CASE REPORT

Diffuse lipomatosis of the thyroid gland

Olfa Ben Gamra a, Nadia Romdhane a, Safa Nefzaoui a,*, Madiha Mahjoubi a, Wafa Abid a, Wafa Koubaa b, Ines Hariga a, Achraf Chadli b, Chiraz Chaouch Mbarek a

a ENT Department, Habib Thameur Hospital, Tunis, Tunisia
b Pathology Department, Habib Thameur Hospital, Tunis, Tunisia

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Abstract Diffuse thyroı¨d lipomatosis is an extremely rare histopathological condition characterized by diffuse fatty infiltration in thyroı¨d stroma. We report a case of 67 year old female who presented a plunging goiter. She underwent a thyroı¨dectomy. Histopathologic study concluded to the diagnosis of diffuse thyroı¨d lipomatosis. No recurrence was observed.

1. Introduction
The presence of adipose tissue in the normal thyroı¨d gland is rare. Mature fat tissue can be found in both benign lesions and neoplasms of the thyroı¨d gland. Diffuse thyroı¨d lipomatosis is an extremely rare histopathological condition characterized by diffuse fatty infiltration in thyroı¨d stroma. Only few cases have been reported in literature. We herein present a case of thyroid lipomatosis and we review the literature.

2. Case report
A 67-year-old female was admitted to our department complaining of midline neck swelling of seven month duration with a recent onset of respiratory discomfort while breathing.

Her medical history included chronic renal failure secondary to systemic lupus and she was receiving hemodialysis. On her physical examination, a painless, diffusely enlarged goiter was detected.

Thyroid profile showed an hyperthyroı¨dism with elevated FT4 30,3 (7–16 l mol/l) and a down level of TSH 0.04 (0.3–4.5 IU/ml). Serum thyroperoxidase antibody (TPO) and anti thyroglobulin antibodies were negative. Euthyroidism was achieved with thiamazole 20 mg daily.

Thyroid ultrasonography revealed diffused thyroid enlargement whose lower limit was not objectived. No cervical nodes were seen. A cervico-thoracic CT scan was performed and showed an heterogenous plunging goiter with multiples nodules presenting a low attenuation (Fig. 1).

The patient underwent total thyroı¨dectomy with careful dissection and preservation of the parathyroı¨d glands and the two recurrent laryngeal nerves. Macroscopically, the specimen weighed 215 g, and the isthmus, right and left lobes measured 2 * 2 cm, 12 * 6 * 3.5 cm, 10 * 5 * 2.5 cm respectively. The external appearance was yellowish brown in color, lobular gland with soft and friable texture (Fig. 2). Microscopic
Figure 1  Contrast-enhanced CT in axial and coronal view showing a diffuse goiter with adipose density.

Figure 2  Peroperative view of the thyroid gland.

Figure 3  (A) Microscopic examination (hematoxylin and eosin stain at low magnification) showing a lobulated mass with diffuse infiltration of mature adipocyte between benign thyroid follicles. (B) Immunohistochemical staining for thyroglobulin showing the follicular cells as well as colloid which are immunoreactive to thyroglobulin. (C) Immunohistochemical staining for TTF-1 labels the nuclei of thyroid follicular cells, some of them are difficult to distinguish from fat cells and vessel (small or collapsed cells).
examination of the tissue revealed thyroid tissue almost totally replaced by mature adipocytes with some follicles containing colloid. There were no signs of hyperplasia, adenoma or malignancy, and no amyloid was demonstrated (Fig. 3). The diagnosis of diffuse lipomatosis of the thyroid was then made. The postoperative course was uneventful. Replacement treatment of thyroid hormone was begun after the operation. The patient has had no recurrence to date.

3. Discussion

The presence of adipose tissue is commonly observed in para-thyroid glands, thymus, salivary glands, pancreas, and breast. In the normal thyroid gland, the presence of mature adipose is an uncommon occurrence; few adipocytes may be found near the capsule and in the perivascular location.1

Diffuse thyrolipomatosis is a rare entity which was first described by Dhayagude in 1942.5 It is a type of diffuse infiltration of an otherwise normal thyroid by mature adipose tissue without evidence of encapsulation. The most common age group which is affected is the middle aged group, with no sex predilection, but the possibility of congenital goiter with fatty change cannot be ruled out.2

Ge et al. reviewed 8 reported cases of diffuse thyroid lipomatosis. Three cases were in children with congenital goiters.3 The thyroid glands with thyrolipomatosis were often described as soft, nodular, bosselated, or diffusely enlarged. Their cut surfaces were pale yellow or yellow brown.

Radiological studies were not diagnostic. Computed tomography of the thyroid may reveal low attenuation components with negative Hounsfield units.4

The thyroid hormone level is frequently normal. In contrast to other previously reported cases that were euthyroid, our patient had hyperthyroidism. Pradeep, reported one case of thyrolipomatosis with hyperthyroidism, however, he does not propose that hyperthyroidism was causally related to this entity.5 Preoperatively, fine-needle aspiration cytology may suggest a diagnosis of thyroid lipomatosis based on an abundance of fat cells in the smear but histopathological studies confirmed the diagnosis. Microscopically, the lesions showed diffuse infiltration of mature fat between benign thyroid follicles. Stromal fibrosis and lymphocytic aggregates were occasionally observed. Differential diagnoses are adenolipoma (thyrolipoma), amyloid goiter, lymphocytic thyroiditis, or parathyroid lipoma, encapsulated papillary carcinoma and liposarcoma.6 Thyrolipoma is a fat containing thyroid follicular adenoma, with complete fibrous encapsulation.7 Differentiating adenolipomas from intrathyroidal parathyroid lipoadenoma may be difficult and may need immunohisto-chemistry. However, liposarcoma of the thyroid is rare, the rapid clinical course and local invasion suggests the diagnosis.5 Amyloid goiter, which often contains fat cells is not difficult to distinguish from thyrolipoma or thyrolipomatosis as the amyloid deposition is readily evident and can be confirmed with special stains.1 Lymphocytic thyroiditis shows diffuse lymphocytic stromal infiltration. Papillary carcinoma has characteristic histomorphological features. Mature fat is to be found within tumor stroma and papillary structures. No fat is detected in adjacent nontumoral thyroid parenchyma in this case.1 Coincidental tumoral lesions may be rarely associated with the diagnosis of thyrolipomatosis. In fact, Vestfrid reported a case of a papillary thyroid carcinoma associated with diffuse lipomatosis occurring in a 53-year-old woman.8,9 Nandyala reported one case of 37 year old man presenting diffuse lipomatosis of thyroid gland associated with papillary microcarcinoma.10

The pathophysiology of adipose tissue infiltration in the thyroid gland is not clear and several theories have been proposed that fat could be included in the thyroid gland along with skeletal muscle during embryologic development.11 Some authors have evoked a metaplastic process from stromal fibroblasts secondary to hypoxia or to the phenomenon of senile involution.11 Natural history of thyrolipomatosis is unknown and its association with tumorous and nontumor lesions is possible. For that, further follow-up is required.10

4. Conclusion

Fat containing lesions of thyroid include not only non-neoplastic lesions but also neoplasms, including an occasional malignant one. Because of the rarity of thyroid fat-containing lesions, confusion in differential diagnosis may occasionally occur. Therefore, thyroid lipomatosis should be kept in mind.

Conflict of interest
None.

References