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# *Association with Thyroid Disorders and Rheumatic Diseases: A Case Report with Thyroid Acropachy*

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Thyroid disorders, such as other endocrine system disorders, can lead to various rheumatic symptoms and findings. Moreover, they frequently exist with many systemic autoimmune diseases, such as mixed connective tissue disease, systemic sclerosis (SSc), Sjögren syndrome, rheumatoid arthritis (RA), and spondyloarthropathy (SpA). Thyroid acropathy is an unusual involvement of autoimmune thyroid disorders (Hashimoto, Graves, etc.), which often appears after a long-lasting thyroid disease. This study aimed to report a case of thyroid acropathy (1).

A 55-year-old female patient presented with a complaint of restricted movement in the joints of the hands and feet. She had been operated for goiter approximately 10 years ago and had received L-thyroxine therapy. Her physical examination revealed soft tissue swelling and flexion deformity in the proximal and distal interphalangeal joints of both the hands. Hypertrophic appearance was observed in both the knees, and flexion deformity and soft tissue swelling were observed in the left toe. There was no accompanying temperature increase. A slight tenderness was observed on palpation. In conventional radiographies, symmetrical narrowing and subperiosteal changes were detected in the joint spaces. In the thyroid function tests, the level of thyroid-stimulating hormone (TSH) was high, but sT3 and sT4 levels were within normal range. The levels of thyroid peroxidase and thyroglobulin antibodies were positive with values of >1000000 IU/mL and 51.7 IU/mL, respectively. The patient had hyperthyroidism for many years before surgery. When hypothyroidism symptoms were examined in the patient, who currently has subclinical hypothyroid, we found widespread muscle pain, hair loss, chill, and depression. In conventional radiographic examinations, joint involvement and periosteal bone changes were symmetrical in both the hands and were consistent with classical thyroid acropathy. On the other hand, toe involvement was unilateral. Different from the development of acropathy that often follows ophthalmopathy and dermopathy, ophthalmopathy and dermopathy were not observed in the existent clinical picture of our patient. While our patient had been hyperthyroid for many years, she had subclinical hypothyroid after surgery.

In literature, there are a few acropathy case studies reporting that acropathy develops independent of thyroid hormones without classical radiological findings, and it is not accompanied by the findings of ophthalmopathy and dermopathy (1-4).

Thyroid acropathy is an unusual involvement of thyroid disorders. It is 3.4 times more frequent among females. Genetic and environmental factors have a role in its etiology. High iodine intake, selenium deficiency, smoking, and chronic infectious diseases, such as chronic hepatitis C, are among the environmental factors. It is known that the musculoskeletal system is the primary target tissue for thyroid hormones. Abnormal thyroid antibody response to thyroid antigens, excessive interaction between abnormal thyrocytes, cells presenting abnormal antigen, and abnormal T cells play a role in disease pathogenesis. The infiltration of the thyroid gland with inflammatory cells results in the production of thyroid-specific antibodies. Thyroid tissue is destroyed and filled with fibroblasts. Accordingly, fibroblast activation is considered to have a critical role in disease pathogenesis (4).

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Thyroid acropathy is generally among the rare complications that develop because of autoimmune thyroid disorders (such as Hashimoto and Graves). The patient can be euthyroid, hyperthyroid, or hypothyroid. It often occurs in patients with long-term Graves' disease and in whom findings of ophthalmopathy and dermatopathy have been revealed. The presence of acropathy shows the severity of ophthalmopathy and dermopathy. Graves' disease can present with hyperthyroidism, ophthalmopathy, pretibial myxedema, acropathy, and their various combinations. High levels of anti-nuclear antibody (ANA) and anti-neutrophilic cytoplasmic antibody (ANCA) and other connective tissue antibodies in patients with autoimmune thyroid disorder and ophthalmopathy support the view that "Graves' disease is a collagen-like disorder." It is controversial whether Graves' disease should be considered as a collagen tissue disease involving the thyroid, muscle tissue, and connective tissue. However, it is unclear why inflammation and tissue damage are restricted to the skin, eyes, skeletal muscle, and probably lacrimal gland. It is believed that a variety of immunological abnormalities lead to different clinical features. Moreover, hyperthyroidism can be related to proximal myopathy and ANCA-positive drug-dependent vasculitis associated with propylthiouracil (5). In some patients, hypothyroidism can be observed. In hypothyroidism, the spectrum of rheumatic symptoms and signs can include muscle weakness, widespread pain, joint stiffness, synovitis in small or large joints, muscle cramps, exercise intolerance, and rarely destructive arthropathy. Hypothyroidism can be associated with polyarthralgia, carpal tunnel syndrome, and proximal myopathy. Decreased deep tendon reflexes and proximal muscle weakness indicate the presence of serious biochemical hypothyroidism. Furthermore, in patients with hypothyroidism, clinical neuropathy can develop as mononeuropathy, compression neuropathy, or diffuse sensorimotor peripheral neuropathy (2).

Soft tissue swelling, clubbing, and periosteal bone changes, particularly in the fingers, toes, and lower extremities, can be observed in patients with thyroid acropathy. Their conventional radiographies are characterized with the periosteal reaction with symmetrical involvement in the long bones of the lower extremities, fingers, and toes. In the literature we rarely see thyroid acropachy cases with thinkenings on acral regions, normal radiography concurently; or cases without other symptoms and signs of Graves' disease. Clinical exophthalmos, myxedema, and acropathy can also be named as "EMA syndrome" (5-7). Besides clinical examination, the diagnosis of thyroid acropathy can be established by conventional radiography, bone scintigraphy, and bone biopsy. The differential diagnosis of thyroid acropathy from pulmonary or paraneoplastic osteoarthropathies can be made with the presence of subperiosteal proliferation, thyroidal disease, dermopathy, and ophthalmopathy findings. At present, there is no treatment that can completely treat the functional and anesthetic problems of dermopathy and acropathy. In acropathy, symptoms are treated with steroids. Clarifying the pathogenesis of the disease will also contribute to its treatment (8).

In our case, the involvement of distal interphalangeal joints in the hand and the negative results for rheumatoid factor and anti-cyclic cirtullinated peptide (anti-CCP) values, in addition to normal wrist joints, enabled us in ruling out the diagnosis of RA. In contrast, ANA positivity supported the relationship between thyroid disorder and connective tissue diseases. The diagnosis of SSc was ruled out because of the absence of findings suggesting Raynaud's phenomenon, skin and organ involvement, ANA staining pattern (non-centromeric), and anti-topoisomerase (anti-Scl 70). Moreover, polymyositis was eliminated by the absence of proximal muscle weakness and negative muscle enzymes; the axial SpA disease group was ruled out because of the absence of back pain, non-restricted spinal motions in the physical examination, and advanced age. There was no history of arthritis, increased uric acid, and tophi that would indicate crystal arthropathy.

Fibromyalgia syndrome (FMS) is a non-inflammatory and chronic musculoskeletal disease that has an unknown etiology and is characterized by the presence of widespread tender points on the body. The most important endocrinological laboratory finding in these patients is the blunted response of TSH. In addition, FMS symptoms and clinical hypothyroidism symptoms are similar to each other. Therefore, hypothyroidism should be considered in the differential diagnosis of patients presenting with FMS symptoms (2). Our patient was evaluated with regard to FMS, and FMS was not considered.

Thyroid hormones are necessary at physiological dose for healthy development of bones; however, a high level of thyroid hormones accelerates the bone turnover and causes osteoporosis (3). In the dual X-ray densitometry, our patient had a total L1–L4 vertebra T score of –1.9 and Z score of –0.9.

In conclusion, thyroid disorders can coexist with rheumatoid diseases as well as rheumatic symptoms and findings. Investigations done for enlighten the immunopathogenesis of these diseases will clarify this association. Thyroid acropathy is an unusual involvement that develops because of long-term autoimmune thyroid disease. It often occurs following the findings of ophthalmopathy and dermopathy. Soft tissue swelling, clubbing, and periosteal bone changes, particularly in the long bones of the fingers, toes, and lower extremities, can be observed in patients with thyroid acropathy. Our case was partially consistent with the classical clinical picture in terms of joint involvement; however, it differed because of the absence of ophthalmopathy and dermopathy findings.

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