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Biatrial mass in heart resulting from colorectal cancer metastasis: Rarest case presentation

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Abstract
A 58-year-old male, chronic heavy smoker and a past history of rectal cancer (stage T3N1M0), treated with neo-adjuvant chemotherapy and radiation, followed by surgical resection with a low anterior resection, ileostomy formation and two subsequent cycles of adjuvant chemotherapy presented for further evaluation of worsening dyspnea, fatigue and lower extremity edema 3 years after follow-up. A CT scan of the chest revealed multiple pulmonary nodules, ascites, a 3 cm retroperitoneal lymph node and a mass in both atrium. 2D Echocardiogram revealed a mass in both right atrium and left atrium. A cardiac MRI showed the same Biatrial mass extending into the AV valve leaflet and the inferior vena cava to the level of the intrahepatic inferior vena cava. Chemotherapy was offered and followed by cardiac surgery to cardiac mass resection. Subsequently treatment modality was performed successfully and relieved dyspnea and edema. Colorectal cancers typically metastasize to the lymph nodes, liver or lungs. Metastasis to the heart is rare and although a few cases of cardiac metastases from colon cancer are described in the literature, cases of metastatic colorectal cancer to the heart are far fewer.

Keywords: biatrial mass, colorectal cancer

1. Introduction
Cardiac metastasis may be underestimated given that they are often clinically silent. Although there is potential for any malignancy to metastasize to the heart, colorectal cancers typically metastasize to the lymph nodes, liver or lungs, usually by lymphatic or hematogenous spread [1-2]. Metastatic cancers affecting the heart are relatively rare but do cite back to the 1940's, showing up on autopsy reports approximately 10% of the time [3-4]. Other unusual sites of metastasis from colorectal cancers have been reported in the literature, such as to the spleen, skeletal muscle and thyroid gland [5-7]. Although a few cases of cardiac metastasis from colon cancer are described in the literature [1, 2, 8-10], cases of metastatic colorectal cancer to the heart are far fewer. In fact, we found only three such well-documented cases of cardiac metastasis from colorectal adenocarcinoma in the literature [11-13].

2. Case Report
A 58-year-old male, chronic heavy smoker and a past history of rectal cancer (stage T3N1M0), treated with neo-adjuvant chemotherapy and radiation, followed by surgical resection with a low anterior resection, ileostomy formation and two subsequent cycles of adjuvant chemotherapy presented for further evaluation of worsening dyspnea, fatigue and lower extremity edema 3 years after follow-up. His lab reports were significant for mild anemia, thrombocytopenia and acute renal injury. A CT scan of the chest revealed multiple pulmonary nodules, ascites, a 3 cm retroperitoneal lymph node and a mass in both atrium. 2D Echocardiogram revealed a mass in both right atrium and left atrium (Figs. 1A). A cardiac MRI showed the same Biatrial mass extending into the AV valve leaflet (Figs. 1B) and the inferior vena cava to the level of the intrahepatic inferior vena cava. An MRI of the abdomen and pelvis confirmed a heterogeneous, hyper-intense filling defect in the inferior vena cava from the level of the renal veins extending into the right atrium (Figs. 1C).

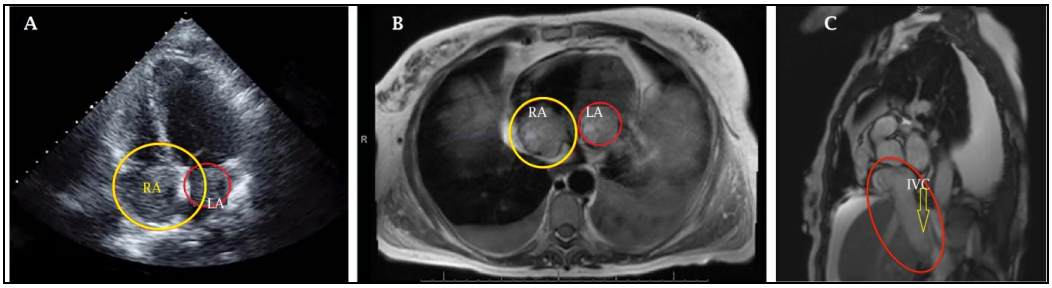

Fig 1A: Biatrial secondary mass seen in 2D Echocardiogram, Figure 1B. Biatrial secondary mass seen in Cardiac MRI, Figure 1C. Sagittal oblique T2-weighted MRI of the chest revealed filling defect in the inferior vena cava from the level of the renal veins into the right atrium. No hepatic mass was present.

The patient underwent a paracentesis for ascites, which yielded a transudative fluid without malignant cells (WBC 8678, ascitic fluid albumin 1.3 g/dL, lactate dehydrogenase 412 U/L (normal 112 - 235 U/L), and serum albumin 2.7 g/dL (normal 3.5 - 5.1 g/dL)). Serum carcinoembryonic antigen (CEA) and carbohydrate antigen 19-9 (CA 19-9) levels were elevated at 53.3 ng/mL (4 ng/mL) and 57 U/mL, respectively. He underwent a cardiac catheterization with biopsy of both atrial mass, which revealed carcinoma cells positive for CDX2 and CK20 and negative for CK7 by immunohistochemistry, consistent with metastatic rectal adenocarcinoma. He was started on anticoagulation for the concomitant thrombus and was evaluated by the oncology team who recommended palliative chemotherapy. Chemotherapy was offered and followed by cardiac surgery to cardiac mass resection. Subsequently treatment modality was performed successfully and relieved dyspnea and edema.

3. Discussion

Although cardiac metastasis in any malignancy is rare, the incidence of metastatic disease to the heart may be underestimated because it is often clinically silent [3, 2, 4]. This phenomenon may occur for two reasons. First, the disease may be infiltrative and the tumor can compress and displace heart tissue rather than causing outright destruction, minimizing interference with cardiac contraction and conduction [3]. Secondly, as metastases can occur by hematogenous, transvenous or direct contiguous extension, they typically invade the pericardium first, which may not initially produce symptoms, but can be associated with pericarditis or pericardial effusion in later stages [1].

When patients do have symptoms of cardiac metastases, they are often non-specific, including symptoms of right-sided heart failure, dyspnea, arrhythmias, pulmonary thromboembolism or tumor thrombus extending to the inferior or superior vena cava, resulting in edema and obstruction [1, 9, 10, 13]. As with our patient, tissue diagnosis is often necessary to determine the best course of management.

When evaluating cardiac masses, differential diagnoses should include primary endocardial tumors, such as atrial myxomas, vegetations or organized thrombi [1]. Cardiac masses are usually initially investigated using transesophageal echocardiography to confirm the presence of metastatic disease [1]. CT or MRI with contrast or newer modalities such as contrast-induced echocardiography are thought to provide a more panoramic view of the pericardium, myocardial walls and cardiac chambers, which may be useful in defining secondary cardiac tumors that are often infiltrative in nature. The contrast used in these scans may help distinguish a tumor from a thrombus [1, 4]. Therefore, it seems reasonable that any patient with a history of malignancy and cardiopulmonary symptoms should undergo diagnostic testing for possible cardiac metastasis.

When definitively diagnosed, metastatic cardiac tumors carry a poor prognosis. If the metastasis is solitary, chemotherapy, radiation or resection may be helpful, but the metastatic burden and volume of disease are important considerations that often determine the treatment modality [13].

Surgical resection is often not feasible in the vast majority of patients with metastatic cardiac tumors due to disseminated metastatic disease. However, surgery may be indicated for palliation, when symptoms of hemodynamic compromise secondary to intra-cavitary tumor growth outweigh the risk of operative death, allowing more time for treatment with chemotherapy or radiation [10, 12]. Determining surgical candidacy often consists of weighing the expected quality of life improvement or increase in life-expectancy against the perils of surgery, including the normal risks associated with cardiac bypass, the risk of further spread and seeding of the malignant cells and bleeding risk [11].

4. Conclusion

Colorectal cancers typically metastasize to the lymph nodes, liver or lungs. Metastasis to the heart is rare and although a few cases of cardiac metastasis from colorectal cancer are described in the literature, cases of metastatic colorectal cancer to the heart are far fewer. The medical literature has a paucity of similar cases of colorectal adenocarcinoma metastasizing to both atrium. Further studies are needed to help guide standardized treatment options. Although cardiac metastasis from malignancy is rare, the differential diagnosis should be considered in a patient with cardiopulmonary symptoms and a history of cancer.

5. Consent

We have taken consent from patient for this study.

6. Acknowledgement

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