Struma Ovarii with Later Metastatic Thyroid-type Carcinoma: A Case Report and Review of the Literature

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Abstract

Struma ovarii is a rare ovarian teratoma composed predominantly of thyroid tissue. We report a patient who underwent left adnexectomy and right ovarian cyst excision in 2014. Histology identified struma ovarii on the left and a dermoid cyst on the right, both reported as benign. Seven years later, a pulmonary biopsy showed metastatic thyroid carcinoma, and right adnexectomy revealed thyroid tissue described as suggestive of secondary thyroid carcinoma. Subsequent thyroidectomy showed no thyroid malignancy. The patient received serial radioiodine treatments, with regression of lesions reported on follow-up imaging. Imaging surveillance and biochemical monitoring continued. This case describes metastatic thyroid-type carcinoma in a patient with a previous diagnosis of struma ovarii. The initial findings do not establish bilateral struma ovarii or the precise timing of malignant transformation.

Keywords: ovarian goitre; ovarian tumour; struma ovarii; teratoma; radioiodine therapy; differentiated thyroid tissue

Introduction

Ovarian goitre, also known as struma ovarii, is an anatomopathological entity characterized by differentiated thyroid tissue within the ovary and is generally classified as a mature monodermal teratoma. Its pathological and functional manifestations encompass benign lesions, malignant lesions, metastatic disease and hyperthyroidism [1]. Most struma ovarii are benign; malignant forms are rare [2].

Objective

This report describes struma ovarii with later metastatic thyroid-type carcinoma. Clinical findings, morphological and scintigraphic imaging, histopathology and management are discussed alongside a review of the literature.

Case Report

The patient, aged 38, was biparous, with two previous caesarean sections for pelvic narrowing, and had hypertension and diabetes managed with dietary measures. No significant personal or family history of thyroid disorders was reported. In 2014, pelvic pain prompted gynaecological evaluation, which revealed an ovarian mass. In 2014, left adnexectomy and excision of a right ovarian cyst were performed. Histological examination identified struma ovarii on the left and a dermoid cyst on the right; both were reported as benign.

Three years later, Graves' disease was diagnosed through TSH receptor antibody testing and thyroid scintigraphy. After a relapse, the patient received radioiodine therapy (444 MBq) and levothyroxine. Intermittent right hypochondrial pain and spontaneous haemoptysis began in 2018. A thoraco-abdominal-pelvic CT examination in 2021 revealed multiple pulmonary nodules and micronodules, hypervascular liver nodules and a pelvic cyst. Pelvic MRI suggested a suspicious right ovarian cyst.

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Diagnostic Assessment and First Treatment

In 2021, biopsy of a pulmonary lesion showed metastatic thyroid carcinoma. Right adnexectomy revealed thyroid tissue described as suggestive of secondary thyroid carcinoma. Subsequent total thyroidectomy showed a microvesicular adenoma and dystrophic thyroid parenchyma, without malignancy.

After thyroidectomy, elevated thyroglobulin and detectable thyroglobulin antibodies were reported. Four months later, radioiodine therapy (5 GBq) was administered after Thyrogen stimulation. Post-therapy imaging showed uptake in pulmonary and hepatic lesions and a pelvic mass (Figure 1).



Figure 1. Anterior and posterior whole-body scintigraphy after the first radioiodine treatment.

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Treatment and Imaging Follow-up

A second radioiodine treatment (3.7 GBq) was administered six months later. Imaging showed regression of pulmonary and hepatic lesions (Figure 2). Nine months later, a third radioiodine treatment (3.7 GBq) was administered after levothyroxine withdrawal. Post-treatment imaging showed regression of lesions (Figure 3).



Fig.2: Post-therapeutic whole body scan of the second cure.

Figure 2. Whole-body scintigraphy after the second radioiodine treatment.

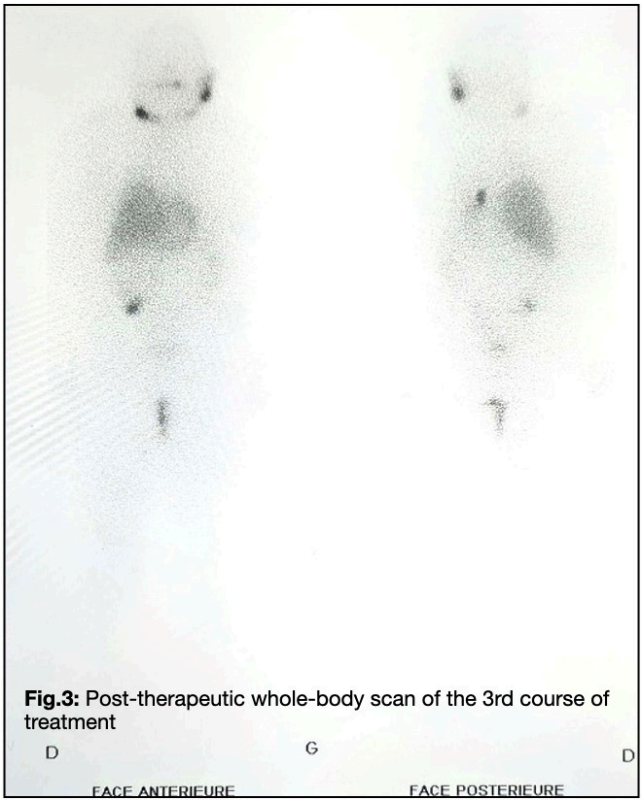


Fig.3: Post-therapeutic whole-body scan of the 3rd course of treatment

Figure 3. Whole-body scintigraphy after the third radioiodine treatment.

Teratoma Tissue Components

Teratomas originate from pluripotent germ cells and contain tissues derived from embryonic germ layers (Table 1). They are frequently ovarian, although other sites include the mediastinum and retroperitoneum. They may sometimes be bilateral [3].

Table 1. Embryonic tissue components [3].

Component	Examples
Ectodermal tissue	Skin and nervous system
Mesodermal tissue	Fat, bone and cartilage
Endodermal tissue	Gastrointestinal and bronchial tissue

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Follow-up Assessment

Follow-up MRI showed no abnormalities. One year after the third treatment, follow-up scintigraphy showed a uniform tracer distribution without abnormal focal uptake (Figure 4). Levothyroxine treatment and regular biochemical surveillance continued.



Figure 4. Anterior and posterior whole-body scintigraphy at follow-up.

Teratoma Types

Table 2. Main teratoma types [3].

Type	Description
Mature teratoma	Also known as a dermoid cyst; benign and slow-growing
Immature teratoma	Rare malignant tumour with variable aggressiveness determined histologically
Monodermal teratoma	A less common teratoma predominantly composed of one tissue type

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Discussion

Struma ovarii is predominantly composed of thyroid tissue, conventionally accounting for more than 50% of the tumour [2, 4]. The thyroid tissue may show benign, hyperplastic or malignant changes [5]. Most struma ovarii are benign; malignant forms are rare [2, 6].

Diagnosis is often incidental. Presentations may include an abdominopelvic mass, acute abdominal pain, hyperthyroidism, abnormal uterine bleeding, ascites or features of Meigs syndrome [2, 4, 6]. Functional thyroid tissue can influence the hypothalamic-pituitary-thyroid axis, and postoperative hypothyroidism has been reported. Associations with autoimmune thyroid disorders, including Hashimoto's disease and Graves' disease, have also been described [2].

Ultrasound, CT and MRI can contribute to the assessment of ovarian teratomas [8]. Kim et al. described a multilobulated complex mass, thickened septa, cysts with variable signal intensity and enhancing solid components on MRI [13]. A published MRI illustration is shown in Figure 5 [12].



Figure 5. MRI illustration of a unilateral multiloculated mixed cystic lesion. Source: Koual et al. [12] (numbered 13 in the original image).

Devaney et al. assessed proliferative and histologically malignant struma ovarii using features of thyroid carcinoma, including papillary-type nuclear changes and invasion [14]. Immunostaining for thyroglobulin can support identification of thyroid differentiation in difficult cases [6]. Histology and the clinical pattern must be considered together when evaluating a thyroid-type ovarian lesion.

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Management and Surveillance

Metastatic dissemination may involve pelvic or para-aortic lymph nodes, adjacent peritoneal structures, the contralateral ovary or distant sites such as the lungs, liver, bone and brain [9]. The present case documents pulmonary thyroid carcinoma and later right ovarian thyroid tissue in a patient with previously resected left struma ovarii. The initial benign findings do not establish bilateral struma ovarii or the precise timing of malignant transformation.

DeSimone et al. discussed thyroidectomy and radioactive iodine in the management of malignant struma ovarii [7]. Thyroidectomy can help assess a possible thyroid primary and facilitate radioiodine treatment and thyroglobulin surveillance. Outcomes in historical case reports do not establish a universal remission rate or a direct comparison with surgery alone. Reports describe radioiodine treatment in recurrent, locally extended or metastatic disease [7, 9, 12].

Recurrence risk is difficult to quantify from small published series, and late recurrence has been described [5, 11]. Long-term surveillance may include clinical assessment, thyroglobulin monitoring interpreted in its treatment and stimulation context, and appropriate imaging [10]. Management and follow-up require individualized multidisciplinary assessment.

Conclusion

This case illustrates the importance of reassessing new lesions in patients with a history of struma ovarii. Management and long-term surveillance should be individualized in a multidisciplinary setting. The reported imaging response supports continued follow-up and does not establish definitive cure.

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Conflict of Interest

The authors declare that there were no conflicts of interest within the meaning of the recommendations of the International Committee of Medical Journal Editors when the article was written.

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