lifestyle disease. At the onset, we want to emphasize early diagnosis of this disease as it can help prevent complications of the disease. In cases, when diabetes management is started early it can help us reverse diabetes. The first step to manage diabetes is diet and lifestyle changes.

There are several diets recommended for diabetics such as high protein diet, Atkins diet, Low carbohydrate diet, ketogenic diet and cyclic keto diet and many more. In this article we are discussing a case of a diabetic woman who was introduced to cyclic keto and lifestyle therapy as a first line management. This case highlights the importance of cyclic ketogenic diet in management of difficult diabetic cases successfully. The author has described everything in detail to help doctors and patients follow it on their own and see the positive effects of cyclic ketogenic diet in diabetic patients.

Key Words: *Diabetes; Hypoglycemia; Cyclic ketogenic diet*

Introduction

The International Diabetes Federation 2017 data estimates that women in earlier stages of life experience higher healthcare expenditure than men across the globe. Globally, the prevalence of diabetes for women 20-79 years is estimated to be 8.4%, with 1.7-2.7 million deaths attributable to diabetes in women compared to 1.5-2.3 million in men.

A research study in a large cohort of middle-aged women showed that a combination of several lifestyle factors, such as managing a body-mass index of 25 or lesser, consuming a diet high in cereal fiber and polyunsaturated fat and low in saturated and trans-fat and glycemic

load, regular physical activity, abstaining from smoking and consuming alcohol moderately, was associated with an incidence of Type-2 diabetes could avoid the incidence of diabetes. Excess body fat is the most important determinant of Type-2 diabetes. Study data has revealed that diabetes cases preventable by diet and exercise independently of body weight are more significant among women of average weight than among obese women. In overweight and obese women, the amalgamation of a suitable diet, a slight amount of physical activity, and self-restraint from smoking could substantially lower the risk of Type-2 diabetes.

Excess weight is a recognized risk factor for

Fellowship in anti-aging and regenerative medicine, CEO, Mediskool Health services Pvt Ltd, Mayur Vihar phase-1 Extension, New Delhi-110096, India

**Corresponding author: Priti Nanda, Fellowship in anti-aging and regenerative medicine, CEO, Mediskool Health services Pvt Ltd, Mayur Vihar phase-1 Extension, New Delhi-110096, India, Tel: 986 847 8149; E-mail: ceo@medi-skool.com*

Received: June 17, 2021, Accepted: July 15, 2021, Published: August 16, 2021



This open-access article is distributed under the terms of the Creative Commons Attribution Non-Commercial License (CC BY-NC) (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits reuse, distribution and reproduction of the article, provided that the original work is properly cited and the reuse is restricted to noncommercial purposes.

diabetes. Studies have identified links between obesity and Type-2 diabetes, suggesting the role of pro-inflammatory cytokines (tumor necrosis factor and interleukin-6), insulin resistance, unbalanced fatty acid metabolism, and cellular processes as mitochondrial dysfunction and endoplasmic reticulum stress. The links between obesity and hyperinsulinemia are reflective of the compensation by insulin-secreting β -cells to systemic insulin resistance. Genetic factors may link β -cell predisposition.

Hypoglycemia is a highly significant complication of diabetes treatment. Elderly, those with co-morbidities such as vascular disease or renal failure, pregnant women are high-risk groups for hypoglycemia. In Type-2 diabetes, progressive insulin deficiency, longer duration of diabetes, and tight glycemic control also raise the risk of hypoglycemia.

Oral hypoglycemic agents are the most common oral drugs used in the treatment of Type-2 diabetes. However, these are associated with several established adverse effects such as hypoglycemia, weight gain, gastrointestinal disturbance, lactic acidosis, and fluid retention [1-9].

Here we talk about how an obese woman chose functional medicine to change her life, which has put her diabetes into remission, and she is also happy about being able to take charge of her health.

Case Presentation

A 44-yr old, severely obese woman (BMI>30.0) presented to the clinic because her regular blood test revealed very high blood glucose levels.

Clinical Examination

At the time of diagnosis, the patient weighed 104 Kgs; her BMI was 36.05, BMR 1818 Kcal, visceral fat 21.0, and body age of 73 years.

Her FBS was 164 mg/dl, and her HbA1c was 11.5%. She had been living in ignorance of her high blood glucose levels. In addition to Type-2 diabetes, she also had dyslipidemia and increased levels of uric acid.

Her blood pressure was 120/90 mm Hg, and she was afebrile. On examination, her skin, head, eyes, ears, nose, throat, lungs, heart, and abdomen were normal. Her tests revealed that she was also suffering from Vitamin B12 and Vitamin D deficiency.

While the patient's history was being taken, she revealed being under extreme stress, cannot tolerate physical strain, has temper issues, and is a light sleeper.

Diagnosis

The patient was diagnosed with stage 3 diabetes.

Treatment

The patient had obesity and Type-2 diabetes and was put on a 3-month weight loss program and a diabetes mellitus reversal program comprising a daily exercise regimen, nutritional supplements, and a cyclic ketogenic diet. She was also counseled on stress management and was educated about several stress buster techniques such as breath control and laughter therapy.

Initially, at the first week, following an examination of her laboratory reports, she was prescribed Vitamin D and tablet Shelcal 500 mg once a day for three months; tablet Berberine twice a day, tab probiotic twice a day; Tablet Ashwagandha twice a day; and Triphala powder before sleeping. She was also recommended an exercise regimen along with 30 mins walk and 10 mins of breathing exercise. She was asked to abstain from processed food, sugar, simple carbohydrates entirely and maintain a daily diet and physical activity and thought diary. She was

encouraged to regularly check on her fasting blood glucose and early morning weight and share it with her health coach a minimum of 4 times a week. She was also motivated to monitor diet through dietary recall with timings every day. She was later prescribed chromium, zinc, and magnesium supplementation to support fluctuating blood glucose levels.

During her program, she was offered continuous support, and the health coach shared recipes which she could make easily. At the time of renewal, she was prescribed α -lipoic acid to help her in detoxification.

Patient Outcome

As her treatment started, she took some time to acclimatize to the changed regime and experienced hunger pangs in late evenings and many blood glucose fluctuations. However, at the end of three months, she had reduced to 95 Kg showing an excellent treatment outcome. Her fasting blood glucose level had reduced to 135 mg/dl, and the reduction is sustained. The patient also showed a significant level of improvement in her immunity and mood swings. She came with a big smile on her next consultation. She extended her program for the next three months, and her FBS reduced to 103 mg/dl and her weight further reduced.

The patient continues to follow a healthy lifestyle to further improve her clinical condition and quality-of-life.

Discussion

In recent years, the ketogenic diet has received much attention for showing immense potential in treating obesity and Type-2 diabetes. My patient bears testimonial that the ketogenic diet is effectively able to lead to a healthy weight loss and optimize earlier fluctuating and uncontrolled blood glucose levels.

Cyclic-Ketogenic diet is unique as in this diet, the followers of the diet are encouraged to have 10% complex carbohydrates, 20% protein, and use elevated levels of fat (generally surpassing 70% of calories consumed), leading to the production of ketones, giving the diet its name. Instead of cheat days, we have a protocol to increase carbohydrates one day in a week or fortnight, or month depending on the patient response to make it a lifestyle rather than a short-term solution.

In a study aimed at determining whether an online diet intervention would improve glycemic control and other health outcomes among overweight individuals with Type-2 diabetes, it was found that individuals with Type-2 diabetes optimized their glycemic control and lost more weight following randomization to a very low-carbohydrate ketogenic diet and digital lifestyle program rather than a conventional, low-fat diabetes diet online program. The study results showed that the intervention reduced the HbA1c level of the patients. Hence, it was seen that the online delivery of these very low-carbohydrate ketogenic diets and lifestyle recommendations might bring about a broader reach in the successful self-management of Type-2 diabetes [10-13].

Another non-randomized trial showed that persons with Type-2 diabetes showed a reduction of 1.3% in glycosylated hemoglobin following one year in the ketogenic group when coupled with technological and behavioral support.

The ketogenic diet's success is based on the fact that restriction of carbohydrates, as in ketogenic diet, can transiently improve glycemic control, and weight loss brings about improved health outcomes in overweight individuals with Type-2 diabetes.

A ketogenic diet works by metabolizing fat into a fuel source referred to as ketones. The metabolization or 'burning' body fat is known

as Ketosis. The diet helps metabolize body fat and has many benefits in individuals losing weight, including people with prediabetes or those otherwise at risk of Type-2 diabetes.

A study has shown that patients with diabetes are 1.6 times more likely to use complementary alternative medicine than regular patients. A systematic review has shown that supplementing vitamin D, combined with calcium, appears to lower the risk of developing Type-2 diabetes.

Magnesium, zinc, chromium, iron, and selenium are organic minerals that are beneficial in various physiological processes and play an essential role in glucose homeostasis.

Chromium, in its trivalent valence state, is an essential micronutrient for humans. Another review has emphasized the crucial role of trace metals such as selenium, vanadium, and chromium in controlling blood glucose concentrations through their insulin-mimetic effects. With an ever-increasing prevalence of metabolic syndrome, the oxidation state and coordination chemistry play crucial roles in defining the responses to these trace metals.

Chromium and polyphenols found in cinnamon have similar effects on insulin signaling and glucose control. A double-blind placebo-controlled study has demonstrated that glucose, insulin, cholesterol, and HbA1c are all improved in patients with Type-2 diabetes following chromium supplementation. It has also been demonstrated that cinnamon polyphenols improve insulin sensitivity in vitro, animal, and human studies. The benefit of cinnamon has been found to reduce mean fasting serum glucose, TAG, total cholesterol, and LDL-cholesterol in patients with Type-2 diabetes.

A review of trials identifies the positive effects of these nutrients on various outcome measures relating to insulin resistance and cardiovascular factors.

It has been seen that the effects of structured exercise interventions in clinical trials of more than eight weeks showed improvement in HbA1c and body mass in people with Type-2 diabetes. Positive intervention HbA1c was significantly higher in exercise than control groups. Another study provides support for encouraging Type-2 diabetic individuals who are already exercising at a moderate intensity to consider increasing the intensity of their exercise to obtain additional benefits in both aerobic fitness and glycemic control. Most benefits of physical exercise on Type-2 diabetes management and prevention are realized through acute and chronic improvements in insulin action. The acute effect of a recent bout of exercise accounts for most of the improvements in insulin action, with most individuals experiencing a decrease in their blood glucose levels during mild and moderate-intensity exercise and for 2-72 hours afterward [14-19].

Conclusion

Type-2 diabetes is a metabolic disorder resulting from many things, with the greatest risk factor being weight, genetics, gut microbiome, lifestyle and dietary habits contributing to its onset. Since the disease typically starts with a sedentary lifestyle paired with a poor diet, it makes sense to approach treatment with lifestyle changes. One such effective strategy is adopting a cyclic ketogenic diet; a diet proven to stabilize blood glucose and promote weight loss.

While complete reversal is challenging, it is still possible with cyclic ketogenic diets, nutritional supplementation, and improved lifestyle choices, including physical activity and stress management, we have seen positive outcome in more than 800 patients till now with this approach.

Conflicts of Interest

Author declare no conflicts of interest.

References

1. IDF Diabetes Atlas. Eighth Edition 2017. International Diabetes Federation.
2. Position statement ADA-Gestational Diabetes Mellitus. *Diabetes Care* 2003;26:S103-5.
3. Eckel RH, Kahn SE, Ferrannini E, et al. Obesity and Type-2 diabetes: What can be unified and what needs to be individualized? *Diabetes Care* 2011;34:1424-30.
4. Shrestha JTM, Shrestha H, Prajapati M, et al. Adverse effects of oral hypoglycemic agents and adherence to them among patients with Type-2 diabetes mellitus in Nepal. *J Lumbini Medical College* 2017;5:34-40.
5. Shafiee G, Mohajeri-Tehrani M, Pajouhi M, et al. The importance of hypoglycemia in diabetic patients. *J Diabetes Metab Disord* 2012;11:17.
6. Hu FB, Manson JE, Stampfer MJ, et al. Diet, lifestyle, and the risk of Type-2 diabetes mellitus in women. *The New England J Medicine* 2001;345:790-7.
7. Niafar M, Hai F, Porhomayon J, et al. The role of metformin on vitamin B12 deficiency: A meta-analysis review. *Intern Emerg Med* 2015;10:93-102.
8. Joshi S, Ostfeld RJ, McMacken M. The ketogenic diet for obesity and diabetes-enthusiasm outpaces evidence. *JAMA Intern Med* 2019;179:1163-4.
9. <https://www.diabetes.co.uk/keto>.
10. <https://cliniciantoday.com/how-keto-diet-can-help-reverse-Type-2-2-diabetes>.
11. https://nccih.nih.gov/sites/nccam.nih.gov/files/Diabetes_11-08-2015.pdf.
12. Yeung S, Soliternik J, Mazzola N. Nutritional supplements for the prevention of diabetes mellitus and its complications. *J Nutrition and Intermediary Metabolism* 2018;14:16-21.
13. Bartlett HE, Eperjesi F. Nutritional supplementation for Type-2 diabetes: A systematic review. *Ophthalmic and Physiological Optics* 2008;28:503-23.
14. Colberg SR, Sigal RJ, Fernhall Bo, et al. Exercise and Type-2 diabetes. *Diabetes Care* 2010;33: e147-67.
15. Saslow LR, Mason AE, Kim S, et al. An online intervention comparing a very low-carbohydrate ketogenic diet and lifestyle recommendations versus a plate method diet in overweight individuals with Type-2 diabetes: A randomized controlled trial. *J Med Internet Res* 2017;19: e36.
16. Panchal SK, Wanyonyi S, Brown L. Selenium, vanadium and chromium as micronutrients to improve metabolic syndrome. *Curr Hypertens Rep* 2017;19:10.
17. Maret W. Chromium supplementation in human health, metabolic syndrome, and diabetes. *Met Ions Life Sci* 2019;19.
18. Granados-Silvestre Mde L, Ortiz-Lopez MG, Montufar-Robles I, et al. Micronutrients and diabetes, the case of minerals. *Cir* 2014;82:119-25.
19. Anderson RA. Chromium and polyphenols from cinnamon improve insulin sensitivity. *Proc Nutr Soc* 2008;67:48-53.