



## Case of thyrotoxicosis associated with struma ovarii: case report

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### Summary

Struma ovarii is a rare type of teratoma with predominant thyroid tissue comprising more than 50% of the overall mass and in some cases hormonal tumor activity results in clinical and biochemical signs of hyperthyroidism. We report on a 68-year-old postmenopausal female patient with Grave's disease treated 34 years prior by total thyroidectomy on levothyroxine replacement therapy presented with thyrotoxicosis. After thorough clinical investigation, imaging tests accompanied by elevated serum levels of CA 125 indicated right ovarian malignancy. The patient underwent bilateral adnexectomy and pathohistological results revealed struma ovarii. Although standard procedure in treating all germ cell tumors is conservative surgery, in our case the procedure was planned in accordance with the patient's age. In non-malignant tumors adjuvant therapy is not indicated, however annual serum thyroglobulin monitoring is advised in the first two postoperative years. Diverse clinical manifestation of this ovarian entity requires a multidisciplinary approach ensuring comprehensive care with a common interest of enhancing the patient's treatment outcome.

KEYWORDS: *ovarian cancer, struma ovarii, teratoma, hyperthyroidism, thyrotoxicosis*

### INTRODUCTION

Ovarian tumors represent a histologically diverse group of tumors including epithelial tumors, germ cell tumors and sex cord stromal tumors. Epithelial tumors, the most common type of ovarian tumors, originate from a thin layer of cells covering the ovarian surface, sex cord stromal tumors, least common ovarian tumors, develop from the stroma or the sex cords of ovary and are hormonally active. Lastly, germ cell tumors are derived from primordial germ cells and are predominantly found in the young female population. Teratomas are the most common type of benign germ cell ovarian tumors and are classified based on their histological and maturity properties into mature, immature and monodermal teratomas. Struma ovarii is monodermal teratoma with predominant thyroid tissues, it is defined by the presence of thyroid tissue comprising more than 50% of the overall mass. Struma ovarii most commonly oc-

curs as part of a teratoma, but may occasionally be encountered with serous or mucinous cystadenoma(1). It makes up to 5% of all ovarian teratomas. Although mostly asymptomatic, in some cases struma ovarii produces sufficient levels of thyroid hormones resulting in clinical and biochemical signs of hyperthyroidism.

### CASE PRESENTATION

A 68-year-old postmenopausal female patient with past medical history of Grave's disease treated 34 years prior by total thyroidectomy, and administered levothyroxine supplementation therapy since, presented with heart failure symptoms, predominantly dyspnea, and paroxysmal atrial fibrillation and was referred to the cardiologist. After the initial assessment, a CT scan discovered a right ovarian tumor. Blood examination showed hyperthyreosis (TSH < 0.004 mIU/L, fT3



Figure 1. Macroscopic view of right adnexa

14.7 pmol/L, fT4 64.2 pmol/L) and an endocrinologist was consulted. Levothyroxine was discontinued, and the patient started propylthiouracil and postponing surgical treatment was advised until thyroid hormone levels were stabilized. Around one month was needed to achieve euthyroid state necessary for surgery (fT3 <2.30 pmol/L, fT4 18.1 pmol/L). Whole-body scintigraphy detected increased iodine ( $I^{131}$ ) pelvic uptake suggesting right ovarian mass. The patient was then referred to a gynecologist for further medical treatment. Transvaginal and transabdominal sonography revealed a right solid ovarian tumor measuring 21x9x18cm with internal cystic formations. Based on ultrasound findings, further imaging was done, and MSCT scans confirmed solid ovarian tumor with a medium amount of ascites suggesting peritoneal dissemination. Assessing tumor markers showed elevated serum CA 125 levels (348 U/mL). These radiological and biochemical findings were highly implicative for malignant ovarian tumor and patient underwent conservative surgery which included bilateral salpingo-oophorectomy. Moderate ascites was identified intraoperatively, and ascitic fluid was aspirated and sent for cytological

evaluation. Due to suspected lesions found intraoperatively, such as non-specific diffuse omentum thickening, an omental and randomly chosen peritoneal biopsy, based on radiological examination, was taken. Malignant cells were not present in ascites fluid cytology, omental and peritoneal specimen. However, mild reactive atypia was described after the pathohistological examination of omentum. Pathohistological examination of the ovary revealed struma ovarii diagnosis. Patient was discharged after the surgery with scheduled gynecologist and endocrinologist follow-up appointments with no need for adjuvant therapy.

## DISCUSSION

Ovarian tumors are not just histologically diverse group of tumors but they also represent group with distinct clinical and prognostic features. Approximately 23% of gynecologic cancers are ovarian in origin, but 47% of all deaths from cancer of the female genital tract occur in women with ovarian cancer(2,3,4). Malignant tumors of the ovaries occur at all ages with variation in histologic subtype. In women younger than 20 years

of age, germ cell tumors predominate, while borderline tumors typically occur in women in their 30s and 40s, 10 or more years younger than in women with invasive epithelial ovarian cancers, which mostly occur after the age of 50 years(2).

Germ cell ovarian tumors consist of a variety of histologically different subtypes that are all derived from the primitive germ cells of the embryonic gonad. Malignant germ cell tumors represent a relatively small proportion of all ovarian tumors. Ovarian dermoid cysts, also called mature cystic teratomas is the most common subtype of ovarian germ cell tumors, which accounts for 11% of all ovarian tumors, 69% of all germ cell tumors, and 95% of teratomas(5,6). Strumae ovarii comprise 1% of all ovarian tumors and 2-5% of ovarian teratomas(5).

Prior to advances in chemotherapy, the prognosis for aggressive germ cell tumors was poor. The use of platinum-based chemotherapeutic regimens has made germ cell malignancies highly curable cancers(7). The aggressiveness of the disease is dependent on the type, the most aggressive being endodermal sinus and choriocarcinoma, but today with combination chemotherapy, they are highly curable(8). As chemotherapy can cure the majority of patients, even with advanced disease, conservative surgery is standard in all stages of all germ cell tumors. Conservative surgery includes laparotomy with careful examination and biopsy of all suspicious areas. Only limited cytoreduction is recommended, thereby avoiding major morbidity. The uterus and the contralateral ovary should be left intact. Wedge biopsy of a normal ovary is not recommended as it may potentially cause infertility which defeats the purpose of conservative therapy(9). However in our case bilateral salpingo-oophorectomy was done in accordance with the patient's age and hysterectomy was avoided based on conservative management principles. Secondary surgery is of no proven value, except in those patients whose tumor was not completely resected at the initial operation and who had teratomatous elements in their primary tumor(9). Although CT scans suggested peritoneal dissemination in our case, intraoperative findings were not consistent with radiological ones. Peritoneal strumosis is described as metastasis of a benign struma ovarii and it is extremely rare, accounting in less than 1/10 000 all ovarian tumors. Treatment strategy includes additional radioactive iodine therapy adjuvant to

surgery(10). For patients with malignant disease, postoperative adjuvant therapy with radio-ablative iodine-131 is recommended. After proper surgical staging, a thyroidectomy is suggested before adjuvant treatment to potentiate the effects of radioablation. As normal thyroid cells preferentially uptake I-131, thyroidectomy would ensure delivery to the malignant cells. Additionally, a thyroidectomy would provide pathological confirmation that the struma is indeed ovarian in origin(11).

Serum thyroglobulin levels can be followed as a marker for recurrence following fertility-sparing or conservative procedures(10), also thyroglobulin is the preferred tumor marker followed in patients with malignant struma ovarii. Patients with malignant struma ovarii require long-term follow-up, at least 10 years. Annual monitoring of serum thyroglobulin is reasonable for the first two years postoperatively. Increases in serum thyroglobulin should be followed up with pelvic imaging with computed tomography (CT), with single-photon emission CT (SPECT) imaging using radioiodine when appropriate or ultrasound(12,13).

## CONCLUSION

8% patients with struma ovarii develop clinical signs of hyperthyroidism(14). This benign form of monodermal teratoma, as presented in this case, along with radiological findings and serological tests mimicked ovarian malignancy. Due to its rarity and non-specific imaging, resembling other conditions, struma ovarii can be easily misdiagnosed. These challenges emphasize the importance of a multidisciplinary approach for adequate diagnostic and therapeutic management of this ovarian pathology.

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## Sažetak

**Slučaj tireotoksikoze povezan sa strumom ovarija: prikaz slučaja**

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Struma ovarija rijetka je vrsta teratoma s dominantnim tkivom štitnjače koje čini više od 50% ukupne mase, a u nekim slučajevima hormonska aktivnost tumora rezultira kliničkim i biokemijskim znakovima hipertireoze. Izvještavamo o 68-godišnjoj pacijentici s anamnezom Gravesove bolesti, podvrgnuta operativnom zahvatu totalne tireoidektomije prije 34 godine te na nadomjesnoj terapiji levotiroksinom koja se sada prezentirala tireotoksikozom. Nakon temeljne kliničke i radiološke dijagnostike uz povišene serumske vrijednosti CA 125, kod pacijentice se postavila sumnja na malignitet desnog jajnika. Nakon obostrane adnektomije i patohistološke obrade uzorka utvrđeno se dijagnoza strume ovarija. Iako je standardni postupak u liječenju svih tumora zametnih stanica konzervativna operacija, u našem slučaju operativni zahvat planiran je u skladu s dobi pacijentice.

Kod benignih tumora adjuvantna terapija nije indicirana, ali se savjetuje godišnje praćenje serumskog tireoglobulina u prve dvije postoperativne godine. Brojne kliničke manifestacije strume ovarija zahtijevaju multidisciplinarni pristup koji osigurava sveobuhvatnu skrb sa zajedničkim interesom poboljšanja ishoda liječenja pacijentica.

**KLJUČNE RIJEČI:** tumor jajnika, struma ovarija, teratom, hipertireoza, tireotoksikoza