Reminder of important clinical lesson

An isolated cardiac metastasis from colorectal adenocarcinoma

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Summary

Epidemiological information relating to cardiac metastases is predominantly based on autopsy studies. The reported incidence ranges from 2.3–18.3%. It is usually found in the presence of widely disseminated disease. Here, a case of an isolated, asymptomatic cardiac metastasis from colonic adenocarcinoma is reported. The metastasis was detected later, following bowel resection and was not amenable to surgical resection. The patient is receiving ongoing care from the oncology team.

BACKGROUND

The management of colorectal cancer makes up a large proportion of the consultant colorectal surgeon's workload. However, the team at the Leicester General Hospital, prior to this case, had yet to come across an isolated cardiac metastasis from colorectal adenocarcinoma in the absence of widespread metastatic disease. Most cardiac metastases are detected following postmortem studies with only a handful reported antemortemly. We believe the advances in cancer care will mean many more of these cases presenting themselves in the future. We need to remain vigilant in our investigation and follow-up of any patient with a confirmed malignancy and this includes paying increasing attention to these unusual sites.

CASE PRESENTATION

Epidemiological information relating to cardiac metastases is predominantly based on autopsy studies. The report incidences range from 2.3–18.3%.¹ Metastatic spread of cancers to the heart is more common than primary cardiac tumours but cardiac involvement usually correlates with widespread metastatic disease and is suggestive of a poor prognosis. Solitary metastases to the heart and, in particular, those of a colorectal origin are very uncommon with a postmortem incidence of 1.4–2%.² Here, a case of a fortuitously discovered, asymptomatic, cardiac metastasis from colonic adenocarcinoma is reported.

A 76-year-old man underwent a right hemicolectomy for a Dukes' C, pT4 N1 caecal adenocarcinoma (a total of 17 nodes were histologically examined; 1 contained metastatic adenocarcinoma) with 10 cycles of neoadjuvant chemotherapy (stopped due to neuropathy). Routine blood tests, including tumour markers and ECG, were normal. Initial staging included CT of the abdomen, chest and pelvis. This confirmed a caecal mass with extension to the anterior abdominal wall and associated regional adenopathy. A solitary lesion in segment five of the liver was seen; however, this was too small to characterise. No cardiothoracic metastases were identified. Subsequent scans following chemotherapy demonstrated an improvement in the caecal

mass and lymphadenopathy. The indeterminate lesion in the liver was unchanged. Our patient underwent open bowel resection with intraoperative ultrasound scanning of the liver, which did not show any hepatic metastases.

Follow-up CT scan at 6 months showed no evidence of abdominal recurrence and again an unchanged lesion in segment five of the liver. Further evaluation and monitoring of this lesion took place with serial MRI scans of the liver every 4 months. As there were no aggressive features, we were satisfied this lesion was benign in nature. It was during this series of imaging (at approximately 13 months post-resection) that a lesion at the apex of the right ventricle was detected. Cardiac MRI confirmed a 3.3 cm, well-circumscribed mass within the epicardial fat containing what was thought to be a haemorrhagic or necrotic centre (figure 1). Whole body positron emission computed tomography (PET-CT) confirmed a single isolated metastasis involving the apices of the right and left ventricles and the inter-ventricular septum with nodal involvement anterior to the right pulmonary artery (figure 2).

The patient underwent an exploratory midline sternotomy with view to resection for what was thought could be an intrapericardial but extra-myocardial mass. However, intraoperative findings confirmed the presence of an intramyocardial mass, which was palpable within the lower part of the free wall of the anterior surface of the right ventricle and was thought to be traversing the interventricular septum close to the apex. Wedge biopsy taken from the mass confirmed moderately differentiated adenocarcinoma with morphological features consistent with metastatic deposit of colonic origin. The patient has subsequently been under the care of the oncologists. Unfortunately, despite further chemotherapy, the metastasis had increased in size to 6.9 cm and was occupying much of the right ventricle.

OUTCOME AND FOLLOW-UP

The patient is now taking part in a phase II clinical trial (FOLFIRA study)³ and the most recent CT scan (approximately 2 months ago) show a slight reduction in the size of

Figure 1 Cardiac metastasis demonstrated on MRI.

Figure 2 PET-CT demonstrating cardiac metastasis in apex of heart (block arrow).

the metastasis, which now measures 5.8 cm. There is no evidence of abdominal recurrence. Treatment is on-going.

DISCUSSION

Cancers with the greatest cardiac metastatic frequency include carcinomas of the lung, breast and the oesophagus, malignant lymphoma, leukaemia and melanoma.^{4–5} In descending order of frequency, epicardium (75.5%), followed by myocardium (38.2%) and endocardium (15.5%) are involved.⁵ The site of development is dependent on the favoured metastatic pathway of the primary tumour with lymphatic spread giving rise to pericardial metastases and haematogenous dissemination giving rise to myocardial disease.^{4–6} To date, in English literature there are only 11 reported cases of colorectal cardiac metastases discovered antemortemly.⁶

Due to mesenteric lymphatics and the portal venous system, the liver is the most frequent site of colorectal metastatic occurrence. Other unusual sites include metastases to the spleen, thyroid gland, spermatic cord, skeletal muscle and the heart. This case allows us to hypothesise that tumour embolisation can invade the heart through the portal circulation via the inferior vena cava and liver without seeding into it. To our knowledge, this is only one of two reported cases of solitary myocardial metastasis from colorectal cancer in the absence of lung and liver disease.

Clinical manifestation can vary according to the location of the lesion under scrutiny. However, tumours of the heart are often clinically silent and do not present themselves during the patient's lifetime.^{4–6} Our patient remains asymptomatic, which may be due to the apical location of the lesion rendering it unlikely to cause obstruction to inflow and outflow valves. If symptoms or signs are present they are often overshadowed in the setting of widespread metastatic disease.^{4–5} Such factors are likely to be contributory to the limited number of cases reported.

Surgery as a treatment modality for cardiac metastases is yet to be fully explored and so far has been used only in exceptional cases of intracavitary mass causing significant functional disruption.^{4–7} There have been cases where coil embolisation of the supplying coronary branch in rapidly growing circumscribed intracardiac masses has been used.^{4–8–9} MRI is the imaging of choice in the evaluation of

a suspected cardiac lesion allowing for differentiation between tumour and myocardium, and for tissue characterisation^{10–11}

Learning points

- Colonic adenocarcinomas rarely metastasise to the heart. The commonest site is the liver. The lungs, brain and bone can be involved usually in the presence of liver disease.
- The present case reinforces the importance of cancer patients entering a surveillance programme with careful multidisciplinary team follow-up ensuring that any suggestion of metastases (even to unusual sites) is actively investigated.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. Bussani R, De-Giorgio F, Abbate A, *et al.* Cardiac metastases. *J Clin Pathol* 2007;**60**:27–34.
2. Lattuada S, Saggia C, Biaggi G, *et al.* Pericardial metastases in a long-surviving patient with sigmoid carcinoma. *Tumori* 2005;**91**:101–2.
3. Cancer Research UK Website. A trial looking at ZD4054 with chemotherapy to treat bowel cancer that has spread - FOLFIRA. August 2010. <http://www.cancerhelp.org.uk/trials/a-trial-looking-ZD4054-with-chemotherapy-treat-bowel-cancer-that-has-spread-FOLFIRA>. (accessed 4 Nov 2010).
4. Reynen K, Köckeritz U, Strasser RH. Metastases to the heart. *Ann Oncol* 2004;**15**:375–81.
5. Klatt EC, Heitz DR. Cardiac metastases. *Cancer* 1990;**65**:1456–9.
6. Choi PW, Kim CN, Chang SH, *et al.* Cardiac metastasis from colorectal cancer: a case report. *World J Gastroenterol* 2009;**15**:2675–78.
7. Gaya MA, Randle A, Ashford RF. Right ventricular outflow tract obstruction secondary to myocardial metastases from colorectal cancer. *Clin Oncol (R Coll Radiol)* 2005;**17**:70–1.
8. Valentin A, Karnik R, Bonner G, *et al.* Coil embolization of coronary supply to a cardiac metastasis. *Am J Cardiol* 1999;**83**:809–10, A11.
9. Parravicini R, Fahim NA, Cocconcini F, *et al.* Cardiac metastasis of rectal adenocarcinoma. Surgical treatment. *Tex Heart Inst J* 1993;**20**:296–8.
10. Chiles C, Woodard PK, Gutierrez FR, *et al.* Metastatic involvement of the heart and pericardium: CT and MR imaging. *Radiographics* 2001;**21**:439–49.
11. Testemassi E, Takeuchi H, Fukuda Y, *et al.* Cardiac metastasis of colon adenocarcinoma diagnosed by magnetic resonance imaging. *Acta Cardiol* 1994;**49**:191–6.

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