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Rapidly Progressive Primary Pleural Myxoid Sarcoma: Diagnostic Challenges and the Critical Role of FDG PET-CT Staging

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ABSTRACT

A 43-year-old agricultural labourer with a 20-year history of occupational pesticide exposure presented with a 2-month history of progressive right-sided chest pain. Imaging revealed a massive right pleural-based myxoid spindle cell tumour (28.1 × 18.9 × 20.5 cm). Whole-body ^{18}F-fluorodeoxyglucose (FDG) PET-CT demonstrated an extensively metabolically active primary pleural mass with widespread metastatic dissemination involving pulmonary, nodal, skeletal, gluteal soft tissue, paravertebral, and suspected cerebral sites, establishing Stage IV disease at initial presentation. Histopathology showed a myxoid spindle cell sarcoma with extensive necrosis. Immunohistochemistry demonstrated vimentin and C-KIT positivity with focal synaptophysin expression; a comprehensive negative panel (cytokeratin, calretinin, D2-40, STAT6, TLE-1, DOG-1, S-100, desmin) excluded carcinoma, mesothelioma, solitary fibrous tumour, synovial sarcoma, and gastrointestinal stromal tumour. The pathological differentials were extraskeletal myxoid chondrosarcoma versus primary pulmonary myxoid sarcoma, with molecular confirmation pending. This case highlights the critical diagnostic and staging value of FDG PET-CT in rapidly progressive primary pleural sarcomas.

Keywords: Extraskeletal myxoid chondrosarcoma; FDG PET-CT; Primary pleural sarcoma; Primary pulmonary myxoid sarcoma; Spindle cell sarcoma; C-KIT positive sarcoma; EWSR1-NR4A3 fusion

INTRODUCTION

Primary pleural sarcomas are exceptionally rare malignancies with a heterogeneous histological spectrum. Among these, extraskeletal myxoid chondrosarcoma (EMC) and primary pulmonary myxoid sarcoma (PPMS) represent two of the most diagnostically challenging entities, sharing overlapping morphological and immunohistochemical (IHC) features and requiring molecular confirmation for definitive classification.[1,2] Both entities carry prognostic and therapeutic implications that differ substantially from the more common pleural malignancies — mesothelioma and metastatic carcinoma — making accurate diagnosis imperative.

FDG PET-CT has transformed oncological staging, enabling detection of occult metastatic deposits and guiding treatment intent in thoracic malignancies. Its application in rare pleural sarcomas, however, remains underreported.[5] We report a case of a rapidly progressive primary pleural myxoid sarcoma with Stage IV dissemination at initial presentation, emphasising the diagnostic utility of a systematic IHC panel and the indispensable role of whole-body FDG PET-CT in staging.

CASE REPORT

A 43-year-old male agricultural labourer with a 20-year history of occupational pesticide exposure and a history of chronic smoking presented to our tertiary care centre with a 2-month history of progressive right-sided chest pain and non-productive cough. Physical examination revealed markedly reduced breath sounds over the right hemithorax with no peripheral lymphadenopathy.

Contrast-enhanced CT (CECT) of the thorax identified a large pleural-based mass in the right hemithorax. Ultrasonography-guided fine-needle aspiration cytology (FNAC) was highly suggestive of malignancy. Whole-body ^{18}F-fluorodeoxyglucose (FDG) PET-CT was performed on a Siemens Biograph Horizon LSO crystal-based integrated PET-CT scanner (3.07 mCi/113.59 MBq intravenous ^{18}F-FDG; uptake time 45–60 minutes; fasting blood glucose 93 mg/dL) for comprehensive staging.

Imaging Findings

PET-CT demonstrated a diffuse, multilobulated, heterogeneously enhancing pleural-based mass with cystic/necrotic areas and lobulated margins in the right hemithorax, measuring approximately 28.1 cm (craniocaudal) × 18.9 cm (width) × 20.5 cm (anteroposterior), SUVmax 8.9 (Figures 1 and 2). The mass caused mild anterior mediastinal invasion, posterior mediastinal insinuation with impingement on the mid/lower thoracic oesophagus and descending thoracic aorta, and mild mediastinal shift to the left. Moderate-to-gross passive atelectatic changes were noted in the underlying right lung.

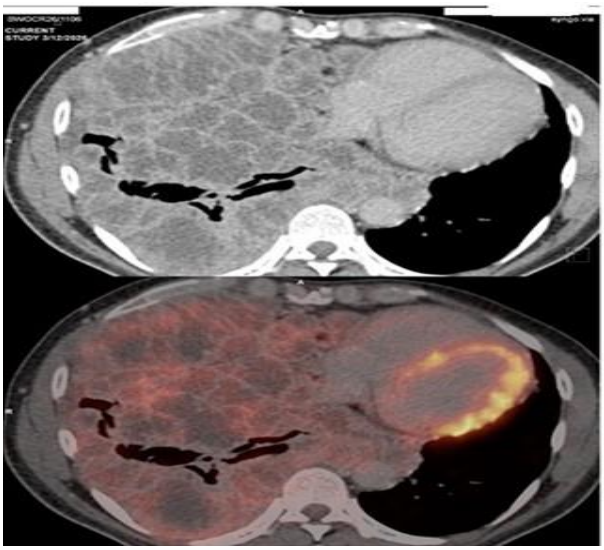

Figure1: Axial CECT (upper) and fused PET–CT (lower) — inferior pleural mass with heterogeneous metabolic activity and extraneous posterior mediastinal impingement.

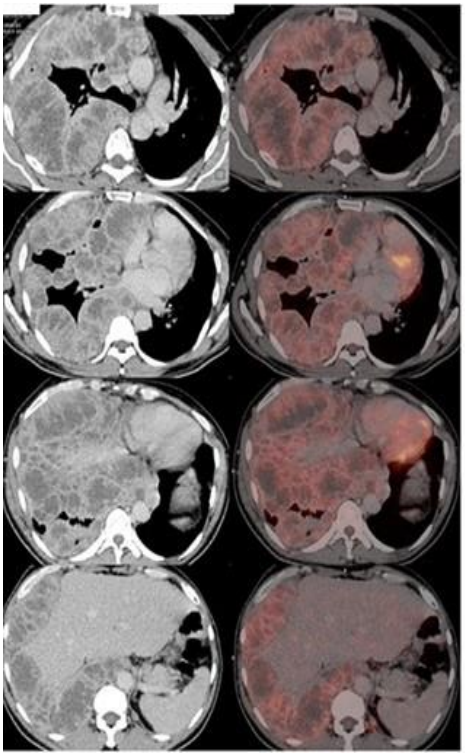

Figure 2: Multi-level axial CT and fused PET–CT of thorax — heterogeneous metabolic activity (SUVmax 8.9) with intensely FDG-avid mediastinal nodes (SUVmax 7.6).

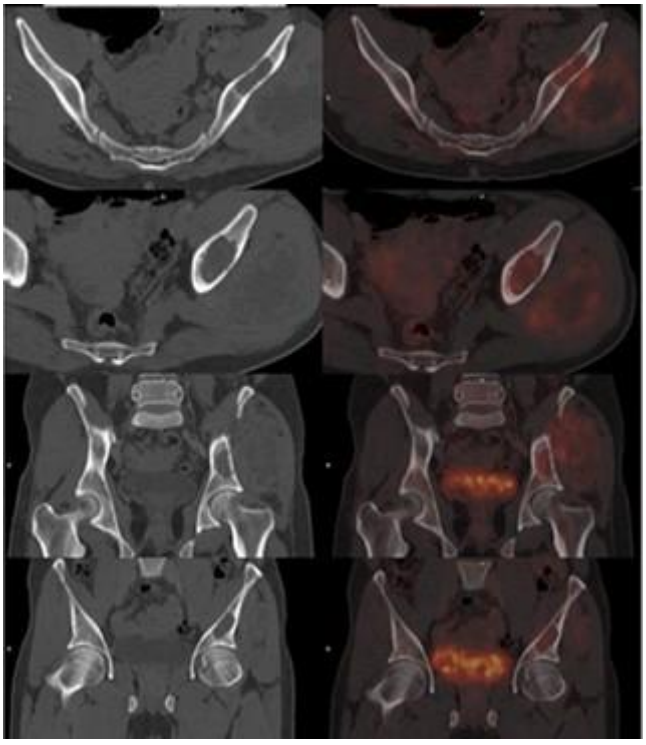

Figure 3: Multi-panel pelvic CT and fused PET–CT — FDG-avid lytic lesions in left iliac bone/acetabulum and large left gluteal soft tissue nodule (7.9 × 6.3 cm, SUVmax 8.9) with cystic/necrotic areas.

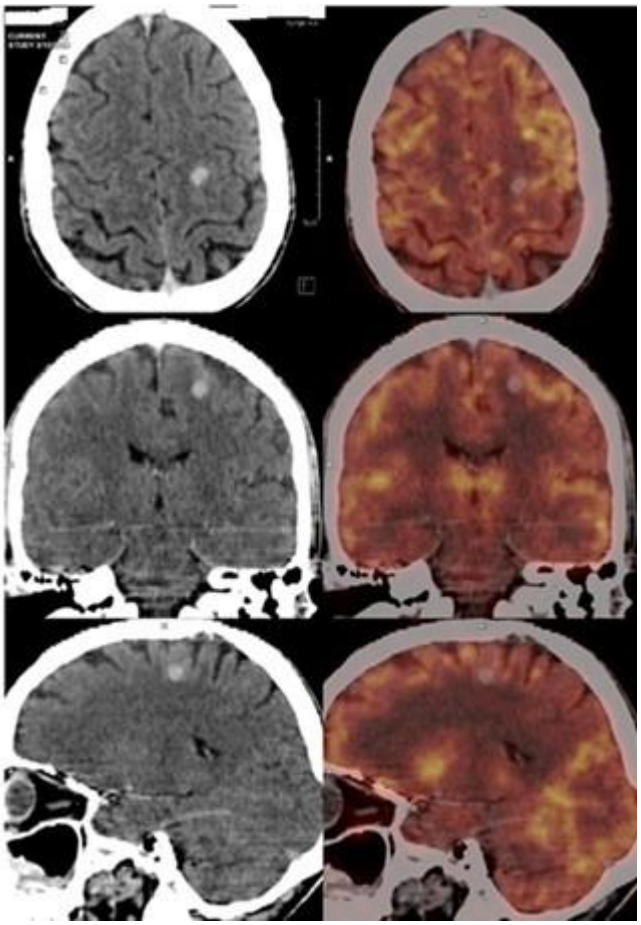

Figure 4: Multi-planar brain CT and fused PET–CT — enhancing left frontal subcortical nodule (0.9 × 0.8 cm) suspicious for cerebral metastasis; no other intracranial abnormality.

Multiple faintly FDG-avid and non-FDG-avid subpleural lung nodules were identified bilaterally (largest 1.9 × 1.8 cm, SUVmax 2.9). Multiple FDG-avid mediastinal lymph nodes were noted in the prevascular, pretracheal/paratracheal, subcarinal, aortopulmonary window, and right hilar regions (largest 2.9 × 1.7 cm, SUVmax 7.6). An FDG-avid D11–D12 paravertebral soft tissue nodule measured 1.6 × 1.3 cm (SUVmax 7.2). FDG-avid lytic lesions were identified in the left iliac bone (SUVmax 5.8) and left acetabulum (SUVmax 6.5). An FDG-avid heterodense nodule with cystic/necrotic areas in the left gluteus muscle plane measured 7.9 × 6.3 cm (SUVmax 8.9). An enhancing nodule with minimal perilesional oedema in the left high frontal subcortical white matter (0.9 × 0.8 cm) was identified, suspicious for cerebral metastasis. Whole-body PET maximum intensity projection (MIP) coronal images strikingly demonstrated the global extent of FDG-avid disease, confirming Stage IV dissemination at initial presentation.

Pathological Findings and Immunohistochemistry

CT-guided core needle biopsy of the pleural mass revealed a spindle cell sarcoma with myxoid features and extensive necrosis. A comprehensive 14-marker IHC panel was performed (Table 1). The tumour showed vimentin positivity, confirming mesenchymal lineage, and C-KIT (CD117) positivity, with focal synaptophysin expression in few cells. The comprehensive negative panel — cytokeratin (AE1+AE3), calretinin, D2-40, STAT6, TLE-1, DOG-1, S-100, and desmin — systematically excluded carcinoma, mesothelioma, solitary

fibrous tumour (SFT), synovial sarcoma, malignant peripheral nerve sheath tumour (MPNST), and gastrointestinal stromal tumour (GIST). Patchy smooth muscle actin (SMA) positivity reflected focal myofibroblastic differentiation.

The reporting pathologist concluded that the differentials were *primary pulmonary myxoid sarcoma (PPMS)* versus *extraskeletal myxoid chondrosarcoma (EMC)*, with EMC favoured given the C-KIT positivity and focal synaptophysin expression in the context of myxoid morphology and extensive necrosis. Molecular studies for a sarcoma panel (including EWSR1/NR4A3 rearrangement by FISH) were recommended for definitive confirmation. The patient was initiated on systemic chemotherapy and remains under active multidisciplinary follow-up.

Table 1: Immunohistochemistry panel — CT-guided core needle biopsy from right pleural-based mass.

Marker	Result	Diagnostic Significance
CK (AE1+AE3)	Negative	*Excludes carcinoma; against epithelioid mesothelioma*
Vimentin	**Positive**	*Confirms mesenchymal lineage*
Calretinin	Negative	*Against mesothelioma*
D2-40	Negative	*Against mesothelioma and lymphatic tumour*
SMA	**Patchy positive**	*Focal myofibroblastic differentiation*
Desmin	Negative	*Against rhabdomyosarcoma/leiomyosarcoma*
CD34	Negative	*Against solitary fibrous tumour*
S-100	Negative	*Against malignant peripheral nerve sheath tumour*
C-KIT (CD117)	**Positive**	*Supports extraskeletal myxoid chondrosarcoma; against GIST (DOG-1 negative)*
STAT6	Negative	*Definitively excludes solitary fibrous tumour*
DOG-1	Negative	*Excludes GIST*
P63	Negative	*Against squamous/myoepithelial differentiation*
Synaptophysin	**Positive (few cells)**	*Focal; supports extraskeletal myxoid chondrosarcoma over neuroendocrine tumour*
TLE-1	Negative	*Effectively excludes synovial sarcoma*

Abbreviations: CK, cytokeratin; EMC, extraskeletal myxoid chondrosarcoma; GIST, gastrointestinal stromal tumour; MPNST, malignant peripheral nerve sheath tumour; SFT, solitary fibrous tumour; SMA, smooth muscle actin.

DISCUSSION

This case illustrates the diagnostic complexity of primary pleural myxoid sarcomas, a heterogeneous group of rare tumours with overlapping histomorphological and IHC features. The final pathological differentials — PPMS and EMC — represent two of the most diagnostically challenging entities in thoracic sarcoma pathology.[1,2]

EMC, favoured by the pathologist in this case, is a rare low-to-intermediate grade sarcoma characterised by multinodular myxoid architecture and uniform round-to-spindle cells arranged in cords and clusters. C-KIT (CD117) positivity, as seen here, has been reported in up to 30–40% of EMC cases.[3] Focal synaptophysin expression is well-recognised in EMC and represents a known diagnostic pitfall that can mislead toward neuroendocrine diagnoses.[3] The pathognomonic molecular alteration of EMC is the *EWSR1–NR4A3* (or less commonly *TAF15–NR4A3*) gene fusion, detectable by FISH or RNA sequencing — recommended but not yet performed in this case.[3]

The alternative diagnosis, PPMS, is an even rarer entity characterised by EWSR1 rearrangement (typically *EWSR1–CREB1* or *EWSR1–ATF1* fusions), myxoid stroma, and a predilection for younger patients.[2] Both entities belong to the *EWSR1*-rearranged sarcoma family, further supporting the recommendation for a molecular sarcoma panel.

The IHC profile in this case is particularly instructive. The negative panel — CK (no carcinoma), calretinin and D2-40 (no mesothelioma), STAT6 (no SFT), TLE-1 (no synovial sarcoma), S-100 (no MPNST), and DOG-1/CD34 (no GIST/SFT) — systematically narrows the differential to a myxoid sarcoma with C-KIT expression.[1,4] Critically, C-KIT positivity in this pleural context should not suggest GIST, which requires DOG-1 positivity and a gastrointestinal primary; it should instead prompt consideration of EMC.

The extraordinary primary lesion size (28.1 × 18.9 × 20.5 cm, SUVmax 8.9) at presentation is characteristic of thoracic myxoid sarcomas, which tend to grow silently within the pleural space before becoming symptomatic. FDG PET-CT proved indispensable in this case, revealing skeletal, soft tissue, paravertebral, and cerebral disease not apparent on anatomical CT alone, fundamentally altering the staging from locoregional to Stage IV and directing systemic rather than surgical therapy.[5] The patient's 20-year pesticide exposure history is a biologically plausible aetiological cofactor; chemical carcinogen exposure has been linked to soft tissue sarcomas in epidemiological studies.[4]

CONCLUSION

This case underscores three key lessons for clinicians encountering large pleural masses. First, a systematic negative IHC panel is as diagnostically informative as positive markers and should be methodically reported. Second, EMC and PPMS must be considered in the differential diagnosis of any primary pleural myxoid spindle cell tumour; definitive separation requires molecular testing. Third, whole-body FDG PET-CT is essential for comprehensive staging and may detect occult skeletal, soft tissue, and cerebral deposits not apparent on

anatomical CT, fundamentally altering management intent. Occupational carcinogen exposure should be elicited in younger patients with rare pleural malignancies.

Ethical Statement and Patient Consent

Informed written consent for publication of this case and all associated imaging and pathological data was obtained from the patient. All patient-identifying information has been anonymised. Institutional ethical approval was not required for this case report.

Conflicts of Interest

The authors declare no conflicts of interest.

REFERENCES

1. Al-Khayat S, Bhatt N, Baig MZ, et al. Primary pleural sarcoma: a systematic review of the literature. Lung Cancer. 2021;158:1–9.
2. Bode-Lesniewska B, Frigerio S, Exner U, et al. Primary pulmonary myxoid sarcoma with EWSR1-CREB1 translocation. Am J Surg Pathol. 2013;37(12):1777–1786.
3. Meis-Kindblom JM, Bergh P, Gunterberg B, Kindblom LG. Extraskeletal myxoid chondrosarcoma: a reappraisal of its morphologic spectrum and prognostic factors based on 117 cases. Am J Surg Pathol. 1999;23(6):636–650.
4. Wambua MW, Hansen J, Uggerby AV, et al. Pesticide exposure and risk of soft tissue sarcoma: systematic review and meta-analysis. Int J Cancer. 2023;152(7):1357–1368.
5. Paoli A, Manfrin E, Brunelli M, et al. FDG PET-CT in the staging and restaging of soft tissue sarcomas: a systematic review. Eur J Nucl Med Mol Imaging. 2022;49(3):801–815.