

CASE REPORT

# Vitamin D Deficiency and Hashimoto's Thyroiditis in a Patient with Polycystic Ovary Syndrome and Ulcerative Colitis

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## ABSTRACT

We present a 25-year-old woman with complaints of missing menstrual cycle for 3 months, and having a history of ulcerative colitis with no significant family history. The polycystic ovary syndrome (PCOS) was diagnosed by an ultra-sonogram of uterus. Lab investigation revealed the thyroid functional test, vitamin D, total RBC, hemoglobin, MCV, MCHC, total cholesterol, LDL cholesterol and non-HDL cholesterol of the patient to be in an abnormal range. The undertaken treatment included 75 mcg levothyroxine and supplements of vitamin D, methyl cobalamin, myo-inositol, D-chiro-inositol and folic acid to provide a healthy menstrual cycle. We showed patient with ulcerative colitis can have risk of malnutrition and lead to vitamin D deficiency with a correlation with anti-TPO level; while treatment measures, diet modification and stress management technique improved the patient's condition and menstrual cycle became normalized.

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## Introduction

Hypothyroidism is the most common endocrine disorder. In this condition, the thyroid gland does not produce enough thyroxin hormone. It occurs primarily due to insufficient stimulation of the thyroid gland by the hypothalamus or pituitary gland or because of a thyroid gland failure that happens due to an autoimmune destruction (Hashimoto's thyroiditis), congenital abnormalities, cardiac diseases, or iodine deficiency (1). It was shown that patients with ulcerative colitis (UC) can exhibit a higher prevalence of thyroid disorders compared to the general population. UC is an autoimmune disease and usually chronic

inflammatory condition of the colon in the large intestine which can be accompanied by bleeding. It is more frequently seen in the late adolescents and early childhood (2). Its prevalence in India was reported 44.3 per one lakh population that indicates the disease not to be a rare disease in India (3). The impact of micronutrients and the effectiveness of some diets in treatment of Hashimoto's disease were assessed before (4). The people with UC may have a high prevalence of vitamin D deficiency based on environmental factors as vitamin D can modulate the adaptive and innate immunity and plays important role in the pathogenesis of autoimmune disease. It can promote the calcium

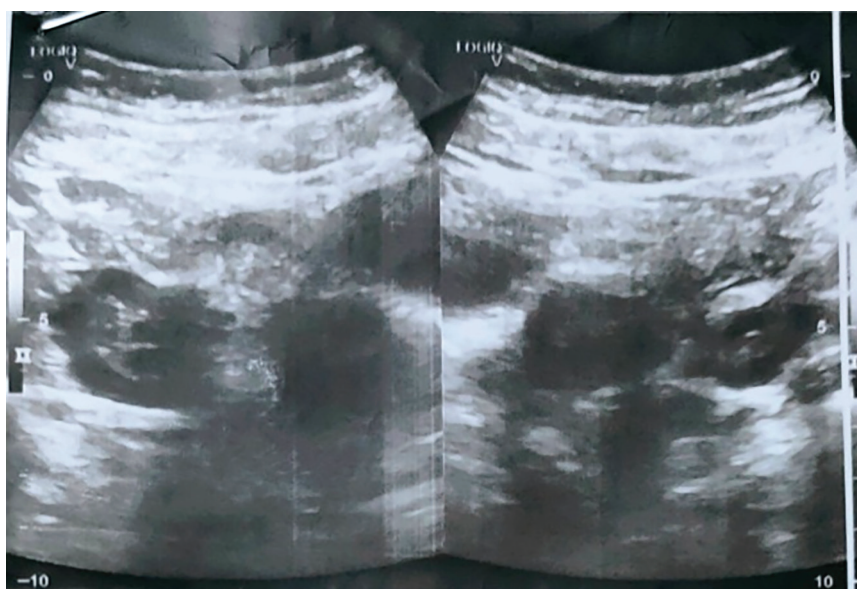
haemostasis and maintaining the bone strength (1, 2, 5). A higher prevalence of Hashimoto's thyroiditis has been demonstrated in Polycystic Ovary Syndrome (PCOS) patients. In PCOS patients, the ovaries contain fluid-filled cysts, in which the ovaries can't mature to release egg cells (6).

### Case Report

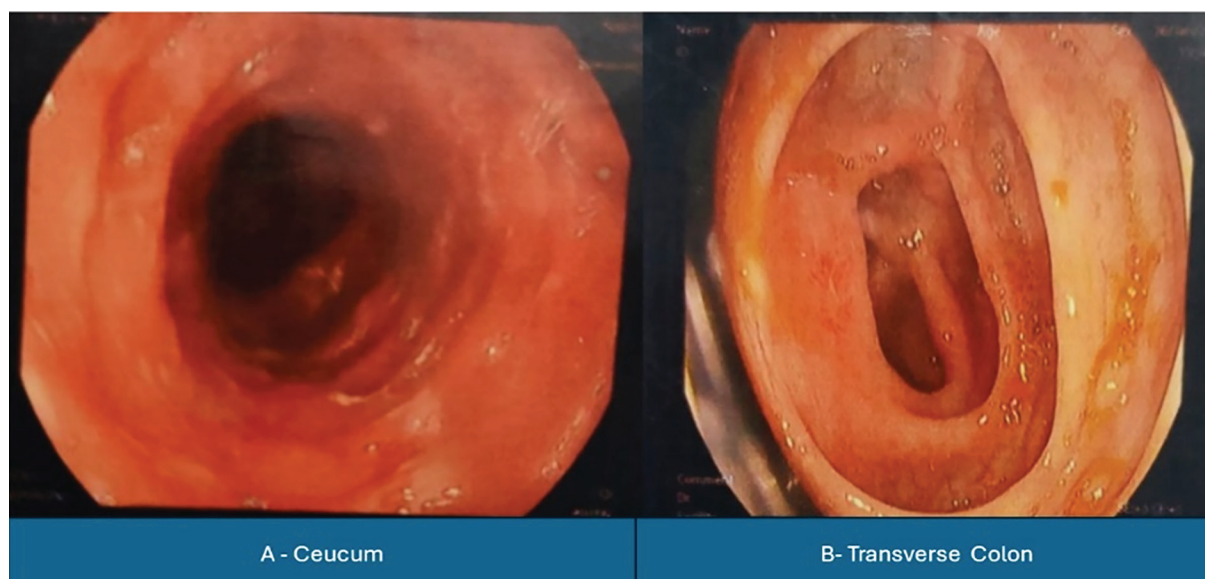
A 25-year-old woman was admitted to the hospital with complaints of missing menstrual cycle for 3 months and unexplained weight gain and puffiness of face, having a history of UC with no significant family history; while the diagnosis was undertaken by colonoscopy and biopsy revealing a mild chronic inflammation. Medication history indicated to receipt of prednisolone (40 mg OD) with a tapering dose for 6 months, together with mesalamine (800 mg/3 times per day) for 18 months that was

followed by the same dose/two times per day for 6 months and finally with the same dose/OD for another 6 months. Supplements like iron and folic acid were also administered.

The patient was admitted due to complaints of missing of menstrual cycle for 3 months, unexplained weight gain and puffiness of the face. PCOS was also diagnosed by the ultrasound abdomen revealing polycystic ovary and multiple follicles in both ovaries (Figure 1). Past diagnosis report of the patient colonoscopy exhibited a mild UC in rectum up to the descending colon. The mucosa was ulcerated with loss of vascular pattern. There were scattered ulcers seen in transverse colon to terminal ileum (Figure 2). The thyroid functional test regarding T3, T4, TSH, 25-OH Vitamin D, Vitamin B12, cholesterol and anti-thyroid peroxidase levels denoted to abnormalities (Table 1).



**Figure 1:** Ultrasonographic examination of the patient with PCOS.



A - Cecum

B- Transverse Colon

**Figure 2:** Patient's colonoscopy with ulcerative colitis. A. Scattered ulcer in cecum. B. The ulcerated mucosa with loss of vascular pattern in transverse colon.

**Table 1:** Thyroid functional test of the patient.

Variable	Observed values	Reference range
T3 (Total)	47.2 ng/dL	80-220 ng/dL
T4 (Total)	1.36 µg/dL	5.0-12.0ug/dL
TSH	≥500 µIU/mL	0.5-5.0 mIU/dL
Anti-thyroid peroxidase (Anti-TPO)	54.33 IU/mL	0-34 IU/mL
25-OH vitamin D	9.25 ng/mL	20-40 ng/mL
Vitamin B12	192 pg/mL	190-950 picograms
Total cholesterol	249 mg/dL	<200 mg/dL
low-density lipoprotein (LDL) cholesterol	196 mg/dL	100-129 mg/dL
None-high-density lipoprotein (HDL) cholesterol	205.35 mg/dL	<130 mg/dL

## Discussion

The patient was initially advised to receive 200 mg per day progesterone for amenorrhea to regulate the reproductive function (7), 75 mg per day levothyroxine for improper activity of the thyroid gland. Vitamin D supplementation (60000 IU) for three days was undertaken for the vitamin D deficiency condition too. The patient was suggested to take vitamin D-rich foods such as fish, juices that were fortified with vitamin D, dairy products, and to be exposed to sunlight to enhance the vitamin D production in the body (8). She was recommended to focus on nutrient-dense foods depending on the disease activity and the complications. The patient was also advised to minimize the intake of processed foods, emulsifiers and artificial ingredients (9). The diet modification was strongly correlated with relapse of UC as many alcoholic drinks contain sulphur as additives that can cause mucosal damages in the large intestine (10). The patient was also consulted for daily practice of yoga or meditation and to be actively involved in sport activities to decrease her stress and to improve the thyroid function. The patient condition improved when treated with vitamin D, thyroxin, and nutrient supplements together with diet modification and stress management techniques.

UC is an autoimmune disease, and a relapsing and an inflammatory disorder of the colonic mucosa through which inflammatory process is driven by T cells affecting the absorption of small intestine. The inflicted patients with IBD show high prevalence of vitamin D deficiency based on various environmental factors (5). Vitamin D is known as an immune-modulator that can affect the autoimmune Hashimoto's thyroiditis. The prevalence of hypothyroidism in vitamin D deficiency was reported to be high and the vitamin D level to be inversely co-related with anti-TPO level (11). So the cause of hypothyroidism in this patient might be due to vitamin D deficiency; while in hypothyroidism, a high level of prolactin hormone is released to prevent the ovulation process by inhibiting the secretion of

follicle stimulating hormone (FSH) so that patient can experience an amenorrhea (12).

## Conclusion

Patients with UC can have the risk of malnutrition and lead to a vitamin D deficiency. This condition may be correlated with an anti-TPO level. Our findings revealed that the patient's condition improved following the treatment measures and a diet modification and stress management techniques.

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## Authors' Contribution

J.K contributed to the conceptualization of the study, as well as review and editing of the manuscript. D.K was responsible for the original draft preparation, writing, review, and editing. S.R contributed to writing, validation, and data analysis. L.A was involved in writing, editing, and analysis. H.PY conducted the clinical investigation and provided patient-related clinical support.

## Conflict of Interest

None declared.

## References

- 1 Calcaterra V, Penagini F, Rossi V, et al. Thyroid disorders and inflammatory bowel disease: an association present in adults but also in children and adolescents. *Front Endocrinol (Lausanne)*. 2025;16:1425241. DOI: 10.3389/fendo.2025.1425241. PMID: 39968296.

- 2 Mehrabani D, Vahedi M, Eftekhari MH, et al. Food Avoidance in Patients with Ulcerative Colitis: A Review. *Int J Nutr Sci*. 2017;2:189-195.
- 3 Kedia S, Ahuja V. Epidemiology of Inflammatory Bowel Disease in India: The Great Shift East. *Inflamm Intest Dis*. 2017;2:102-115. DOI: 10.1159/000465522. PMID: 30018961.
- 4 Mikulska AA, Karaźniewicz-Łada M, Filipowicz D, et al. Metabolic Characteristics of Hashimoto's Thyroiditis Patients and the Role of Microelements and Diet in the Disease Management-An Overview. *Int J Mol Sci*. 2022;23:6580. DOI: 10.3390/ijms23126580. PMID: 35743024.
- 5 Daniel Caviezel, Silvia Maissen, Jan Hendrik Niess, High Prevalence of Vitamin D Deficiency among Patients with Inflammatory Bowel Disease. *Inflamm Intest Dis*. 2018;2:200-210. DOI: 10.1159/000489010. PMID: 30221147.
- 6 Serin AN, Birge Ö, Uysal A, Görar S, Tekeli F. Hashimoto's thyroiditis worsens ovaries in polycystic ovary syndrome patients compared to Anti-Müllerian hormone levels. *BMC Endocr Disord*. 2021;21:44. DOI: 10.1186/s12902-021-00706-9. PMID: 33750377.
- 7 DeMayo FJ, Zhao B, Takamoto N, et al. Mechanisms of action of estrogen and progesterone. *Ann N Y Acad Sci*. 2002;55:48-59. DOI: 10.1111/j.1749-6632.2002.tb02765.x. PMID: 11949965.
- 8 Buttriss JL, Lanham-New SA. Is a vitamin D fortification strategy needed. *Nutr Bull*. 2020;45:115-122. DOI: 10.1111/nbu.12430. PMID: 32536809.
- 9 Nicolaus Nazarenkov, Kristina Seeger. Implementing Dietary Modifications and Assessing Nutritional Adequacy of Diets for Inflammatory Bowel Disease. *Gastroenterol Hepatol*. 2019;15:133-144. PMID: 31061655.
- 10 Jowett SL, Seal CJ, Pearce MS, et al. Influence of dietary factors on the clinical course of ulcerative colitis: a prospective cohort study. *Gut*. 2004;53:1479-1484. DOI: 10.1136/gut.2003.024828. PMID: 15361498.
- 11 Asli Dogruk Unal, Ozlem Tarcin, Hulya Parildar. Vitamin D deficiency is related to thyroid antibodies in autoimmune thyroiditis. *Cent Eur J Immunol*. 2014;39:493-497. DOI: 10.5114/ceji.2014.47735. PMID: 26155169.
- 12 Kaiser UB. Hyperprolactinemia and infertility: new insights. *J Clin Invest*. 2012;122:3467-3468. DOI: 10.1172/jci64455. PMID: 23193578.