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CLINICAL RECORD

Diffuse lipomatosis of the thyroid with amyloid deposition

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Abstract

Background: The authors present a case of diffuse fatty infiltration of the thyroid gland with coexistent deposition of amyloid protein.

Method: A case history and brief literature review concerning amyloid goitre and fatty infiltration of the thyroid are presented, and the relationship between these two phenomena is discussed.

Results: A patient with AA amyloidosis presented with a slowly enlarging goitre, which on histological examination was extensively infiltrated with adipose tissue. Amyloid protein was found on Congo red staining.

Conclusion: To our best knowledge, this patient represents the first reported case of diffuse lipomatosis of the thyroid gland causing goitre in a patient with AA amyloidosis. The presence of amyloid protein within the thyroid was not sufficient to cause enlargement per se, and was therefore of unclear significance. Together with previous reports of the concurrent deposition of amyloid and fat, this case raises questions as to the relationship between these two phenomena.

Key words: Goiter; Thyroid Gland; Lipomatosis; Amyloidosis; Adipose Tissue; Lipoma; Pathology

Introduction

The presence of adipose tissue in the thyroid gland is very rare. Fatty infiltration of the entire gland has been described in only a few case reports. Amyloid goitre is also rare in clinical practice, and occurs mostly in patients with systemic amyloidosis.

Here, we present a case of diffuse lipomatosis of the thyroid gland, along with amyloid deposition, and we briefly review the literature on these two phenomena.

Case report

A 55-year-old man was referred to the ENT department by his endocrinologist for evaluation of a neck swelling. The mass had been progressively enlarging for two years, and now prevented the patient from fastening his shirt collar. The patient had a cough but no respiratory difficulty. There was no dysphagia, dysphonia or symptoms suggestive of deranged thyroid function.

The patient's past medical history included Crohn's disease, which had required a right hemicolectomy at the age of 17 years. He had subsequently developed systemic AA amyloidosis, which had led to end-stage renal failure, necessitating a renal transplant at the age of 38 years. Both his Crohn's disease and his amyloidosis were stable at the time of presentation, and his transplanted kidney was functioning well. His current medications were ciclosporin, azathioprine, loperamide, prednisolone and vitamin B12 injections. The patient was a non-smoker and there was no significant family history of illness.

On examination, there was a large, firm goitre affecting both sides of the neck, with no associated lymphadenopathy. Further examination of the ears, nose and throat was unremarkable. Fibre-optic laryngoscopy revealed normal vocal fold movements with no other abnormalities. Blood tests were unremarkable, with normal thyroid function parameters.

Two fine-needle aspirates were obtained from the swelling. Histopathological analysis showed thick colloid, a few bare nuclei of follicular epithelium, and droplets of fat within the sample.

An unenhanced computed tomography scan of the neck showed a diffusely enlarged thyroid gland with a density slightly greater than that of fat (−40 Hounsfield units). The mass caused tracheal deviation but no compression, and did not extend retrosternally.

Ultrasound scanning showed a diffusely swollen, hyperechoic thyroid with no focal nodularity. The radiologist reported the appearances to be consistent with fatty infiltration.

A total thyroidectomy was performed, both to relieve compressive symptoms and to exclude malignancy. Both recurrent laryngeal nerves were identified and preserved, and there was no post-operative hypocalcaemia.

The macroscopic appearance of the resected thyroid was of diffuse fatty infiltration, with no focal lesions present. The left lobe measured $70 \times 50 \times 25$ mm, the isthmus $40 \times 20 \times 10$ mm and the right lobe $90 \times 60 \times 40$ mm. The excised specimen weighed 148 g.

Microscopic examination (Figure 1) showed extensive infiltration of the gland by adipose tissue, with only a small amount of fibrous stroma remaining. Only small groups of colloid-filled follicles remained within the parenchyma, with no evidence of malignancy. In places, there were deposits with a hard eosinophilic appearance, which were confirmed as amyloid protein on Congo red staining.

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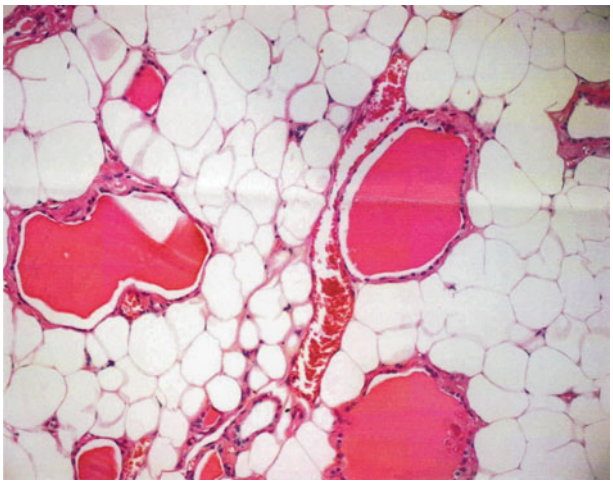

FIG. 1
Photomicrograph of the thyroid gland, demonstrating extensive fatty infiltration with some colloid-containing follicles. (H&E; ×200)

The patient made a good recovery from surgery. At the time of writing, he remained well under the care of the physicians for his amyloidosis and Crohn's disease.

Discussion

Diffuse infiltration of the thyroid gland with adipose tissue was first described by Dhayagude in 1942, and has since been described using several different terms.[1,2] We performed a PubMed literature search using the terms 'amyloid', 'amyloidosis', 'goitre', 'thyroid', 'diffuse lipomatosis', 'hamartomatous adiposity', 'diffuse lipomatosis', 'adenolipoma' and 'thyrolipoma', singly or in combination, and limited to articles in the English language. Articles of particular relevance to the present case were reviewed.

The presence of mature adipose tissue within the thyroid gland is rare, and may be focal or diffuse. Adenolipoma of the thyroid can be excluded in the present case, as this pertains to a well circumscribed, fatty lesion within a normal thyroid gland. Adipose tissue has also been found in association with papillary carcinoma.[3] In the present case, however, no malignancy was detected. Diffuse fatty infiltration of the entire thyroid gland is extremely rare, and has been described in only seven other English language case reports.[4,5]

Amyloidosis refers to a heterogeneous group of diseases characterised by the deposition of insoluble protein in the extracellular space. Amyloid deposits can occur in any tissue, and histologically show apple-green birefringence under polarised light when stained with Congo red.

Amyloid goitre is defined as the presence of amyloid protein in the thyroid in sufficient amounts to produce enlargement of the gland. It is a rare condition, and is occasionally associated with the presence of variable amounts of adipose tissue within the gland.[6] Patients typically present with a diffusely enlarged, non-tender goitre, which may enlarge rapidly with or without impingement on the airway.

Diffuse lipomatosis of the thyroid has been described with and without detectable amyloid deposition.[4] The origin of the adipose tissue is unclear; it has been suggested that it may arise from metaplasia of stromal fibroblasts, precipitated by ischaemia due to the destruction of capillaries caused by amyloid deposition.[2] In one previous case report, despite no histological evidence of amyloid, the patient suffered from chronic renal failure, which is a common association of systemic amyloidosis.[5] A large proportion of patients with amyloidosis have subclinical amyloid deposition in the thyroid gland.[7]

In the present case, the amyloid protein found on histological examination of the thyroid gland may or may not have been significant in the pathogenesis of the goitre. One previous case report described a thyroid gland infiltrated by fat, which appeared to contain a much larger amount of amyloid protein than in the present case.[4] The authors therefore termed this condition 'fatty infiltration in amyloid goitre'. The pathogenetic relationship between the presence of fat and amyloid protein within the thyroid is unclear, and merits further exploration.

- **Extensive fatty infiltration of the entire thyroid gland is very rare**
- **The presented case also had AA amyloidosis and amyloid deposition within the thyroid**
- **Amyloid goitre may contain variable amounts of adipose tissue**
- **It should be considered in the differential diagnosis of thyroid enlargement (particularly of rapid onset)**

The present case may therefore represent fatty infiltration of amyloid goitre with an unusual predominance of adipose tissue, or diffuse lipomatosis of the thyroid with the incidental presence of amyloid protein due to the patient's systemic disease. In keeping with previous reports, the patient remained euthyroid despite the dramatic loss of thyroid follicular architecture.[5,8]

Conclusion

Extensive fatty infiltration of the entire thyroid gland is a very rare finding, and in the current patient was present together with amyloid protein deposition. This is the first report of these two phenomena occurring together in a patient with AA amyloidosis. Amyloid goitre may also contain variable amounts of adipose tissue on histological examination, and should be considered in the differential diagnosis of thyroid enlargement, particularly of rapid onset.

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