

Alveolar-filling growth pattern of sarcomatoid malignant pleural mesothelioma

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Abstract

A case of sarcomatoid malignant pleural mesothelioma showing extremely rare growth pattern is described. A 63-year-old man presented to our hospital with left pleural effusion. A computed tomography (CT) scan of the chest showed diffusely thickened left visceral and parietal pleura associated with intermingled pulmonary infiltrative shadowing. Biopsy of the pleura under general anaesthesia confirmed the diagnosis of sarcomatoid malignant pleural mesothelioma. The patient underwent left extra-pleural pneumonectomy. Histopathologically, the sarcomatoid spindle tumour cells changed their morphology to polygonal cells in the pulmonary parenchyma and grew upwards, filling the alveolar space without the destruction of its septa, showing an alveolar-filling growth pattern. The current report indicates a case of sarcomatoid pleural mesothelioma that shows an alveolar-filling growth pattern, despite having not been thoroughly categorized in the World Health Organization (WHO) classification.

Introduction

Malignant pleural mesothelioma is a tumour arising from mesothelial cells, which proliferate along with the parietal and visceral pleura. We encountered a case of sarcomatoid malignant pleural mesothelioma showing an extremely rare alveolar-filling growth pattern, in which the tumour cells invaded the pulmonary parenchyma and proliferated to fill the alveolar space, without destroying the pre-existing elastic framework of the alveolar septa. Only three cases of malignant pleural mesothelioma showing alveolar-filling growth pattern have been previously reported, and this is the first case that has been examined in detail using immunohistochemical findings.

Case Report

A 63-year-old man presented to our hospital with left pleural effusion. A computed tomography (CT) scan of the chest showed diffusely thickened left visceral and parietal pleura associated with intermingled pulmonary infiltrative

shadowing (Fig. 1). Biopsy of the pleura under general anaesthesia confirmed the diagnosis of sarcomatoid malignant pleural mesothelioma. Positron emission tomography-computed and magnetic resonance imaging detected no distant metastatic lesions in other organs. Upon the diagnosis of stage III c-T3N2M0 sarcomatoid malignant pleural mesothelioma, the patient underwent left extra-pleural pneumonectomy. The tumour was non-resectable because of peritoneal dissemination beyond the diaphragm and direct invasion of the descending aorta. The patient suffered a cardiopulmonary arrest due to lethal arrhythmia on postoperative day 14. Although a series of resuscitation procedures succeeded in temporary recovery, he died on postoperative day 39 due to multiple organ failure.

Histopathological examination revealed proliferation of spindle tumour cells with strong nuclear atypia along with the entire parietal and visceral pleura associated with central necrosis. The tumour cells proliferating along with the pleura presented typical morphology of sarcomatoid pleural mesothelioma. However, once the spindle tumour cells had infiltrated the internal elastic lamina into the pulmonary

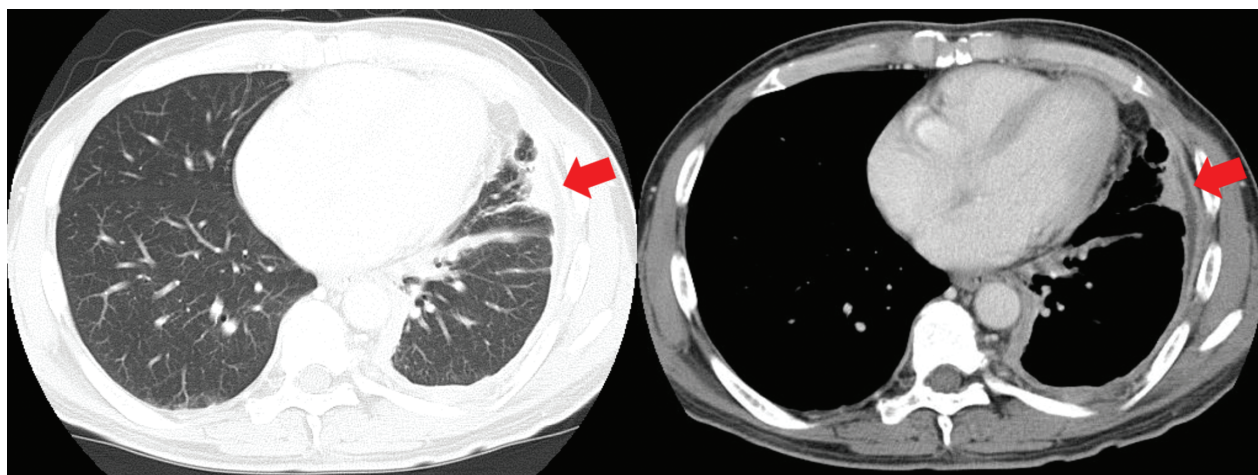


Figure 1. A computed tomography (CT) scan of the chest showed diffusely thickened left visceral and parietal pleura associated with intermingled pulmonary infiltrative shadowing (arrows).

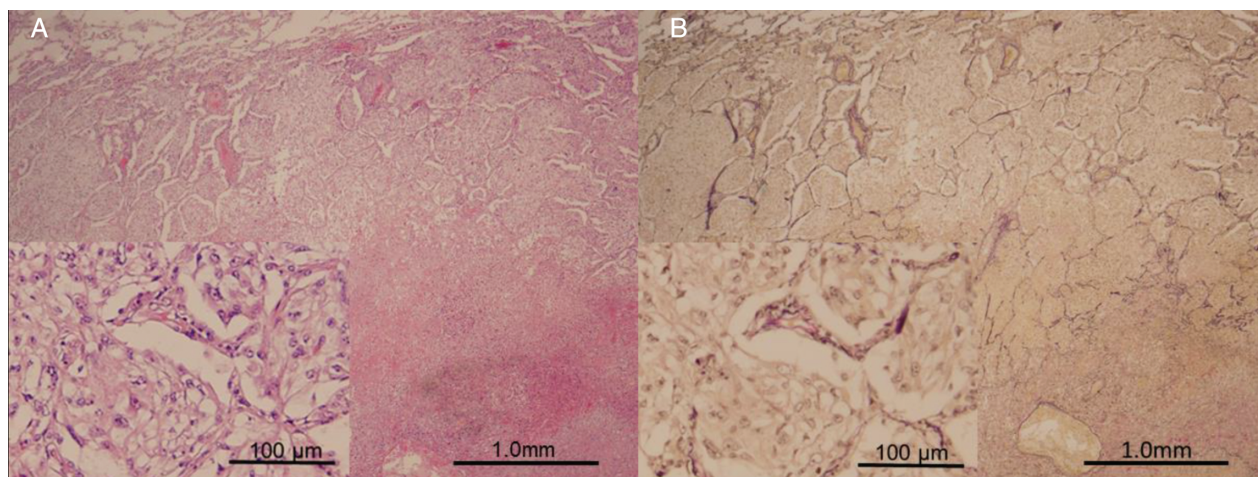


Figure 2. (A) Haematoxylin and eosin (H&E) staining showed the spindle tumour cells proliferated along with the pleura, but in the pulmonary parenchyma, the polygonal tumour cells grew upwards, filling the alveolar space. (B) Elastic van Gieson (EVG) staining revealed no destruction of the alveolar septa.

parenchyma, the tumour cells changed morphology to polygonal cells, forming clusters that filled the alveolar spaces. These alveolar-filling cells showed progression via the pores of Kohn into adjacent alveoli, with no destruction of the alveolar septa (Fig. 2A,B). Immunohistochemical examination demonstrated that CK5/6 and Calretinin showed diffuse expression in both spindle and polygonal tumour cells. The interesting finding is that the sarcomatoid spindle tumour cells were negative for epithelial membrane antigen (EMA), but the polygonal cells were positive for EMA.

Discussion

Here, a rare case of sarcomatoid malignant pleural mesothelioma is presented, in which sarcomatoid spindle

tumour cells, proliferating in the thoracic cavity, changed their morphology to polygonal tumour cells following invasion into the pulmonary parenchyma, showing an alveolar-filling growth pattern.

Malignant pleural mesothelioma originates from the mesothelium of the parietal pleura and typically proliferates along with the pleura. Nind *et al.* [1] reported that the patterns of pulmonary parenchymal growth of malignant pleural mesothelioma were almost directly subpleural or lymphangitic. Among 200 malignant pleural mesothelioma (1.5%) and 25 sarcomatoid malignant pleura mesothelioma (12%) cases, only three cases of sarcomatoid malignant pleural mesothelioma were detected, in which tumour cells grew upwards, filling the alveolar space. They expressed this growth pattern as “intra-alveolar growth pattern

(epithelioid haemangioendothelioma-like pattern).” This pattern is seen only in cases of sarcomatoid subtypes. The current case was a sarcomatoid subtype, too. Funai *et al.* [2] reported a similar alveolar-filling growth pattern of peripheral squamous cell carcinoma of the lung. On the other hand, epithelioid subtype can show a “bronchioloalveolar carcinoma-like pattern,” spreading along the alveoli. In the current case, the tumour cells at the pleura presented typical morphology of sarcomatoid pleural mesothelioma. However, once the spindle tumour cells had infiltrated the internal elastic lamina into the pulmonary parenchyma, the tumour cells changed their morphology to polygonal cells. Moreover, EMA staining was negative in the spindle cells but positive in the alveolar-filling lesion. The tumour cells acquired an epithelial character within the pulmonary parenchyma, and kept their sarcomatoid character, reflected by the positivity for CK5/6.

Generally, the common CT findings of malignant pleural mesothelioma include diffuse thickened pleura and a nodular shadow in the pulmonary parenchyma [3], with an infiltrative shadow of the lung being rather atypical. The infiltrative shadow on CT seen in the current case reflected the special histopathological feature of the tumour cells that had invaded the pulmonary parenchyma, filling the alveolar space.

Although the alveolar-filling growth pattern of malignant pleural mesothelioma is not described in the current World Health Organization (WHO) classification [4], the present case shows evidence that a rare growth pattern of sarcomatoid malignant pleural mesothelioma surely exists.

A rare case of sarcomatoid malignant pleural mesothelioma is described, in which the tumour cells changed their morphology to polygonal cells in the pulmonary parenchyma

and grew upwards, filling the alveolar space without the destruction of its septa. The current case indicates that sarcomatoid malignant pleural mesothelioma can show an alveolar-filling growth pattern, despite having not been thoroughly categorized in the WHO classification previously.

Disclosure Statements

No conflict of interest declared.

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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