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# A Case of Stage II Ascending Colon Cancer with Cardiac Tamponade Due to Pericardial Metastasis

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Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
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**Conflict of interest:** None declared

**Patient:** Female, 63-year-old  
**Final Diagnosis:** Cardiac metastasis  
**Symptoms:** Dyspnea  
**Medication:** —  
**Clinical Procedure:** Surgery  
**Specialty:** Oncology

**Objective:** Unusual clinical course

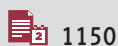
**Background:** Malignant tumors, such as lung and breast cancers, can metastasize to the heart. However, cardiac metastasis rarely occurs in colorectal cancer. Cardiac metastasis cases are typically asymptomatic and rarely cause cardiac tamponade. Heart failure due to systemic metastasis is a terminal symptom; therefore, cardiac metastasis is rarely diagnosed when a patient is alive. We report a case of stage II ascending colon cancer with cardiac tamponade due to pericardial metastasis.

**Case Report:** The patient was a 63-year-old woman who underwent laparoscopic ileocecal resection for ascending colon cancer. The final pathological diagnosis was stage IIB cancer. At the time of surgery, computed tomography scans revealed no metastases to the regional lymph nodes, liver, lungs, and other organs. The patient was then referred for dyspnea 5 months after the surgery. Computed tomography revealed large quantities of pericardial effusion, and the patient was diagnosed with cardiac tamponade. The symptoms were alleviated after pericardiocentesis. Cytological examination of the pericardial fluid confirmed the diagnosis of adenocarcinoma, and by extension, cardiac metastasis of the ascending colon cancer. Anticancer agents were recommended, but the patient opted for palliative treatment.

**Conclusions:** We report a rare case of ascending colon cancer with pericardial metastasis. The advancements in chemotherapy have made the prognosis of colorectal cancer more favorable. The prevalence of pericardial metastasis is expected to increase as well. As such, it is necessary to discuss similar case encounters and establish appropriate treatment.

**Keywords:** Cardiac Tamponade • Colonic Neoplasms • Neoplasm Metastasis

**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/932239>



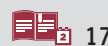
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## Background

Colorectal cancer most commonly metastasizes to the liver and lungs; metastasis to the heart is rare. Cardiac metastases often develop during the terminal stages of cancer. Most cases are asymptomatic and rarely develop cardiac tamponade [1,2]. However, once a carcinomatous cardiac tamponade develops, it is a life-threatening condition that should be carefully managed. We report a rare case of stage II ascending colon cancer with primary metastasis only to the pericardium, which led to cardiac tamponade development.

## Case Report

A 63-year-old woman with a history of autoimmune hepatitis presented with a chief concern of abdominal pain. She was referred to us after undergoing colonoscopy, where a tumor in the ascending colon was identified. A colonic biopsy revealed adenocarcinoma. Computed tomography (CT) scans revealed no metastases to the regional lymph nodes, liver, lungs, and other organs. The patient underwent laparoscopic ileocecal resection and D3 lymph node dissection based on the diagnosis of cT4a, cN0, cM0, cStage IIB ascending colon cancer. The surgical histopathological findings confirmed pT4a, pN0, cM0, and fStage IIB poorly differentiated adenocarcinoma. Despite receiving adjuvant chemotherapy (tegafur/uracil [UFT]/oral Leucovorin [UZEL]), the patient requested to discontinue it and switch to routine surveillance after experiencing intense anorexia and diarrhea. Six months after surgery, the patient was scheduled to undergo a CT scan to assess the presence of metastases. However, 5 months after surgery, she visited the emergency room with a chief concern of dyspnea. Chest radiography revealed cardiomegaly (Figure 1). CT confirmed large quantities of pericardial effusion (Figure 2), and the patient



Figure 1. Chest X-ray – confirmation of cardiomegaly.



Figure 2. CT – observation of pericardial effusion.

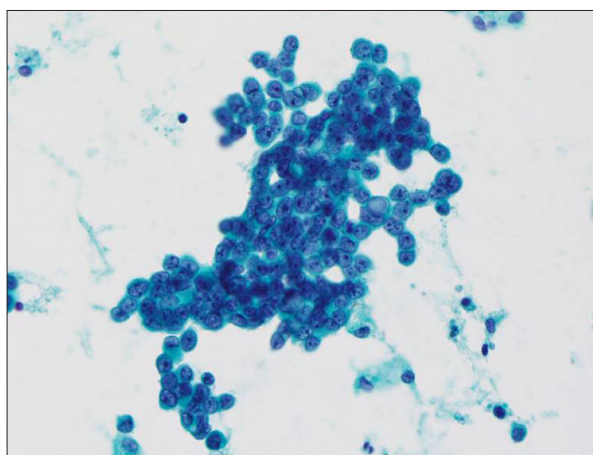
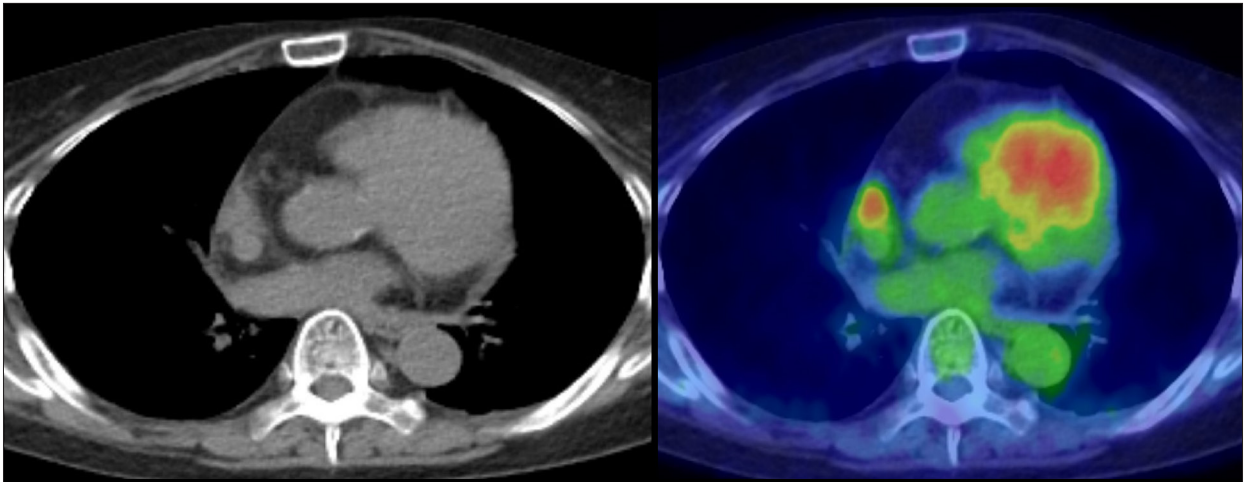


Figure 3. Cytological examination of the pericardial fluid – identification of adenocarcinoma cells.

was diagnosed with cardiac tamponade. Pericardiocentesis was performed, and 1000 mL of serum was drained, after which her condition promptly improved. Cytological examination of the pericardial fluid showed adenocarcinoma cells, similar to the patient's previous ascending colon cancer. Based on this, she was diagnosed with pericardial metastasis of ascending colon cancer (Figure 3). Positron emission tomography (PET)-CT confirmed radiotracer accumulation in the pericardium. There was no clear evidence of metastases in the other areas (Figure 4). There was no *RAS* mutation, but the patient's cancer was positive for *BRAF V600E* mutation and MSI-High. The patient was receiving steroid treatment for her autoimmune liver disease. We had planned to administer an anticancer agent or pembrolizumab as treatment, but it was postponed due to autoimmune hepatitis exacerbation. As per the patient's wish to receive palliative treatment, anticancer agents were not given. Eleven months after pericardial drainage, she remained alive and there was no recurrence of cardiac tamponade.



**Figure 4.** CT/FDG-PET – observation of pericardial thickening. There was FDG accumulation in the same site. FDG – fluorodeoxyglucose.

## Discussion

Cardiac metastasis of malignant tumors occurs in approximately 9.2% of autopsy cases. Primary lesions are often found in pleural mesothelioma (48.4%), melanoma (27.8%), lung adenocarcinoma (21%), undifferentiated carcinomas (19.5%), lung squamous cell carcinoma (18.2%), and breast carcinoma (15.5%). It is rare for colon cancer to metastasize to the heart. A large autopsy series reported that cardiac metastases from colon cancer account for 1.2%, with a prevalence of 1.9%, of all metastatic neoplasms. The reasons for the limited number of reported cases are that cardiac tumors are usually asymptomatic and do not present themselves [3]. Furthermore, since heart failure due to systemic metastasis is a terminal symptom, cardiac metastasis is rarely diagnosed when a patient is alive [4-7]. In addition, cardiac tamponade is rare. According to Takayama et al, cardiac tamponade occurs in only 0.3% of cases [2]. Our patient was asymptomatic until cardiac tamponade occurred. It was also an extremely rare case wherein PET scans showed no distant metastases other than that in the pericardium. To the best of our knowledge, only 1 such report in a patient with colorectal cancer has been described in the literature [8]. Symptoms of cardiac tamponade include dyspnea, shock, and edema. It is relatively easy to diagnose cardiac metastasis in patients that have developed cardiac tamponade. In patients with a history of malignant tumors, cytological examinations are performed on the pericardial fluid obtained from ultrasound-guided pericardiocentesis/drainage. The presence of cancer cells confirms the diagnosis. The positivity rate of these cytological examinations is reportedly 70-90% [9].

Adele et al reported that patients with pericardial metastasis presented with low potential and ST-T changes [10]. Our patient also exhibited large quantities of pericardial effusion and low potential at the time of examination. However, the

electrocardiogram changes are sometimes non-specific, and a definitive diagnosis requires ultrasound and CT scans. In contrast, electrocardiographic findings of myocardial ischemia or injury that are particularly localized and prolonged ST elevation, in the absence of ischemic symptoms, have high specificity for detecting cardiac metastasis in patients with malignancy [11].

The pathways for cardiac metastasis include the pericardium, myocardium, and endocardium. Metastasis to the pericardium is reportedly the most efficient. About two-thirds of all cardiac metastases involve the pericardium (69.4%), one-third the epicardium (34.2%) or myocardium (31.8%), and only 5% the endocardium [3].

Metastases can spread via the hematogenous route, lymphatic system, and direct infiltration. Mukai et al reported that mediastinal lymph node metastasis was observed in 328 out of 407 autopsy cases (80.6%) with metastatic cardiac tumors [12]. Blockade of the common lymph node by neoplastic cells from metastasized mediastinal lymph nodes is a key event that leads to the formation of metastases [3]. In our patient, the PET scans did not indicate metastasis to the mediastinal lymph nodes. Therefore, we believed that it was a hematogenous metastasis.

The prognosis for carcinomatous pericarditis is poor, and the median survival is 2-5 months [13]. Treatment options for carcinomatous pericarditis include systemic chemotherapy, pericardial sclerotherapy by pericardiocentesis and intrapericardial drug administration, and surgical pericardiectomy [14]. In our patient, the symptoms rapidly improved after pericardiocentesis. The pericardial drainage was adequate because the pericardial effusion has not recurred since the latest follow-up. However, approximately 60% of patients experience recurrence of pericardial effusion after undergoing temporary pericardiocentesis [15]. Thus, pericardial sclerotherapy is considered to

prevent this recurrence. If pericardial fluid control is possible, it is recommended that patients receive systemic chemotherapy in accordance with their disease condition [16].

Hiroi et al reported that capecitabine (Cape)+bevacizumab (BEV) was effective in patients with sigmoid colon cancer and cardiac metastasis [17]. In our patient, the symptoms were alleviated and did not recur after pericardiocentesis. The patient was *RAS*-wild, but folinic acid (Leucovorin)-fluorouracil-oxaliplatin-irinotecan (FOLFOXIRI)+BEV was considered after identifying a *BRAF* mutation. However, the patient developed liver dysfunction and chronic renal failure, making it difficult for her to tolerate potent anticancer drug treatment. Hence, Cape/oxaliplatin (CapOX)+BEV was considered instead. Since the patient's cancer was MSI-High and the patient was at risk of autoimmune hepatitis, treatment with pembrolizumab may have been viable. Unfortunately, as per the patient's request, palliative treatment was administered instead of anticancer drug treatments.

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## Conclusions

We encountered a rare case of ascending colon cancer with pericardial metastasis, which developed cardiac tamponade. Pericardial drainage effectively improved the patient's symptoms. We anticipate that the number of cases involving pericardial metastasis secondary to colorectal cancer will increase due to cancer chemotherapy advancements. Therefore, it is necessary to collect and assess more cases.

## Conflict of Interest

None.