

## Case Report

# A huge mediastinal, well-differentiated liposarcoma with heterogenous smooth muscle differentiation: a case report

Xianglin Mei<sup>1</sup>, Meiyong Li<sup>2</sup>, Yang Xia<sup>1</sup>

<sup>1</sup>Department of Pathology, The Second Hospital of Jilin University, Changchun 130041, Jilin, P. R. China; <sup>2</sup>The Key Laboratory of Pathobiology, Ministry of Education, Jilin University, Changchun 130021, Jilin, P. R. China

Received April 27, 2019; Accepted May 23, 2019; Epub July 1, 2019; Published July 15, 2019

**Abstract:** Liposarcoma is one of the most common mesenchymal tumors, although liposarcomas that occur in the mediastinum are uncommon. We recently encountered a case of mediastinal well-differentiated liposarcoma with secondary myxoid changes and smooth muscle differentiation in a 54-year-old man. The patient reported a 20-day history of chest pain, and thorax computed tomography revealed a large and multilobulated mass with heterogeneous density in the posterior and anterior mediastinum, which extended to the right hemithorax. Resection was performed and a pathological analysis subsequently confirmed a diagnosis of well-differentiated liposarcoma. The patient experienced recurrence at 15 months after the surgery and subsequently died of heart failure.

**Keywords:** Mediastinal, well-differentiated liposarcoma, atypical lipomatous tumor, smooth muscle differentiation

## Introduction

Liposarcoma is a common soft tissue tumor that accounts for approximately 20% of all mesenchymal malignancies [1]. However, primary mediastinal liposarcoma is very rare and accounts for < 1% of all mediastinal tumors [2]. This kind of tumor usually presents as a painless mass, which may be found by chance. However, the tumor's anatomical site is one of the most important factors for prognosis, especially those tumors occurring in deep anatomical locations such as the mediastinum and retroperitoneum, which tend to cause death as a result of uncontrolled local effects. Here, we report our experience with the case of a giant primary mediastinal liposarcoma in a 54-year-old man, who finally died from the tumor's local effects. Interestingly, this tumor showed smooth muscle differentiation and myxoid degeneration separately.

## Case presentation

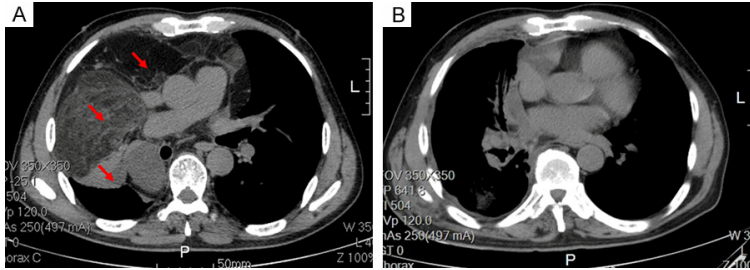
A 54-year-old man presented to our hospital because of a 20-day history of right chest pain,

although he reported spontaneously experiencing remission. Our physical examination and laboratory testing did not reveal any abnormalities. However, thorax computed tomography revealed a large, smooth, well-defined, and multilobulated mass with soft tissue density in the posterior and anterior mediastinum, which extended to the right hemithorax (**Figure 1**). This mass exhibited distinct regions with low density (-87 HU) and high density (43 HU). Contrast-enhancement revealed that the mass occupied the posterior, anterior, and upper mediastinum, with clear margins and extension into the right thoracic cavity (**Figure 1**). The mass compressed the lung and heart where it extended into the right thoracic cavity. Based on the tumor's heterogeneous density, the imaging results suggested the diagnosis of a teratoma.

## Pathologic findings

Surgical excision was attempted and the tumor's gross appearance revealed multiple individually encapsulated lobules, with pale yellow

## Huge mediastinal liposarcoma



**Figure 1.** A. A large, smooth, well-defined, and multilobulated mass with soft tissue density in the mediastinum and extending to the right hemithorax. The arrow indicates the different densities. B. The postoperative outcome.



**Figure 2.** The tumor was multilobulated and huge, with a diameter of approximately 30 cm.

and tan-gray colors, and a smooth and gelatinous surface that was soft to the touch (**Figure 2**). The tumor measured 30 cm × 21 cm × 8 cm. The cut sections of the tumor revealed three distinct morphological types: adipose tissue, smooth muscle-like tissue, and myxoid tissue.

A histological examination of the tumor also revealed three distinct types with no necrotic areas (**Figure 3**). First, we observed a well-differentiated liposarcoma that was composed of relatively mature adipocytic proliferation, varying sizes of focal adipocytes, and stroma cells with limited atypical nuclei. Immunohistochemical testing revealed that this section had positive S-100 expression and negative results for P53, HMB45, and Melan-A. Second, we observed a myxoid degenerate area with round-to-oval primitive mesenchymal cells and small signet-ring lipoblasts in a prominent myxoid stroma. The “chicken wire” capillary vasculature was observed in the myxoid stroma, although there was no “pulmonary edema” growth pattern and primitive round cells were observed. Third, we observed an area with

smooth muscle differentiation, which was composed of cells that closely resembled normal smooth muscle cells. These cells had eosinophilic cytoplasm and uniform blunt cigar-shaped nuclei, with no atypical findings and an extremely low level of mitotic activity. Immunohistochemical testing revealed positive expressions of desmin, smooth muscle antigen, and h-Caldes-

mon without Ki67 proliferation (proliferation index of < 1%). These histological features were consistent with a diagnosis of a well-differentiated liposarcoma (WDLS) with smooth muscle differentiation and secondary myxoid degeneration.

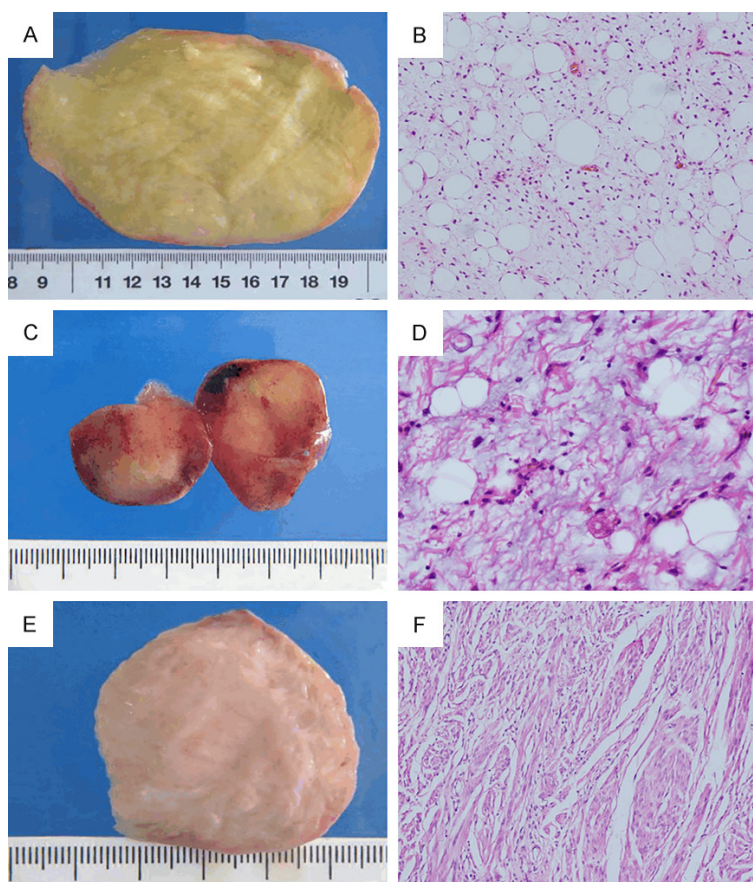
The patient experienced local recurrence at 1.5 years after the surgical resection, and subsequently died due to heart failure.

### Discussion

Primary mediastinal liposarcomas are very rare, although they are most likely to occur in the anterior mediastinum [3]. In the present case, the tumor filled the entire mediastinum and extended to the right thorax, where it compressed the heart and aorta. A CT scan revealed a huge multilobulated mass with heterogeneous density, which led to an incorrect diagnosis of teratoma. However, the macroscopic specimen seemed to be comprised of many individual masses with different colors and cutting surfaces. Thus, it appears that a preoperative biopsy is needed to evaluate areas with different densities, although well-differentiated areas can still complicate the diagnosis.

The recent *World Health Organization Classification of Soft Tissue Tumors* lists four subtypes of liposarcoma: Atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLS), dedifferentiated liposarcoma (DDLPS), myxoid liposarcoma, and pleomorphic liposarcoma. However, the ALT/WDLS and DDLPS types have overlapping genetic factors, and the C-Jun pathway has been implicated in the progression from ALT/WDLS to DDLPS [4]. Furthermore, mesenchymal stem cells derived from ALT/WDLS have greater osteogenic differentia-

## Huge mediastinal liposarcoma



**Figure 3.** (A) The first cut section was yellow and soft to the touch, and (B) histopathological examination revealed relatively mature adipocytic proliferation with mildly atypical mononuclear mesenchymal cells. Magnification, (B)  $\times 100$ . (C) The second cut section was pale red and gelatinous, and (D) histopathological examination revealed a prominent myxoid stroma with capillary vasculature and atypical mononuclear cells. Magnification, (D)  $\times 200$ . (E) The third cut section was white and whorled, and (F) histopathological examination revealed spindle cells arranged in intersecting fascicles with no atypical findings or mitoses. Magnification, (F)  $\times 100$ .

tion potency, compared to cells from normal adipose tissues, but smooth muscle differentiation is rather rare [5]. These findings suggest that ALT has a strong potential for heterologous differentiation and may practically explain why liposarcoma macroscopically appears as a lobulated mass. In the present case, the mass was multilobulated and the different lobes had distinct histological characteristics, such as a myxoid altered area and an area with smooth muscle differentiation. Therefore, appropriate sampling is critical for diagnosing this type of multilobulated tumor, as the atypical component(s) may not be obvious. An immunohistochemistry staining panel that includes S100, MDM2, and CDK4 may also help facilitate the diagnosis.

Surgical resection has been recognized as an effective treatment for soft tissue sarcoma, as it can relieve the compressive symptoms, even in cases with only optimal cytoreduction [6]. However, the anatomical location can play an important role in determining whether complete excision is possible, and deep anatomical sites (e.g., the mediastinum) tend to develop recurrence from positive margins. Furthermore, the patient may not survive because of uncontrolled local effects, such as the heart failure in our case. Moreover, radiation therapy for extremity sarcoma provides good local control, although radiation therapy for ALT/WDLS may help stimulate tumor recurrence [7, 8]. Approximately 40% of mediastinal liposarcomas recur after surgery, and Derbel et al. have reported that soft tissue sarcomas have a median time of 11.5 months between the diagnosis and first relapse [6]. Therefore, patients with this type of tumor require a prolonged follow-up of at least 1 year after the surgery.

Primary mediastinal liposarcomas are very rare, and their anatomical location can make it difficult to achieve complete surgical resection. Furthermore, despite their slow growth, these tumors are associated with a poor prognosis. Therefore, given the tendency to develop recurrence, patients should receive active postoperative follow-up.

### Acknowledgements

This work was supported by the Outstanding Youth Program for Science and Technology Development of Jilin Province, China (no. 20190103094JH).

### Disclosure of conflict of interest

None.

## Huge mediastinal liposarcoma

**Address correspondence to:** Yang Xia, Department of Pathology, The Second Hospital of Jilin University, 218 Ziqiang Street, Changchun 130041, Jilin, P. R. China. Tel: +86-0431-88796533; Fax: +86-0431-88796533; E-mail: xiayang@jlu.edu.cn

### References

- [1] Dei Tos AP. Liposarcoma: new entities and evolving concepts. *Ann Diagn Pathol* 2000; 4: 252-66.
- [2] Punpale A, Pramesh CS, Jambhekar N, Mistry RC. Giant mediastinal liposarcoma: a case report. *Ann Thorac Surg* 2006; 12: 425-7.
- [3] Ortega P, Suster D, Falconieri G, Zambrano E, Moran CA, Morrison C, Suster S. Liposarcomas of the posterior mediastinum: clinicopathologic study of 18 cases. *Mod Pathol* 2015; 28: 721-31.
- [4] Mariani O, Brennetot C, Coindre JM, Gruel N, Ganem C, Delattre O, Stern MH, Aurias A. JUN oncogene amplification and overexpression block adipocytic differentiation in highly aggressive sarcomas. *Cancer Cell* 2007; 11: 361-74.
- [5] Inatani H, Yamamoto N, Hayashi K, Takeuchi A, Miwa S, Higuchi T, Abe K, Taniguchi Y, Yamada S, Asai K, Otsuka T, Tsuchiya H. Do mesenchymal stem cells derived from atypical lipomatous tumors have greater differentiation potency than cells from normal adipose tissues? *Clin Orthop Relat Res* 2017; 475: 1693-1701.
- [6] Derbel O, Heudel PE, Cropet C, Meeus P, Vaz G, Biron P, Cassier P, Decouvelaere AV, Ranchere-Vince D, Collard O, De Laroche E, Thiesse P, Farsi F, Cellier D, Gilly FN, Blay JY, Ray-Coquard I. Survival impact of centralization and clinical guidelines for soft tissue sarcoma (A prospective and exhaustive population-based cohort). *PLoS One* 2017; 12: e0158406.
- [7] Nassif NA, Tseng W, Borges C, Chen P, Eisenberg B. Recent advances in the management of liposarcoma. *F1000Res* 2016; 5: 2907.
- [8] Miuran K, Hamanaka K, Matsuoka S, Takeda T, Agatsuma H, Hyogotani A, Ito KI, Nishimaki F, Koizumi T, Uehara T. Primary mediastinal dedifferentiated liposarcoma: five case reports and a review. *Thorac Cancer* 2018; 9: 1733-1740.