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Prolonged Water-Only Fasting in the Management of Hashimoto's Thyroiditis: A Case Report

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Abstract

Hashimoto's thyroiditis (HT) is a common autoimmune disease and current treatment aims to manage symptoms with ongoing hormone replacement therapy. Here we present the case of a 61-year-old female who experienced a sustained decrease in symptoms of HT as well as levels of thyroid-stimulating hormone and C-reactive protein after two prolonged water-only fasts at a residential health clinic.

Keywords: Hashimoto's thyroiditis, prolonged water-only fasting, whole-plant-food diet, inflammation

Introduction

Hashimoto's thyroiditis (HT) is an autoimmune disorder characterized by chronic thyroid gland inflammation that affects nearly 5% of the US population.¹ Standard treatment involves life-long thyroid hormone replacement therapy.² Despite receiving conventional treatment, some patients with HT experience persistent symptoms and disease progression. Additionally, some individuals have deleterious side effects from thyroid medications, including arrhythmias and osteoporosis.² Determining the dose necessary to achieve consistent euthyroidism and avoid side effects often requires ongoing adjustments due to factors such as weight changes, comorbidities, and polypharmacy.² These complications drive many patients to seek alternative methods for managing HT. Here we present a case of a 61-year-old female, with a 10-year history of HT, who elected to undergo two prolonged water-only fasting and refeeding interventions to manage symptoms associated with HT.

Case Report

A 61-year-old female patient arrived to the residential health clinic with the intention of undergoing a medically supervised, prolonged water-only fast due to persistent symptoms associated with HT. At the age of 51, she had been diagnosed with HT after experiencing unexplained and significant weight gain, edema, joint pain, fatigue, constipation, cold sensitivity, brain fog, and depression. She was prescribed levothyroxine, but due to allergic reactions was switched to Armour Thyroid. Following multiple dosage adjustments, she remained on 120 mg of Armour Thyroid once daily, which eliminated constipation, improved depression, reduced edema, and stopped the continuous weight gain. However, the patient continued to experience symptoms such as fatigue, brain fog, joint pain, cold sensitivity, and mild depression. She also struggled to lose excess weight. Additionally, she had a long-standing history of gastroesophageal reflux disease and was prescribed esomeprazole to manage the condition on an as-needed basis. She had stopped medical care with her primary care physician, reported struggling with daily medication adherence, and expressed apprehension at the need for continual medication adjustment.

On arrival, her weight was 277.4 lbs., body mass index (BMI) was 41.3 kg/m², and systolic/diastolic blood pressure was 134/81 mmHg (Table 1). Baseline exams also revealed a thyroid-stimulating hormone (TSH) of 61.3 uIU/mL and C-reactive protein (CRP) of 13.4 mg/L (Table 1). She followed a Standard American Diet and did not smoke or consume alcohol.

The patient received a thorough medical examination, including complete blood count and comprehensive metabolic panel, and was approved to water-only fast for 21 days followed by 10 days of refeeding according to an established protocol.³ She prepared by consuming a whole-plant-food diet

Table 1. Outcomes After Fasting and Refeeding Interventions

	Before fast	After fast First fast	After refeed	Before fast	After fast Second fast	After refeed	30-Day FU
Weight (lb)	277.4	247.8	261.5	277.4	250.6	254.8	262.0
BMI (kg/m ²)	41.3	36.9	38.8	41.3	37.3	37.9	39.1
Systolic/diastolic BP (mmHg)	134/81	111/77	114/74	131/78	105/70	108/74	—
TSH (uIU/mL)	61.3	—	—	39.3	—	6.8	9.7
CRP (mg/L)	13.4 ^a	—	—	7.4 ^a	—	—	1.2 ^b

Second fasting intervention occurred seven months after first fasting intervention.

^aHigh sensitivity CRP.

^bStandard CRP.

BMI, body mass index; BP, blood pressure; CRP, C-reactive protein; FU, follow up; TSH, thyroid stimulating hormone.

without added salt, oil, or sugar (SOS-free diet) for four days, after which she had vegetable juice for one day and then transitioned to water-only fasting. Due to reduced metabolic rate while fasting, the Armour Thyroid dose was cut in half from 120 to 60 mg for the first four days of eating and further reduced to 30 mg while water-only fasting. During the fast, she consumed a minimum of 40 ounces of distilled water and received 24-hour medical supervision. Her vitals were measured twice daily and serology and urinalysis were assessed weekly and as medically indicated. She experienced common adverse events including mild to moderate fatigue, light-headedness, heartburn, and persistent nausea.³ She also reported exacerbation of osteoarthritic joints, and, on the last day of fasting, she experienced one episode of emesis.

The patient terminated the fast with a supervised, five-phase refeeding protocol with two days on each phase for a total of 10 days. The first phase consisted of fresh fruit and vegetable juices, followed by the addition of raw fruits and vegetables, then the addition of steamed vegetables, then the addition of cooked gluten-free, whole-grains, and ending with an exclusively SOS-free diet.³ By the end of refeeding, she resumed taking 120 mg of Armour Thyroid once daily. After refeeding, her weight was 261.5 lbs., BMI was 38.8 kg/m², and systolic/diastolic blood pressure was 114/74 mmHg (Table 1). The patient also reported decreased fatigue, joint pain, brain fog, and depressive symptoms. On discharge, she was instructed to continue care of HT with a primary care physician.

Seven months later, the patient returned to the residential health center to undergo a second fast. On arrival, her weight was 277.4 lbs., BMI was 41.3 kg/m², systolic/diastolic blood pressure was 131/78 mmHg, TSH was 39.3 uIU/mL, and CRP was 7.4 mg/L (Table 1). The patient reported that, for approximately three weeks after returning home after the first visit, she was able to maintain a whole-plant-food diet and had remained symptom free. However, despite having received two doses of the Pfizer-BioNTech COVID-19 vaccine, she contracted SARS-CoV-2. During which, she returned to the Standard American Diet, regained 15 pounds, and all of her previous HT symptoms returned. She also reported that she did

not return to her primary care physician nor attend a follow-up laboratory appointment for further thyroid panel evaluation.

One week prior to arrival, she reduced her Armour Thyroid dose to 90 mg. On arrival, it was reduced to 60 mg for the first day of eating and then further reduced to 30 mg during the fast. The patient elected to consume vegetable juice for 12 days, followed by 10 days of water-only fasting and 10 days of refeeding as described above. Throughout the fast she reported mild light-headedness, fatigue, and moderate acid reflux. After fasting and refeeding, her weight was 254.8 lbs., BMI was 37.9 kg/m², systolic/diastolic blood pressure was 108/74 mmHg, and TSH was 6.8 uIU/mL. All previously reported symptoms resolved except for mild fatigue and intermittent cold sensitivity. By the end of refeeding, she had resumed taking 90 mg of Armour Thyroid once daily. On discharge, she was instructed to continue care of HT with a primary care physician.

At a remote, 30-day follow-up visit, the patient reported that she had reestablished care with a primary care physician and maintained a plant-based diet. Her most recent labs indicated that TSH was 9.7 uIU/mL and CRP was 1.2 mg/L. She also had maintained weight loss, had less arthritic knee pain, and was no longer using esomeprazole (Table 1). Although her TSH remained slightly elevated, she chose to continue dietary and lifestyle changes before further adjusting the dosage of Armour Thyroid.

Discussion

After two prolonged water-only fasting and refeeding interventions, the patient in this case experienced improvements in energy as well as decreased weight, joint pain, brain fog, and depressive symptoms. In addition to symptomatic relief, this patient also achieved clinically meaningful reductions in TSH and CRP values. Although it is likely that this patient may have benefited from a higher dose of hormone replacement, she had independently chosen to taper her medication, and her compliance to the dietary changes increased after sustained results

from the second fast. It has been previously reported that fasting decreases triiodothyronine and TSH and increases free thyroxine, coinciding with a transient decrease in basal metabolic rate, and it is unknown how these changes impact long-term thyroid health.⁴ CRP has also been previously reported to increase during fasting, but levels decrease during refeeding to below baseline and are sustained for at least for at least six weeks.^{5,6}

The pathogenesis of HT involves the dysregulation of CD4+Th cells,⁷ where Th cells recognize the thyroid antigens presented by antigen-presenting cells and become activated. Once activated, they release various cytokines, such as interferon-gamma and interleukin-2, which stimulate B cells to produce autoantibodies against thyroid proteins.⁷ Thyroid peroxidase antibodies and thyroglobulin antibodies target and attack the thyroid gland, contributing to thyroid inflammation and damage.⁷ The mechanisms by which fasting impacts HT can only be speculated, but it may potentially reduce downstream immune system activation. For example, one study reported reduced CD4+Th activation and differentiation after a 24-hour fast in healthy volunteers,⁸ while another observed enhanced innate immune system activity, particularly in neutrophils, after a 72-hour fast.⁹ It is postulated that this temporary increase in immune cell profile during fasting interventions combined with serological evidence of decreased inflammatory markers after fasting and refeeding,⁶ may promote beneficial immune system remodeling potentially via the process of hormesis.

A longitudinal study investigating the risk of hypothyroidism in participants consuming a vegan diet compared to an omnivorous diet observed an increased risk of hypothyroidism in overweight and obese participants as well as those consuming a lacto-ovo-vegetarian or omnivorous diet.¹⁰ This suggests that adherence to an SOS-free diet following the fast may help to maintain improvements in HT symptoms. However, this patient did not change her diet following the first fast and still experienced sustained improvements in TSH and CRP indicating that there may be benefits from fasting alone. While this case shows the promising therapeutic benefits of water-only fasting followed by an SOS-free diet, it also highlights the need for research to determine if the results observed in this patient are seen in a larger population of people with HT.

Conclusion

This case demonstrates the potential benefits of prolonged water-only fasting and refeeding with an SOS-free diet in a patient with HT. In this patient, fasting substantially improved TSH and CRP values as well as multiple symptoms that are often experienced in HT. This case sets a precedent for further research, including larger controlled trials, to explore the effects of prolonged water-only fasting and the implications of diet and lifestyle factors for the management of HT.

Authors' Contributions

M.W. prepared the original draft, collected/interpreted data, and approved the final version of this report. S.G. and T.R.M. collected/interpreted data as well as critically revised and approved the final version of this report. A.C.G. critically revised and approved the final version of this report.

Author Disclosure Statement

A.C.G. is owner of the TrueNorth Health Center. All other authors have no conflicts of interest to declare.

Funding Information

No funding was received for this article. ■

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