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CASE REPORT

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Sarcomatous transformation with metastatic deposits in the Omentum in Teratoma of the Ovary: A case report and review of the literature

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ABSTRACT

Symptoms: A 25-year-old woman was presented with abdominal pain, mass, and fever. Physical examination revealed a tender abdominal mass and fever.

Investigations: Ultrasound abdomen showed a solid and cystic mass arising from the right adnexa. Magenitic Resonance Imaging (MRI) pelvis showed a large dermoid cyst arising from the right ovary, pelvic lymph nodes enlargement, and omental deposits.

Interventions: Total abdominal hysterectomy and bilateral salpingo-oophorectomy, omentectomy, and pelvic and para-aortic lymph nodes excision.

Histopathology: Solid diffuse growth of malignant spindle cells with a high number of abnormal mitotic figures and areas of necrosis.

Post-Operative Period: The patient was given two cycles of chemotherapy and she was discharged to come again for five to six courses of chemotherapy. Patient was followed up for 1 year and no recurrence or metastasis noted.

Conclusion: The current case will add to the knowledge of pathologists, gynecologists, and oncologists, thereby helping in early diagnosis and better management of sarcomatous transformation in the mature cystic teratoma.

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Introduction

Mature cystic teratoma (MCT) is the commonest ovarian germ cell tumors and it forms about 10%–20% of all ovarian tumors [1]. It occurs at any age, with the highest age incidence during the reproductive period. The clinical course of MCT is indolent and its prognosis depends on patients' age, stage, and optimal surgical management. However, in rare cases, MCT might be complicated with a malignant transformation [2], which is a very rare complication that might happen in 1%–2% of the cases and 75% of such malignant transformation is squamous cell carcinoma [3], followed by adenocarcinoma, melanoma, carcinoid, thyroid carcinoma, basal cell carcinoma, and lastly sarcoma [1]. Malignant transformation in MCT has a worse prognosis in comparison with malignant epithelial ovarian tumors [4]. Sarcomatous transformation in MCT is very rare and carries a grim prognosis. There are very few published studies about sarcomatous transformation in ovarian teratoma; therefore, this case will add to the knowledge of pathologists, gynecologists, and oncologists, thereby helping in the early diagnosis and the better management of such malignancy [3]. Various types of sarcoma arising in an ovarian dermoid cyst have been reported such as angiosarcoma [5], osteosarcoma [6,7], malignant fibrous histiocytoma [8], rhabdomyosarcoma [9], chondrosarcoma [10], and leiomyosarcoma [1,11].

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Case Report

Clinical data

A 25-year-old woman came to the Department of Gynecology and Obstetrics, Faculty of Medicine, Zagazig University with chief complains of pain in right hypochondrium. The pain was deep, aching, and non-radiating. It was not associated with any genito-urinary complains or bleeding per vagina. Abdominal examination revealed a large mass, cystic in consistency with well-defined margins. It was highly tender on palpation. ESR was elevated and CA-125 was within normal limits.

Radiological data

Ultrasound abdomen showed a huge solid and cystic mass arising from the right adnexa (Fig. 1).

Magenitic Resonance Imaging (MRI) pelvis showed a large dermoid cyst with mixed solid and cystic components, pelvic lymph nodes enlargement, and omental deposits.

True cut from the solid areas and the omental nodules revealed solid diffuse growth of malignant spindle cells with high number of abnormal mitotic figures and areas of necrosis.

Surgical management

Preoperative finding of a huge right ovarian cyst was seen measuring 20 × 15 cm. Intra-operatively, uterus with cervix with left tube and ovary showed no significant pathology. Right ovary showed a partially cystic mass with solid foci that measured 17 × 15 × 10 cm. After exploration and surgical staging, total abdominal hysterectomy with bilateral salpingo-oophorectomy, omentectomy, and pelvic and para-aortic lymph nodes excision for adequate pathological evaluation were done at the Department of Gynecology and Obstetrics, Faculty of Medicine, Zagazig University. The specimen was sent to the Pathology Department, Faculty of Medicine, Zagazig University.

Morphological evaluation

Macroscopically, the right ovarian mass was partially cystic mass with solid foci that was composed of a unilocular cyst with thick sebaceous material mixed with hairs and a solid mural thickening (13 × 10 × 4 cm), which showed a gray irregular surface (Figs. 2–4). The solid part of the tumor invaded through the external surface with the involvement of the right tube. Large areas of necrosis

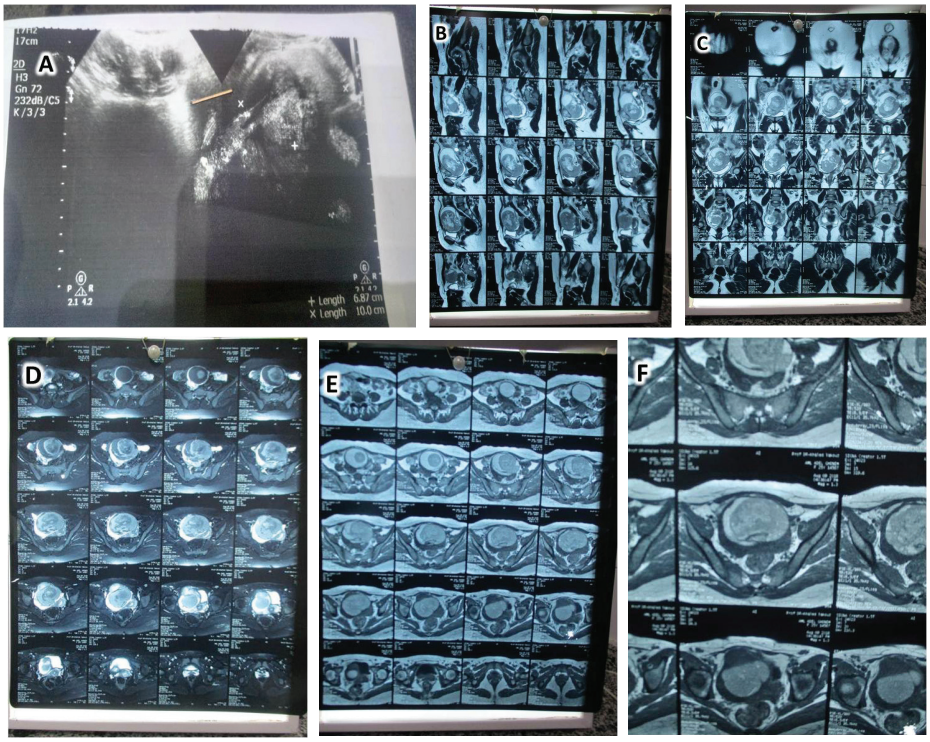

Figure 1. Radiological features. (A) Ultrasound abdomen showed a massive solid and cystic mass arising from the right adnexa. B-F MRI pelvis showed a large teratodermoid cyst, pelvic lymph nodes enlargement, and omental deposits.

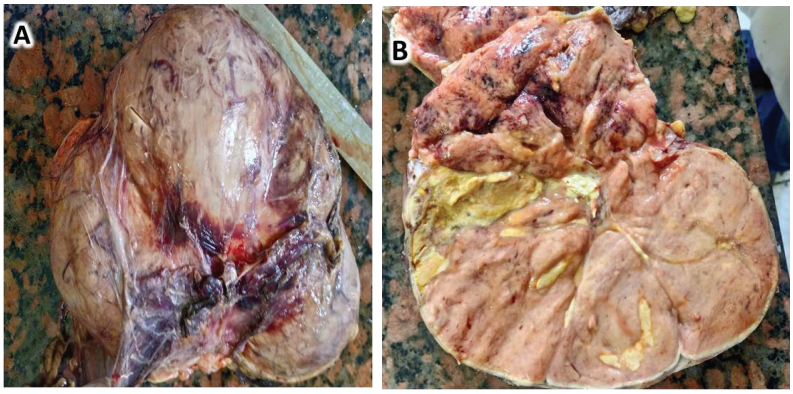

Figure 2. (A and B) Gross appearance of the excised mass. A mass about 17 × 15 × 10 cm irregular in shape, cystic in consistency with focal solid areas B cut section reveals a multilocular cyst filled with sebaceous content and showed solid areas with focal hemorrhage and calcification.

were seen. The omental nodules were irregular in shape, multiple, and ranged from 2 × 1 × 1 cm to 0.5 × 0.5 × 0.5 cm in size.

Microscopically, the cystic part showed a cutaneous lining composed of keratinized squamous epithelium with associated cutaneous appendages, associated with underneath mature fat tissue and intestinal mucous glands with goblet cells. The mural solid component was composed of intersecting fascicles of malignant spindle cells with diffuse moderate to marked nuclear atypia. The neoplastic cells showed blunt-ended (cigar-shaped) nuclei with eosinophilic fibrillar cytoplasm (Fig. 4B and C). The mitotic count was 13 in 10 high power fields, and atypical mitotic figures were present. Areas of coagulative tumor cell necrosis were noted. The malignant spindle cell component was consistent with a diagnosis of high-grade sarcoma. The omental nodules revealed metastatic deposits from the high-grade sarcoma, which originated from sarcomatous changes from the teratoma in the ovary.

A final diagnosis of teratoma with secondary malignant transformation into high-grade sarcoma was rendered.

Oncological management

The patient was referred to Clinical Oncology & Nuclear Medicine Department, Faculty of Medicine, Zagazig University for any further management. Patient was given two cycles of platinum-based chemotherapy. Patient tolerated chemotherapy well and was discharged to come again for five to six courses of chemotherapy at monthly interval. Patient was followed up for 1 year by ultrasound, Computerized Tomography (CT), and MRI examination and no recurrence or metastasis noted.

Discussion

MCT contains tissues that are derived from all three germ cell layers, all of which can give rise to malignant tumors, although such tumors develop in only 0.17%–2% of cases [12]. The most common subtype of malignant transformation in MCT is squamous cell carcinoma [13], while the sarcomatous transformation is very rare.

We report a case of 25-year-old woman who was diagnosed with malignant transformation of MCT into high-grade spindle cell sarcoma with metastatic omental nodules. There are previous reports that have identified different subtypes of malignant transformation of MCT: Mathew et al. [14] described a case of urothelial carcinomas arising in an MCT of ovary in a 50-year-old lady, Tahaoglua et al. [13] described a case of squamous cell carcinoma and a malignant fibrous histiocytoma developing in a patient with an MCT in a 42-year-old premenopausal woman, Pongsuvareeyaku et al. [1] described a case of leiomyosarcoma and squamous cell carcinoma arising in an MCT of the ovary in a 65-year-old postmenopausal woman, additionally, Mandal and Badhe [15] described a case of malignant transformation in an MCT with metastatic deposits in the omentum in a 56-year-old female. Maeda et al. [3] described a case of ovarian clear cell carcinoma arising from ovarian MCT in a 71-year-old female. Shirazi et al. [16] described a secondary sarcomatous transformation in MCT as an uncommon cause of acute abdomen. Moreover,

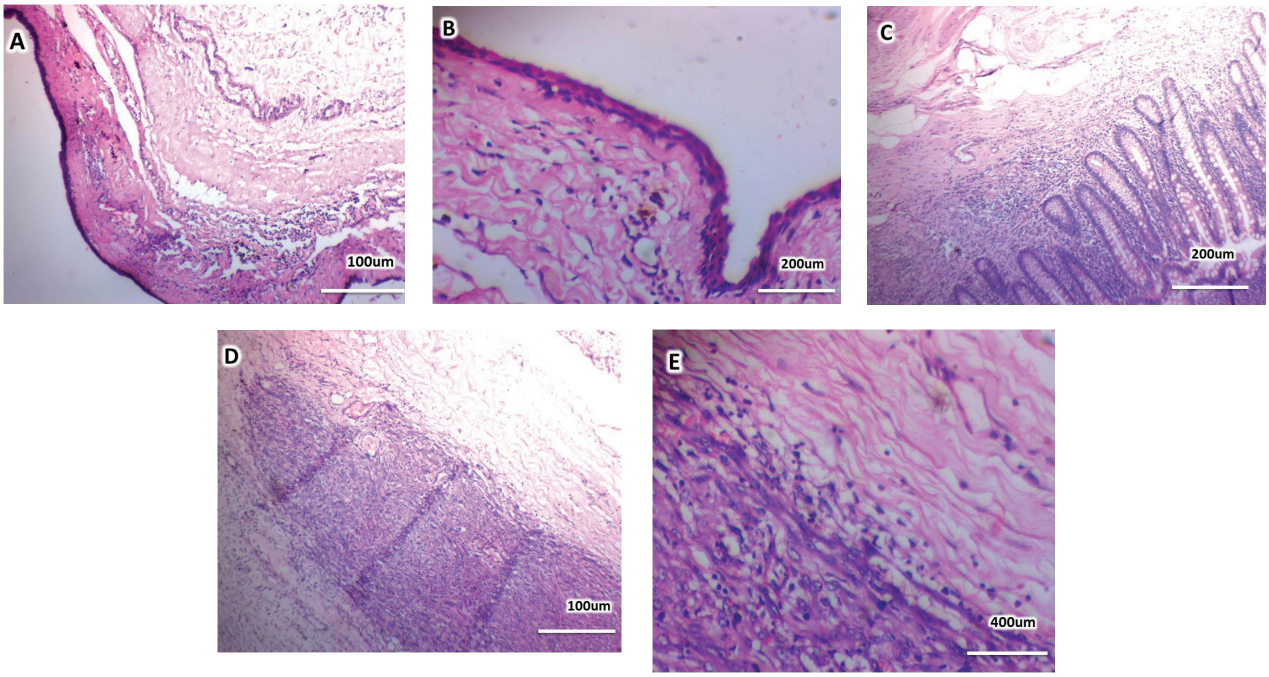

Figure 3. Histopathological features of the mass (A and B), the cyst wall of mature cystic teratoma lined by stratified squamous epithelium, (C) focal areas of mature intestinal glands in the teratoma, (D and E) focal solid area with hypercellularity and pleomorphism.

Rathore et al. [12] described malignant transformation in MCT of the ovary in their retrospective study of eight cases of MCT and they have concluded that although Squamous Cell Carcinoma (SCC) is still the commonest, transitional cell carcinoma (TCC) may also develop not infrequently as malignancy apart from other rare differentiations such as adenocarcinoma or malignant melanoma in an MCT.

Several studies tried to explain the causes of malignant transformation in MCT: Araujo et al. [17] showed that HPV infection is a risk factor for malignant transformation of MCT and they have stated that molecular studies are required to confirm the role of HPV in malignant transformation.

In addition, the risk factors for malignant transformation in MCT include older patient age (>45 years), larger tumor size, and tumor growth rate [13]. The chosen treatment of malignant transformation simulates that offered to patients with epithelial ovarian cancer [18]. Complete surgery and adjuvant chemotherapy are often prescribed; any role for radiotherapy remains unclear [13]. Tahaoglua et al. [13] performed complete surgery and platinum-based chemotherapy for six cycles, but despite that treatment, metastasis was observed after 2 months. The mean age of patients with malignant transformation in MCT in Rathore et al. [12] series was 44 years as against 32.5 years for MCT. The rarity of this malignant transformation is generally true for all age groups, but the chances of any of the components becoming malignant are higher in peri-menopausal and older women. Although MCT patients present with a painful abdomen or a lump in the abdomen, the possibility of malignant transformation in MCT is still missed owing to the lack of any specific signs and symptoms. Patients with malignant transformation in MCT may present with a rapidly enlarging tumor or may present with systemic symptoms suggestive of malignancy in an advanced stage of the disease, as seen in one of our case with a positive peritoneal biopsy and omental deposits. The prognosis of patients with malignant transformation in teratoma is very poor, with a 5-year survival rate of only 15%–30%. However, the prognosis is considered to be better if the tumor is limited to one ovary with an intact capsule and not adhered to surrounding structures [16]. These tumors respond poorly to radiotherapy and systemic chemotherapy and carry a very poor prognosis with most patients presenting as early recurrence or death within 1 year of initial diagnosis [16]. Although the most common malignancy seen in an MCT is SCC, which represents about 75% of malignant transformation, other neoplasms, including adenocarcinoma, neuroectodermal tumors, sarcoma, and malignant melanoma, have also been reported [12]. In Rathore et al. [12] study also,

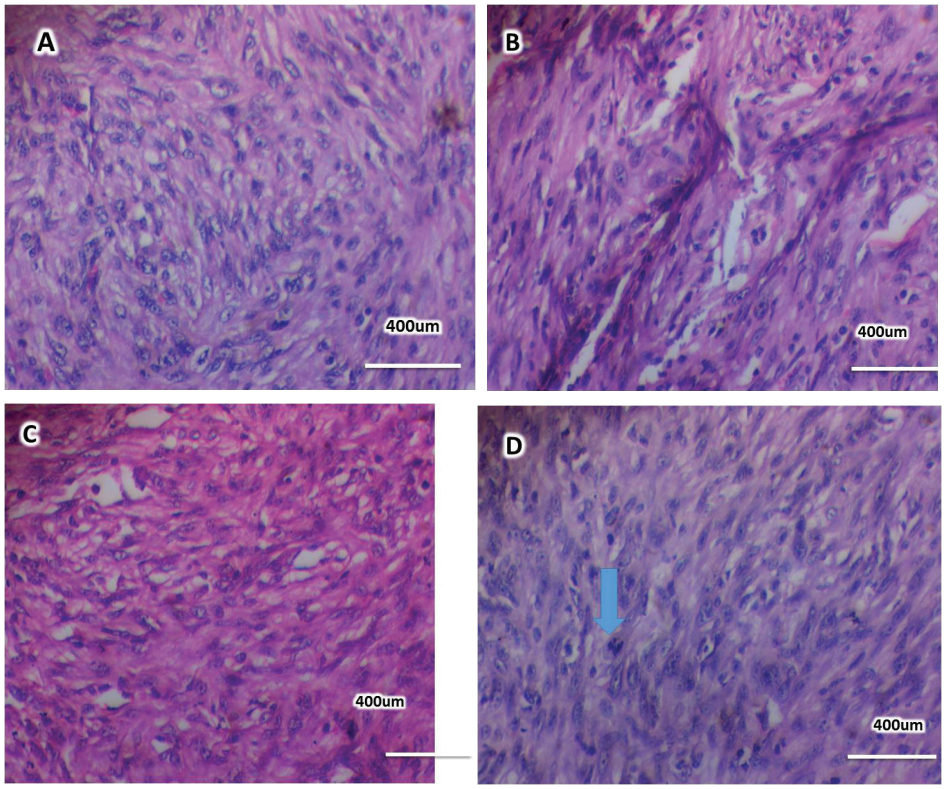

Figure 4. Histopathological features of the solid sarcomatous component, (A–C) hypercellularity, pleomorphism, and many mitotic figures, (D) large number of abnormal mitotic figures (arrow).

SCC was the most frequently identified malignant transformation found in four out of eight cases (50%). There was one case of adenocarcinoma and malignant melanoma each. Although SCC was the commonest tumor to be found, two cases of TCC (25%) were found. Malignant melanoma arising within a MCT is also extremely rare, with an estimated incidence of 0.2%–0.8% [12]. In Rathore et al. [12] study, out of the 230 cases of MCT, they had only one case of malignant melanoma, giving an incidence of 0.4%. Sarcomas account for 8% malignancies in dermoid cysts. Malagon et al. [18] stated that the most common sarcomatous component to arise in germ cell tumors was embryonal rhabdomyosarcoma (29/46), followed by angiosarcoma (6/46), leiomyosarcoma (4/46), and undifferentiated sarcoma (3/46). Other histological subtypes arising from MCT are prostate type adenocarcinoma [19], small cell carcinoma [20], sebaceous carcinoma [21], undifferentiated carcinoma [22], carcinoid tumor [23], signet ring mucinous adenocarcinoma [24], large cell neuroendocrine carcinoma [25], urothelial carcinoma [26], and urothelial carcinoma [14]. In the Pongsuvareeyaku et al. [1] case, leiomyosarcoma was the main malignant component associated with ovarian MCT.

Maeda et al. [3] is the first case report of clear cell carcinoma arising from MCT reported in English literature.

Due to the rarity of this tumor, adjuvant treatment has not been prospectively evaluated. Our patient administered paclitaxel and carboplatin as the standard chemotherapy for ovarian carcinoma as that was stated by Maeda et al. [3].

Certain imaging features of the tumor may contribute to the diagnosis of malignant transformation in MCT. The use of transvaginal Doppler Ultrasound for the measurement of the blood flow resistance in the intratumoral vessel may be an accurate method to distinguish benign from malignant MCTs. The prognosis of these tumors is poor and depends on the stage of the disease [4,26]. Goudeli et al. [2] reported that the 5-year survival rate for all stages was 48.4%, whereas the 5-year survival rates for stages I, II, III, and IV were 75.7%, 33.8%, 20.6%, and 0%, respectively. Other factors that may have an impact on prognosis are capsular invasion, ascites, rupture or spillage, adhesions, and vascular space invasion. Several medical groups investigated the role of adjuvant treatment on the clinical course of

the disease; however, the rarity of this entity has precluded patients from participating in large randomized phase III trials. No treatment guidelines have therefore been established. Nonetheless, it is commonly accepted that treatment must be tailored to the transformed histology [2]. There is evidence that cisplatin is active against gynecological SCC and is the most studied among alkylating agents. In a case series of patients with malignant transformation of MCT, 13 patients received cisplatin-based chemotherapy. Ten out of 13 women received the POMB regimen (comprised of cisplatin, vincristine, mitomycin-c, and bleomycin), two received PF (cisplatin and 5-fluorouracil), and one received POB (cisplatin, vincristine, and bleomycin). Whole pelvic radiotherapy was given individually based on the tumor location. The median disease-free interval was 56.4 months (range 7–137 months). Notably, the 2-year disease-free survival was 30% for International Federation of Gynecology and Obestetrics (FIGO) stage III disease (3/10). Authors advocated multimodality treatment based on optimal cytoreduction, cisplatin-based adjuvant chemotherapy, and radiotherapy for disease located into the pelvis [2].

Conclusion

We report a very rare occurrence of sarcomatous malignant transformation in surgically resected ovarian MCT and presenting as acute abdomen. Neither imaging studies nor tumor marker levels can accurately diagnose such a malignant transformation pre-operatively. Hence, all the dermoid cysts should be examined histologically by giving multiple sections with a particular focus on solid areas along with the aid of immunohistochemistry in case of poorly differentiated tumors. This will result in more such cases being identified and thus treated at an early stage.

Conflict of interest

No potential conflict of interest was reported relevant to this article.

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