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CASE REPORT | COLON

Malignant Pericardial Effusion due to Colorectal Cancer in a Young Man

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ABSTRACT

A 28-year-old man presented with sudden-onset right lower quadrant abdominal pain and shortness of breath at rest. On examination, he had tachycardia with distant heart sounds and right lower quadrant tenderness. A computed tomography scan showed segmental thickening of the proximal ascending colon and ileum with proximal cecal distension. Echocardiogram confirmed large pericardial effusion with impending tamponade. Video-assisted thoracoscopic surgery was performed for pericardial fluid drainage from a pericardial window. The mediastinal lymph node biopsy revealed metastatic adenocarcinoma cells. A colonoscopy showed a large polypoidal mass in the ascending colon with biopsy confirming poorly differentiated adenocarcinoma, thereby suggesting a possible lymphatic or hematogenous spread without liver or lung involvement.

KEYWORDS: colorectal cancer; pericardial effusion; metastasis; immunohistochemistry

INTRODUCTION

Pericardial effusion (PEff) is a potential marker of occult cancer.[1] Primary pericardial tumors are rare. Metastatic pericardial disease occurs in one-tenth of patients with cancer and most commonly arises from lungs, breast tumors, melanoma, and hematologic malignancies.[2] Colorectal cancer (CRC) has a hematogenous spread, but rarely metastasizes to the pericardium. We report a rare case of symptomatic malignant PEff as the initial presentation of a previously unrecognized colonic adenocarcinoma in a 28-year-old man who had no involvement of his liver or lungs.

CASE REPORT

A 28-year-old man presented with 1 day of new-onset, crampy right lower quadrant abdominal pain and shortness of breath at rest. His medical history was significant for perforated appendix 5 years before index admission. The review of symptoms was negative for other prodromal, cardiovascular, or gastrointestinal symptoms. Pertinent positives include a family history of unknown cancer in the mother and adrenal cancer in the brother who died at the age of 38 years.

Vitals were significant for tachycardia. He was alert and oriented. The lungs were clear to auscultation with distant heart sounds. His abdomen was soft with fullness palpable in the right lower quadrant. Laboratory studies revealed microcytic anemia. Serum liver function tests and lipase were unremarkable. The admission chest radiograph showed an enlarged cardiac silhouette. An abdominal/pelvic computed tomography scan showed segmental thickening of the proximal ascending colon and ileum, proximal cecal distension, and lymphadenopathy but no liver lesions (Figure 1). Owing to his persistent tachycardia and difficulty in breathing, computed tomography angiography chest with contrast was performed, which revealed moderate-to-large-sized PEff and subsegmental pulmonary embolism. A complete echocardiogram (Figure 2) showed large PEff without any signs of tamponade. The patient was started on heparin drip dosed per partial thromboplastin time. Multidisciplinary management was pursued, including general surgery, cardiothoracic surgery, and

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Figure 1. Abdominal computed tomography scan with positive oral/intravenous contrast: pink arrow showing mass vs segmental inflammation in the proximal ascending colon and white arrow showing mild thickening of the terminal ileum.

gastroenterology. On hospital day 4, he underwent video-assisted thoracoscopic surgery for PEff with a pericardial window and sentinel mediastinal lymph node biopsy was performed. Postoperatively, a right-sided chest tube was placed for drainage. Lymph node biopsy and pericardial fluid cytology were positive for metastatic adenocarcinoma (Figure 3). On colonoscopy, a large polypoid mass was identified in the ascending colon (Figure 4), and biopsies were significant for poorly differentiated adenocarcinoma (Figure 3). Immunohistochemistry for mismatch repair proteins was negative.

He was subsequently referred to oncology for further management of undifferentiated colonic adenocarcinoma with pericardial metastasis. Positron emission tomography for staging demonstrated hypermetabolic uptake corresponding to the previously seen cecal mass and suspected mild hypermetabolic uptake at previously seen nodular peritoneal reflections in the pelvis. He underwent genetic testing, which revealed Kirsten rat sarcoma viral oncogene homologue and epidermal growth factor receptor amplification, and was negative for Lynch syndrome. He was started on a palliative chemotherapy with capecitabine with oxaliplatin and bevacizumab. Six months after hospital discharge, he was admitted twice with large bowel obstruction, which was managed conservatively by bowel rest and decompression.

DISCUSSION

We present a rare case of a large PEff due to metastatic CRC. It is the third most common cancer in the United States. The most common site of metastasis for CRC is to liver followed by lungs, peritoneum and rarely intrathoracic spread. However, cardiac metastasis of CRC is rare.[3–6]

Two-thirds of PEffs are idiopathic or secondary to viral infection. Only 5% are attributable to underlying cancer.[7] Primary malignant tumors of the heart are rare, and most of the malignant PEffs are caused by metastatic tumors, including lung cancer, lymphoma, leukemia, malignant melanoma, and breast tumors.[8] A large population-based cohort study was performed on patients admitted to the hospital with pericarditis over 20 years with no previous cancer diagnosis on admission. It concluded that patients with pericarditis had a 50% higher occurrence of subsequent cancer diagnoses, especially within the first t3 months.[7]

CRC primarily spreads hematogenously through the portal venous system that drains the colon and proximal rectum to the liver and from the lungs to the heart. However, the above-mentioned patient had biopsy-proven involvement of the mediastinal lymph node in the absence of hepatic or pulmonary involvement. Given the metastasis of CRC to lymph nodes and lack of visceral organ involvement like liver and lungs; the route of spread is more likely to be lymphatic.

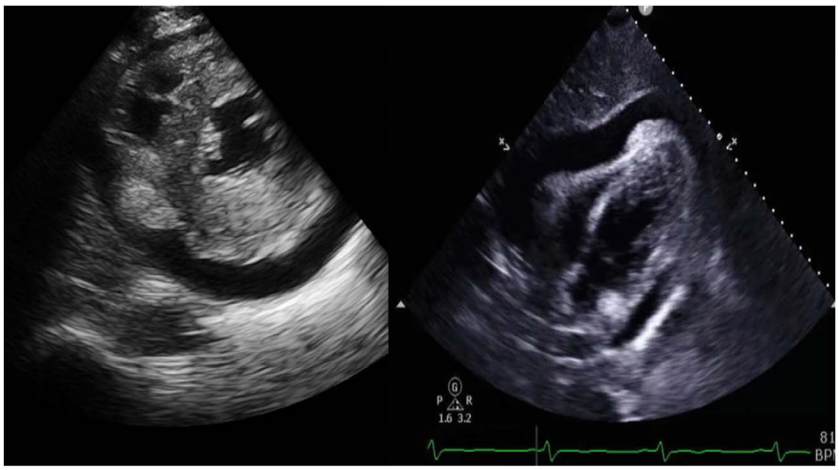

Figure 2. Echocardiogram with parasternal short axis view (left side) and apical 4 chamber view (right side) showing large pericardial effusion, impending cardiac tamponade.

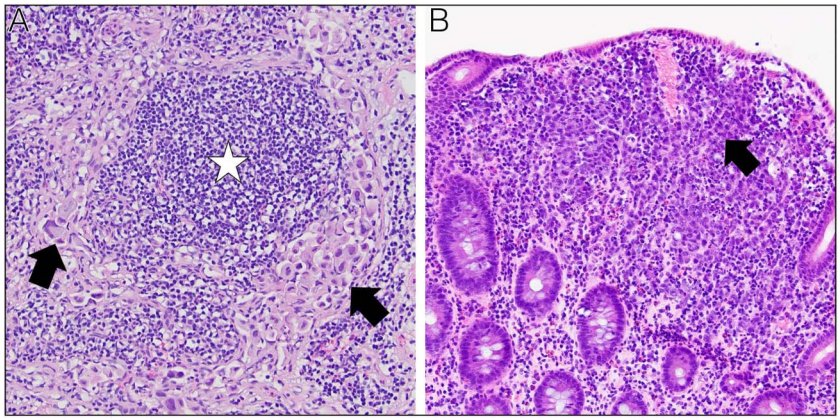

Figure 3. (A) The mediastinal lymph node shows high-grade, pleomorphic epithelial cells with pale, somewhat mucinous-appearing cytoplasm (black arrows) infiltrating around normal lymphoid tissue (white star). (B) The ascending colon biopsy specimen shows sheets of high-grade malignant cells (black arrow) expanding the colonic lamina propria.

The incidence of cardiac metastases is underestimated. However, according to the literature, cardiac metastases have been found in 1.5%–20% of autopsies of patients with cancer and in 0.2%–6.5% of subjects in unselected autopsy series.[9] The low incidence can be attributed to the absence of symptoms and the infrequent use of diagnostic modalities such as cardiac magnetic resonance imaging. CRC rarely spreads lymphatically. Fraser et al illustrated the retrograde invasion of the epicardial lymphatic isthmic nodes at the root of the aorta.[10] There is no standardized approach for treating patients with cardiac metastases because of the rarity of this finding. Therefore, patients should be treated according to established guidelines for the type of malignancy they have.[11] Our patient was started on palliative chemotherapy with capecitabine with oxaliplatin and bevacizumab.[12] Management should be directed at palliative care of these patients to preserve the quality of their limited remaining life span.[13] The prognosis for carcinomatous pericarditis is poor, with a median survival is 2–5 months.[7]

In conclusion, we report a case of the youngest male patient with CRC cancer with pericardial metastasis. The biopsy-proven mediastinal lymph node involvement with the absence of visceral organ involvement proposes a possible lymphatic spread of CRC in this case. We emphasize the early consideration of PEff as a marker of occult malignancy in appropriate clinical context.

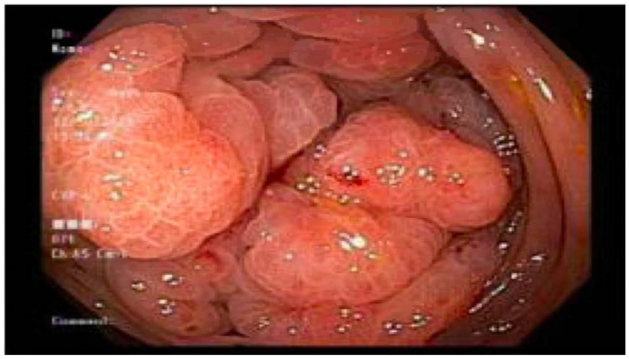

Figure 4. Colonoscopy showing a large polypoidal mass in the ascending colon.

DISCLOSURES

Author contributions: All authors took part in writing, editing, and approving the final version of the manuscript. L. Lee is the article guarantor.

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Informed consent was obtained for this case report.

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REFERENCES

1. Søgaard KK, Sørensen HT, Smeeth L, Bhaskaran K. Acute pericarditis and cancer risk: A matched cohort study using linked UK primary and secondary care data. *J Am Heart Assoc*. 2018;7(16):e009428.
2. Mukai K, Shinkai T, Tominaga K, Shimosato Y. The incidence of secondary tumors of the heart and pericardium: A 10-year study. *Jpn J Clin Oncol*. 1988;18(3):195–201.
3. Pizzicannella J, Ricci V, Gorla R, Spinapolice E, Esposito A. Isolated cardiac metastasis from colorectal cancer in a 35-year-old man. *Case Rep Med*. 2012;2012:751761.
4. Pãosinho A, Esteves AL, Pereira AJ. From the gut to the heart: Cardiac tamponade due to lymphatic metastasis. *Eur J Case Rep Intern Med*. 2019;6(2):001033.
5. Sawada H, Toyota K, Hakoda K, et al. A case of stage II ascending colon cancer with cardiac tamponade due to pericardial metastasis. *Am J Case Rep*. 2021;22:e932239.
6. Neves MBM, Stival MV, Neves YCS, et al. Malignant pericardial effusion as a primary manifestation of metastatic colon cancer: A case report. *J Med Case Rep*. 2021;15(1):543.
7. Søgaard KK, Farkas DK, Ehrenstein V, Bhaskaran K, Bøtker HE, Sørensen HT. Pericarditis as a marker of occult cancer and a prognostic factor for cancer mortality. *Circulation*. 2017;136(11):996–1006.

8. Burazor I, Imazio M, Markel G, Adler Y. Malignant pericardial effusion. *Cardiology*. 2013;124(4):224–32.
9. Hanfling SM. Metastatic cancer to the heart. Review of the literature and report of 127 cases: Review of the literature and report of 127 cases. *Circulation*. 1960;22(3):474–83.
10. De Loach JF, Haynes JW. Secondary tumors of heart and pericardium: Review of the subject and report of 137 cases. *Arch Intern Med*. 1953;91:224–49.
11. Löffler H, Grille W. Classification of malignant cardiac tumors with respect to oncological treatment. *Thorac Cardiovasc Surg*. 1990;38(Suppl 2):173–5.
12. Hiroi S, Miguchi M, Ikeda S, et al. Capecitabine plus bevacizumab for cardiac metastasis of sigmoid colon cancer: Case report and literature review. *In Vivo*. 2020;34(6):3413–9.
13. Rome RB, Luminais HH, Bourgeois DA, Blais CM. The role of palliative care at the end of life. *Ochsner J*. 2011;11(4):348–52.