Thyroid acropathy: correlation of imaging and pathology

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Abstract Thyroid acropathy is a rare manifestation of autoimmune thyroid disease, in the form of soft tissue swelling of the hands and feet with insidious onset, associated with clubbing and characteristic periosteal reactions. It is usually part of a syndrome consisting of a typical triad of thyroid acropathy, exophthalmos, and pretibial myxedema. The purpose of this case report is to demonstrate the imaging features of this typical triad in a 65-year-old woman. This case is the first in which the MRI features of thyroid dermopathy are documented.

Key words Pretibial myxedema · Endocrine exophthalmos · Hyperthyroidism · Acropathy · MRI

Case report

A 65-year-old woman presented with progressive swelling of the anterior aspect of both legs, the dorsal aspect of the feet (Fig. 1a), and the fingers, together with clubbing of the last (Fig. 1b). These features had been present for 4 years but she had only recently developed discomfort and pain in her feet from pinching shoes. The overlying skin was indurated with red-purple discoloration. A localized nodular thickening sharply demarcated from the surrounding skin surface was seen on the dorsal aspect of both feet (Fig. 1a).

The patient’s past medical history was unremarkable except for hyperthyroidism of Graves, which she had had for 10 years and for which she had received treatment with iodine-131 on three occasions. The last dose of iodine-131 was administered a year before the present hospital presentation. She was currently euthyroid taking thyroxine replacement therapy.

On physical examination the thyroid gland was normal. Marked exophthalmos had been present from the onset of Graves’ disease but did not require surgical therapy. On CT scan of the orbit, marked proptosis was confirmed (Fig. 2a), as well as thickening of the extraocular muscles (Fig. 2b).

Laboratory examination of the thyroid function revealed a suppressed thyroid-stimulating hormone level and an elevated titer of thyroid stimulating immunoglobulin.

Radiographs of the hands revealed a bilateral feathery diaphyseal periosteal reaction on the radial side of the first and second
Fig. 1  a Clinical photograph of the patient’s legs and feet. Both legs below the knee are swollen. On the dorsum of both feet is a heaped-up mass that interferes with the wearing of shoes.  

b Clinical photograph of the patient’s hand. A soft tissue swelling is noted at the proximal and middle phalanges and the thumb bilaterally. There is also some clubbing, most noticeable in the second and third finger of both hands.

Fig. 2a, b  CT scan of the orbit. 
a On an axial slice, marked bilateral proptosis is seen. Thickening of the inferior rectus muscle is also shown.  
b A coronal slice shows thickening of the inferior rectus muscles bilaterally. The rectus medialis muscle is thickened to a lesser degree.

metacarpals, the ulnar side of the fifth metacarpal, and the diaphyseal portion of several phalanges, as well as soft tissue swelling of the hands (Fig. 3). The soft tissue swelling was even more pronounced on the radiographs of the feet, especially on the dorsal aspect of both feet (Fig. 4). There was only minimal periosteal reaction in the metatarsals.

An MRI examination confirmed diffuse soft tissue swelling both in the pretilial area and in the feet, located in the subcutaneous tissue. Superimposed on that diffuse soft tissue swelling, a more localized heaped-up mass was seen on the dorsal aspect of both feet, sharply demarcated from the less swollen surrounding subcutis. The subcutaneous lesions were hypointense compared to fat on T1-weighted images (Fig. 5a), and hyperintense with relatively hypointense components on fat-saturated T2-weighted images (Fig. 5b, c).

An incisional biopsy specimen was obtained from the nodular area of the right foot. Histopathological examination showed an increased amount of hyaluronic acid to be present in the dermis compared to normal skin (Fig. 6).

The clinical history, radiological and histological features were consistent with thyroid acropathy, combined with pretilial Graves’ dermopathy and ophthalmopathy.

Discussion

The term “acropathy” is derived from two Greek roots and means thickening of the extremities. Thyroid acropathy was first described as a separate entity by Thomas in 1933 [1, 2]. It is an unusual but well-recognized manifestation of autoimmune thyroid disease. It is usually associated with Graves’ disease, but has also been described in Hashimoto’s thyroiditis [3].

The exact incidence of thyroid acropathy is not known, but it has been estimated to occur in 0.1–1% of patients with Graves’ disease [2, 4, 5]. There is usually a long latency period between the onset of thyroid acropathy and the preceding thyroid disease [3, 5].

Although thyroid acropathy may be isolated, it is usually associated with exophthalmos and pretilial myxedema, with which it forms a classical triad as part of the so-called EMO syndrome, an acronym derived from exophthalmos, myxedema, and osteoarthropathia hypertrophicans [6]. Although thyroid acropathy rep-