Diffuse lipomatosis of the thyroid gland with papillary microcarcinoma: Report of a rare entity

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ABSTRACT

Presence of lobules of adipose tissue either focally or diffusely is very rare in the thyroid gland. Fat accumulation can be macroscopic or microscopic. Focal infiltrates of fat have been reported in conditions such as adenolipoma, intrathyroid lipoma, and encapsulated papillary carcinoma. Diffuse lipomatosis has been reported in conditions such as amyloid goitre, heterotopic fat nests, thyrolipoma and liposarcoma. The exact mechanism of fat accumulation is not known although there are many theories postulated. Investigations such as ultrasound, computed tomography scan, and magnetic resonance imaging can detect the presence of macroscopic fat in the thyroid gland. Accurate diagnosis of the type of fat accumulation is necessary because tumorous and nontumorous conditions fall into the differential diagnosis. Only nine cases of papillary carcinoma associated with lipomatosis of thyroid are reported so far. We report possibly the first case of diffuse lipomatosis of the thyroid gland with a focus of papillary microcarcinoma.

KEY WORDS: Lipomatosis, papillary microcarcinoma, thyroid gland

INTRODUCTION

Fat-containing lesions of the thyroid are seen as lesions containing macroscopic mature fat or lesions rich in microscopic intracellular fat vacuoles, or lesions that are referred to as clear cell or lipid-rich neoplasms.1 Diffuse lipomatosis of the thyroid gland is an extremely rare lesion, first reported by Dhayagude in 1942.2 Normal thyroid may have a scanty amount of fat immediately adjacent to the capsule and along the fibrous tissue septa, but do not have fat intermixed with the follicles. Rarely, a small amount of fat around the blood vessels in the subcapsular area of the anterior portion can be seen.1,3 Lipomatosis is characterized by diffuse fatty infiltration into the thyroid stroma without any evidence of encapsulation. Many tumorous and nontumorous conditions of thyroid have been reported to be associated with diffuse lipomatosis. The exact mechanism of lipomatosis is still debated though there are some theories to explain the presence of fat in the thyroid gland.4,5 Correct diagnosis of these tumorous or nontumourous conditions is essential for the better management. There are only nine case reports of papillary carcinoma of the thyroid gland associated with lipomatosis. We are presenting the first case of papillary microcarcinoma associated with diffuse lipomatosis of the thyroid gland.

CASE REPORT

A 37-year-old male presented to the outpatient department of surgery in May 2013 with the complaints of painful midline swelling in the neck of 8 months duration. This patient is a known case of adenocarcinoma of the ascending colon for which he underwent right side hemicolecction and complete course of chemotherapy in 2010. During the follow-up, he was diagnosed to have pulmonary tuberculosis and hypertrophic cardiomyopathy. He had taken the complete course of treatment for pulmonary tuberculosis in 2012. The present clinical examination did not reveal any significant findings. Fine-needle aspiration cytology (FNAC) of the neck swelling was suggestive of nodular goitre with adipocytes in the background. Total thyroidectomy was done, and the specimen was sent to the laboratory for pathological evaluation.

Gross examination of the specimen revealed an encapsulated greyish brown oval mass of size 5 cm × 11 cm × 15 cm. Cut surface showed yellowish, greasy lobular areas with tiny foci of cystic spaces and hemorrhages [Figure 1]. Microscopic examination of the tissue revealed thyroid tissue almost totally replaced by mature adipocytes with normal or slightly distended follicles scattered in between [Figure 2]. One small focus of a lobule of thyroid follicles showing papillary projections was noted. The cells covering these papillary projections were round to oval with the ground glass...
nucleus. Overlapping of these cells was observed [Figures 3 and 4]. Psammoma bodies were not seen. Immunohistochemistry of this papillary area revealed positive thyroid transcription factor-1, thyroglobulin and focal positivity of cytokeratin confirming the diagnosis of papillary carcinoma.

DISCUSSION

Presence of fat in the thyroid tissue or fat containing lesions of thyroid is extremely rare. Focal microscopic deposits of fat can rarely be seen in normal thyroid. Lipomatosis of the thyroid gland is usually seen in the middle-aged persons with no sex predilection. Amyloid goitre, lymphocytic thyroiditis, thyroid or parathyroid lipoma, encapsulated papillary carcinoma, liposarcoma, and adenolipoma are reported to be associated with focal or diffuse macroscopic fat deposition in the thyroid gland.[1,5,6] Most common lesion of thyroid to have fat is thyrolipoma. It is characterized by a well-circumscribed and encapsulated nodule composed of thyroid follicles admixed with a mature adipose tissue. Thyrolipomatosis shows diffuse infiltration of thyroid by mature adipocytes and without any evidence of encapsulation.

Amyloid goitre is usually associated with systemic amyloidosis which stains intensely with crystal violet or Congo red.[9] Lymphocytic thyroiditis shows diffuse stromal infiltration of lymphocytes. The presence of intracytoplasmic glycogen favors the parathyroid tissue in case of parathyroid adenoma. Papillary carcinoma will have characteristic morphological features. Liposarcoma is an aggressive rapidly growing tumor. Clear cell adenoma with lipid-rich areas shows follicular cells with small round nuclei and abundant foamy to coarsely vacuolated cytoplasm.[6]

There are no definite set criteria to make a diagnosis of diffuse lipomatosis by FNAC. Computed tomography (CT) scan, magnetic resonance imaging and ultrasonography have been shown to be effective in the preoperative diagnosis of such fatty lesions.[8] In suspected cases, due to the softness of the gland, both FNAC and CT can confirm the diagnosis preoperatively.

Only nine cases of papillary carcinoma of the thyroid gland associated with lipomatosis are reported so far.[5,9] Our case is

Figure 1: Thyroidectomy specimen which shows yellowish grey lobular areas with tiny foci of hemorrhages and cystic change

Figure 2: Low power view of single or small groups of follicles surrounded by adipocytes (H and E, ×20)

Figure 3: Low power view showing a cluster of follicles surrounded by adipocytes and a focus of papillary carcinoma (H and E, ×20)

Figure 4: High power view showing the papillae with ground glass nuclei and overlapping of cells (H and E, ×40)
probably the first case of papillary microcarcinoma associated with diffuse lipomatosis.

Etiopathogenesis of lipomatosis is still obscure. Schröder and Böcker\(^4\) postulated that the adipose tissue may be derived from the metaplasia of the stromal fibroblasts in response to tissue hypoxia or to senile involution as demonstrated in the other organs. Chesky \textit{et al.}\(^{10}\) attributed the lesions to the simultaneous inclusion of fat with striated muscle in the thyroid gland during embryogenesis before the development of the thyroid capsule.

The interesting fact in our case is that the patient has been treated successfully for adenocarcinoma of the colon and pulmonary tuberculosis. He had hypertrophic cardiomyopathy. It is tempting to postulate that there might have been hypoxia during the treatment period for carcinoma colon and pulmonary tuberculosis, which could have triggered the lipomatous metaplasia of the stromal cells in the thyroid gland.

Further follow-up is definitely warranted in cases of lipomatosis of the thyroid gland because this condition is rare, the natural history of the lesion is unknown and its association with tumorous and nontumorous lesions.

**REFERENCES**


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