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Anterior mediastinal mass and Graves's disease

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Radiological evidence of a mass in the anterior mediastinum may provide a difficult problem in diagnosis. Disorders of the thymus, particularly thymomas, are frequently the cause of such mass lesions. Although modest thymic enlargement occurs in many patients with Graves's disease,[1] rarely is the enlargement great enough to lead to a clinical diagnostic dilemma.[2–4] We report here two patients with thyrotoxicosis, presumably due to Graves's disease, and an enlarged thymus gland. One patient underwent thoracotomy and removal of a considerably enlarged, histologically normal thymus. In the other patient an anterior mediastinal mass was detected by computed tomography during a search for metastatic disease. It disappeared when he became euthyroid after treatment with carbimazole.

Case reports

CASE 1

A 46 year old Tokelaun man presented in January 1981 with symptoms of several months' duration that included shortness of breath, tremulousness, and weakness of the hips and thigh muscles, which made it difficult for him to climb stairs or rise from a chair. Weight loss of 9 kg had occurred over the same time period despite a good appetite. On physical examination, the pulse was 120 beats/min and there was a fine tremor of the outstretched fingers. The thyroid was not enlarged. There was moderate weakness of the quadriceps and of hip flexion bilaterally. There was no exophthalmus and no other important abnormalities were observed.

Thyroid function tests gave the following results: total thyroxine concentration 306 nmol/l (normal 60–160), thyroid binding globulin binding ratio (triiodothyronine (T_3) uptake test) 1.61 (normal 0.88–1.19), free thyroxine index 493 (normal 60–160), total T_3 concentration 6.8 nmol/l (normal, 1.5–3), thyroid stimulating hormone concentration less than 0.5 mU/l (normal less than 4). Antibodies against thyroglobulin and thyroid microsomes were not detected. On technetium 99m (^{99m}Tc) scintigraphy both lobes of the thyroid appeared normal. There was no intrathoracic uptake of the tracer. The 24 hour uptake of iodine 131 was 58%. Other routine laboratory tests gave normal results. Radiography showed an anterior mediastinal mass (fig 1).

The patient was treated initially with 45 mg of carbimazole daily. As the thyrotoxicosis came under control the muscular weakness regressed and did not recur; control of hyperthyroidism was however erratic owing to the patient's poor compliance. In July 1981, because of persistent radiological evidence of a mediastinal mass, the patient underwent total thymectomy. The thymus was considerably and symmetrically enlarged, each lobe measuring 5.5 cm × 8 cm × 2 cm. The histological appearance of the thymus was normal. The patient's postoperative course was uneventful. The thyrotoxicosis continued unabated and required at least 30 mg of carbimazole daily for control. In November 1982 8 mCi of iodine 131 was administered and since then thyroid function has remained normal without carbimazole treatment.

CASE 2

A white man born in 1925 underwent right nephrectomy and adrenalectomy in 1976 for removal of a large hypernephroma. In 1978 a solitary metastasis in the lower lobe of the left lung was resected. He remained well until early 1982, when symptoms of heat intolerance, agitation, tremulousness, and weight loss despite a good appetite were

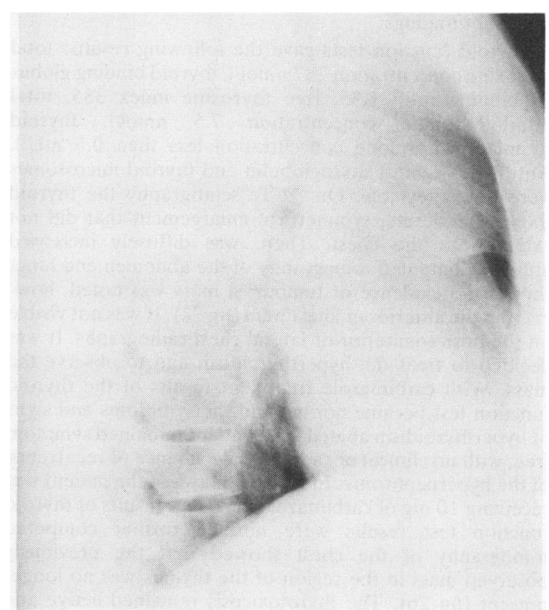

Fig 1 *Case 1: Chest radiograph showing enlargement of the thymus.*

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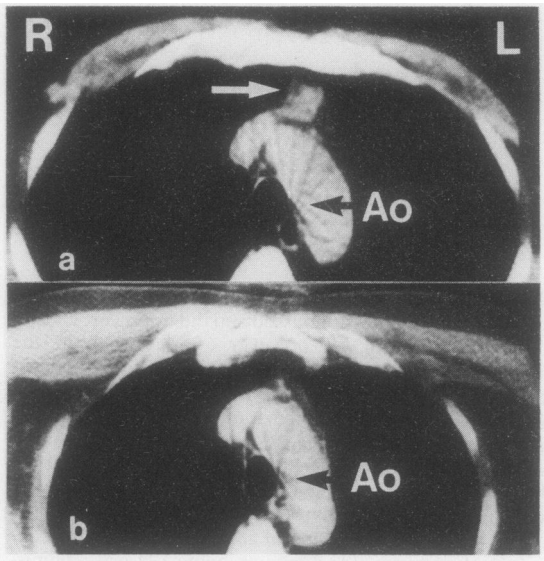

Fig 2 *Case 2: Computed tomography of the chest at the level of the thymus (a) in 1982, when the patient was hyperthyroid; and (b) in 1984, when he was euthyroid. Black arrows—aorta; white arrow—enlarged thymus.*

noted. When he was first seen in July 1982 there were no symptoms referable to the chest and no family history of thyroid disease could be elicited. On examination the patient was restless, the pulse rate was 120 beats/min, and there was moderate weakness of the deltoid muscles bilaterally. The thyroid was diffusely and symmetrically enlarged with no palpable nodularity. There were no other important findings.

Thyroid function tests gave the following results: total thyroxine concentration 287 nmol/l, thyroid binding globulin binding ratio 1.35, free thyroxine index 385, total triiodothyronine concentration 7.5 nmol/l, thyroid stimulating hormone concentration less than 0.5 mU/l. Antibodies against thyroglobulin and thyroid microsomes were not detectable. On ^{99m}Tc scintigraphy the thyroid showed moderate, symmetrical enlargement that did not extend into the chest. There was diffusely increased uptake. Computed tomography of the abdomen and lungs showed no evidence of tumour; a mass was noted, however, in the anterior mediastinum (fig 2a). It was not visible on the posteroanterior or lateral chest radiographs. It was decided to treat the hyperthyroidism and to observe the mass. With carbimazole treatment results of the thyroid function test became normal and the symptoms and signs of hyperthyroidism abated. The patient remained symptom free, with no clinical or radiological evidence of recurrence of the hypernephroma. In June 1984, when the patient was receiving 10 mg of carbimazole daily and results of thyroid function test results were normal, further computed tomography of the chest showed that the previously observed mass in the region of the thymus was no longer present (fig 2b). The thyrotoxicosis remained active and the patient was given iodine 131 as definitive treatment. There has been no recurrence of the mediastinal mass evident on plain chest radiographs.

Discussion

The thyrotoxicosis of Graves's disease is attributed to stimulation of the thyroid by circulating autoantibodies directed against components of the thyroid plasma membrane.[5] The thymus may also contribute to the pathogenesis of Graves's disease as there is considerable evidence that T lymphocytes may play a part in the induction and perpetuation of the disorder.[6] In our first case, as in another patient,[3] the persistence of hyperthyroidism after total thymectomy showed that the enlarged thymus was not necessary for the continuation of established Graves's disease, although it may have been concerned in its initiation. Despite reports that remission of Graves's disease may follow thymectomy,[7,8] possibly thymic enlargement, at least in some patients, is a result rather than a cause of the thyrotoxicosis.[9,10]

Recently it was reported that a large anterior mediastinal mass in a patient with Graves's disease virtually disappeared during treatment with propylthiouracil.[4] This was thought to represent regression of thymic hyperplasia, and it was suggested that in such patients invasive diagnostic procedures should be deferred until the response to specific antithyroid treatment could be evaluated. Our experiences confirm these observations and suggestions. The fact that little change in the size of our first patient's thymus occurred during the four months before surgery may have been due to poor control of his hyperthyroidism. Thus benign thymic hyperplasia associated with Graves's disease should be considered in the differential diagnosis when radiography shows an anterior mediastinal mass.

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