Struma Ovarii: Hyperthyroidism in a Postmenopausal Woman

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A rare case of struma ovarii producing hyperthyroidism in a postmenopausal woman is reported. The ovarian tumor demonstrated uptake of both [^{99m}Tc]pertechnetate and ^{131}I, allowing preoperative diagnosis of the condition. In females with unexplained hyperthyroidism and low ^{131}I uptake by the cervical thyroid gland, imaging of the pelvis should be considered.

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Benign cystic teratomas comprise ~10% of all ovarian tumors. Thyroid tissue is found in 1.5–28.5% of these and is usually present in small, clinically insignificant quantities. In 1–2% of teratomas, thyroid tissue is a major constituent of the tumor. Rarely, this tissue produces sufficient thyroid hormone to cause hyperthyroidism. When either of these features is present, the tumor is designated "struma ovarii" (*1*).

It has been reported that 85% of patients with struma ovarii present before menopause and very few proven cases occurring after menopause are found in the literature (*2*). We report a case of struma ovarii producing thyrotoxicosis in an 81-yr-old female. Because the pelvis was imaged at the time of radionuclide thyroid scanning, the diagnosis was made preoperatively.

CASE REPORT

An 81-yr-old female presented with new onset of supraventricular tachydysrrhythmia. She reported frequent insomnia and had lost 20 lb. during the year before admission. A history of increased bowel frequency was elicited as well. Physical examination revealed a blood pressure of 140/95 and an irregular pulse of 120/min. The thyroid gland was not enlarged and contained no nodules. A large, firm mass was palpated in the mid-pelvis.

Laboratory investigation was remarkable for a T3 of 200 ng/dl (normal 65–195 ng/dl) T4 of 13.7 μg/dl (normal 4.5–12.0), and TSH of 0.02 mIU/ml (normal 0.0–6.0 mIU/ml).

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An electrocardiogram showed atrial fibrillation and flutter with a ventricular response of 120–150/min. To further evaluate the patient's hyperthyroidism a thyroid scan was performed after intravenous administration of 10 mCi of technetium-99m (^{99m}Tc) pertechnetate. A pinhole image showed a thyroid gland with low tracer uptake (Fig. 1). Twenty-four-hour iodine-131 (^{131}I) uptake was 2.6% (normal 10–35). Because of the patient's known mass, the pelvis was imaged and showed tracer activity within the mass, with the bladder displaced to the right (Fig. 2). These findings were confirmed using ^{131}I, and there was persistent ^{131}I activity in the pelvis after the bladder was irrigated with saline.

A plain radiograph of the abdomen revealed a pelvic soft-tissue density containing curvilinear calcifications. Real-time ultrasound showed a mass containing solid and cystic components. Computed tomography confirmed the presence of this mass, which measured 15 cm in its greatest diameter and displaced the uterus and bladder to the right. This mass contained fatty elements and a fat-fluid level was identified (Fig. 3). The computed tomographic appearance was considered diagnostic of a teratoma.

The mass was surgically removed and was found to arise from the left ovary. There were several cysts containing fluid and sebaceous material. A large solid component consisting entirely of thyroid tissue accounted for ~50% of the tumor volume and the diagnosis of benign struma ovarii was made. One week after the surgery, the patient was hypothyroid with a T3 of 26 ng/dl, a T4 of 3.0 μg/dl, and a TSH of 0.2 mIU/ml.

A repeat thyroid scan and radioactive iodide uptake were performed 2 mo after the surgery and revealed normal thyroid gland on the scan and a 24-hr uptake of 16% (normal range 10–35%). This is consistent with release from suppressive effect of the thyroid hormone secreted by the struma ovarii. The patient improved symptomatically but the electrocardiogram showed persistent atrial fibrillation.

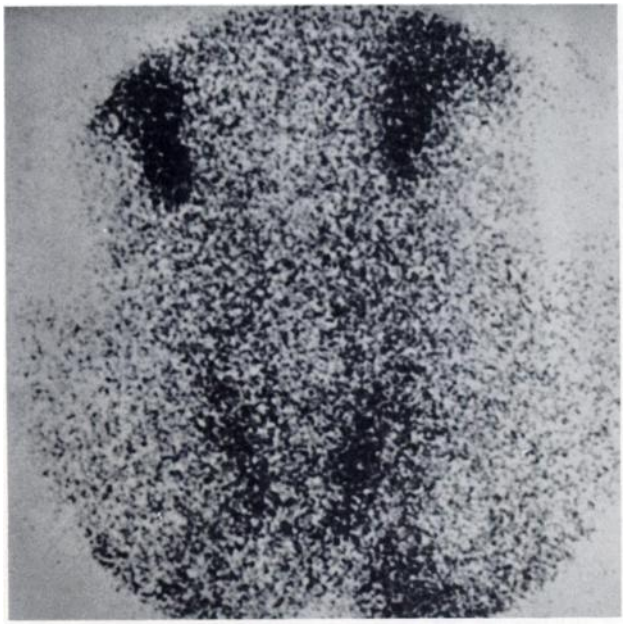

FIGURE 1
[^{99m}Tc]pertechnetate scan showing low thyroid uptake relative to the salivary glands.

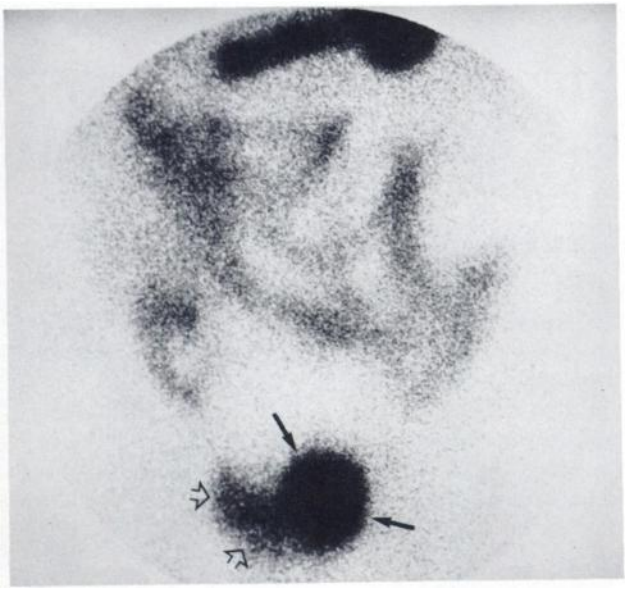

FIGURE 2
Image of the abdomen taken after [^{99m}Tc]pertechnetate thyroid scanning. There is tracer uptake by a pelvic mass (arrows) which displaces the bladder (open arrows) to the right.

DISCUSSION

There has been much discussion in the literature regarding the precise definition of "struma ovarii." Originally described as an ovarian tumor composed solely of thyroid tissue, this definition has changed significantly and only 20% of reported cases fulfill this criterion (*3*). One report states that to qualify as true struma ovarii thyroid tissue should comprise greater than 50% of the tumor (*4*). Most, however, suggest that the thyroid element be a major constituent of the mass or that hyperthyroidism result from the ovarian thyroid tissue (*2*, *5*, *6*).

Most cases of struma ovarii occur within ovarian teratomas. In those cases where the tumor is composed entirely of thyroid tissue, it is believed that the teratomatous thyroid component has completely overgrown the remainder of the tumor. Earlier suggestions that these "pure" cases are due to metastases from the thyroid gland have been discredited (*5*).

Clinically, most cases of struma ovarii are silent or present with nonspecific symptoms similar to those produced by other benign ovarian tumors. Occasionally, if the tumor secretes significant thyroid hormone, symptoms and physical findings of hyperthyroidism are present. Struma ovarii rarely presents with ascites and hydrothorax in a manner similar to Meig's syndrome

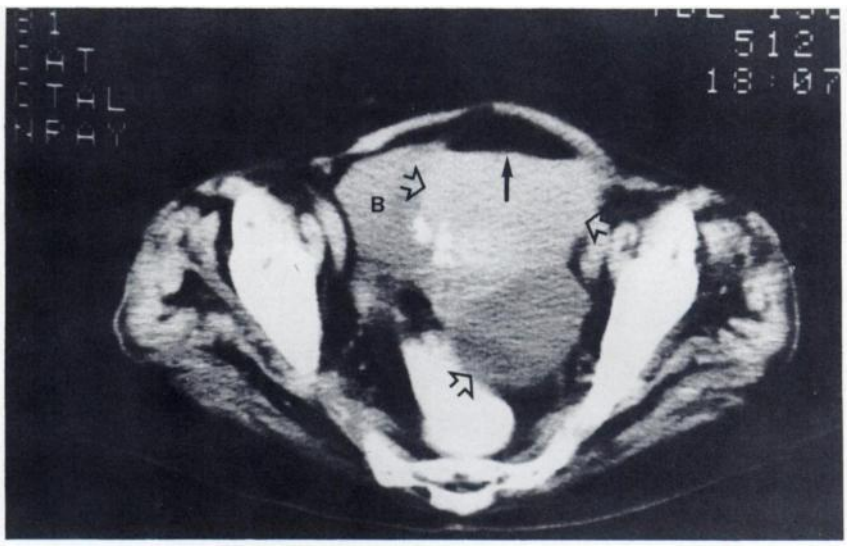

FIGURE 3
Computed tomography of the pelvis reveals a large mass (open arrows) with calcifications and fat-fluid level (arrow) displacing the bladder (B) to the right.

(*4*), or causes symptoms related to peritoneal adhesions (*7*).

Struma ovarii is usually diagnosed when pathologic examination of a resected ovarian teratoma incidentally reveals a large component of thyroid tissue. In patients with hyperthyroidism resulting from the tumor, the diagnosis can be made preoperatively because of the high avidity of the ovarian thyroid tissue for [^{99m}Tc] pertechnetate and ^{131}I. However, uptake of these radionuclides may be misleading because struma ovarii is rarely mimicked by functioning thyroid carcinoma metastasizing to the ovaries. In addition, concentration of ^{131}I by an ovarian cyst has been reported (*8*).

Histologically, struma ovarii is usually identical to normal, mature thyroid tissue. The contralateral ovary contains a benign teratoma in ~5% of cases. Malignant transformation occurs in 5–10% of these patients with follicular and papillary carcinoma being the most common histologic types. These tumors have been reported to metastasize (*3*).

In summary, although struma ovarii is a rare cause of hyperthyroidism, there is a subset of female patients with thyrotoxicosis, known pelvic masses, and unexplained low ^{131}I uptake by the cervical thyroid that should be evaluated by radionuclide imaging of the pelvis.

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