

Case Report

# Exploring the Triad of Thyroid Dysfunction, Chronic Diarrhea and Anemia

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## Abstract

Hyperthyroidism, a disorder characterized by excessive thyroid hormone production, typically presents with many symptoms including weight loss, tremors, and heat intolerance. However, in rare instances, it can manifest solely as chronic diarrhea, posing a diagnostic challenge. This case study aims to highlight an unusual presentation of hyperthyroidism and underscore the importance of considering thyroid disease in the differential diagnosis of chronic gastrointestinal symptoms. We present the case of a fifty-year-old woman who, six months prior to her ER visit, had been experiencing severe weight loss and diarrhea along with anemia. Despite her lack of typical hyperthyroidism symptoms, a thorough investigation revealed that hyperthyroidism was the underlying cause of her gastrointestinal issues. This case illustrates that hyperthyroidism can present atypically, solely as chronic diarrhea. The patient's anemia was linked to iron deficiency, worsened by chronic gastrointestinal loss and the hyper metabolic state induced by hyperthyroidism. Treatment of the hyperthyroidism led to significant improvement in her gastrointestinal symptoms and correction of the anemia. This case underscores the critical need to include thyroid disease in the differential diagnosis for patients with chronic diarrhea and weight loss, even in the absence of typical hyperthyroid symptoms. Early recognition and appropriate management of hyperthyroidism can significantly improve patient outcomes by alleviating gastrointestinal manifestations and correcting associated anemia. Clinicians should maintain a high index of suspicion for thyroid dysfunction in patients presenting with unexplained chronic diarrhea and weight loss to ensure timely and accurate diagnosis and treatment.

## Keywords

Chronic Diarrhea, Anemia, Hyperthyroidism, Weight Loss

## 1. Introduction

Chronic diarrhea, lasting beyond four weeks, can stem from various causes including infections, inflammatory bowel disease, malabsorption disorders, medications, and hormonal imbalances. In hyperthyroidism, up to a quarter of patients

experience mild to moderate diarrhea accompanied by frequent bowel movements. Additionally, fat malabsorption, reaching up to 35 grams per day is often observed.

Hyperthyroidism is a common endocrine disorder with

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diverse clinical manifestations. While it is typically associated with symptoms such as weight loss, palpitations, and heat intolerance, gastrointestinal symptoms such as chronic diarrhea can occasionally be the sole presenting complaint [1]. Here, we present a case highlighting the atypical presentation of hyperthyroidism as chronic diarrhea, emphasizing the importance of considering thyroid function testing in patients with unexplained gastrointestinal symptoms. Warning signs to heed include persistent diarrhea lasting for weeks or months without relief, often accompanied by increased frequency and severity of bowel movements [2]. In addition to abdominal pain or discomfort, inadvertent weight loss despite a normal or increased appetite may also appear. Additionally, symptoms of hyperthyroidism such as palpitations, heat intolerance, sweating, tremors, anxiety, and fatigue might coexist, exacerbating gastrointestinal distress. Hyperthyroidism associated chronic diarrhea is associated with signs of malabsorption, so a thorough clinical approach is required to exclude the other causes of chronic diarrhea [3]. Currently, the patient got operated after the radioactive iodine scan confirmed the presence of multi-nodular goiter and is now on maintenance dose of tablet Thyroxine 50mcg 2 tablets per oral once daily.

## 2 Case Presentation

A 50-year-old, married women presented in emergency room of a tertiary care hospital with the presenting complaints of loose stools (6-7 episodes per day) along with un-intentional weight loss (15-20 kilos) for last 6 months. The patient denied having any significant comorbidities. She was in her usual state of health 6 months back when she suddenly developed large volume diarrhea 6-7 episodes per day containing partially digested food particles with no passage of blood and mucus in it and having no significant aggravating & relieving factors. She denied having nocturnal diarrhea, fecal urgency, tenesmus and altered bowel habits ruling out large gut diarrhea. There was no history of fever, self-medications, un-protected intercourse, and history of contact (Tuberculosis), crampy abdominal pain prior to defecation or eating from unhygienic areas. The diarrhea was associated with lethargy and un-intentional weight loss.

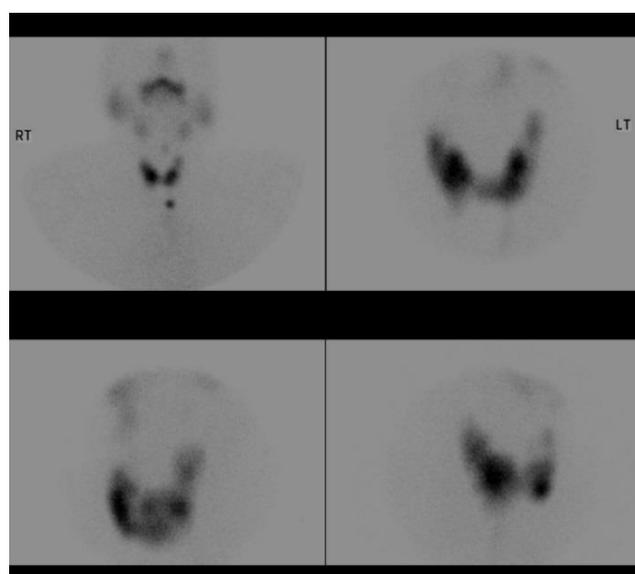
The patient was vitally stable having temperature of 98.6 Fahrenheit, blood pressure was 120/80 mm HG, respiratory rate of 18 breaths per minute and pulse rate of 75 (regularly regular). On examination, a thin, lean patient lies comfortably in bed with no obvious signs of distress or facial grimace. The patient was pale overall having conjunctival pallor, decreased muscle mass and grade 1 pedal edema. There were no signs of thyroid enlargement, tremors, or tachycardia. Abdominal examination revealed no tenderness or palpable masses. The systemic review was unremarkable, and the patient was admitted for further workup and management.

The baseline investigations were ordered which showed hemoglobin of 9.5 mg/dl, MCV 70 f/l, LFTs showed albumin level of 2.0 g/dl, serum electrolytes showed hypokalemia of

2.8 mEq/L suggesting the presence of malabsorption. CRP, RFTs, stool complete examination, stool for occult blood, stool culture was all negative. For the workup of low MCV, iron studies were ordered which showed serum iron levels 40 mcg/dL, serum ferritin 70ng/mL and TIBC 300mcg/dL. Upper GI endoscopy was done to rule out gastric ulcer, angiodysplasias and coeliac disease which came out to be negative. Since the CRP was normal and there were no signs of large gut diarrhea colonoscopy was not done. The ultrasound abdomen was unremarkable. The patient was managed conservatively however when the diagnosis of hyperthyroidism was confirmed she was put on Tab Neomercazole (Carbimazole) 10mg per oral thrice daily along with low dose Propranolol 10mg per oral twice daily.

**Table 1.** Treatment flow table.

Parameters	Before treatment	After treatment
TSH	0.1 mIU/L (0.4-4.0 mIU/L)	0.3 mIU/L
Free T3	6.5 pg/mL (2.3-4.2 pg/mL)	3.8 pg/mL
Free T4	2.5 ng/dl (0.8-1.8 ng/dL)	1.2 ng/dL
Hemoglobin	9.5 mg/dl	12.5 mg/dl
MCV	70 f/l	85 f/l
Weight	40 kilos	54 kilos



**Figure 1.** Radioactive iodine scan showing presence of Multi-nodular goitre. Note the presence of patchy uptake on the scan which is the hallmark for MNG.

The patient came for follow up after 5 months with significant improvement in bowel movements, stool consistency and weight. Follow up labs were TSH 0.3 mIU/L, free T3 3.8

pg/mL and free T4 1.2 ng/dL. The patient was put on maintenance dose of Tab Neomercazole 10mg per oral once daily and referred to surgeon for further management which showed the presence of multi-nodular goiter.

### 3. Discussion

Chronic diarrhea is defined as diarrhea persisting for more than four weeks. Diarrhea should be considered alarming when the warning signs are there like presence of anemia, weight loss, altered bowel habits, nocturnal diarrhea, passage of blood & mucus and intractable diarrhea [4]. In the presence of warning signs the organic causes of diarrhea should be ruled out via upper GI endoscopy or colonoscopy along with blood tests like CBC, CRP, albumin level, stool complete examination, stool for occult blood, anti-tissue transglutaminase IgA antibody and stool for c/s [5]. Osmotic diarrhea usually stops after cessation of the offending agent but the secretory diarrhea persists despite conservative management and it is this diarrhea which leads to development of symptoms like anemia, weight loss, lethargy, decreased muscle mass and failure to thrive [6]. Chronic diarrhea is common in hyperthyroidism, particularly in severe or untreated cases. The incidence can vary, but studies indicate that gastrointestinal symptoms, including diarrhea, occur in about 20-30% of hyperthyroid patients [7]. Thyroid hormones, particularly thyroxine (T4), have a stimulating effect on intestinal motility. When there is an excess of thyroid hormones in hyperthyroidism, it can lead to hyperactive contractions of the intestines, resulting in decreased transit time for food through the gastrointestinal tract [8]. This decreased transit time can impair the proper digestion and absorption of nutrients. The rapid movement of food through the intestines may limit the contact time between nutrients and the intestinal lining, reducing the absorption of essential nutrients such as carbohydrates, fats, proteins, vitamins, and minerals. Moreover, sympathetic overstimulation also contributes to diarrhea by enhancing bowel motility, altering secretion of intestinal fluids, and changing the normal gut microbiota [9]. As a result, malabsorption can occur, leading to various gastrointestinal symptoms, including diarrhea. Chronic diarrhea in the context of thyroid malignancies is rare but can occur, particularly with medullary carcinoma of thyroid (MTC). This type of thyroid cancer originates from the Para follicular C cells of the thyroid, which produce calcitonin. MTC can produce other bioactive substances like serotonin and prostaglandins that can cause gastrointestinal symptoms, including diarrhea [10]. This symptom can be particularly pronounced if the tumor secretes elevated levels of these substances. Anemia is also a notable complication in hyperthyroidism [11]. The prevalence of anemia in hyperthyroid patients varies but falls between 20-40%. The anemia in hyperthyroidism is due to malabsorption of essential nutrients which often gets corrected after treatment as happened in this case [12]. Chronic diarrhea in hyperthyroidism leads to development of anemia in which the

incidence of different anemias is as follows,

1. Normocytic Normochromic Anemia: 30-50%
2. Microcytic Hypochromic Anemia: 10-20%
3. Macrocytic Anemia: 5-10%
4. Hemolytic Anemia: Rare

Diarrhea can range from a mild, self-limiting condition to a severe, life-threatening issue [13]. It is important to recognize warning signs that indicate a need for prompt medical evaluation. Here are some key warning signs to watch for:

#### Dehydration

1. Severe Thirst: Constant feeling of thirst.
2. Dry Mouth and Skin: Dryness despite adequate fluid intake.
3. Little or No Urine: Dark urine, or very infrequent urination.
4. Dizziness or Lightheadedness: Especially upon standing.

#### Bloody or Black Stools

1. Blood in Stool: Visible red blood or maroon-colored stools.
2. Black, Tarry Stools: Indicative of bleeding in the upper gastrointestinal tract.

#### Severe Abdominal Pain or Cramping

1. Intense Pain: Especially if it is not relieved by passing stools or gas.
2. Localized Pain: Pain that is concentrated in one area of the abdomen.

#### Persistent Diarrhea

1. Duration: Diarrhea lasting over 2 days in adults, or over 24 hours in young children and infants.
2. Frequency: More than 6-8 loose stools in 24 hours.

#### Fever

1. High Fever: Temperature above 102 °F (39 °C).
2. Accompanying Symptoms: Chills, sweat, or feeling unwell.

#### Signs of Infection or Systemic Illness

1. Severe Fatigue: Extreme tiredness or weakness.
2. Rash: Any skin rash accompanying diarrhea.
3. Jaundice: Yellowing of the skin or eyes.

#### Chronic Symptoms

1. Weight Loss: Unintentional weight loss.
2. Prolonged Symptoms: Diarrhea persisting for weeks.

#### Special Populations

1. Infants and Young Children: They are at higher risk for rapid dehydration.
2. Elderly: Higher risk for complications.
3. Immunocompromised Individuals: Those with weakened immune systems are more susceptible to severe infections.

#### When to Seek Immediate Medical Attention

1. Severe Dehydration: Signs include very dry mouth, skin, little or no urination, severe weakness, or dizziness.
2. Persistent Vomiting: Inability to keep fluids down.
3. Severe Pain: Intense abdominal pain or cramping.
4. High Fever: Particularly if it is above 102 °F (39 °C).
5. Blood or Pus in Stools: Visible signs of blood or pus.

6. Altered Mental Status: Confusion, lethargy, or unresponsiveness.

A basic algorithm in approaching a patient of chronic diarrhea is as follows:

1. Onset, duration, progression, aggravating & relieving factors, and association of diarrhea.
2. Difference between large and small gut diarrhea.
3. Assessment of warning signs like weight loss, passage of blood, mucus, nocturnal diarrhea, altered bowel habits and anemia.
4. Workup should include complete blood count, CRP levels, stools complete examination, stool for culture and sensitivity, upper GI endoscopy, colonoscopy, and tumor markers (particularly in elderly people) [14].

## 4. Conclusion

In conclusion, this case report highlights the association between hyperthyroidism and chronic diarrhea. Hyperthyroidism, characterized by excess thyroid hormone production, can lead to various gastrointestinal symptoms, including diarrhea. The mechanisms underlying diarrhea in hyperthyroidism include increased intestinal motility, malabsorption of nutrients, alterations in fluid secretion, and sympathetic stimulation. Additionally, autoimmune processes associated with hyperthyroidism may directly affect the intestines, leading to inflammation and diarrhea.

Management of chronic diarrhea in hyperthyroidism involves addressing the underlying thyroid dysfunction, typically through anti-thyroid medications, radioactive iodine therapy, or thyroidectomy. Additionally, nutritional supplementation may be necessary to correct any deficiencies resulting from malabsorption. Further research may be warranted to explore the specific mechanisms linking hyperthyroidism to chronic diarrhea and to optimize treatment strategies for affected individuals.

## Abbreviations

MCV	Mean Corpuscular Volume
CRP	C-reactive Protein
TSH	Thyroid Stimulating Hormone
MTC	Medullary Thyroid Carcinoma
MNG	Multi-Nodular Goitre

## Patient's Consent

Informed consent was obtained from the patient.

## Author Contributions

**Waqar Hafeez:** Manuscript writing, data collection  
**Zeeshan Shafqat:** Conceptualization  
**Zia Ur Rehman:** Validation

**Anas Muhammad Din:** Finances, editing  
**Muhammad Faisal Khan:** Finances, editing  
**Hassaan Ahmad:** Finances, editing

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

- [1] Trivalle C, Doucet J, Chassagne P, Landrin I, Kadri N, Menard JF, Bercoff E. Differences in the signs and symptoms of hyperthyroidism in older and younger patients. *J Am Geriatr Soc*. 1996 Jan; 44(1): 50-3. <https://doi.org/10.1111/j.1532-5415.1996.tb05637.x>
- [2] Schiller LR, Pardi DS, Sellin JH. Chronic Diarrhea: Diagnosis and Management. *Clin Gastroenterol Hepatol*. 2017 Feb; 15(2): 182-193. e3. <https://doi.org/10.1016/j.cgh.2016.07.028>
- [3] Shakir MKM, Spiro AJ, Mai VQ, Hoang TD. Diarrhea as an Initial Presentation in Patients with Medullary Thyroid Cancer: Delaying the Diagnosis. *Case Rep Gastroenterol*. 2020 Jul 30; 14(2): 391-401. <https://doi.org/10.1159/000508850>
- [4] Fine KD, Schiller LR. AGA technical review on the evaluation and management of chronic diarrhea. *Gastroenterology*. 1999 Jun; 116(6): 1464-86. [https://doi.org/10.1016/s0016-5085\(99\)70513-5](https://doi.org/10.1016/s0016-5085(99)70513-5)
- [5] Bahn Chair RS, Burch HB, Cooper DS, Garber JR, Greenlee MC, Klein I, Laurberg P, McDougall IR, Montori VM, Rivkees SA, Ross DS, Sosa JA, Stan MN; American Thyroid Association; American Association of Clinical Endocrinologists. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Thyroid*. 2011 Jun; 21(6): 593-646. <https://doi.org/10.1089/thy.2010.0417>
- [6] Ross DS, Burch HB, Cooper DS, Greenlee MC, Laurberg P, Maia AL, Rivkees SA, Samuels M, Sosa JA, Stan MN, Walter MA. 2016 American Thyroid Association Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis. Erratum in: *Thyroid*. 2017 Nov; 27(11): 1462. <https://doi.org/10.1089/thy.2016.0229.correx> PMID: 27521067.
- [7] Xu GM, Hu MX, Li SY, Ran X, Zhang H, Ding XF. Thyroid disorders and gastrointestinal dysmotility: an old association. *Front Physiol*. 2024 May 2; 15: 1389113. <https://doi.org/10.3389/fphys.2024.1389113>
- [8] Hiroi N, Sakamoto Y, Urita Y, Higa M, Kuboki K, Yoshino G. Graves' disease with intractable diarrhea, chylous ascites, and chylothorax: a case report. *Thyroid*. 2007 Dec; 17(12): 1299-303. <https://doi.org/10.1089/thy.2007.0006>
- [9] Daher R, Yazbeck T, Jaoude JB, Abboud B. Consequences of dysthyroidism on the digestive tract and viscera. *World J Gastroenterol*. 2009 Jun 21; 15(23): 2834-8. <https://doi.org/10.3748/wjg.15.2834>

- [10] Kyriacou A, McLaughlin J, Syed AA. Thyroid disorders and gastrointestinal and liver dysfunction: A state of the art review. *Eur J Intern Med.* 2015 Oct; 26(8): 563-71. <https://doi.org/10.1016/j.ejim.2015.07.017>
- [11] Bathgate G, Karra E, Khoo B. New diagnosis of hyperthyroidism in primary care. *BMJ.* 2018 Aug 24; 362: k2880. <https://doi.org/10.1136/bmj.k2880>
- [12] Szczepanek-Parulska E, Hernik A, Ruchała M. Anemia in thyroid diseases. *Pol Arch Intern Med.* 2017 May 31; 127(5): 352-360. <https://doi.org/10.20452/pamw.3985>
- [13] Dorgalaleh A, Mahmoodi M, Varmaghani B, Kiani Node F, Saeedi Kia O, Alizadeh Sh, Tabibian Sh, Bamedi T, Momeni M, Abbasian S, Kashani Khatib Z. Effect of thyroid dysfunctions on blood cell count and red blood cell indice. *Iran J Ped Hematol Oncol.* 2013; 3(2): 73-7. Epub 2013 Apr 22. PMID: 24575274; PMCID: PMC3915449.
- [14] Wopereis DM, Du Puy RS, van Heemst D, Walsh JP, Bremner A, Bakker SJL, Bauer DC, Cappola AR, Ceresini G, Degryse J, Dullaart RPF, Feller M, Ferrucci L, Floriani C, Franco OH, Iacoviello M, Iervasi G, Imaizumi M, Jukema JW, Khaw KT, Luben RN, Molinaro S, Nauck M, Patel KV, Peeters RP, Psaty BM, Razvi S, Schindhelm RK, van Schoor NM, Stott DJ, Vaes B, Vanderpump MPJ, Vdžke H, Westendorp RGJ, Rodondi N, Cobbaert CM, Gussekloo J, den Elzen WPJ; Thyroid Studies Collaboration. The Relation Between Thyroid Function and Anemia: A Pooled Analysis of Individual Participant Data. *J Clin Endocrinol Metab.* 2018 Oct 1; 103(10): 3658-3667. <https://doi.org/10.1210/jc.2018-00481>