Malignant mesenchymoma of the pleura

Gaëtan Deslée, Pierre José Guillou, Bernard Baehrel, François Lebargy

*Department of Respiratory Medicine, University Hospital, Reims, France
bDepartment of Pathology, University Hospital, Reims, France
cDepartment of Thoracic Surgery, University Hospital, Reims, France

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Abstract
Malignant mesenchymomas are rare soft tissue tumors of mesenchymal origin. We report a case of pleural localization with liposarcomatous, leiomyosarcomatous and osteocartilaginous elements. The treatment associated surgical resection, chemotherapy and radiotherapy. Sixteen months after the diagnosis a metastatic retroperitoneal sarcoma with osteosarcomatous differentiation appeared without any sign of thoracic recurrence. A surgical resection was performed, but a rapid retroperitoneal recurrence led to death.

Keywords: Malignant mesenchymoma; Pleura; Sarcoma; Soft tissue

1. Introduction
Malignant mesenchymomas are uncommon soft tissue tumors that are composed of two or more different types of malignant mesenchymomal differentiation in addition to any undifferentiated or fibrosarcomatous elements [1–3]. These tumors predominantly involve retroperitoneum and thigh. However, thoracic localization has been described involving heart [4], chest wall [5], lung [6] and pleura [7,8]. We report herein a case of pleural localization of malignant mesenchymoma that fully meets the histologic definition.

2. Case report
A 39-year-old woman was admitted to hospital because of shortness of breath, cough, right-sided chest pain for 2 months and weight loss of 3 kg. The patient had a smoking history of 10 pack-years. On physical examination, the positive findings were limited to the right side of the chest. Dullness to percussion throughout the right lung and absence of breath sounds were noted. Chest radiography and CT scan of chest revealed a large heterogeneous mass with calcifications on the right side (Fig. 1). Bronchoscopy showed extrinsic compression of the right upper lobe. Bronchial biopsies and bronchial washing were negative for tumor cells. Laboratory data were within normal limits. Brain CT scan, bone scan, abdominal pelvic CT scan and abdominal ultrasonography did not reveal any other localization. Fine-needle aspiration biopsy of the intra-thoracic mass showed liposarcomatous differentiation. A right thoracotomy was performed and revealed a voluminous mass in the pleura occupying two-thirds of the right chest. The tumor was markedly adherent to the mediastinum, the diaphragm and to the middle and lower lung. The tumor was easily cleaved from adherent elements and resected 'en bloc' with a portion of diaphragm which was primary closed. The mass measured 26 x 18 x 8 cm and weighed 2 kg. The cut surface was variably white, gray and yellow with patchy areas of calcifications. Microscopic examination and immunohistochemical study revealed three clearly distinct types of malignant mesenchymomal differentiation (Fig. 2): (i) liposarcoma positive for anti-vimentin and antiboby S-100 protein; (ii) osteochondrosarcoma positive for anti-vimentin; and (iii) leiomyosarcoma positive for anti-vimentin, anti smooth muscle actin and anti-desmin. All the epithelial markers (epithelial membrane antigen, cytokeratins of low and high molecular weight) were negative. An adjuvant treatment associated chemotherapy (doxorubicine-ifosfamide) and thoracic radiation therapy (55 Gray). The patient was then regularly seen for
Sixteen months later, physical examination revealed an asymptomatic mass in the left flank. Abdominal ultrasonography and abdominal pelvic CT scan showed a voluminous left retroperitoneal mass. CT scan of chest did not reveal any sign of local recurrence. The patient underwent a surgical resection of the retroperitoneal mass. Microscopic examination revealed an osteosarcomatous differentiation extending to the mesocolon. Four weeks after resection, a local recurrence of the retroperitoneal mass appeared with major asthenia, anorexia and weight loss of 21 kg. A surgical resection was not possible because of poor general state. The patient died 19 months after the diagnosis of malignant mesenchymoma of the pleura.

**Fig. 1.** CT scan of chest showing a voluminous heterogeneous mass in the right side.

**Fig. 2.** Pathology demonstrates three clearly distinct types of mesenchymal differentiation (hematoxylin-eosin staining). Top left: osteochondrosarcoma (original 400×). Top right: liposarcoma with lipoblasts containing round empty vacuoles that scallop the nucleus (original 1000×). Bottom left: leiomyosarcoma characterized by malignant spindle cells that have cigar-shaped nuclei arranged in interweaving fascicles (original 100×). Bottom right: Immunohistochemical study demonstrates intense actine smooth muscle immunoreactivity in leiomyosarcoma areas (clone HHF35, Dako) (original 200×).
3. Discussion

The term ‘malignant mesenchymoma’ was introduced by Stout [1] in 1948 to define tumors of the soft tissues of mesenchymal origin, which are composed of two or more cellular types any of which, if taken by itself might be considered a primary malignant neoplasm. Since fibrosarcomatous areas were noticed in most of the mesenchymal tumors, Stout [2] noted that this form was not to be counted as one of the two elements required. More recently, Enzinger and Weiss [3] advised the use of Stout’s criteria and insisted on the fact that each of the two or more tissue elements has to be sufficiently differentiated to permit clear recognition of its histogenetic type with the light microscope, immunohistochemically or ultrastructurally. In our case, three clearly distinct types of malignant mesenchymal differentiation were found, justifying the term of malignant mesenchymoma. It may be hypothesized that the heterogeneous mesenchymal tissue is developed in the pleura by a process of metaplasia from pluripotential undifferentiated mesenchyma. However, the origin of malignant mesenchymoma in the pleura is uncertain and a diaphragmatic origin can not be excluded. Furthermore, the metastatic nature of the retroperitoneal osteosarcoma can be discussed. However, considering the absence of retroperitoneal tumor at the diagnosis and the presence of the osteosarcomatous differentiation in the pleural tumor, a metastasis is more likely than a primary osteosarcoma.

The last two series of malignant mesenchymomas [9,10] reported respectively nine and eight cases. Both series were alike with regard to the localization (predominantly on the retroperitoneum and the thigh, but no pleural localization), to the histology (lipoblastic, rhabdomyoblastic and osteocartilaginous differentiation) and to the age of the patients (median, 55 and 41 years). Only the prognosis differed. For Newman and Fletcher [9], a malignant mesenchymoma is not as aggressive as the histology could imply since only two local recurrences and one death from tumor were reported. For Brady et al. [10], it is a particularly aggressive form of soft tissue sarcoma with recurrence in all the cases (six local recurrences and two lung metastasis) and six deaths from tumor. However, the limited number of patients makes it difficult to come to a definitive conclusion about the prognosis.

We could only find two cases of malignant mesenchymoma of the pleura in the literature, which fully meet the histologic definition. Rhabdomyosarcomatous, liposarcomatous and chondrosarcomatous elements were found in both cases [7,8] with in addition osteosarcomatous elements in one case [8]. Both cases [7,8] involved male adults (54 and 69 years). Radiological presentation was not specific and showed in all the cases a voluminous hemithoracic mass. Fine needle thoracic aspiration biopsy was wrongly interpreted as showing undifferentiated large cell carcinoma in one case [8], although it showed liposarcomatous differentiation in our case. Autopsy revealed the diagnosis in the two cases [7,8] whereas our diagnosis was obtained in vivo at thoracotomy. No specific treatment was performed in these two cases and early death occurred.

Complete surgical resection is the most effective treatment of malignant mesenchymomas. However, palliative resection of massive tumor provides satisfying symptomatic results [5,6]. Chemotherapy and radiotherapy have little effect. Despite combination of surgical resection, chemotherapy and radiotherapy, our patient died with a retroperitoneal metastasis in 18 months.

References