Case Report
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Colon Cancer with Metastasis to the Right Atrium: A Case Report and Review of Literature

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Abstract

We report a case of colon cancer with pancreatic and interesting heart metastasis several months prior to disseminated metastases. The case was a 59-year-old man with a cecal cancer (T4N2); he received chemotherapy with XELOX regimen and then radiotherapy up to a dose of 45 Gy. He was under close and regular follow-up. After 42 months, he developed jaundice and computed tomography (CT) scan showed an isolated mass in the pancreas. We performed Whipple's operation and the pathology report was pancreatic metastasis. He received chemotherapy and was relatively well until his CEA rose again and the chest CT scan indicated cardiac metastasis. We resected the metastasis and administered chemotherapy. Unfortunately, the case developed brain metastasis and passed away. We searched the literature and found 15 cases of colon cancer and cardiac metastasis. We found no cases with metastasis from colon cancer to the left side. Although cardiac metastasis has a poor prognosis, it might be more prevalent than what is generally believed.

Keywords: Heart, Metastasis, Colon cancer

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Introduction

Heart is among the organs where primary tumors are far less common than metastasis. Primary heart neoplasms affect less than 0.02% of autopsies and most are benign. On the other hand, metastasis is seen more frequently than primary heart lesions. It is most commonly observed in epicardium. Most common cancers that metastasize to the heart are lung cancer and melanoma. In colorectal cancer, the rate of heart metastasis reaches up

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to 7% in some autopsy series. Few cases of heart metastasis from colorectal cancer are reported in English literature.[1,2] Herein, we reported a case of colon cancer and heart metastasis and his clinical course. In addition, we searched for colon cancer and heart metastasis in the literature.

Case Presentation

In February 2013, a 59-year-old man referred to our department with the diagnosis of moderated differentiated adenocarcinoma of the cecum with invasion to abdominal wall (T4bN2). We observed large bowel perforation at the site of the tumor. Hematology and biochemical tests and postoperative abdomen, pelvic, and chest computed tomography (CT) scans were normal. The patient received eight cycles of chemotherapy with capecitabine plus oxaliplatin (CAPEOX) and chemoradiation therapy at a dose of 4500 cGy in 25 fractions to the tumor bed and regional lymphatics. The case was well and under follow-up; after 42 months, CEA concentration increased (60 µg/L). Abdominal CT scan showed an isolated lesion in the pancreas. We found no other liver, lung, or lymphatic involvement. We performed Whipple's operation; the result was poorly differentiated carcinoma in the head of pancreas and no lymph node involvement. He received six cycles of mFOLFOX6. In July 2017, CEA rose to 44 µg/l and the chest CT scan indicated a large mass in the right atrium (Figure 1). The abdomen and pelvic CT scans were normal, and we observed no lung metastasis. The subject underwent thoracotomy and excision of the right atrial mass. The pathology showed metastatic carcinoma originating from the colon (Figure 2). Afterwards, the patient received chemotherapy with the FOLFIRI and Bevacizumab regimen. The treatment was in process when he developed a headache. In January 2018, multiple brain metastases were found in the brain magnetic resonance imaging (MRI). Although the case received whole brain radiotherapy with a dose of 30 Gy, he passed away after one month.

Discussion

Colorectal cancer is the second or third most common human malignancy and the leading cause of cancer-related mortality.[2, 3] The most common sites of metastasis in colorectal cancer are regional lymph nodes, liver, and lung.[4] While colorectal cancer is among the most prevalent human malignancies, cardiac metastasis is highly rare with very few available reports.[4] In autopsy series, the rate of heart metastasis is significantly different from the reports on patients with colorectal cancer. Although unusual sites of metastasis such as skin, spleen, or thyroid are reported in end stage cases, heart metastasis is still rare.[4, 5] In autopsy series, approximately 1.4-7.2% of patients with colon cancer developed heart metastasis.[4] We only found 15 cases with colon cancer and heart metastasis

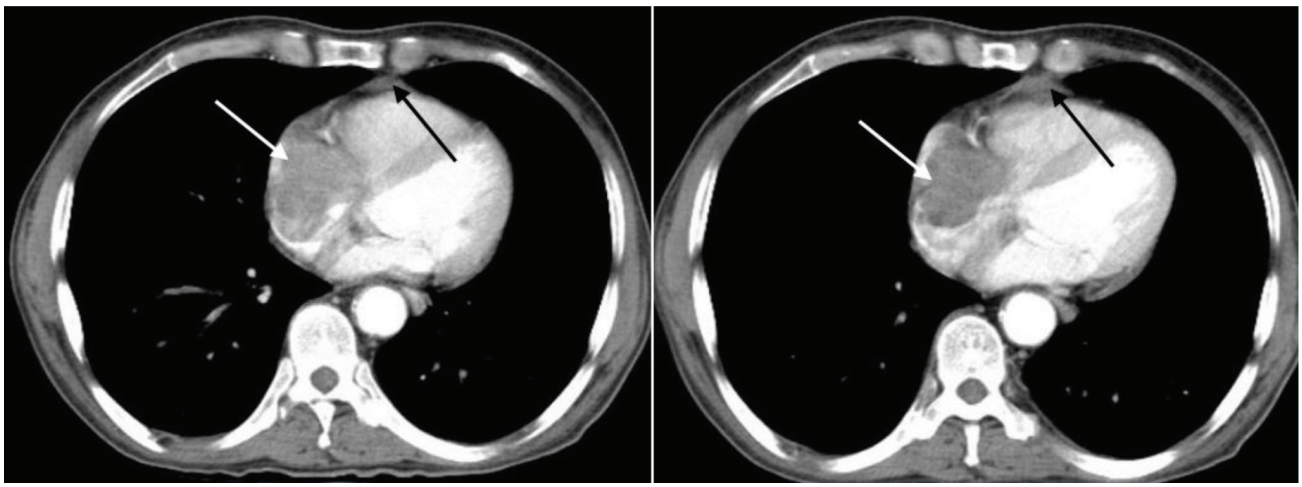

Figure 1. Two consecutive CT images with contrast administration show a filling defect in the right atrium (white arrows) that is a metastatic lesion. There is mild pericardial effusion (black arrows).

Table 1. Cases with colon cancer and heart metastasis

	Age/Gender	DFS (M)	Other Metastatic Sites	Surgery	Survival	CC	Location
Mihali[11]	56/M	0	Liver, adrenal, bone	No	1D	Dyspnea, chest pain, orthopnea, hypertension	?
Choi[4]	70/F	0	?	Yes	1A	Shortness of breath	RA
Patel[10]	76/M	13	LN	No	? A	No symptom	RV
Pizzicannella[3]	35/M	12	Liver	No	? D	No symptom	RV
Tsujii[2]	76/F	0	Lung	No	24 A	No symptom	RV
Kasama[12]	72/M	144	Lung	Yes	183 D	DOE	RA
Ayyala[13]	69/F	60	Lung, ascitis, LN	No	?D	dyspnea, fatigue and lower extremity edema	RA
Lord[14]	71/M	36	No	No	37 D	Dyspnea, anorexia, weight loss	RV
Namireddy[15]	51/M	12	No	Yes	? A	Dyspnea, syncope	RA
Koizumi[16]	65/M	19	No	Yes	30 D	Dyspnea	RA
Patel[7]	72/M	36	No	No	36 D	Dyspnea, facial swelling	RA
Nishida[8]	69/M	11	No	Yes	11 D	SVC syndrome	RA
Hayýroˆglu[17]	53/M	?	Pleura	No	? D	Cardiac arrest	RV
Choufani[18]	58/M	34	Ascitis, liver, pleura	No	? A	DOE	RA
Ngow[9]	59/M	0	Lung , ascitis	No	? D	Dyspnea	RA
Our case	59/M	42	Pancreas	Yes	48D	No symptom	RA
Mean	63.2	27.9			41		

DFS: disease free survival, CC: chief complaint, M: male, F: female, D: dead, A: Alive, LN: lymph node, RA: right atrium, RV: right ventricle, DOE: dyspnea on exertion, SVC: superior vena cava.

in the literature (Table 1).

In an autopsy series, the most common primary site of heart metastasis was lung, followed by lymphoma, breast, and esophagus. In their report, 10% had heart metastasis, comprising epicardium, myocardium, and thrombi; 1.5% of the cases had endocardial metastasis. Regarding endocardiac metastasis, most cases were lymphoma, followed by lung cancer and leukemia. In this series, 64 cases had colon metastasis, and two cases had pericardium and endocardium metastasis.[6]

We searched PubMed and Google scholar sites for colorectal cancer and heart metastasis; we only found 16 reported cases, most of whom (12/16) were males with a mean age of 63.4 (35-76) years. All patients had right side metastasis (Table 1). All symptomatic patients had dyspnea. Three patients were asymptomatic and one had cardiac arrest at presentation (Table 1). Cardiac metastasis is usually asymptomatic and its incidence is underestimated.[4] Our patient had no symptoms and his tumor was found to be caused by increased CEA levels.

The right side of the heart is more commonly involved than the left side.[7] In our review, all patients had right heart metastasis, 10 cases had right atrium (RA), and five had right ventricle (RV) metastases.

Echocardiography is a helpful tool for diagnosis of metastasis in heart; however, there exist false positive and false negative results.[1] Echocardio-

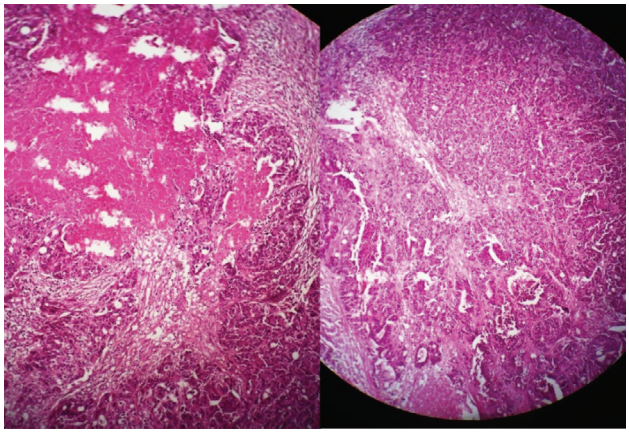

Figure 2. Infiltrative malignant glands with cribriform pattern and extensive necrosis in the left atrial mass (H & E, ×3).

graphy is a common screening tool for heart diseases. It is non-invasive and able to evaluate physiologic and anatomic aspects of the heart.[1] In an old report in 1991, CT scan was not successful in detecting heart metastasis; however, our patient was initially diagnosed with CT scan.[8] Cardiac CT scan and MRI are as conducive as echocardiography in evaluating and diagnosing heart mass. MRI and CT scan are more accurate than echocardiography when it comes to studying calcification and other extra cardiac lesions.[1, 3]

Role of surgery in heart metastasis is not well established. In cases with obstruction, surgery is recommended.[4] Surgery could enhance both the quality of life and survival but in selected eligible cases.[3] Tsujii reported a case of heart metastasis and more than two-year survival with mere chemotherapy and no surgery.[2] Surgery is not always possible. In this light, Nishida reported a case of heart metastasis who passed away two weeks after tumor resection.[8] It seems that surgery should be performed in carefully selected cases.

Four cases had heart metastasis at presentation and 11 cases developed heart metastasis after a period of time from the diagnosis of the primary tumor. The mean DFS was 27 (0-144) months.[9] Although two cases with heart metastasis at presentation had a bad outcome, one case faired better. She was a 76-year-old patient who received mFOLFOX6 regimen plus panitumumab and had partial response for a total of two years. Overall survival was 41 (1-183) months; five cases were alive at the time of report, and 11 cases passed away. The outcome of one case was not described.[2, 4, 9, 10] Our patient developed brain metastasis soon after heart metastasis with a poor prognosis.

Conclusion

Heart metastasis is an extremely rare event in colon cancer. Herein, we reported a case of colon cancer with pancreatic and heart metastasis several months prior to disseminated metastases. We propose a careful heart evaluation in patients with an increased CEA.

Informed Consent

We obtained a written consent form from the patient prior to any intervention.

Conflict of Interest

None declared.

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