

Malignant Pericardial Tamponade Secondary to Ovarian Clear Cell Carcinoma

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ABSTRACT

Malignant pericardial effusion is an uncommon metastatic manifestation of ovarian carcinoma. Few cases of ovarian serous carcinoma have been previously reported. Ovarian clear cell carcinoma is the second most common histologic subtype in East Asian countries and is a relatively rare in Western countries. Here, we report the case of cardiac tamponade secondary to Ovarian clear cell carcinoma. A 46-year-old woman with recurrent Ovarian clear cell carcinoma presented with worsening cough, palpitations, and shortness of breath during chemotherapy. Chest radiography and computed tomography confirmed a pleural effusion with cardiac tamponade. The patient underwent pericardial fenestration and drainage for cardiac tamponade. Pericardial fluid cytology showed malignant cells forming papillary and ball-like clusters with irregular stacking. The cells had a mirror ball-like appearance and collagenous stroma, in which a homogenous hyaline core was observed in the center of most tumor cell clusters. Based on these findings, a diagnosis of Ovarian clear cell carcinoma metastasis was made. She received palliative care and died 5 months after the operation without recurrent cardiac tamponade. This case suggests that cytological findings from pericardial effusion are useful in diagnosing Ovarian clear cell carcinoma metastasis.

Key words cardiac tamponade; clear cell carcinoma; cytology; ovarian carcinoma; pericardial effusion

Ovarian cancer is the most lethal gynecological cancer in Japan and the United States.^{1, 2} Patients with ovarian cancer commonly present with intraperitoneal metastasis.³ Pericardial metastasis of ovarian cancer is rare. There are several case reports of malignant pericardial effusion from ovarian cancer.^{4–7} Almost all cases reported were high-grade serous carcinoma,

which is the dominant histologic subtype of epithelial ovarian cancer. However, there have been no reports of malignant pericardial effusion with cardiac tamponade in ovarian clear cell carcinoma (OCCC) patients.

Ovarian clear cell carcinoma is the second most common histologic subtype in East Asian countries, especially Japan, and is a relatively rare subtype in Western countries.⁸ The incidence of OCCC in Japan has been increasing, and the proportion of OCCC to epithelial ovarian cancer is now > 25%.⁹ OCCC is diagnosed at an earlier stage than high-grade serous carcinoma. Endometriosis is identified in > 50% of patients with OCCC and is considered a precursor of OCCC. Patients with early-stage disease have a favorable prognosis, but those with advanced or recurrent disease have poor oncologic outcomes.⁸ OCCC is known to have unique cytological features, including abundant clear cytoplasm rich in glycogen, hobnailed formation, and mirror ball pattern.^{9–12}

We report, for the first time, a case of OCCC with metastasis leading to malignant pericardial effusion with cardiac tamponade. We found that cytological findings from pericardial effusion proved to be useful in diagnosing OCCC metastasis.

PATIENT REPORT

A 46-year-old woman presented with a mass in the lower abdomen. Contrast-enhanced computed tomography (CT) identified a pelvic mass with a maximum diameter of 22 cm containing both solid and fluid components. She underwent primary debulking surgery consisting of hysterectomy, bilateral salpingo-oophorectomy, omentectomy, appendectomy, and pelvic and para-aortic lymphadenectomies. After thorough pathological examination, she was diagnosed with stage IIIc OCCC (FIGO, 1998). Five cycles of paclitaxel (PTX) (175 mg/m² on day 1 every 3 weeks) plus carboplatin (area under the curve 5 on day 1 every 3 weeks) were administered as adjuvant therapy followed by consolidation therapy with PTX (80 mg/m² every 2 weeks). After four cycles of biweekly PTX, supraclavicular and mediastinal lymph node metastases were detected. She was treated with cisplatin (60 mg/m²) and irinotecan hydrochloride

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Abbreviations: CT, contrast-enhanced computed tomography; OCCC, ovarian clear cell carcinoma; PTX, paclitaxel

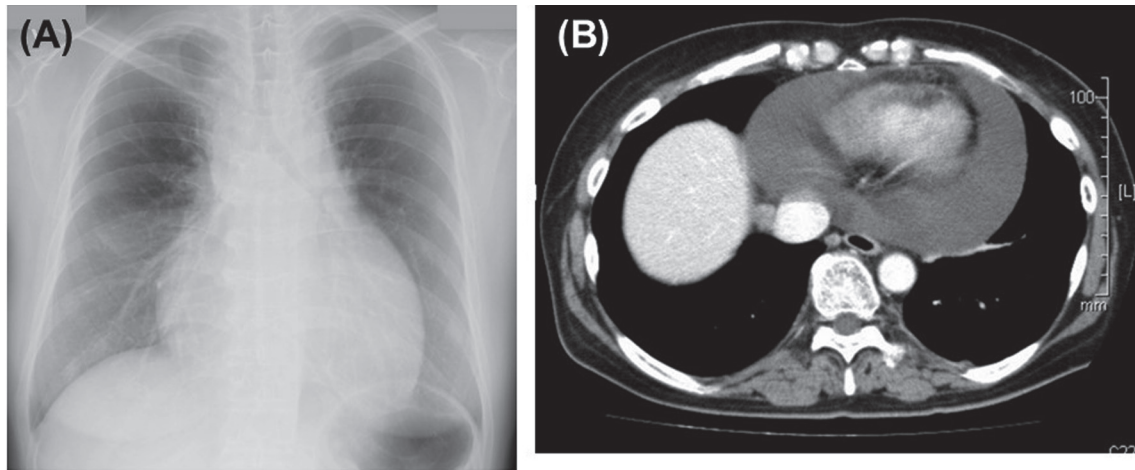


Fig. 1. Chest radiograph showing an enlarged heart caused by pericardial effusion at the time of admission. (A) Chest radiograph; (B) Computed tomography scan.

(60 mg/m²) as second-line treatment. Because of disease progression after six cycles of treatment, radiation therapy for the mediastinal and supraclavicular metastatic lymph nodes was administered. Subsequently, she received four cycles of docetaxel (60 mg/m² every 2 weeks) as the third-line regimen and five cycles of gemcitabine as the fourth-line regimen for platinum-resistant disease.

During the fourth-line treatment, she reported palpitations, shortness of breath, and cough.

Chest radiography revealed an enlarged cardiac silhouette (Fig. 1A). A CT scan showed pleural effusion after five cycles of the fourth-line treatment, consistent with cardiac tamponade (Fig. 1B). On physical examination at the time of admission, her blood pressure was 105/74 mmHg, and her pulse was 150 beats per minute.

Pericardial fenestration and drainage, which drained 600 ml of pericardial effusion, was performed. Cytological examination confirmed the presence of malignant cells. The background of the smears was clear, unlike that of ascites. Malignant cells were partially found in papillary and ball-like clusters with irregular stacking (Fig. 2A). The cells had a mirror ball-like appearance (Fig. 2B) and collagenous stroma, in which a homogenous hyaline core was observed in the center of most tumor cell clusters (Fig. 2C). Cytological findings revealed metastasis of OCCC.

The drain was removed 7 days after a marked decrease in pericardial effusion, and the patient refused to continue chemotherapy. She received palliative care and died 5 months after the operation without recurrent cardiac tamponade (Figs. 3A and B).

DISCUSSION

The typical routes of metastasis for ovarian carcinoma are intraperitoneal and retroperitoneal. In particular, ovarian high-grade serous carcinoma tends to cause peritoneal and pleural dissemination and distant metastasis. On the other hand, OCCC is less likely to cause peritoneal dissemination or peritonitis carcinomatosa. Metastases in the pericardium are uncommon in OCCC.

A large retrospective analysis of patient autopsies with a confirmed diagnosis of primary malignancy revealed the presence of cardiac and pericardial metastases in 10% of cases.¹³ Cancer associated pericardial effusions are generally observed in lung cancer, breast cancer, melanoma, lymphoma, and leukemia, but are extremely rare in ovarian cancer.¹⁴ Up to now, there have never been any reports of pericardial metastasis of OCCC; this is a very rare case.

Patients with malignant pericardial effusion can often be asymptomatic at the onset of pericardial metastases. However, an increase in pericardial fluid brings about symptoms such as dyspnea, cough, chest discomfort, palpitations, and fatigue. Physical examination may reveal hypotension with narrow pulse pressure, jugular venous distension, distant heart sounds, tachycardia, hepatomegaly, cyanosis, and peripheral edema. In cases with moderate or severe tamponade, pulsus paradoxus is often observed.^{4, 13, 15, 16} In cases with pericardial effusion and cardiac tamponade, electrocardiograms may reveal a decreased QRS voltage or electrical alternations, and chest radiographs may show an enlarged cardiac silhouette. CT and echocardiography are useful for the diagnosis of cardiac tamponade and/or pleural effusion. In the present case, chest radiography and electrocardiography before chemotherapy showed no

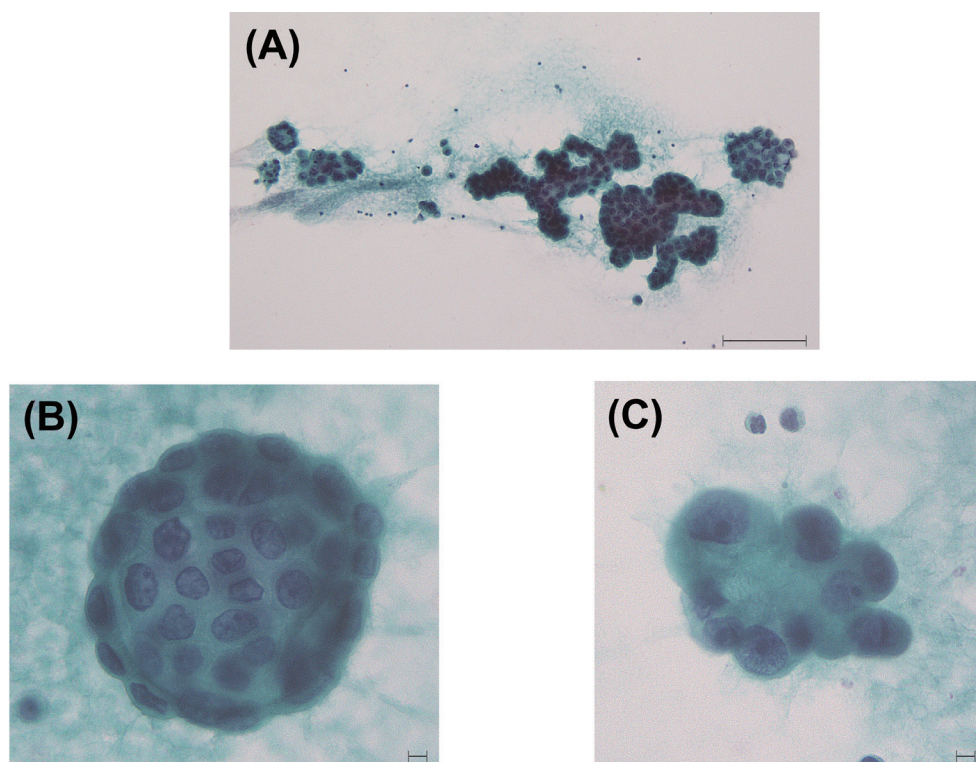


Fig. 2. Cytologic findings from pericardial effusion of ovarian clear cell carcinoma. (A) Malignant cells were partially found in papillary and ball-like clusters with irregular stacking. Papanicolaou. Bar = 100 μ m. (B) The cells showed a mirror ball-like appearance. Papanicolaou. Bar = 10 μ m. (C) The cells consisted of collagenous stroma with a homogenous hyaline core that was observed in the center of most tumor cell clusters. Papanicolaou. Bar = 10 μ m.

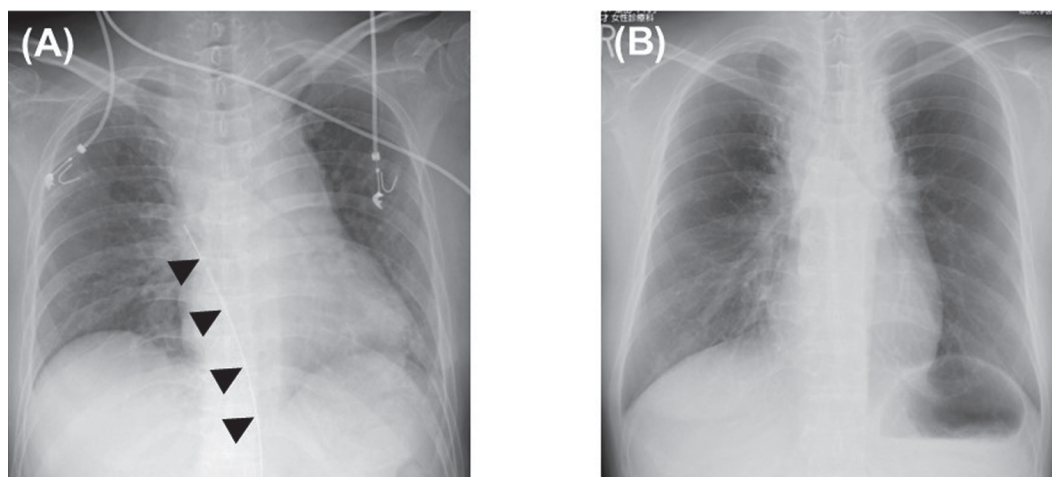


Fig. 3. Chest radiographs. (A) Scan taken immediately after pericardial fenestration and pericardial drainage. \blacktriangle indicates the drainage tube. (B) Two months later.

obvious abnormalities or subjective symptoms. After the onset of symptoms, including palpitations and shortness of breath, chest radiography and CT scanning led to the diagnosis of cardiac tamponade. In patients with

refractory disease, heavily treated patients, or those with mediastinal lymph node metastasis, pericardial metastasis should be considered when such symptoms appear. Cytology and histology should be performed to

diagnose pericardial metastasis as the cause of cardiac tamponade. Although pericardiocentesis is a high-risk procedure, in addition to its diagnostic significance, drainage can be expected to prolong survival and improve the quality of life in cases of oncologic emergencies, such as cardiac tamponade. In the present case, we were able to provide at-home palliative care without pericardial effusion after drainage, and the patient survived for 5 months.

The cytoplasm of OCCC cells is granular or vacuolated, and the nuclei are round to oval, moderately polymorphic, and typically have large nucleoli. Unlike in serous carcinoma, Psammoma bodies are rare. Clear cell carcinoma cells are characterized by small, hyperchromatic protruding nuclei surrounding the core of a hyalinized matrix (hobnail pattern), light green basement membrane-like material in the cell cluster (raspberry bodies), and a ball-shaped cluster with extracellular matrix components (mirror balls). In this case, a mirror ball-like appearance and hobnail cells were observed in the pericardial fluid smear. Clear cell carcinoma can be diagnosed easily based on its characteristic cytological appearance, even at metastatic sites.

To the best of our knowledge, this is the first report of malignant pericardial effusion with cardiac tamponade in OCCC. This case suggests that cytological findings from pericardial effusion are useful in diagnosing OCCC metastasis.

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