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Primary Pulmonary Sarcomatoid Carcinomas: a Report of two Cases

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Abstract

Sarcomatoid carcinomas (SC) are rare non-small cell lung cancers (NSCLCs), accounting for less than **1% of lung cancers**. They are characterised by a spindle-shaped or giant cell component suggestive of a sarcoma. We report two cases in patients aged 80 and 75, both former smokers, illustrating the extreme aggressiveness of this condition. In both cases, the course of the disease was marked by rapid local and metastatic progression, leading to death within **six months** of diagnosis. This study highlights the diagnostic challenges and poor prognosis of these tumours, which are often resistant to conventional therapies.

Keywords: Sarcomatoid carcinoma, NSCLC, Rare tumour, Prognosis, Tumour aggressiveness.

1. Introduction

Primary sarcomatoid carcinomas of the lung constitute a heterogeneous group of poorly differentiated carcinomas. According to the **2021 WHO** classification, they comprise five subtypes: pleomorphic carcinoma, giant cell carcinoma, spindle cell carcinoma, carcinoblastoma and carcinosarcoma. Characterised by an **epithelial-mesenchymal transition**, these cancers are known for their rapid growth, high metastatic potential and relative resistance to conventional platinum-based chemotherapy (Kharouaa et al., 2024).

2. Clinical Observations

We report two clinical cases illustrating the rapidly progressive course of this condition. The first patient, aged 80, a chronic smoker who had quit 2 years ago at the age of 55, presented with a mass in the left upper lobe discovered incidentally following a chest injury. Radiological follow-up showed rapid growth of the mass, associated with mediastinal lymphadenopathy and secondary brain and bone metastases on PET-CT. Pathological examination confirmed pulmonary sarcomatoid carcinoma. The course of the disease was marked by a rapid deterioration in the patient's general condition, and the patient died (3 months after the mass was discovered). The second patient is a 75-year-old man, a former smoker for 40 pack-years, who presented with progressive exertional dyspnoea (MRC grade 4), a dry cough and left-sided chest pain. A chest CT scan revealed a 75 × 44 mm left parahilar mass with mediastinal lymphadenopathy and a satellite nodule, classified as stage IIIA. Bronchoscopy showed diffuse tumour infiltration of the left bronchial tree. Histological and immunohistochemical analysis confirmed a primary pulmonary sarcomatoid carcinoma ( ). Death occurred within 5 months of the discovery of the condition (Derfoufi et al., 2024).

Summary Table

Parameter	Case No. 1	Case No. 2
Age / Smoking	80 years / 55 PA	75 years / 40 pack-years
Tumour size	Progressive	75 mm
Initial stage	IV (Brain, Bone)	IIIA
Overall survival	3 months	5 months

3. Discussion

3.1. A Diagnostic and Histopathological Challenge

Sarcomatoid carcinoma (SC) is not a single entity, but a heterogeneous group. The main difficulty lies in the **epithelial-mesenchymal transition (EMT)**: cancer cells lose their epithelial characteristics (cohesion) to acquire a mesenchymal phenotype (mobility and spindle-shaped form) (Erefai et al., 2022).

- **WHO 2021 criteria:** To make the diagnosis, the tumour must contain at least **10% spindle-shaped or giant cells**, or be a carcinosarcoma (a mixture of carcinoma and true heterologous sarcoma, such as osteosarcoma).

- **Immunohistochemical (IHC) profile:** In both cases, IHC is the deciding factor. CSPs often express **vimentin** (a mesenchymal marker), whereas classic epithelial markers such as **cytokeratins (AE1/AE3)** or **TTF-1** may be focally negative or very weakly expressed, which can lead to a misdiagnosis as a primary thoracic sarcoma.

3.2. Unusual Tumour Kinetics

The striking feature of your observations is the rapidity of progression (death within 3 and 5 months). Unlike classic adenocarcinoma, CSP has an **extremely high Ki-67 proliferation index** and a tendency towards massive tumour necrosis (Khadrouf et al., 2025).

- **Tumour volume:** The size at diagnosis is often substantial (75 mm in your second case). This large mass explains the early invasion of adjacent structures (pleura, chest wall, mediastinum).

- **Metastatic tropism:** CSP has a particular affinity for unusual metastatic sites (the digestive tract, kidney, pancreas) in addition to the classic sites (brain and bone, as in your first patient).

3.3. The Molecular Revolution: The MET Pathway

For a long time, CSP was considered to have no effective treatment. However, recent advances have identified specific therapeutic targets:

- **MET alterations: The MET exon 14 skip (METex14)** is present in **20–30%** of sarcomatoid carcinomas, compared with only 3% in other NSCLCs. It is a 'driver' mutation that stimulates cell growth.

- **Targeted therapies:** The use of MET inhibitors (tepotinib, capmatinib) has shown promising results, although the aggressiveness of the tumour often limits the therapeutic window of opportunity.

3.4. The Role of Immunotherapy

SCP very frequently expresses the **PD-L1** ligand (often > 50%). This high expression is paradoxical: the tumour uses PD-L1 to suppress the immune system, but this makes it a theoretically ideal target for **checkpoint inhibitors (immunotherapy)**. Despite this, the rapid deterioration in general condition (as seen in your patients) often prevents the implementation of these protocols (Aazzane et al., 2024).

3.5. Comparison with the Literature

Your cases are consistent with series in the literature (such as that from the *Mayo Clinic* or the French *GFPC* study), where:

- The prognosis correlates with the TNM stage, but remains poor even in early stages.

- Resistance to conventional chemotherapy (platinum salts + gemcitabine) is the norm, with response rates rarely exceeding 15–20%.

5. Conclusion

Pulmonary sarcomatoid carcinomas are tumours with **a very poor prognosis**, characterised by exceptional local and systemic aggressiveness. The diagnosis is often made at an advanced stage where surgical options are limited. A better

understanding of molecular alterations, particularly the MET pathway, is essential if we are to improve survival in these patients.

Clinical Message: In the presence of an unusually rapidly growing pulmonary mass in an elderly smoker, the diagnosis of sarcomatoid carcinoma should be considered at an early stage.

Recommended references for your tutor:

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