

Malignant Pericardial Effusion Secondary to Ovarian Adenocarcinoma Presenting with Cardiac Tamponade: A Case Report

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ABSTRACT

Malignant pericardial effusion presenting with cardiac tamponade is a rare manifestation of metastatic gynecological cancer. Our patient, a 62-year-old female was presented with papillary serous adenocarcinoma of the right ovary in 2016. She was treated with interval cytoreduction surgery and platinum-based chemotherapy until 2018. Now, she presented with sudden onset dyspnea, tachypnea, tachycardia with hypotension, and distended jugular venous pressure. Echocardiography confirmed a large pericardial effusion with mild bilateral pleural effusion. She underwent an emergent pericardiocentesis which yielded 350 mL of hemorrhagic fluid and cytological examination of smears confirmed the presence of metastatic adenocarcinoma cells. The patient was managed conservatively and discharged after one week of hospitalization with a referral to the oncology center for further treatment. With increasing longevity and improved chemotherapeutic regimens, cases of malignant pericardial effusion with cardiac tamponade are on the rise, and therefore, clinicians need to be familiar with the prompt diagnosis and management of this life-threatening disease process.

Keywords: Adenocarcinoma, Cardiac tamponade, Malignant, Ovarian cancer, Pericardial effusion



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Introduction

Among all cardiac cancers, pericardial metastases are more common (2.3%-18.3%) than primary cardiac tumors (0.001%–0.28%) and have a poor prognosis (1). In a study by Thurber *et al.* on 55 patients with cancer, pericardial involvement significantly contributed to mortality in 86% of patients (2). An autopsy review demonstrated malignant pericardial effusion in 7%-12% of cancer patients, most commonly secondary to lung carcinoma (19%-40%), breast carcinoma (10%-28%), and hematolymphoid malignancies (9%-28%) and very rarely, secondary to gynecological malignancies (3-5). However, its incidence is gradually increasing due to the availability of better diagnostic and therapeutic options for ovarian malignancies resulting in prolonged post-therapy disease-free survival (5). Cardiac tamponade is a life-threatening emergency occurring due to various causes, among which malignant pericardial effusion accounts for 32–58% of cases (5). The reported mean interval time between diagnosis of ovarian tumor and the overall survival after pericardial metastases is about 2.3 months (1–5 months) (1). Timely and early diagnosis of malignant pericardial effusion and institution of chemotherapeutic interventions can prolong the overall survival up to 3–72 months in these patients (1).

Case Presentation

Our patient, a 62-year-old, thin frail female, presented to the emergency department with palpitations, chest discomfort, breathing difficulty, and generalized weakness for the past few days. She was found to have papillary serous adenocarcinoma, right ovary four years back, and treated with pre-operative 4 cycles Platinum-based neoadjuvant chemotherapy (CT) followed by interval cytoreduction surgery (total abdominal hysterectomy and bilateral salpingo-oophorectomy) and subsequently, 4 cycles of adjuvant CT. On examination, she had dyspnea on exertion and rest, blood pressure of 90/60 mmHg, tachycardia (heart rate 150 /min), and tachypnea (respiratory rate 36/min). Her oxygen saturation was 70% with supplemental oxygen therapy and her jugular venous pressure was 19 mm (elevated). Her chest X-Ray showed massive cardiomegaly and mild bilateral pleural effusion (Figure 1A), Electrocardiogram (ECG) was suggestive of atrial fibrillation with dilated cardiomyopathy and computed tomography (CT) scan of the chest showed a large pericardial effusion and mild bilateral pleural effusions suggesting cardiac tamponade with left heart failure. After cardiology consultation, bedside 2-dimensional Echocardiography (2 D ECHO) showed

pericardial effusion with diastolic collapse confirming the diagnosis of cardiac tamponade. Subsequently, under strict aseptic precautions with written informed consent, pericardiocentesis was performed through a subxiphoid approach which yielded 350 ml of hemorrhagic fluid which (Figure 1B). Cytological examination of direct and cytocentrifuged smears revealed malignant adenocarcinoma cells in 3-dimensional clusters and micropapillary formation in a hemorrhagic background (Figure 1 C & D).

A pigtail catheter was inserted for the management of possible re-accumulation of fluid which had minimal output and was subsequently removed on hospitalization day 4. Gradually, on the clinical improvement of her symptoms, she was discharged on the 6th day of admission in stable condition with a referral to an oncology center for further treatment.

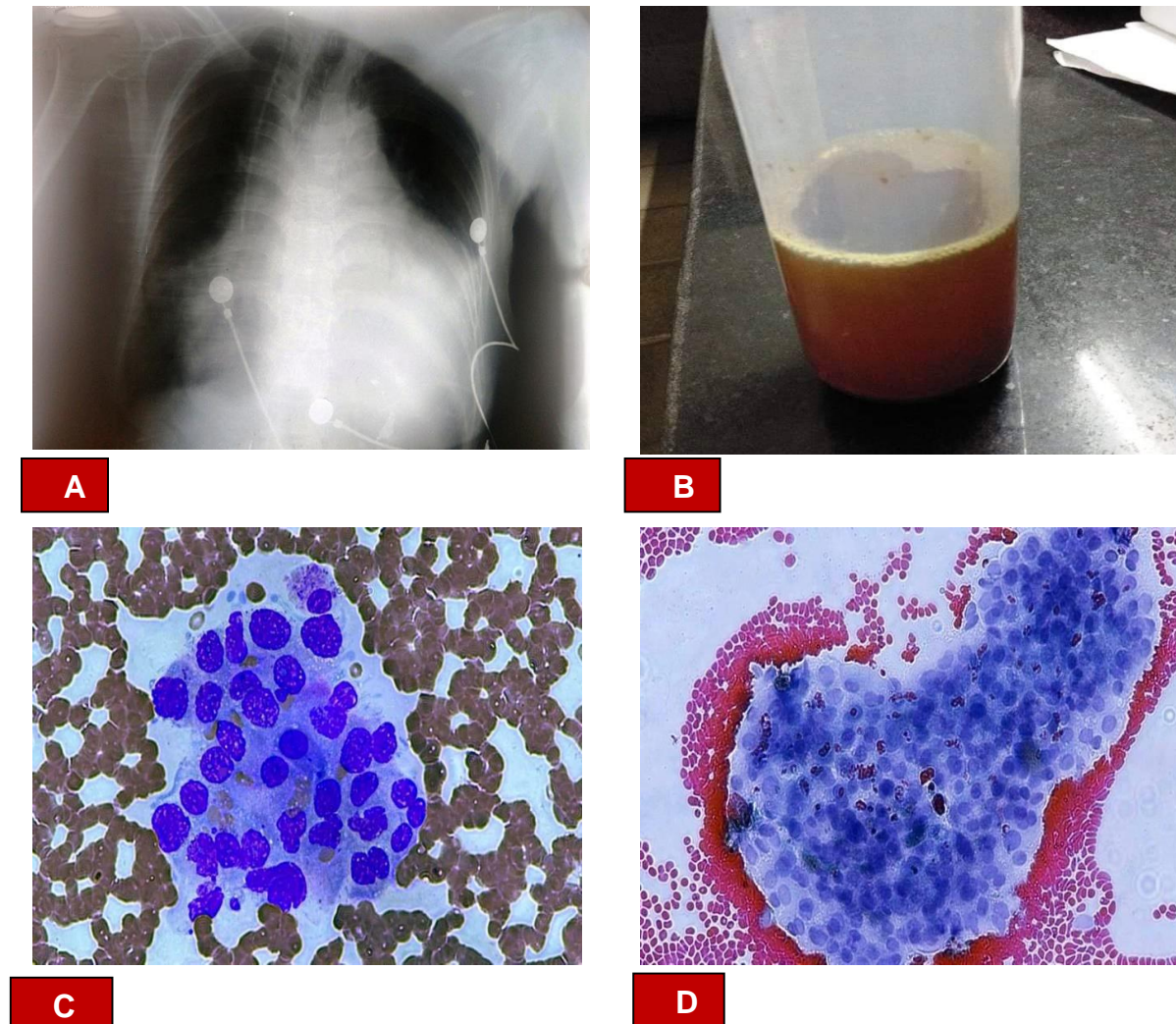


Figure 1. A) X-ray chest showing massive cardiomegaly B) Pericardiocentesis Fluid showing hemorrhagic appearance C) Malignant Adenocarcinoma cells , Leishman Giemsa stain x 400 and D) Malignant Adenocarcinoma cells ,Pap stain x 200

Discussion

In the two autopsy series with 255 and 100 ovarian cancer patients, the incidence of pericardium as distant metastasis site was 2.4% and 4% respectively (1). The cardiac metastases most commonly involves pericardium (70%) followed by myocardium (32%) and epicardium (5%) (1). Ovarian malignancy either usually remains locoregionally confined or metastasizes by

direct extension to surrounding pelvic organs or via transperitoneal dissemination of detached malignant cells (1). Less commonly, metastases through hematogenous or lymphatic pathways may occur to pelvic and/or para-aortic lymph nodes, pleura (33%), liver (26%), and lung (15%) and rarely, heart (2.4–4%) and have a poor prognosis (1, 5).

Clinical presentation of malignant pleural effusion remains variable with non-specific symptoms such as dyspnea on exertion and rest (most common), chest pain, cough, orthopnea, and fatigue (8). Physical examination may reveal Beck's triad in acute cases (tachycardia, hypotension and muffled heart sounds), elevated jugular venous pressure, pulsus paradoxus, peripheral edema, and cyanosis (3, 8). In a study done by Fatema *et al.* on 260 patients having malignancy-related pericardial effusion, 81% of patients had shortness of breath, while the pulsus paradoxus and pericardial tamponade were seen in 22% and 5 % patients, respectively (7). Consistent with the above features, our patient presented with vague generalized symptoms as well as classic signs of cardiac tamponade such as tachycardia, tachypnea, hypotension and jugular venous distension.

Various multidimensional non-invasive investigations are available for the timely and correct diagnosis of malignant pericardial effusion. Chest X-ray usually shows widening of the cardiac silhouette with clear lungs (the "water bottle" sign) while ECG may be normal or show low QRS voltage in the limb leads due to impaired transmission across the pericardial fluid, nonspecific ST- or T-wave changes, atrial fibrillation, ventricular tachycardia and in some cases, complete atrioventricular block (2,3,8). In the setting of larger pericardial effusions and tamponade, ECG typically shows electrical alternans (variation in the amplitude of P wave and QRS complexes with each successive beat) possibly due to swinging heart within a large pericardial effusion. However, due to the low sensitivity of ECG in diagnosing pericardial effusions, ECHO remains a "gold standard" investigation probably due to its high sensitivity and specificity, lack of ionizing radiations, and its ability in determining the presence, size, location, and hemodynamic effect of pericardial effusion (3, 8). Classical ECHO findings are the diastolic collapse of the right atrium or ventricle with respiratory doppler variation in transvalvular flow. In the absence of classical diagnostic findings, clinically symptomatic patients should undergo Pericardiocentesis (3).

Usually, pericardiocentesis is performed by aspirating the pericardial fluid through the subxiphoid approach. After the procedure, the pericardial fluid samples are immediately sent for centrifugation and cytological diagnosis, culture, biochemical tests, or stored at 2-8°C (best at 4°C) if the delay is anticipated, to avoid cellular degeneration (4). Confirmation of malignant pericardial effusion necessitates the detection of malignant adenocarcinoma cells within the pericardial fluid but it may be difficult either due to hyperplastic or reactive mesothelial cells mimicking adenocarcinoma cells. Therefore, in cytology-negative samples, or whenever the diagnosis is equivocal, the dosage of tumor markers, such as carcinoembryonic antigen (CEA), neuron-specific enolase (NS-

E), serum cytokeratin 19 fragments (CYFRA 21-1), and carbohydrate antigens CA 125, CA 15-3 and CA 19-9, in the effusion may be helpful (4). However, these tumor markers must be used cautiously because of their ill-defined cut-off values and variable sensitivity. Nevertheless, specificity is high for some markers and tumors (among carcinomas: 80%-100% for CEA, 80%-97% for NSE and CYFRA), and the combination of two or more tumor markers leads to a higher diagnostic value (4).

Management of malignant pericardial effusion primarily focuses on immediately relieving the symptoms (cardiac tamponade or dyspnea), to prevent recurrent effusion for a long-term symptomatic benefit, or to treat the local neoplastic disease for prolonged survival.(3, 4) In terminally ill patients, therapeutic approach should be directed towards control of symptoms while in all other patients who have a chance of surviving at least a few months, the goals should be to obtain complete and stable control of effusion as long as possible, and to try to improve survival as well.

Treatment modalities of malignant pericardial effusion includes pericardiocentesis (lifesaving but recurrence rate up to 40%), pericardial sclerosis, systemic chemotherapy, radiotherapy, and surgical treatment depending upon various factors such as the presence of hemodynamic compromise, the general medical condition of a patient, expertise available at a particular institution, and the extent and histological features of the tumor (7-9).

Conclusion

Cardiac tamponade due to malignant pericardial effusion is a potentially fatal medical emergency rarely seen in ovarian carcinoma patients. Its prompt evaluation, timely correct diagnosis, and management will help many patients in surviving without recurrence for several months or even years.

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None declared by Authors.

Ethical Permission

None declared by Authors

Conflict of Interest

The author declared no conflict of interest.

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