CASE REPORT

Thymic carcinoma presenting as atypical chest pain

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Accepted 7 November 2015

SUMMARY

A 58-year-old woman with a 2-month history of atypical chest pain was referred to the chest pain clinic by the general practitioner. Exercise stress test was positive and subsequent coronary angiogram revealed significant triple vessel disease with left ventricular impairment requiring a coronary artery bypass graft (CABG). The patient had a chest X-ray as part of the preoperative work up. Chest X-ray revealed a large anterior mediastinal mass. Subsequent thorax CT revealed a 7.2 cm anterior mediastinal mass. CT-guided biopsy of the mass revealed the diagnosis of a poorly differentiated thymic basaloid carcinoma. The patient was successfully treated with concomitant surgery involving complete resection of the mass and a CABG procedure.

Figure 1 Preoperative X-ray demonstrating an incidental finding of a large mediastinal mass.

BACKGROUND

Thymic carcinoma is a rare malignancy of the thymus in the anterior mediastinum. It accounts for <1% of all thymic neoplasms.¹ The basaloid variant is exceedingly rare with <20 cases published in the literature to date.² Thymic basaloid carcinomas is often regarded as a low-grade variant of thymic carcinoma. However, aggressive behaviour has been reported in 30% of cases,³ such as our case, with infiltration into adjacent thymic tissue and left lung, extensive vascular invasion and intrathoracic nodal metastases.

Currently, there is a lack of trials on the definitive treatment for thymic carcinoma, especially when it coexists with significant triple coronary vessel disease. It appears that complete excision of the tumour and en bloc resection of locally involved structures, followed by chemoradiotherapy, are associated with the most favourable outcome.^{1 3}

CASE PRESENTATION

We present a case of a 58-year-old woman who was referred to the chest pain clinic by her general practitioner following a 2-month history of atypical chest pain, shortness of breath on exertion and lightheadedness. An exercise stress test was positive and subsequent coronary angiogram revealed significant triple vessel disease with left ventricular (LV) impairment requiring a coronary artery bypass graft (CABG). The patient had a chest X-ray as part of the preoperative work up for the CABG. Chest X-ray revealed a large anterior mediastinal mass (figure 1). Subsequent CT angiogram of the thoracic aorta revealed a 7.2 cm anterior mediastinal mass (figures 2 and 3) with some internal necrosis and enlarged mediastinal nodes. Follow-up CT-guided biopsy of the mediastinal mass revealed

the diagnosis of poorly differentiated basaloid carcinoma (differential thymic carcinoma versus squamous cell carcinoma).

Extensive work up to identify a possible primary lesion was undertaken. Investigations included a bilateral mammogram, CT of the brain, CT of the neck, colposcopy and bronchoscopy. All were negative for malignancy. The patient also had CT of the abdomen and pelvis, which revealed a left adrenal nodule of indeterminate nature. Subsequent abdominal MRI to further characterise the left adrenal nodule favoured a benign aetiology. Positron emission tomography (PET) CT scan showed no evidence of any fluorodeoxyglucose (FDG) avid tumour other than the known anterior mediastinal mass (figure 4). Owing to the location

Figure 2 CT scan (coronal view) demonstrating an anterior mediastinal mass extending above the left innominate vein (illustrated by arrows).

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To cite: Siddiqui S, Connelly T, Keita L, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-211374

Figure 3 CT scan (axial view) demonstrating anterior mediastinal mass.

of the mass in the anterior mediastinum, radiological appearances suggested thymic carcinoma over metastases from a tumour of unknown origin. Thus the tumour was diagnosed as a basaloid variant of thymic carcinoma. In view of the new diagnosis of thymic carcinoma and the absence of any visible disease elsewhere, the patient was scheduled for elective resection of the anterior mediastinal mass followed by an immediate CABG procedure.

INVESTIGATIONS

All investigations were tailored to rule out extra-thoracic metastasis and/or a primary lesion in the case of squamous cell carcinoma.

Figure 4 Positron emission tomography CT demonstrating abnormal fluorodeoxyglucose uptake restricted to the thymus.

Figure 5 Resected en bloc mass including the thymus, a portion of the upper lobe of the left lung (orange arrow), the phrenic nerve (white arrow) and pericardium.

DIFFERENTIAL DIAGNOSIS

Differential diagnoses included a thymoma, lymphoma and a germ cell tumour in descending order of likelihood. On CT, the mass was found to originate from the thymus and therefore was not an additional lesion in the anterior chest (ie, a germ cell tumour). PET excluded thymoma due to lack of FDG uptake. Lymphoma was excluded clinically by the lack of any additional masses or lymphadenopathy.

TREATMENT

The surgical dilemma regarding the resection of the thymic carcinoma was caused by the concomitant presence of significant complex coronary artery disease with LV dysfunction, which is better treated with CABG versus percutaneous intervention. In addition, if percutaneous intervention was performed instead of CABG, it would likely result in incomplete revascularisation leading to poorer outcome. The patient's thymic carcinoma was best treated by en bloc resection if deemed possible.

In view of the patient's pre-CABG cardiac function, chemotherapy would likely not be tolerated, as chemotherapy would worsen cardiac function and symptoms unless her heart was revascularised. The case was extensively discussed in a multidisciplinary meeting. A decision was made to perform a concomitant operation that entailed a median sternotomy, followed by an assessment of the feasibility of resection prior to proceeding. The large anterior tumour was mobilised from the periphery and excised in total. En bloc excision of part of the upper lobe of the left lung surrounding parietal the pleura, pericardium and left phrenic nerve was then carried out (figure 5). As the tumour was well excised, a standard CABG was then performed and the procedure was completed giving the patient the best option for further adjuvant treatment for her cancer as well as appropriate treatment for her coexisting cardiac condition.

There is no convincing evidence to support adjuvant chemotherapy postresection of thymic carcinoma. On review of the histology, however, a decision was made to proceed with systemic therapy based on stage 4B disease and presumed microscopic residual disease, and high likelihood of subclinical nodal metastases. As per Masaoka staging, this tumour was stage 4B because lymphatic spread was present with 7 of 19 resected lymph nodes containing metastases. The tumour also invaded the pericardium and upper lobe of the left lung, part of which was resected en bloc with the thymic tumour.⁴ It was felt

appropriate to defer adjuvant radiotherapy until completion of chemotherapy in view of the patient's recent CABG. The patient proceeded with postoperative chemotherapy, opting for a cisplatin/etoposide-based regimen of six cycles (as opposed to a cisplatin/anthracycline-containing regimen, because of its cardiotoxicity). CT imaging performed post completion of the course of chemotherapy was concerning for residual/recurrent nodal disease in the internal mammary region, which was confirmed on subsequent PET/CT, with no FDG uptake elsewhere. Following this, the patient received radical radiotherapy (6000 cGy/30 fractions) to the mediastinum involving the internal mammary region within the radiation field.

OUTCOME AND FOLLOW-UP

The patient's recovery both in the intensive care unit and the ward was grossly uneventful, and she was fit for discharge on day 7 postoperation. She is currently in complete remission, as demonstrated on two follow-up CT images, 6 months after discharge.

DISCUSSION

To the best of our knowledge, this is the first case in the literature in which a known invasive thymic carcinoma coexisted with significant coronary artery disease. Reports of the excision of incidentally found thymic lesions are found in the literature. However, our case is unique for two reasons. First, a thymic carcinoma, not thymoma, was excised thus requiring an oncological resection. Second, this was a planned combined procedure instead of an incidental finding. As the evidence-based approach to this case was limited due to the lack of literature on the subject, careful analysis of risks and benefits of every available option was essential to maximise the prognosis of the patient. In this case, three treatment options were considered: (1) chemotherapy±radiotherapy for the anterior mediastinal mass alone, (2) CABG without prior treatment of the mass and (3) resection of the anterior mediastinal mass followed by a CABG procedure in a single surgery. The side effects associated with radiation therapy to the central chest such as fibrosis may render future CABG a more complicated procedure. A bypass procedure prior to treatment of the cancer was not a viable option either. The surgical procedure would also delay any definitive treatments for the malignancy as the patient had to be in a stable state of health postoperatively to undergo stressful cancer therapy. Another notable aspect of this case is the aggressiveness of this tumour, which was demonstrated by the lack of uptake in the internal mammary gland on diagnosis followed by the rapid development of FDG uptake, during treatment, in these lymph nodes shortly after.

Importantly, cardiac surgery is typically contraindicated in cases of active malignancy. However, revascularisation was required for appropriate chemotherapy. Additionally, entry through the malignant thymus would be required to perform

the CABG. The central location of the carcinoma would hinder access to the heart and its supplies, which may in turn have resulted in a suboptimal bypass surgery. Thus a concomitant procedure involving complete resection of the mass and its surrounding structures, followed by a CABG procedure, was warranted.^{5 6} By performing a concomitant surgery, malignancy may be removed in an early course of the disease, conferring a survival advantage to the patient. Correction of the pre-existing coronary artery disease means a reduction of morbidity risk for the patient, with subsequent adjuvant chemotherapy and/or radiotherapy for the cancer.

Learning points

- ▶ Multidisciplinary discussion is required prior to embarking on a clinical treatment pathway, particularly when there is scant literature to guide in decision making.
- ▶ Concomitant surgery is a feasible option in the simultaneous presence of mediastinal malignancy and significant coronary artery disease.
- ▶ Concomitant surgery is best carried out when both pathologies have an indication for a successful operation.
- ▶ If oncological resection is included in the concomitant surgery, no evidence of metastatic disease should be present.
- ▶ More case studies in this area are needed in order to reach a common consensus in dealing with such cases, irrespective of the rare occurrence of such cases.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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