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CASE REPORT

Coexistence of struma ovarii with marked ascites and elevated CA-125 levels: case report and literature review

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Abstract
Introduction Struma ovarii is a rare form of ovarian neoplasm and consists mainly of thyroid tissue. Ascites has been reported in approximately one-third of all the cases. However, the combination of struma ovarii and elevated CA-125 has rarely been reported.
Materials and methods We described a case of benign struma ovarii, presenting with the clinical features of ovarian cancer: large complex pelvic mass, gross ascites and markedly elevated serum CA-125 levels. Surgical excision of the ovarian mass was followed by rapid resolution of the ascites and reduction of the serum CA-125 level.
Conclusion Struma ovarii can mimic ovarian malignancy clinically, when presented with ascites and an elevated CA-125 level.

Keywords Struma ovarii · Ascites · CA-125

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Introduction

Struma ovarii is a rare ovarian tumor composed of thyroid tissue, which is classified as a variant of mature ovarian teratoma [1]. Although 5–37% of these cases undergo malignant transformation, this tumor is generally benign in nature [2]. Most of the patients had asymptomatic mass, and diagnosis was usually made postoperatively by histologic examination. Ascites occurred in one-third of the cases [3]. However, this is rarely accompanied by elevated serum CA-125 level. Although recently some cases of struma ovarii associated with pseudo-Meigs' syndrome and elevated serum CA-125 levels were reported and the pleural effusion is supposed to be caused when ascites is transported through the diaphragm or lymphatics. Nevertheless, we cannot confirm that they are totally two different symptoms or the pleural effusion is just the result of the progressive ascites, because only a few cases had been reported. On the other hand, though struma ovarii has been reported associated with Graves' disease [4], struma ovarii in a patient with recurrent non-toxic multinodular goiter has never been described. We here report a patient of struma ovarii having the history of recurrent huge non-toxic goiter, who was initially thought to have an ovarian malignancy.

Case report

A 56-year-old Chinese woman presented with increasing abdominal distension for 2 months. She had menopause at the age of 51. Her family history was unremarkable. The patient did not complain of any pain, urinary or bowel symptoms. She had no symptoms of hyperthyroidism.

The patient had a history of nodular goiter with partial thyroidectomy done in 1986 in Mainland China. At that

time, she did not have symptoms of hyperthyroidism and the blood results for thyroid function was unknown. Three years later, she was diagnosed to have recurrent multinodular goiter. There was sudden increase in size in 2002, associated with dysphagia. Thyroid function was normal. Chest X-ray showed deviation of trachea to right side. Computed tomography scan of the neck and thorax found multinodular goiter with displacement of trachea. Total thyroidectomy was then performed and histology confirmed nodular hyperplasia. Thyroxine sodium supplement of 100 μg per day was started postoperatively and the patient became euthyroid.

The patient presented to our unit in September 2007 because of abdominal distension, and physical examination revealed marked ascites. Abdomen and pelvic ultrasound revealed gross ascites with a complex solid mass in the left adnexa, about 6.6 × 5.8 × 4.7 cm in size. Computed tomography scan of abdomen and pelvis revealed a fatty mass at left adnexa which was suggestive of a teratoma. There was another irregular soft tissue mass noted closely abuting it, suspicious of malignant change or concomitant ovary tumor (Fig. 1). Paracentesis was performed for symptomatic relieve while awaiting operation which yielded 3,210 ml straw-colored fluid. Cytological examination of the ascitic fluid revealed no malignant cells. Chest X-ray was negative for pleural effusion or lung metastasis. Serum CA-125 level was 5,218 μ/ml (normal value <35 μ/ml). The AFP and CEA levels were within normal range.

She was taken to the operating room for a laparotomy. The patient was found to have ascites and 5,000 ml of clear fluid was drained upon entrance to the peritoneal cavity. A 6 × 5 × 4 cm vascular, fleshy tumor was found arising from left ovary with contact bleeding. Beneath which noted a 3 cm teratoma consisting of hair and sebaceous material. Uterus and both fallopian tubes were normal. Omentum was inflammatory-looking, but there was no obvious tumor deposits. There was no enlarged lymph nodes or metastatic lesions noted. Left tube and ovary were removed for frozen section and it was suggestive of coexisting mature teratoma and struma ovarii. Total abdominal hysterectomy, right salpingo-oophorectomy and omentectomy were also performed. The final histology revealed left ovarian struma ovarii accompanying a mature cystic teratoma. The tumor tissue is composed of colloid-filled follicles of variable size, which are lined by bland-looking cuboidal cells (Fig. 2). Some have abundant eosinophilic cytoplasm consistent with Hurthle cell changes. In areas, clusters of follicular cells devoid of colloid are present. The stroma is edematous in areas. Immunohistochemically, the cells are diffusely positive for thyroglobulin. The right ovary, fallopian tube, uterus, and omentum were normal, and the ascitic fluid was negative for malignant cells. The patient recovered uneventfully and was discharged on day 7 postoperatively. CA-125 level had reduced to 10.8 μ/ml 4 months after operation. TSH and free T4 were within the normal range. The patient was well with no evidence of recurrent ascites.

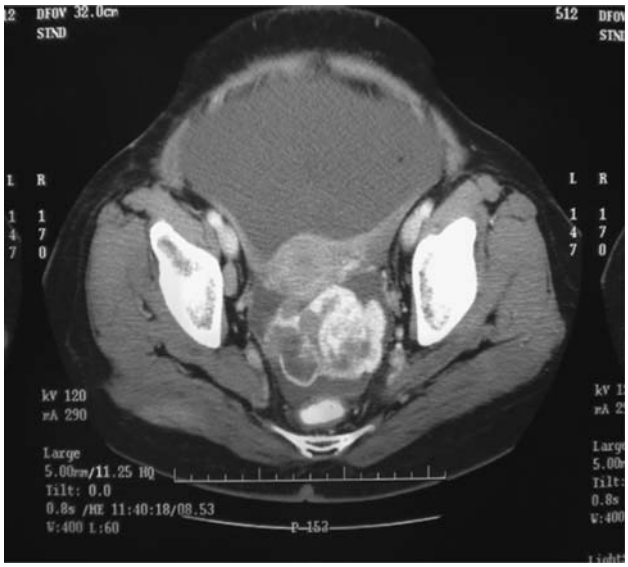

Fig. 1 Fatty mass at left adnexa suggestive of teratoma. Another irregular soft tissue mass is also noted closely abutting it at POD, suspected malignant change of the teratoma or concomitant ovary tumor. Gross ascites with increase densities over greater omentum. Peritoneal carcinomatosis cannot be excluded

Discussion

Struma ovarii is a rare benign tumor of ovary. It usually presents with asymptomatic mass and is diagnosed histologically after surgical resection. However, it has been reported that ascites is present in one-third of the cases [3].

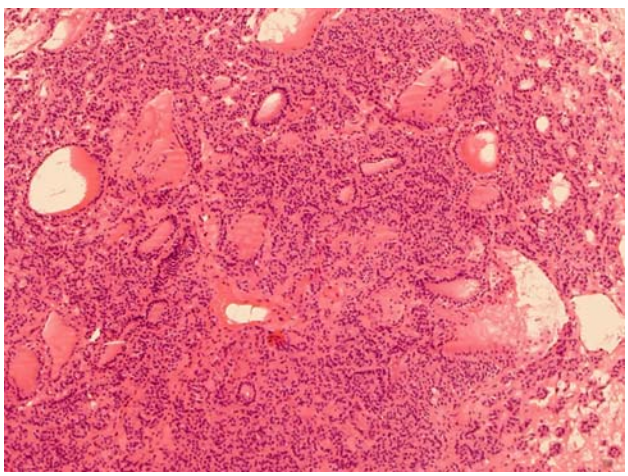

Fig. 2 Variably sized colloid-filled follicles are lined by bland-looking cuboidal epithelial cells

Several hypotheses have been postulated to explain the origin of ascites. It probably occurs by means of a transudative mechanism through the tumor surface, which exceeds the peritoneum's resorptive capacity. Other possible mechanisms include obstruction of peritoneal lymphatics by tumor or increased permeability of the neovasculature with protein leakage and an inflammatory reaction [5]. Majority of the studies found that ascites disappeared completely after tumor removal. As in our case, the ascites totally subsided after the operation.

Serum tumor markers may be helpful in determining if a mass likely to be malignant. CA-125 is elevated (>35 μ/ml) in over 80% of epithelial ovarian cancers and a smaller proportion of endometrial, bowel, breast, lung and other malignancies. Non-malignant causes of elevated CA-125 can be due to conditions, such as menstruation, pregnancy, endometriosis, infections and ovarian fibroma [6]. When ovarian fibroma associated with pleural effusion and ascites which resolve following excision was referred to Meigs' syndrome and was first described by Meigs and Cass [7]. When the tumor is other benign ovarian tumor, the condition is called pseudo-Meigs' syndrome. Meigs' syndrome with marked elevation of CA-125 is an unusual clinical condition and only reported in 27 cases in the literature. The most likely histopathology is fibroma; others included thecoma, granulose cell tumor and Brenner tumor [8]. The exact mechanism that accounts for the elevation of CA-125 in Meigs' syndrome is still unknown; however, a possible explanation is the irritation and subsequent inflammation of pleura and peritoneum surface produced by the presence of free fluid in these spaces. The benign primary ovarian tumor by secondary irritation of adjacent mesothelial cells, ascites and pleural effusion may be responsible for the release of or increase in CA-125 production on the surface of these serosal membranes [9].

An ovarian mass associated with ascites and an elevated serum CA-125 level in a postmenopausal woman generally suggests a malignant process. A MEDLINE search of the English language literature found eight case reports of struma ovarii in association with ascites and elevated CA-125 level. Details of those reports were shown in Table 1. All the cases were initially suspected to be a malignant tumor.

Recently, some authors have reported cases of struma ovarii associated with pseudo-Meigs' syndrome and elevated serum CA-125 levels. We also had a MEDLINE search of the English language literature for struma ovarii associated with pseudo-Meigs' syndrome and elevated serum CA-125 levels and found eight case reports totally too. Details of those reports were shown in Table 2. Pleural effusion is thought to be caused when ascites is transport through the diaphragm or lymphatics. In those cases with ascites but absence of pleural effusion is thought probably due to the early diagnosis and timely treatment. But from review of the literatures, the amount of ascites seems have not relation to induce pleural effusion. As in our case, the amount of ascites was 8,210 ml, but no pleural effusion was found. Of fibromas, there is 10–15% associated with ascites, but only 1% presents ascites and pleural effusion simultaneously [5]. However, we cannot confirm that they are totally two different syndromes or the pleural effusion is just the result of the progressive ascites, because only a few cases had been reported.

Although struma ovarii contains thyroid tissue, only 5% of the cases have features of hyperthyroidism [1]. All but one of the cases listed in Table 1 had symptoms of hyperthyroidism. The particular case had history of Graves' disease but it was resistant to the medical treatment and thyroidectomy was then performed [10]. After surgery, the hyperthyroidism persisted. The patient subsequently presented ascites and a large pelvic mass was found. The diagnosis of struma ovarii was finally made after surgical removal. The patient became euthyroid and CA-125 level returned to normal after operation. Although our patient showed no symptoms or clinical signs of hyperthyroidism, interestingly she had a history of recurrent non-toxic goiter which required total thyroidec-

Table 1 Literature review of cases of struma ovarii associated with ascites and elevated CA-125 level

Author	Year	No. of patients	Age (years)	Presenting symptoms	Ascites volume (ml)	Tumor size (cm)	CA-125 (μ/ml)	Coexist thyroid disease
Jotkowitz and Gee [12]	1993	1	79	Abdominal swelling	Several liters	Not reported	4,670	Absent
Leung and Hammond [6]	1993	2	60	Nonspecific symptoms	500	10	224	Absent
			77	Pelvic mass	4,000	8 × 10	2,860	Absent
Mancuso et al. [13]	2001	1	31	Lower abdominal pain	300	10 × 9	689	Absent
Loizzi et al. [14]	2002	1	83	Abdominal pain, distension	3,000	10 × 7.0 × 6.5	1,570	Absent
Bokhari et al. [15]	2003	1	51	Abdominal distension	Not reported	15 × 6.5 × 11	1,160	Absent
Rim et al. [16]	2005	1	50	Abdominal distension	3,000	4 × 4	878.67	Absent
Guida et al. [10]	2005	1	42	Abdominal distension	4,000	9.1 × 7.7	2,548	Graves disease
Present report	2008	1	56	Abdominal distension	8,210	6 × 5 × 4	5,218	Nontoxic multinodular goiter

Table 2 Literature review of cases of struma ovarii with pseudo-Meigs' syndrome and elevated CA-125 levels

Author	Year	No. of patients	Age (years)	Presenting symptoms	Ascites volume (ml)	Tumor size (cm)	CA-125 (μ/ml)	Coexist thyroid disease
Mitrou et al. [17]	2008	1	55	Large pelvic mass, marked cachexia, ascites	8,000	22 × 23 × 10	3,803	Absent
Paladini et al. [18]	2008	1	42	Ascites, weight loss	8,000	11 × 7.3 × 8.0	2,548	Absent
Obeidat et al. [19]	2007	1	52	Ascites and shortness of breath	4,000	10 × 15 × 8	149	Absent
Loizzi et al. [20]	2005	1	65	Dyspnea and diffuse abdominal pain	Few liters	7 × 7	161	Hyperthyroidism
Julie et al. [21]	2002	1	65	Dyspnea	20,000	5 × 4 × 4	402	Absent
Long et al. [22]	2001	2	53	Abdominal distension	4,100	15 × 11 × 7	540	Absent
			78	Abdominal distension and weight loss	Not reported	12.2 × 10 × 5.2	124.9	Absent
Bethune et al. [23]	1996	1	62	Acute hydrothoraces and ascites	3,500	9 × 5 × 5	1,621	Absent

tomy. In the literature, struma ovarii coexisting with history of recurrent huge non-toxic goiter has not been report. Non-toxic nodular goiters are common, even in areas in which iodine intake is sufficient. Both environmental and genetic factors play a role in the pathogenesis [11]. However, in our patient, we cannot exclude that the coexistence struma ovarii may be just a coincidence or it was some intrinsic factor which caused the abnormal growth of thyroid tissue in different part of her body.

In summary, we described a case of struma ovarii presented with marked ascites and elevated CA-125 levels who also had a history of recurrent huge non-toxic goiter. Although similar cases have been reported before, the interesting history and presentation of this case may be of interest to others who encounter similar situation in the future. Furthermore, we reviewed the literatures of the two similar syndromes which only had difference on concurrence of pleural effusion. Though we cannot draw a conclusion on these two interesting condition, we hope that more cases will be reported in future to increase our knowledge on them.

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