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CASE REPORT

Thymic carcinoma originating from the mid-posterior mediastinum

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Abstract: An unusual thymic carcinoma in a 74-year-old woman is described. Initial chest CT revealed a mass at the mid-posterior mediastinum. Transbronchial fine needle biopsy of the mass failed to provide a definite diagnosis. The mass was treated as a malignant mediastinal tumour, and chemoradiotherapy was performed as initial treatment. The patient died 5 years after receiving primary treatment. The results of postmortem microscopic examination, including immunohistochemical study with CD5 antibody, were consistent with thymic carcinoma. This case is interesting in that the mid-posterior mediastinum is the site where thymic carcinoma is least likely to originate.

Key words: CD5, chemoradiotherapy, ectopic thymus, thymic carcinoma.

INTRODUCTION

Thymic carcinoma is a rare neoplasm that usually occurs in the anterior mediastinum. We describe herein a thymic carcinoma that originated in the mid-posterior mediastinum, the most uncommon site. To our knowledge, only one other similar case has been reported.[1]

CASE REPORT

A 74-year-old woman was admitted to Nishi-Kobe Medical Center, Kobe, Japan, for assessment of a CXR abnormality (Fig. 1a). Contrast-enhanced chest CT revealed an 8×5 cm, well circumscribed heterogeneous mass compressing the pulmonary arteries at the mid-posterior mediastinum (Fig. 1b). Examination of a transbronchial fine needle biopsy specimen revealed mitotic and anaplastic hyperchromatic cells, and a malignant mediastinal tumour was diagnosed. Thorough clinical and radiographic examination failed to reveal any evidence of metastatic disease. After chemoradiotherapy [two courses of chemotherapy with cisplatin (20 mg/kg body weight/day) and etoposide (50 mg/kg body weight/day) for five consecutive days and concurrent thoracic radiotherapy (60 Gy)], the mediastinal mass disappeared completely. The patient was discharged 3 months later. A CT scan 15 months later showed no evidence of local recurrence, but a new 3×2-cm tumour was observed at the right costophrenic sulcus and was thought to be a metastatic lesion.

Two further courses of chemotherapy (the same regimen as described above) led to a partial response. A metastasis to the right femur was subsequently detected and treated with radiotherapy (total dose 39 Gy). The patient's condition deteriorated gradually, and she died nearly 5 years after her initial presentation.

Postmortem examination revealed that the mid-posterior mediastinal tumour had indeed disappeared. Tumour tissue existed mainly at the anterior mediastinum and had invaded the right lung and subdiaphragm and metastasized to the left diaphragm. Microscopic examination showed that the tumour consisted of polygonal and spindle cells that were similar to thymic epithelial cells with increased

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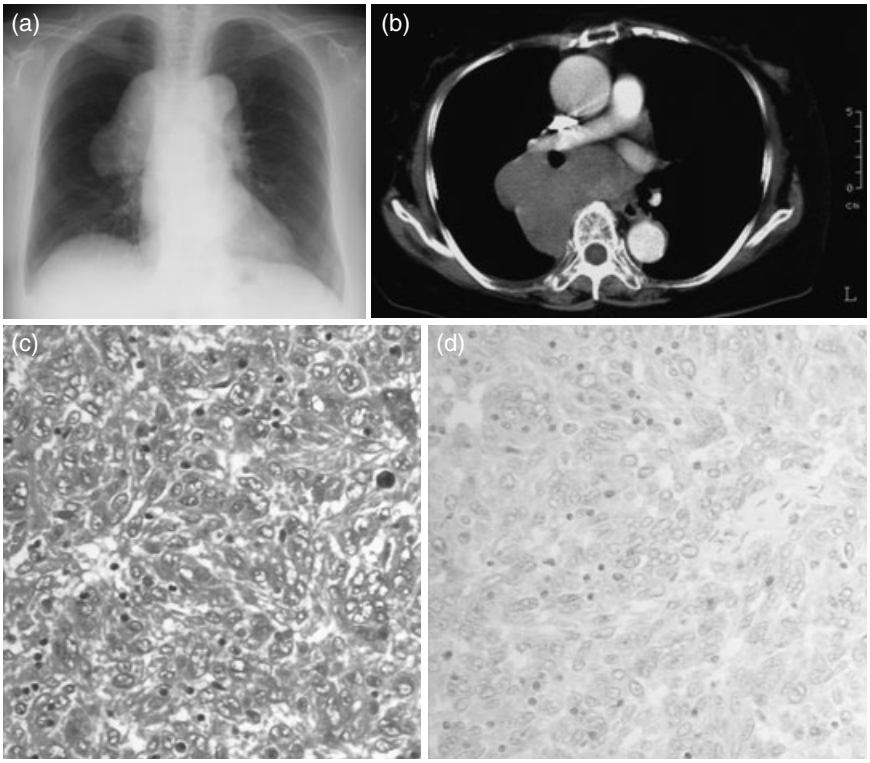

Figure 1 (a) Chest X-ray taken on first admission showing a mediastinal mass. (b) Contrast-enhanced chest CT image obtained on first admission showing an 8×5 cm, well circumscribed heterogeneous mass at the mid-posterior mediastinum compressing the main pulmonary arteries. (c) Postmortem microscopic examination. The tumour consists of polygonal and spindle cells that are similar to thymic epithelial cells with increased chromatin, prominent nucleoli and occasional mitotic figures, consistent with thymic carcinoma (hematoxylin and eosin stain, ×200). (d) Immunohistochemical study using CD5 antibody, showing positive staining of neoplastic cells (×200).

chromatin, prominent nucleoli, and occasional mitotic figures, consistent with thymic carcinoma (Fig. 1c).

Immunohistochemical staining was positive for CD5 (Fig. 1d), NSE and vimentin, and negative for CAM 5.2, cytokeratin AE1/AE3, MNF 116, CD57, CD56, CD3, CD79a, chromogranin A and synaptophysin. Tumours that commonly originate from the mid-posterior mediastinum include malignant lymphoma, germ cell tumour, and neurogenic tumour. The tumour in the present case was diagnosed as a thymic carcinoma (type C thymoma)—an undifferentiated carcinoma originating from the mid-posterior mediastinum, based on the WHO classification system.[2]

DISCUSSION

The thymic carcinoma we encountered was exceedingly rare in that it originated in the mid-posterior mediastinum. Embryologically, the thymus develops from the ventral portion of the third and fourth pharyngeal pouches, and descends into the anterior mediastinum by the sixth week of gestation. Migration failure results in thymic ectopia. Aberrant thymic tissue is found in approximately 20% of humans at the base of the skull, the mediastinum, or the root of the bronchus.[3] Localization of thymoma resembles that of the thymus itself: 75% of thymomas originate in the anterior mediastinum, 15% originate in both the anterior and superior mediastinum, and 6% originate in the superior mediastinum.[3] The other 4% occur ectopically. To the best of our knowledge, only two cases of malignant ectopic thymoma have been reported.[1,4] In the first case, the tumour arose from the posterior mediastinum and a pedicle connected the extrapleural mass to the mediastinum.[1] The second was a thymic carcinoma in the left parapharyngeal space of the neck.[4] The initial chest CT examination in our patient revealed a mid-posterior mediastinal mass without evidence of anterior or superior mediastinal involvement.

Definite postmortem pathological diagnosis was made by morphological and immunohistochemical analysis. Immunohistochemical study with the use of CD5 antibody has been shown to be very useful in diagnosing thymic carcinoma. Hishima *et al.* first reported that CD5 antibody reacted with 100% (seven of seven) of thymic carcinomas and 40% (two of five) of atypical thymomas, but 0% (zero of 11) of typical thymoma tissue sections.[5] Dorfman *et al.* reported that CD5 antibody stained 67% (16 of 24) of tissue sections from patients with thymic carcinomas. Of note was staining of particular subtypes: 100% (nine of nine) of squamous cell, 50% (two of four) of lymphoepithelioma-like, and 100% (two of two) of undifferentiated.[6] However, none of 17 cases of benign thymoma and none of 21 cases of invasive thymoma were immunoreactive for CD5.[6] Furthermore, none of 61 cases of other malignant neoplasms that can involve the mediastinum, including 40 non-thymic carcinomas and 13 malignant germ cell neoplasms, were immunoreactive for CD5.[6] These data support the diagnosis of thymic carcinoma in our case.

Chemoradiotherapy was effective and prolonged survival for our patient. Chemoradiotherapy may be a very effective treatment for thymic carcinoma. Ogawa

et al. recommended multimodal treatment, especially complete resection and postoperative radiotherapy with or without chemotherapy, as curative therapy for thymic carcinoma.[7] Although surgical resection has been the first line treatment for thymic carcinoma, radiotherapy and/or chemotherapy have also been used in cases of unresectable tumour.[7–11] Cisplatin-based combination chemotherapy is recommended.[9,11,12] Radiotherapy is also effective for both primary (non-resectable) and locoregional recurrent thymic carcinoma.[10] Combination chemotherapy with cisplatin and etoposide and concurrent radiotherapy is considered a reasonable treatment approach.[13] Although high-grade tumours including undifferentiated carcinoma have been reported to behave aggressively (average survival, 15 months)[8] our patient survived for 5 years after her initial treatment. This clinical course supports the view that initial chemoradiotherapy is effective and prolongs survival of patients with thymic carcinoma.

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