CASE REPORT

A rare cause of recurrent cerebral emboli despite oral anticoagulation

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SUMMARY

We report on a patient with a history of colon carcinoma and clinical presentation of recurrent cardiac emboli despite oral anticoagulation for atrial fibrillation. On delayed transoesophageal echocardiography, finally a left atrial myxoma was suspected. Surgery, however, revealed a left atrial metastatic tumour with histopathological features of a colon adenocarcinoma. Metastases of colorectal adenocarcinoma invading cardiac structures are rare. Isolated literature reports describe metastatic masses detected in the right atrium reflecting natural haematogenous spreading of cancer, but none in the left heart.

BACKGROUND

Ischaemic strokes are caused by cardiac embolism in about 30% of cases.¹ Common causes are atrial fibrillation, persistent foramen ovale, valvular prosthesis and rheumatic heart disease.

Overall, primary malignant and metastatic cardiac tumours represent a rare clinical entity. Primary cardiac tumours are usually benign (up to 75%), cardiac myxoma being the most frequent diagnosis.² Cardiac metastases, however, are relatively common and found in up to 20% of patients suffering from primary distant malignant tumours, on autopsy.³

In colorectal adenocarcinoma, metastatic masses are usually detected in liver or lungs. The heart is an overall unusual site for tumour spreading; nonetheless, prevalence is reported in up to 5% of cases.⁴ Its natural course of distant invasion is mainly haematogenous. Hence, all reported cases of cardiac adenocarcinoma metastases were described in the right atrium.⁵ To the best of our knowledge, this is the first report of a case of colorectal adenocarcinoma metastasis detected in the left atrium.

CASE PRESENTATION

We report the case of a 58-year-old obese man with multiple comorbidities who was repeatedly transferred to our stroke-unit with varying focal neurological deficits. On first admission (08/2012), he presented with an incomplete left-sided hemiparesis. A few weeks later he presented with a sudden worsening of this deficit and additional ataxia. Repeated cranial CT imaging documented recurrent multifocal embolic ischaemic infarctions in the right middle cerebral artery, left cerebellar and left posterior cerebral artery territory. The patient had experienced a first episode of atrial flutter in 2008, which had been successfully converted into sinus

rhythm. Since 2011, he was known to have chronic atrial fibrillation and received a primary prophylaxis with aspirin. After occurrence of the first embolic event (06/2012) he was started on coumadin; following another embolic event 2 months later the anticoagulation was switched to rivaroxaban, but recurring ischaemic events persisted.

Another relevant pre-existing condition was a colon adenocarcinoma (pT3 pN2b (8/25) M0 V0 L1 G2) treated with an extended left hemicolectomy in 02/2010 and six cycles of adjuvant chemotherapy following the FOLFOX 4 regimen (Cisplatin, Oxaliplatin, Fluorouracil, folic acid) between 03/2010 and 08/2010. The patient was monitored after that without evidence of recurrence; however, plasma levels of carcinoembryonic antigen are not known to us and no imaging of abdomen was performed due to limited patient compliance. In addition, he suffered from alcohol-induced hepatic cirrhosis and stage IV chronic renal insufficiency.

Repeated transthoracic echocardiography studies had shown globally dilated cardiac cavities with a moderately impaired ejection but no source of cardiac emboli. Finally, we performed a transoesophageal echocardiography (TEE) revealing a left atrial mobile mass (5×2 cm) of unusual anemone-like appearance protruding from the inflow area of the right-sided pulmonary veins towards the mitral valve (figure 1). In addition, we detected a 10 mm effusion in the vicinity of the right atrium and right ventricle. There was no evidence of a patent foramen ovale. Subsequent thoracic CT scan eliminated an intrapulmonary origin of this tumour, thus a cardiac myxoma was suspected. Under balanced consideration of an elevated risk of intracerebral haemorrhage versus recurrence of potentially fatal cerebral embolisation, surgery was performed under emergency indication (TW), using cardiopulmonary bypass with bicaval cannulation, median sternotomy and cold crystalloid cardioplegia. A polypoid, friable, pediculated tumour with a narrow base between right-side pulmonary vein orifices was completely resected (figure 2) with additional correction of valvular defects, ablation for atrial fibrillation and closure of left atrial appendage. No thrombotic material or evidence for a right-to-left shunt was found. Gross morphological appearance and consistency of the tumour made preoperatively suggested diagnosis of a left atrial myxoma improbable. Histopathology finally revealed the diagnosis of an adenocarcinoma (figure 3), which under consideration of the patient's history represents a hyper-mobile left

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Figure 1 Echocardiography shows a lobulated, hyper-mobile structure protruding from the right-side pulmonary veins into left atrium; depiction of tumour base was not possible.

atrial metastasis of colorectal carcinoma as likely source of recurrent cerebral emboli.

In the immediate postoperative course, the patient was somnolent and showed generalised myoclonia but no focal neurological deficit. On CT imaging, moderate haemorrhagic transformation of the previously known infarctions was seen. Antithrombotic treatment was continued with intravenous heparin that was switched to coumadin later. After 12 days of postoperative stabilisation, the patient was discharged to a rehabilitation unit. Another cycle of chemotherapy was not performed due to the patient's overall poor general condition.

OUTCOME AND FOLLOW-UP

The patient died from metastatic disease within 1 year from initial presentation.

DISCUSSION

Even though the prevalence of cardiac involvement in patients with cancer reaches from 1.5% up to 20%,³ cardiac metastases of colon adenocarcinoma represent a rare clinical entity. In a recent report by Patel *et al*,⁵ an overview of all published cases of colorectal metastases was subsumed. According to this summary, only eight cases of cardiac metastases of colon adenocarcinoma were reported to date worldwide. Noteworthy, metastatic masses were detected exclusively in the right atrium

Figure 2 A gross photograph shows a polypoid tumour with lobulated surface. This pattern corresponds to the histological features of multiple papillary projections of epithelium.

Figure 3 H&E (x40) demonstrates central necrotic (arrow) papillary proliferation of an atypical pleomorphic epithelium with a cribriform growth pattern and basophilic cells resembling colorectal mucosa.

reflecting the natural, haematogenous course of spreading of colon adenocarcinoma. Clinical manifestations of right-sided metastases of colorectal cancer are usually non-specific and include: signs of right-sided cardiac insufficiency, dyspnoea, pulmonary embolism, arrhythmia and sometimes superior vena cava syndrome.

Our presented case of metastasis of a colon adenocarcinoma into the left atrium is, to the best of our knowledge, the first case documented worldwide. Clinical presentation and tumour location were misleading: chronic atrial fibrillation led to the initial assumption of insufficient oral anticoagulation, therefore a TEE was only performed after multiple recurring ischaemic events. TEE falsely suggested the presence of a left atrial myxoma rather than malignancy. Even though a neoplastic process of substantial extension was already known, metastasis of the primary tumour was not taken into account as potential cardiac source of recurrent cerebral embolisation. Only histological examination confirmed the typical architecture of a colon adenocarcinoma, thus eliminating any suspicion of detected left atrial mass being a primary cardiac tumour. We did not detect any shunts connecting the venous and arterial system, however, explaining the unusual spreading pathway against the blood stream. However, a 'pinpoint defect' functionally shunting from right to left atrium cannot be ruled out since bubble flow imaging had not been performed. In addition, considering the positive finding of lymphatic vessels on primary cancer resection, a lymphatic tumour spread needs to be discussed as it has not yet been specifically described in the literature.

Based on our current experience, we recommend considering the possibility of cancer spreading into the heart in patients with recurrent cerebral embolisation, especially in patients with a known neoplastic process. Taking into account the relatively high rate of cardiac metastases among patients with cancer, we suggest

Learning points

- ▶ Consider a cardiac tumour in patients with recurrent embolic strokes.
- ▶ Suspect cardiac metastatic disease in patients with cardioembolic strokes and a history of a malignant tumour.
- ▶ Perform a transoesophageal echocardiography early on in these patients.

an extensive and aggressive diagnostic approach in order to eliminate or confirm this spreading pathway of a primary tumour.

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