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## Malignant pericardial effusion as first presentation in carcinoma of ovary

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### Abstract

**Background:** Ovarian cancer is the eighth most common cancer among women globally, with a high mortality rate. Malignant pericardial effusion (MPE) is a rare but severe complication of ovarian cancer, often indicative of advanced disease and poor prognosis.

**Methods:** We report a case of a 60-year-old female who presented with chest pain, difficulty breathing, and fatigue. Initial examinations revealed a severe pericardial effusion. Diagnostic tests included echocardiography, ECG, chest X-ray, and cytological analysis of pericardial fluid. Immunohistochemical (IHC) staining was used to determine the origin of the malignant cells.

**Results:** The echocardiography confirmed a severe pericardial effusion with cardiac tamponade effects. Pericardiocentesis drained 800ml of fluid, with cytology positive for metastatic adenocarcinoma. IHC staining was positive for PAX-8, confirming the gynecological origin of the cancer. Subsequent investigations diagnosed primary ovarian cancer at FIGO stage IVa, with elevated tumor markers. The patient was started on a chemotherapeutic regimen including paclitaxel, carboplatin, and bevacizumab.

**Conclusion:** This case underscores the importance of considering ovarian cancer as a potential underlying cause of MPE. Early diagnosis and aggressive management are critical in improving outcomes, though the prognosis remains poor. Multidisciplinary approaches are essential for optimal management of such complex cases.

**Keywords:** Ovarian cancer, malignant pericardial effusion, cardiac tamponade, pericardiocentesis, FIGO stage IVa

### Introduction

Worldwide, ovarian cancers are the second most common gynecological malignancy and the second most common cause of gynae-cancer mortality. It is the 8<sup>th</sup> most common cancer among women in the world. As per GLOBOCAN's 2022 data, the number of women worldwide diagnosed with ovarian malignancy will rise to over 55% to 5,03,448<sup>[1]</sup>.

95% of ovarian malignancies are epithelial in origin and usually occur in women of older age with mean age of diagnosis at 63 years. Epithelial ovarian cancers (EOC) are the most common accounting for approximately 90% of ovarian cancer. The lifetime risk of EOC is 1.38% or 1 in every 72 women. The most common presenting symptoms of ovarian cancer in decreasing frequency are abdominal distension and pain, dyspepsia, urinary frequency, and weight changes. Few patients will also have ascites. EOC metastasizes either by intraperitoneal exfoliation or retroperitoneal lymphatic spread. In very few cases, the patient may also have pericardial effusion.

Out of various causes of malignant pericardial effusion, ovarian cancer is a rare one. A study by Thurber *et al.* on 55 cancer patients, concluded that involvement of pericardium as a result of malignant effusion leads to mortality in 86% of cases<sup>[2]</sup>. The reported mean time interval between the diagnosis of ovarian cancer and overall survival after pericardial metastasis is 2.3 months (1-5) months. Adequate diagnosis at early stages of the disease and timely intervention to treat pericardial involvement along with treatment with chemotherapeutic agents can enhance the survival of patients by 3 – 72 months<sup>[3]</sup>.

### Case Presentation

Our patient 60-year-old G5P4014 female from the periphery of Rajasthan, presented to the emergency department of our college with chief complaints of chest pain, difficulty in

breathing on exertion, and tiredness for the last one to two weeks. On examination, the patient was in respiratory distress with chest pain. Physical examination revealed increased heart rate, distant heart sounds on auscultation, and high respiratory rate. Peripheral pulses were intact and symmetric.

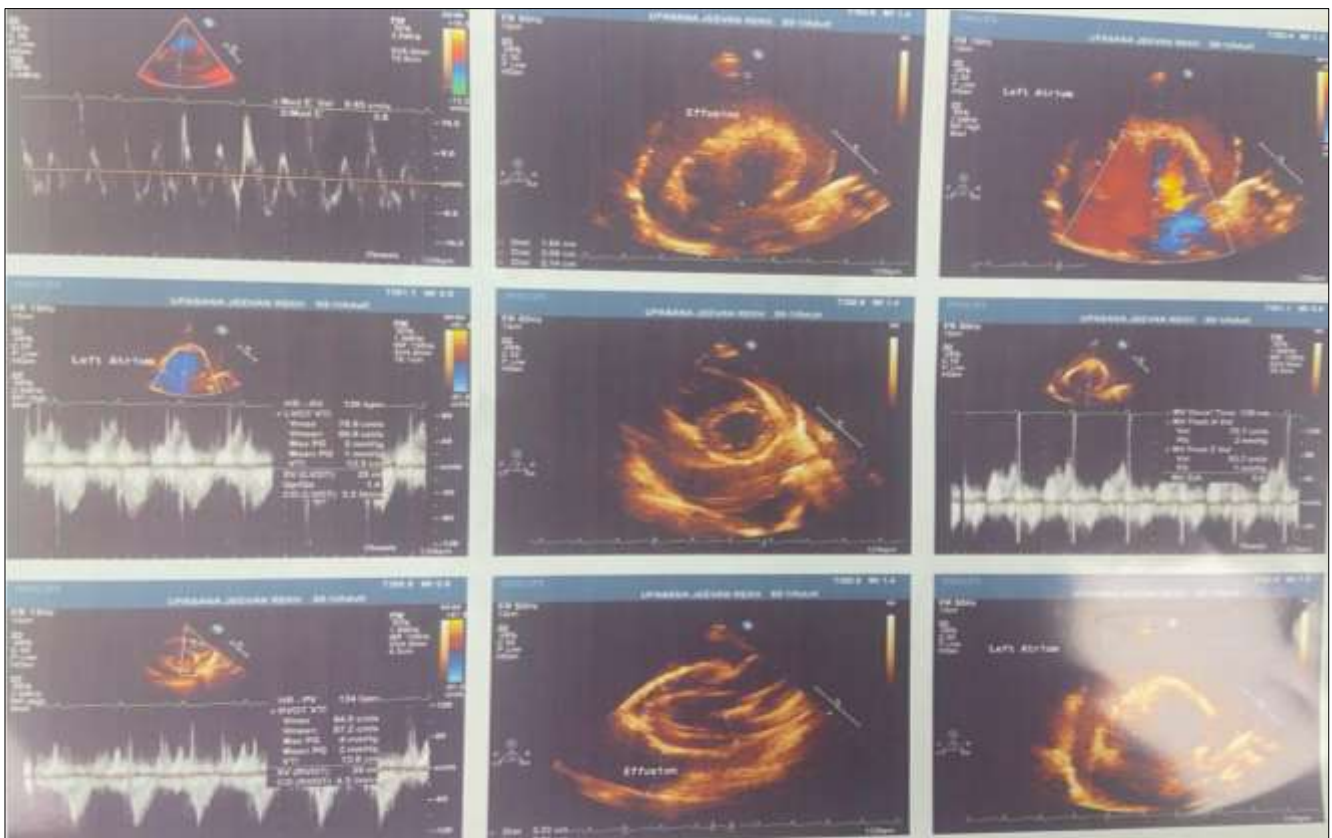
On diagnostic evaluation, ECG shows sinus tachycardia and low QRS voltages. Serial monitoring of Troponin T was negative. Chest x-ray shows an enlarged globular heart with mild pleural effusion on the left side (Fig.1). All these findings diagnose pericardial effusion. To confirm the diagnosis, an Echocardiography was done which showed thickened mitral and normal aortic valve with severe pericardial effusion and collapse of Rt. Atrium during systole along with jerky interventricular septum (Fig. 2). Ejection fraction was 60%. The patient was then admitted to the cardiology department for pericardiocentesis. 800ml of pericardial fluid was drained and was sent for biochemical investigation and cytology. Reports show the fluid positivity for malignant cells consistent with metastatic adenocarcinoma (Fig.3). Fluid was sent for cell block and IHC. IHC reports show cell block positive for PAX-8 which indicates gynecological origin.

To find the primary various investigations were done. Ultrasound images show bilateral bulky ovaries. Tumor markers show raised CA-125 levels of 1053 U/ml and CEA of 220.6 ng/ml. Fine needle aspiration cytology was done from bilateral ovaries and in microscopic examination, smear revealed good cellularity showing malignant epithelial cells having pleomorphic, hyperchromatic nuclei

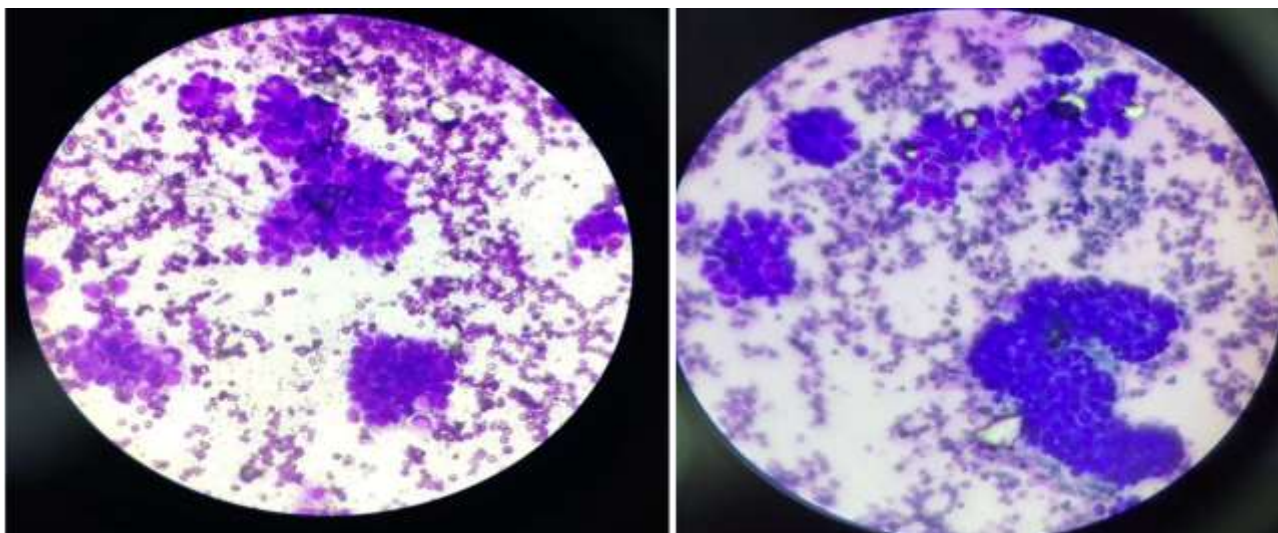
with prominent nucleoli, irregular nuclear membrane, and high N: C ratio, arranged in adeno. pattern. Findings are suggestive of adenocarcinoma. Furthermore, investigations were done to find the exact stage of ovarian cancer. As the diagnosis of primary ovarian cancer was made FIGO stage IVa, the patient was started on a chemotherapeutic regimen of paclitaxel, carboplatin, and bevacizumab.



**Fig 1:** Chest X-ray showing an enlarged, globular heart suggestive of pericardial effusion with mild pleural effusion on the left side



**Fig 2:** Echocardiography showing severe pericardial effusion with collapse of the right atrium during systole and a jerky interventricular septum



**Fig 3:** Cytological analysis of pericardial fluid demonstrating malignant cells consistent with metastatic adenocarcinoma, confirmed via immunohistochemical staining positive for PAX-8, indicating gynecological origin

### Discussion

Malignant pericardial effusion is a serious condition characterized by the accumulation of fluid within the pericardial sac surrounding the heart, caused by malignant tumors this condition poses significant challenges in diagnosis, management, and treatment due to its association with advanced cancer and potential complications. Malignant pericardial effusion often arises as a result of metastatic spread from various primary malignancies, including lung, breast, and hematological cancers. Cancer cells can infiltrate the pericardium directly or through lymphatic or hematogenous routes. Once within the pericardial space, tumor cells stimulate an inflammatory response leading to increased vascular permeability and fluid accumulation. While ovarian cancer commonly metastasizes to the peritoneum and distant organs like the liver and lungs, its spread to the pericardium, resulting in pericardial effusion, is relatively uncommon but carries significant morbidity and mortality [4].

Patients with pericardial effusion may present with non-specific symptoms such as dyspnea, chest pain, cough, fatigue, and palpitations [5]. These symptoms can be subtle and easily overlooked, particularly in the setting of advanced cancer. Physical examination may reveal signs of cardiac tamponade, including tachycardia, hypotension, pulsus paradoxus, elevated jugular venous pressure, peripheral edema, and cyanosis [6].

The triad of tachycardia, hypotension, and muffled heart sounds is known as Beck's Triad. Diagnosis of malignant pericardial effusion in carcinoma of the ovary relies on a combination of clinical evaluation, imaging studies, and laboratory tests. Transthoracic echocardiography (TTE) is the initial imaging modality of choice for evaluating pericardial effusion and assessing hemodynamic status. TTE can demonstrate the presence and size of the effusion, and signs of cardiac tamponade, and assess cardiac function. Other imaging modalities, such as computed tomography (CT) or magnetic resonance imaging (MRI), may be utilized for further characterization of the pericardial involvement and extent of disease. Chest X-ray usually shows the widening of the cardiac silhouette with clear lungs, known as WATER BOTTLE SIGN. ECG may be normal or show low QRS voltage, non-specific T-wave or ST-wave changes.

Pericardiocentesis, the aspiration of fluid from the pericardial sac, is both diagnostic and therapeutic and may be necessary for patients with suspected malignant pericardial effusion. Pericardiocentesis, either performed blindly or guided by imaging techniques such as echocardiography or fluoroscopy, can provide immediate relief by draining the accumulated pericardial fluid and relieving cardiac compression. In cases of hemodynamic instability or recurrent effusion, the placement of a pericardial drain may be necessary to allow continuous drainage and prevent fluid re-accumulation. Analysis of the aspirated fluid, including cytology, can confirm the presence of malignant cells and guide subsequent management.

Treatment strategies for MPE in carcinoma of the ovary are challenging due to the advanced stage of the disease and limited therapeutic options. The goals of management include symptom relief, prevention of recurrent effusion, and improvement in quality of life. Therapeutic interventions may include pericardiocentesis for acute symptom relief, followed by the instillation of sclerosing agents or placement of a pericardial drain to prevent recurrence. Installation of sclerosing agents (e.g., talc, tetracycline, doxycycline) into the pericardial space during pericardiocentesis or through a pericardial drain can promote adhesion formation and prevent fluid re-accumulation, reducing the risk of recurrence. The surgical creation of a pericardial window allows for continuous drainage of pericardial fluid into the pleural or abdominal cavity, reducing the likelihood of effusion recurrence.

Systemic chemotherapy remains the mainstay of treatment for ovarian cancer. Various regimens, including platinum-based combinations (e.g., carboplatin and paclitaxel), may be used based on the histological subtype, stage, and molecular characteristics of the tumor. In cases of recurrent or refractory disease, targeted agents (e.g., PARP inhibitors) or immunotherapy (e.g., immune checkpoint inhibitors) may be considered, particularly in patients with specific molecular biomarkers or genetic mutations. Management of chest pain may require the use of analgesic medications, such as nonsteroidal anti-inflammatory drugs (NSAIDs) or opioids, to alleviate discomfort and improve quality of life. Diuretic therapy with agents like furosemide may be indicated to manage fluid overload and alleviate symptoms of dyspnea and peripheral edema. Corticosteroids may be

used to reduce inflammation and provide symptomatic relief in patients with pericarditis or signs of systemic inflammation. Regular clinical assessments, imaging studies, and cardiac monitoring are essential for monitoring disease progression, detecting recurrent effusion, and evaluating treatment response. Multidisciplinary tumor boards involving oncologists, cardiologists, radiologists, and palliative care specialists can facilitate coordinated care and optimize patient outcomes through shared decision-making and collaborative management strategies.

### Conclusion

The prognosis for patients with MPE secondary to carcinoma of the ovary is generally poor, with a median survival ranging from a few weeks to a few months. Palliative care plays a crucial role in managing symptoms, providing psychosocial support, and improving the patient's quality of life. Despite advancements in the treatment of ovarian cancer, MPE remains a challenging complication associated with significant morbidity and mortality. Future research efforts should focus on identifying novel therapeutic targets, developing more effective treatment strategies, and improving early detection methods to enhance outcomes for patients with advanced ovarian carcinoma and MPE. Additionally, collaborative efforts between oncologists, cardiologists, and palliative care specialists are essential to provide comprehensive care and support for these patients. In conclusion, malignant pericardial effusion in carcinoma of the ovary represents a complex clinical scenario requiring a multidisciplinary approach for optimal management. While the prognosis may be grim, aggressive symptom management and palliative care interventions can help improve the quality of life for these patients in the face of advanced disease. Further research is warranted to explore innovative treatment modalities and improve outcomes in this challenging patient population.

### Conflict of Interest

Not available

### Financial Support

Not available

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