

## CASE REPORT

# Effect of Naturopathic Management in a Patient with Grade I Fatty Liver and Type 2 Diabetes Mellitus: A Case Report

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Received on: 13 December 2023; Accepted on: 13 August 2024; Published on: 24 October 2024

### ABSTRACT

**Aim:** In a 42-year-old married woman with metabolic syndrome (MS), the effect of naturopathic treatments on blood parameters and abdominal ultrasound compared before and after 12 weeks were evaluated.

**Methods:** A 42-year-old married woman with obesity for 5 years, hypertension for 2 years on conventional medications, type 2 diabetes for 2 years (not on any medications), and non-alcoholic fatty liver disease (NAFLD) for the past 2 years visited our clinic in June 2022. She underwent naturopathic treatments and dietary interventions for 12 weeks. Blood investigations like fasting blood sugar (FBS) levels, postprandial blood sugar levels (PPBS), lipid profile, liver function test (LFT), renal function test (RFT), glycated hemoglobin (HbA1c), and abdomen ultrasound sonography (USG).

**Results:** The patient's FBS, PPBS, total cholesterol, LFT, RFT, HbA1c, body weight, body mass index (BMI), and liver size in USG of the abdomen, were reduced at a 12 weeks of intervention.

**Conclusion:** According to the study, MS can be efficiently managed with a naturopathic lifestyle adjustment.

**Keywords:** Blood sugar level, Case report, Essential hypertension, Glycated hemoglobin, Liver function test, Non-alcoholic fatty liver disease, Obesity grade I, Renal function test, USG of abdomen.

*Integrative Medicine Case Reports* (2024): 10.5005/imcr-11021-0005

### INTRODUCTION

Metabolic syndrome (MS) is characterized by different metabolic disorders, such as obesity, dyslipidemia, diabetes, hypertension, and insulin resistance.<sup>1</sup> Non-alcoholic fatty liver disease (NAFLD) is often linked to metabolic risk factors like obesity, type 2 diabetes, and dyslipidemia in patient's.<sup>2</sup> Hyperglycemia is a common risk factor in type 2 diabetes due to insulin deficiency. Among the two major types of diabetes (type 1 diabetes and type 2 diabetes), 90% of the patient's have type 2 diabetes.<sup>3</sup> Around 15–19% of Indian adults are having diabetes and 30% have MS and 38.6% have NAFLD.<sup>4</sup> Non-alcoholic fatty liver disease includes liver disease, such as liver fibrosis, fatty liver, and steatohepatitis and is considered as a common form of liver disease worldwide.<sup>3</sup> There have been few, prior investigations on naturopathy treatments and obesity, type 2 diabetes, high blood pressure, and dyslipidemia but not for NAFLD. These hypotheses frame the study to investigate whether the naturopathic treatments have an effect or not on the specified health parameters over the 12 weeks in the described individual.

### CASE DESCRIPTION

A 42-year-old married woman with obesity for 5 years, hypertension for 2 years on conventional medications, type 2 diabetes for 2 years, not on any medications, and NAFLD for the past 2 years visited our clinic in June 2022 with complaints of increased blood sugar levels, increased body weight and known case of fatty infiltrations of liver and was advised to undergo naturopathic interventions at home. Her family history was not contributory. These interventions were followed from July 11, 2022 to October 1, 2022 (12 weeks), monitored daily, and written informed consent was obtained from the subject. The subject was able to assess her blood tests only on 22/06/2022

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**How to cite this article:** Ghosh A, Shetty GB, Janardhanan SK, *et al.* Effect of Naturopathic Management in a Patient with Grade I Fatty Liver and Type 2 Diabetes Mellitus: A Case Report. *Integr Med Case Rep* 2024;5(2):57–59.

**Source of support:** Nil

**Conflict of interest:** None

**Patient consent statement:** The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.

and 05/10/2022 and ultrasound sonography (USG) of the abdomen on 04/07/2022 and 06/10/2022.

**Table 1:** A detailed intervention was given to the subject for 12 weeks

Treatment protocol	Specific treatment	Duration (min)	Total number of sessions/12 weeks
Hydrotherapy	Gastro hepatic pack	20 minutes	83
	Cold hip bath	30 minutes	69
Exercises	Brisk walking	30 minutes	82
Therapy	Diet	Timings	Servings/day
Diet therapy	2 cloves of garlic	6:30 a.m.	1
	1 teaspoon of turmeric powder + 1 teaspoon of gooseberry powder + 1 teaspoon of fenugreek powder in 1 glass of lukewarm water	7:00 a.m.	1
	Ash gourd juice	7:30 a.m.	1
	Fruits + 1 chapathy + boiled vegetables (200 gm)	9:30 a.m.	1
	Fruits + rice (200 gm) + boiled vegetables (200 gm)	12:30 p.m.	1
	Cucumber (100 gm)	3:30 p.m.	1
	Citrus fruits (300 gm) + flax seeds powder (1 teaspoon)	6:30 p.m.	1
Name of therapy	Details of applications		
Gastro hepatic pack (GHP)	A hot temperature water bag (45 °C) was carried out over the abdomen, overlaying the epigastric, left and right hypogastric, left and right lumbar, and umbilical area. The ice bag kept on the location of lumbar vertebrae L2, L3, L4, and L5. <sup>5</sup>		
Cold hip bath (CHB)	The person was asked to sit down in a mainly designed bathtub immersing from mid-thigh to the location of the umbilicus in water (18–24 °C). <sup>5</sup>		

### Intervention

The treatments given were hydrotherapy (40–60 minutes), exercises (30 minutes), and diet therapy given daily from July 11, 2022 to October 1, 2022 (12 weeks) along with the conventional medicines. A detail of the treatment protocol is given in Table 1. Data assessments were done before and after the intervention (Table 2).

## OUTCOME MEASURES

### Blood and Biochemical Analysis

The study assessed liver function, glycated hemoglobin (HbA1c), fasting blood sugar (FBS), and postprandial blood sugar levels (PPBS) in Varkala, Kerala, India, followed by an abdominal ultrasound scan.

### Blood Pressure

Blood pressure was measured at baseline and after treatment by using sphygmomanometer in a sitting position.

## RESULTS AND DISCUSSION

The results of this study showed that body weight, body mass index (BMI), FBS, PPBS, total cholesterol, HbA1c, liver size, uric acid, SGOT, SGPT, alkaline phosphatase, albumin, A/G, while maintaining systolic blood pressure (SBP) and diastolic blood pressure (DBP) compared with baseline, and showed significant changes (Table 2). These results may be due to naturopathic interventions in conjunction with conventional medicine. Hydrotherapy and diet have been shown to play a positive role in lowering blood sugar levels and liver function tests (LFTs). Therefore, the results suggest that the natural therapy not only helped lower blood sugar levels but also improved liver function and liver size.

Insulin resistance leads to adipose tissue dysfunction, altered production and secretion of adipokines, inflammatory cytokines, and mitochondrial dysfunction which may further lead to oxidative stress-related mechanisms.<sup>6</sup>

**Table 2:** Baseline and post-test assessments of the subject

Test	Result on 22/06/2022	Result on 05/10/2022
FBS	149 milligram per deciliter	104 milligram per deciliter
PPBS	168 milligram per deciliter	87 milligram per deciliter
Total cholesterol	189	172
Triglycerides	115	116
Blood urea	24	19
Uric acid	4.3	3.8
SGOT	46 IU/L	20 IU/L
SGPT	68 IU/L	19 IU/L
Alkaline phosphatase	173 IU/L	73 IU/L
Total protein	6.6	6.6
Albumin	3.9	3.8
A/G ratio	1.44	1.36
HbA1c	9.3%	4.8%
SBP	140 mm Hg	110 mm Hg
DBP	90 mm Hg	80 mm Hg
USG	On 04/07/2022	06/10/2022
Liver size	15.2 cm	12.3 cm
Body weight	72.6 kg	54.9 kg
BMI	32 kg/m <sup>2</sup>	24.4 kg/m <sup>2</sup>

The outcomes of the current case study are consistent with past research that demonstrated lowered blood glucose and HbA1c levels with dietary and hydrotherapy therapies. According to studies, simply submerging oneself in cold water might alter one's blood sugar levels.<sup>5</sup>

Increasing energy expenditure might be a tactic to improve certain metabolic states. By boosting cold-triggered thermogenesis in brown adipose tissues, CHB may have increased metabolic rate and enhanced glucose utilization as well as energy expenditure.<sup>7</sup>

Through thermoregulatory adjustments, blood may be drifted to abdominal organs (liver, pancreas, muscle tissue, and numerous others) by GHP application and ameliorate glucose metabolism. The utilization of glucose because of quickened metabolism, downgraded hepatic glucose manufacturing due to expanded blood float (i.e., elevated availability of glucose) to the liver, ameliorated insulin sensitivity due to multiplied metabolism, and expanded glucose-induced insulin secretion because of increased blood float (i.e., enriched availability of glucose) to the body are hence some of the capacity mechanisms for the deduction in blood glucose stages (BGL) followed by a measure of GHP.<sup>8</sup>

Due to its antioxidant, anti-inflammatory, hepatoprotective, anti-atherosclerotic, and anti-diabetic qualities, curcumin, an ingredient in turmeric, may be beneficial for treating type 2 diabetes and NAFLD. By enhancing lipoprotein lipase activity and lowering triglycerides, curcumin treatment for 12 weeks in females with polycystic ovary syndrome (PCOS) confirmed wonderful outcomes on body weight, glycemic control, serum lipids, and PPAR- and low-density lipoprotein receptor (LDLR) gene expression. The reduction of NF-B8 has been identified as one of the main mechanisms behind curcumin's anti-inflammatory properties.<sup>9</sup>

There are various medicinal benefits of fenugreek. It can lower cholesterol and serum glucose levels. Additionally, it contains hepatoprotective, antioxidant, and anti-inflammatory effects. Blood sugar ranges, inflammation, insulin resistance, liver features, and lipids have all been demonstrated to be favorably impacted by 4-hydroxy isoleucine, diosgenin, and fiber from fenugreek. In addition to increasing insulin secretion, 4-hydroxyisoleucine can block the molecular mechanisms that underlie insulin resistance. It has been tested to enhance blood glucose ranges, insulin sensitivity, and liver gluconeogenesis. Fenugreek reduced triglyceride accumulation inside the liver without affecting blood sugar or insulin levels. They hypothesized that tumor necrosis component-alpha may additionally be vital to this process.<sup>10</sup>

The ash gourd contains a variety of phytochemicals, including alkaloids, flavonoids, glycosides, tannins, and phenols. In adipocytes, flavonoids promote glucose transport and lipogenesis. Consequently, it reduces blood sugar levels.<sup>11</sup>

Our subject's everyday activities may have benefited from improvements in blood sugar, blood analysis, USG scanning, and maintenance of normal BP. Due to the fact that this case study only involves one instance, the validity and reliability of the findings may differ. No further investigation was done on the person to see whether or not these effects persisted. Therefore, more research with a bigger sample size and more sophisticated methodologies is needed to corroborate our findings.

## CONCLUSION

The present case study suggests naturopathy treatment can be considered as an adjuvant to conventional medicine in patient's with NAFLD associated with type 2 diabetes and essential hypertension.

## Limitation

It is a single case study; a large group of subjects can be included.

## ACKNOWLEDGMENT

The authors very grateful to the subject who participated in this study and the SDM society for giving a great opportunity to learn.

## Authors' Contribution

All authors contributed to design, implementation, evaluation, and writing.

## Ethical Statement

The nearby Institutional Review Board deemed to have a look exempt from review.

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