

## Case Report

# Pretibial myxoedema: a case study of a 49-year-old male

**Rajesh Rajagopalan\***, Mohankumar Vedhanayagam, Revathi Kandasamy,  
Srinivasahan Karattupalayam Govindan, Priyathileepan Thangavelu, Sachin Subrahmanya K.

Department of Dermatology, Venereology and Leprology, Government Erode Medical College, Perundurai, Tamil Nadu, India

**Received:** 18 December 2024

**Revised:** 18 January 2025

**Accepted:** 06 February 2025

**\*Correspondence:**

Dr. Rajesh Rajagopalan,

E-mail: [gemchskin@gmail.com](mailto:gemchskin@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

Pretibial myxoedema (PTM), also known as thyroid dermopathy, is a rare but distinctive complication of Graves' disease, often appearing as skin lesions on the shins. A 49-year-old male with thyrotoxicosis and diabetes presented with significant swelling in his lower legs, including the shins, ankles, and feet. Laboratory tests revealed normal thyroid function but elevated thyroid-stimulating hormone (TSH) receptor antibodies, confirming PTM diagnosis upon biopsy. Thyroid dermopathy is usually asymptomatic, but severe cases may result in elephantiasis or thyroid acropachy, often accompanying ophthalmopathy, which typically appears earlier. Diagnosis is made by identifying characteristic lesions in patients with a history of Graves' disease and ophthalmopathy, sometimes requiring biopsy for confirmation. Though many cases are mild and self-resolving, topical corticosteroids can provide relief in symptomatic or cosmetically concerning cases. In severe instances, systemic immunomodulation may be required, though evidence supporting its long-term efficacy is limited. The underlying pathogenesis involves immune-mediated fibroblast activation and glycosaminoglycan (GAG) production, particularly in the pretibial area due to mechanical factors. Studies show that subclinical dermopathy can occur in untreated Graves' disease, though histological changes in other areas like the forearm remain rare. Overall, treatment remains largely palliative, with more effective options still needed.

**Keywords:** Grave's disease, Thyrotoxicosis, Mucin deposition, Glycosaminoglycan's

### INTRODUCTION

Pretibial myxoedema is a skin condition caused by the buildup of mucin, often seen on the front of the lower legs. It is a sign of overactive thyroid, most commonly linked to Graves' disease. First described by Hektoen in 1895, it affects fewer than 5% of people with Graves' disease.<sup>1</sup> This condition is more noticeable in the lower legs due to gravity and is often associated with thyroid eye disease and thickening of the fingers and toes.

The mechanism behind the development of pretibial myxoedema involves the accumulation of

glycosaminoglycan's (GAGs) in the dermis and subcutaneous tissue. This process is thought to be part of a generalized autoimmune response, with fibroblast activation contributing to tissue remodeling. Though the condition is rare, it often manifests after the onset of Graves' ophthalmopathy, reflecting a systemic nature of the autoimmune disorder.<sup>2</sup>

It can appear as patches of thickened, waxy skin, and in severe cases, the texture and colour changes can become more pronounced. Even though it typically resolves spontaneously in mild cases, it can be disfiguring and difficult to treat in more severe forms. The condition's

relationship with other extra thyroidal manifestations, such as acropachy (thickening of fingers and toes), underscores its systemic impact on connective tissues throughout the body.<sup>2</sup>

## CASE REPORT

A 49-year-old male came with complaints of swelling over both legs for the past 3 months. The patient was apparently normal before 3 months; then he developed swelling initially over both lower legs, and these lesions gradually increased in number and size with time.

He had increased sweating and hunger for the past 2 months, along with exophthalmos in both eyes for the same duration. History of hyperthyroidism for the past 6 months; he is on methimazole 10 mg TDS. History of type 2 diabetes mellitus for 3 months; the patient is on metformin 500 mg BD.

The patient was conscious, oriented, well-built, and well-nourished. Non-pitting pedal oedema involving both lower legs was present.

### *Thyroid region*

Enlarged in both lobes.

### *Eye signs*

Stellwag sign and lid retraction were present.

On cutaneous examination, there were multiple non-pitting indurated plaques and nodules of various sizes present over the pretibial, anteromedial (Figure 1), and posterior aspects (Figure 2) of both lower legs, with thickening of skin over both lower legs.



**Figure 1: Multiple nodules and plaques in both legs.**



**Figure 2: Indurated plaques on the posterior aspect of lower legs.**

### *Hair*

Fine, thin hair over the scalp.

### *Nails*

Dull, dry, and brittle nails involving all finger and toe nails.

Laboratory findings (complete blood count, liver functions, and kidney functions) were unremarkable. CXR-PA view, USG abdomen and pelvis, and ECG were normal. Laboratory tests showed that thyroid function was within normal values, but the level of thyroid stimulating hormone (TSH) receptor antibodies was very high.

### *USG neck*

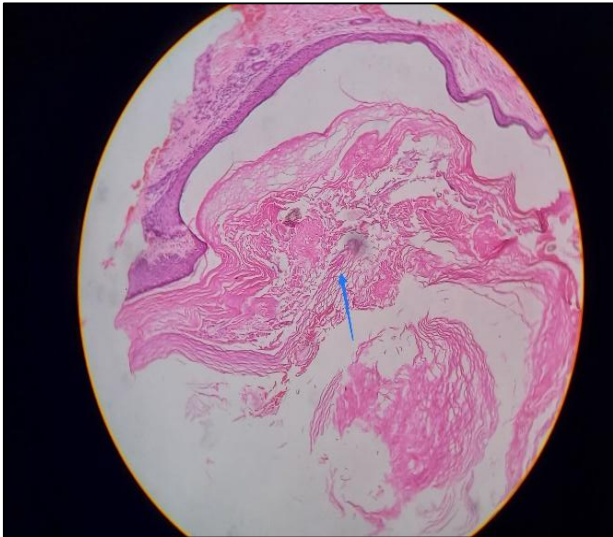
Right lobe-30×21 mm, left lobe-19×18 mm, isthmus-4.9 mm.

### *USG of both lower limbs*

Skin thickening with subcutaneous oedema seen in both legs.

### *HPE*

Section shows epidermis; the underlying dermis shows adnexal structures along with degenerated collagen bundles (Figure 3).



**Figure 3: HPE (10 X) shows epidermis and the underlying dermis shows adnexal structures along with degenerated collagen bundles.**

Diagnosis of pretibial myxoedema was made. Treated with tablet pentoxifylline 400 mg BD then TID and emollients. Patient is under follow up.

## DISCUSSION

Thyroid-related skin problems, like dermopathy, are uncommon complications of Graves' disease. They typically occur after hyperthyroidism and thyroid eye disease<sup>2</sup> develop, though, in rare cases, they can appear beforehand. This condition is less common in men and is usually seen in middle-aged women.

There are four types of this condition based on appearance: widespread non-pitting swelling, plaques, nodules, and elephantiasis (severe swelling). The most frequent type is the diffuse non-pitting swelling. It appears as thick, symmetrical, waxy, flesh-colored, or yellow-brown raised patches<sup>3</sup> on the shins, often giving the skin a texture similar to an orange peel.

Thyroid hormone receptors (TRa and TRb) They are located in keratinocytes, pilosebaceous units (dermal papilla, outer root sheath and sebocytes) and fibroblasts.<sup>3</sup> Autoimmune thyroid disorders involve antibodies targeting specific thyroid proteins like anti-thyroid peroxidase (TPO), anti-thyroglobulin (Tg), and anti-thyroid-stimulating hormone receptor (TSHR) antibodies. Other antigens, such as carbonic anhydrase 2, T3, T4, and sodium iodide symporter, also play a role.<sup>4</sup> The TSH receptor antibodies stimulate fibroblast cells to produce mucin, while thyroid-specific T cells collect in the tissues of the shins.

Inflammatory molecules like TNF- $\alpha$  and gamma-interferon, released by T-helper 1 lymphocytes activated by TSH receptor antigens, increase the production of

glycosaminoglycan's by fibroblasts. Trauma or injury can trigger T cell activity and an immune response. Additionally, mechanical factors and poor venous circulation lead to glycosaminoglycan buildup in the tissues. The accumulated mucin retains fluid, compressing the lymphatic vessels and resulting in swelling (lymphedema).<sup>4</sup>

Triiodothyronine (T3) affects blood flow by lowering vascular resistance and preventing vascular smooth muscle growth<sup>5</sup>, which can cause warm skin, redness in the palms, and flushing of the face. Fibroblast activity also stimulates the release of transforming growth factor-beta 1 (TGF- $\beta$ 1), which promotes thickening of the skin.<sup>6</sup> Thyroid ophthalmopathy is present in 30% of patients with pretibial myxoedema, dermopathy in 4%, and thyroid acropachy in 1%. The combination of exophthalmos, pretibial myxoedema, and acropachy occurs in fewer than 1% of patients.<sup>7</sup> Treatment options for pretibial myxedema include corticosteroid creams, which can be applied under dressings, and injectable steroids directly into the affected area. Compression stockings may also help, along with medications like pentoxifylline or octreotide. In more severe cases, advanced treatments such as high-dose intravenous immunoglobulin therapy or plasmapheresis may be considered.<sup>8</sup>

Topical corticosteroids for treating pretibial myxoedema come in varying strengths, ranging from low-potency options like fluocinolone acetonide to higher-potency treatments like clobetasol propionate. The absorption of these steroids can be enhanced with hydrocolloid or occlusive dressings, such as plastic wrap.<sup>9,10</sup> Occlusion is typically maintained for at least 12 hours daily for 4 to 6 weeks, though close monitoring is essential to check for potential side effects, including skin thinning, telangiectasia, and bruising. In some cases, local excision is tried with octreotide but as low success rate.<sup>11,12</sup> Due to chronicity and recurrence of thyroid dermopathy, the benefit of surgery is unclear.

## CONCLUSION

The skin plays a role in multiple hormones, synthesizes various chemicals, and helps in autocrine and paracrine signaling. It is a crucial indicator of endocrine abnormalities, as many endocrine disorders primarily manifest through distinct skin-related symptoms. Localized pretibial myxoedema is a rare but notable skin manifestation of hyperthyroidism, particularly associated with Graves' disease. We report this case due to its rare occurrence, particularly in males, and it warrants further investigation to understand the exact mechanisms behind this phenomenon.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

## REFERENCES

1. Lan C, Wang Y, Zeng X, Zhao J, Zou X. Morphological diversity of pretibial myxedema and its mechanism of evolving process and outcome: a retrospective study of 216 Cases. *J Thyroid Res.* 2016;1:2652174.
2. Veeranna S, K, Betkerur J, S. Pretibial myxedema, ophthalmopathy and acropachy in a male patient with Graves disease. *Indian J Dermatol Venereol Leprol* 2004;70:380-382
3. Datta D, Bhushan M, Das A. Skin as an endocrine organ: A narrative review. *Indian J Dermatol Venereol Leprol.* 2022;88(5):590-7.
4. Fatourechi V. Pretibial myxedema: pathophysiology and treatment options. *Am J Clin Dermatol.* 2005;6(5):295-309.
5. Ai J, Leonhardt JM, Heymann WR. Autoimmune thyroid diseases: etiology, pathogenesis, and dermatologic manifestations. *J Am Acad Dermatol.* 2003;48(5):641-59.
6. Christopher E, Griffiths M, Barker J, Bleiker TO, Chalmers R, Creamer D. *Rook's Textbook of Dermatology.* Ninth edition, John Wiley & Sons Inc., 2016: 4118-4119.
7. Anderson CK, Miller OF 3rd. Triad of exophthalmos, pretibial myxedema, and acropachy in a patient with Graves' disease. *J Am Acad Dermatol.* 2003;48(6):970-2.
8. Kim WB, Mistry N, Alavi A, Sibbald C, Sibbald RG. Pretibial myxedema: case presentation and review of treatment options. *Int J Low Ext Wounds.* 2014;13(2):152-4.
9. Volden G. Successful treatment of chronic skin diseases with clobetasol propionate and a hydrocolloid occlusive dressing. *Acta Dermato-Venereolog.* 1992;72(1):69-71.
10. Kriss JP, Pleshakov V, Rosenblum A. Therapy with occlusive dressings of pretibial myxedema with fluocinolone acetonide. *J Clin Endocrinol Metabol.* 1967;27(5):595-604.
11. Kuyvenhoven JP, van der Pijl JW, Goslings BM, Wiersinga WM. Graves' dermopathy: does octreotide scintigraphy predict the response to octreotide treatment? *Thyroid.* 1996;6:385-9.
12. Priestley GC, Aldridge RD, Sime PJ, Wilson D. Skin fibroblast activity in pretibial myxoedema and the effect of octreotide (Sandostatin) in vitro. *Br J Dermatol.* 1994;131:52-56.

**Cite this article as:** Rajagopalan R, Vedhanayagam M, Kandasamy R, Govindan SK, Thangavelu P, Subrahmanya KS. Pretibial myxoedema: a case study of a 49-year-old male. *Int J Res Dermatol* 2025;11:177-80.