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Primary squamous cell carcinoma of the ovary accompanied by transition of a mucinous borderline ovarian tumor

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Abstract

This report describes a woman with a rare primary squamous cell carcinoma of the ovary accompanied by transition of a mucinous borderline ovarian tumor. A woman in her late 40s was referred for abdominal discomfort, which worsened during defecation. Pelvic magnetic resonance imaging showed a multiloculated cystic lesion in the left adnexa measuring approximately $7.5 \times 9.5 \times 7.0$ cm. An intraoperatively obtained frozen biopsy sample of the mass in the left ovary was positive for malignancy, resulting in a surgical staging operation. The tumor was composed of squamous cell carcinoma and mucinous borderline tumor. There was no evidence of capsular invasion or invasion of other internal organs, including pelvic and para-aortic lymph nodes (0/41). Immunohistochemistry showed that the tumor was diffusely positive for cytokeratin 7, cytokeratin 20, Ki-67, and P40 but negative for P16. After a debulking operation, the patient has been monitored regularly without adjuvant therapy owing to final surgical staging of the tumor as stage IA.

Keywords

Primary squamous cell carcinoma of the ovary, transition of mucinous borderline ovarian tumor, immunohistochemistry, monitoring, cytokeratin, p40, Ki-67, ovarian cancer

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Introduction

Primary squamous cell carcinoma (SCC) of the ovary is rare, constituting fewer than 1% of primary ovarian malignant tumors. Most primary ovarian SCCs arise from cystic teratomas or less frequently, from Brenner tumors or endometriosis.[1–3] However, pure or *de novo* ovarian SCC not associated with preexisting ovarian lesions has also been described.[4]

To our knowledge, primary SCCs of the ovary accompanied by transition of a mucinous borderline ovarian tumor have not yet been reported. The present study describes a patient with a primary SCC of the ovary accompanied by transition of a mucinous borderline ovarian tumor who was treated in our institution. In addition, the clinical and pathological features of primary SCCs of the ovary are reviewed along with their diagnosis, treatment, and prognosis.

Case presentation

A woman in her late 40s in perimenopause was referred to our hospital for evaluation of a left pelvic mass. She had experienced abdominal discomfort for 3 months. Concentrations of the tumor markers, carbohydrate antigen (CA)125, alfa-fetoprotein (AFP), lactate dehydrogenase (LDH), ß-human chorionic gonadotropin (ß-hCG), and carcinoembryonic antigen (CEA) were within normal ranges; however, the CA19-9 concentration was elevated at 174.0 U/mL (normal range: <33 U/mL). Pelvic magnetic resonance imaging (MRI) showed a $7.5 \times 9.5 \times 7.0$-cm multiloculated cystic lesion in her left ovary comprising an internal solid portion and multiple septa, suggesting a malignant ovarian tumor (Figure 1). A whole-body bone scan showed no evidence of bone metastasis, and the results of colonoscopy, endoscopy, and chest computed tomography (CT) were unremarkable.

Surgery revealed a mass on the patient's left ovary, but no sign of metastasis to the right ovary or any other organ. She underwent total abdominal hysterectomy, bilateral salpingo-oophorectomy, pelvic and para-aortic lymph node dissection, partial omentectomy, and peritoneal cytological examination.

Pathological examination showed that the tumor in her left ovary was composed of solid and cystic portions. Her uterus and right adnexa, as well as her peritoneum and omentum, were intact and without metastasis. Pelvic and para-aortic lymph nodes (0/41) were also free of metastasis. The ovarian capsule and fallopian tubes were intact, with no evidence of tumor invasion. Hematoxylin-eosin (H-E) staining showed that the cystic portion of the lesion consisted of a mucinous borderline tumor, whereas the solid portion consisted of an SCC, characterized by polygonal-shaped cells with intercellular bridges and keratin formation. The columnar cells lining the mucinous borderline tumor were continuous with the squamous epithelium (Figure 2). Immunohistochemistry showed that the tumor cells in the cystic portion of the tumor were diffusely positive for cytokeratins (CK) 7 and 20, whereas the tumor cells in the solid portion of the tumor were positive for P40. The final diagnosis was primary SCC of the ovary accompanied by transition of a mucinous borderline ovarian tumor, stage pT1N0M0 (Figure 3).

After the operation, the serum CA19-9 concentration decreased to 23.4 U/mL, and the SCC antigen level obtained on the day of surgery was 0.8 U/mL. The patient was followed-up without adjuvant therapy. Follow-up MRI and chest CT 3 months after surgery showed no evidence of tumor, and all tumor markers were within their respective normal ranges. However, a lung metastasis was diagnosed 9 months

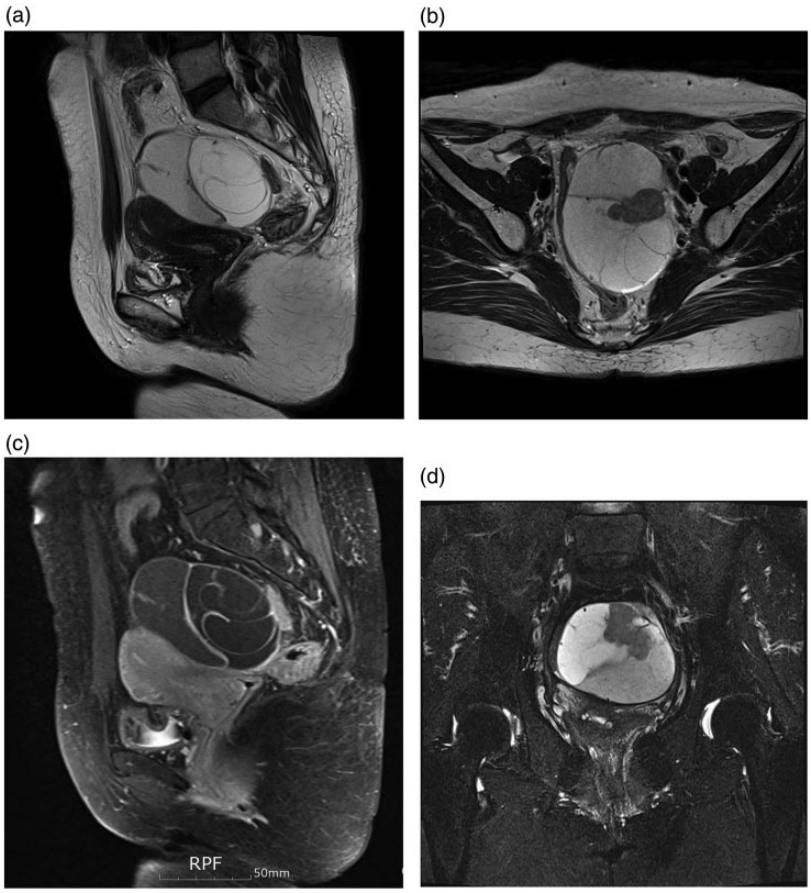

Figure 1. MRI findings showing a multiloculated cystic lesion measuring 7.5 × 9.5 × 7.0 cm with a heterogeneous signal intensity and an internal solid portion and multiple septa, suggesting a malignant ovarian tumor arising from the left ovary. (a) Sagittal view. (b) Axial views. (c) Fat-suppressed sagittal view and (d) Fat-suppressed coronal view; M: mass, U: uterus.
MRI, magnetic resonance imaging.

after surgery. The patient is currently being treated with carboplatin-paclitaxel chemotherapy, with its effects monitored by measuring SCC antigen and CA19-9 concentrations.

The reporting of this study conforms to the CARE guidelines.[5]

Discussion

Pure or de novo primary SCC of the ovary is extremely rare and its pathogenesis remains unclear. Most primary SCCs of the ovary are associated with ovarian dermoid cysts, Brenner tumors, and ovarian endometriosis.[6–9] These tumors are thought to arise from an oncogenic stimulus that induces synchronous or metachronous neoplasia in histologically or embryologically similar tissues.[4] This hypothesis could explain the finding of cervical intraepithelial lesions in approximately one third of patients with primary SCC of the ovary. Ovarian SCCs may be induced by

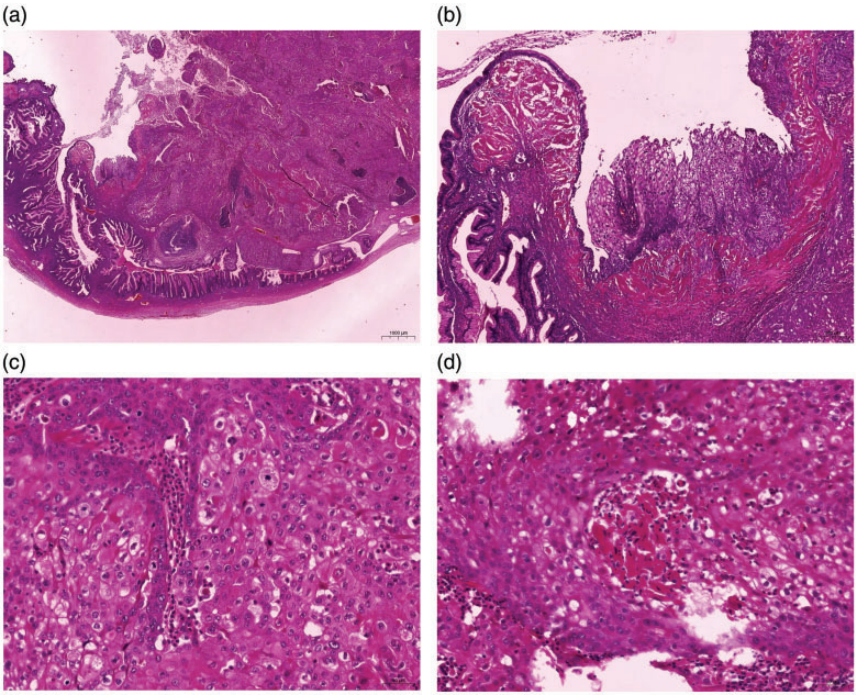

Figure 2. Microscopic findings in the left ovary. (a) A mucinous borderline tumor is noted on the left, while a solid area is noted on the right (H-E, ×10). (b) The columnar cell lining of the mucinous borderline tumor is continuous with the squamous epithelium (H-E, ×50) and (c) The solid area consists of squamous cell carcinoma, characterized by polygonal-shaped cells with intercellular bridges. Mitotic figures (arrows) are visible (H-E, ×200). (d) Keratin formation is visible (H-E, ×200).
H-E, hematoxylin-eosin.

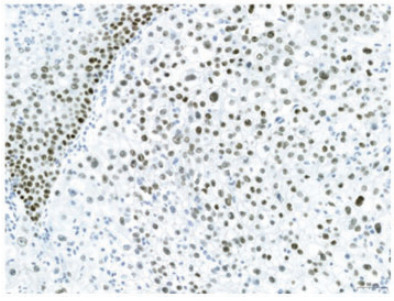

Figure 3. Immunohistochemical findings. The solid areas were immunoreactive to P40, consistent with squamous cell carcinoma (×200).

high-risk human papilloma virus (HPV) infection,[10,11] and several of these tumors were accompanied by cervical intraepithelial lesions that correlated with HPV infection.[12] However, chromosomal instability (CIN) and HPV infection are nonspecific causes of concomitant cervical lesions.

Because of the rarity of ovarian SCCs tumors, it is difficult to analyze their characteristics. Patient age, symptoms, tumor size, and clinical stage have been reported to vary widely. Diagnosis is usually confirmed by histological examination after surgery. However, it is difficult to differentiate primary ovarian SCCs from SCCs originating in other anatomical locations because the morphology and immunohistochemistry of all SCCs are almost identical. Therefore, clinical examination and imaging of the upper gastrointestinal tract, thoracic cavity, head and neck, bladder, and skin are required to

rule out metastasis. As an immunohistochemical panel, evaluating vimentin, CK7, CK20, CK5, GATA-3, thyroid transcription factor (TTF)-1, p16, p53, p63, Wilms' tumor susceptibility gene 1 (WT-1), and estrogen and progesterone receptors are helpful. Histological grades also vary from well differentiated to poorly differentiated.

There are currently no guidelines for the treatment of ovarian SCC. The scope of surgery is based primarily on the tumor stage. Surgery has been reported to comprise complete hysterectomy and bilateral salpingo-oophorectomy, as well as pelvic and aortic lymphadenectomy for staging.[12] Adjuvant treatment has comprised radiation or chemotherapy, the latter consisting of cisplatin-based chemotherapy[13] or combinations of paclitaxel, cyclophosphamide, adriamycin, and topotecan.[12]

The correlation between adjuvant treatment and patient prognosis is unclear, and no treatment guidelines have been formulated to improve patient prognosis. Because of the rarity of this condition and the wide variation in patient prognosis, the risk factors have not yet been identified. However, survival is clearly associated with tumor stage and is poorer per stage than that in patients with classical ovarian carcinoma.[12]

The patient described in the present study was finally diagnosed with primary SCC of the ovary accompanied by transition of a mucinous borderline ovarian tumor. Although primary SCC of the ovary is extremely rare, the co-occurrence of ovarian SCC and borderline mucinous tumor is even rarer, making it difficult to determine its characteristics. The patient described here was diagnosed with a stage I tumor and did not receive additional treatment initially. However, lung metastasis was diagnosed during the follow-up, and the patient is currently being treated with systemic chemotherapy.

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Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Ethics statement

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of St. Vincent's Hospital (approval number: VC21ZISI0192).

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References

1. McCluggage WG. Morphological subtypes of ovarian carcinoma: a review with emphasis on new developments and pathogenesis. *Pathology* 2011; 43: 420–432.
2. Hackethal A, Brueggmann AD, Bohlmann MK, et al. Squamous cell carcinoma in mature cystic teratoma of the ovary: systematic review and analysis of published data. *Lancet Oncol* 2008; 9: 1173–1180.
3. Acién P, Abad M, Mayol MJ, et al. Primary squamous cell carcinoma of the ovary associated with endometriosis. *Int J Gynaecol Obstet* 2010; 108: 16–20.
4. Amjad AI and Pal I. De novo primary squamous cell carcinoma of the ovary: a case of a rare malignancy with an aggressive clinical course. *J Pak Med Assoc* 2008; 58: 272–274.

5. Gagnier JJ, Kienle G, Altman DG, et al.; CARE Group. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache* 2013; 53: 1541–1547.
6. Krumerman MS and Chung A. Squamous carcinoma arising in benign cystic teratoma of the ovary: a report of four cases and review of the literature. *Cancer* 1977; 39: 1237–1242.
7. D'Angelo E, Dadmanesh F, Pecorelli S, et al. Squamous cell carcinoma of the ovary arising from a mucinous cystic tumor of endocervical (müllerian) type. *Int J Gynecol Pathol* 2010; 29: 529–532.
8. Cuatrecasas M, Catasus L, Palacios J, et al. Transitional cell tumors of the ovary: a comparative clinicopathologic, immunohistochemical, and molecular genetic analysis of Brenner tumors and transitional cell carcinomas. *Am J Surg Pathol* 2009; 33: 556–567.
9. Mostoufizadeh M and Scully RE. Malignant tumors arising in endometriosis. *Clin Obstet Gynecol* 1980; 23: 951–963.
10. Mai KT, Yazdi HM, Bertrand MA, et al. Bilateral primary ovarian squamous cell carcinoma associated with human papilloma virus infection and vulvar and cervical intraepithelial neoplasia. A case report with review of the literature. *Am J Surg Pathol* 1996; 20: 767–772.
11. Park JY, Song JS, Choi G, et al. Pure primary squamous cell carcinoma of the ovary: a report of two cases and review of the literature. *Int J Gynecol Pathol* 2010; 29: 328–334.
12. Koufopoulos N, Nasi D, Goudeli C, et al. Primary squamous cell carcinoma of the ovary. Review of the literature. *J BUON* 2019; 24: 1776–1784.
13. Goudeli C, Varytimiadi A, Koufopoulos N, et al. An ovarian mature cystic teratoma evolving in squamous cell carcinoma: a case report and review of the literature. *Gynecol Oncol Rep* 2017; 19: 27–30.