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UNVEILING THE UNCOMMON: A RARE CASE OF SARCOMATOID CARCINOMA

Histopathology

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ABSTRACT

Sarcomatoid carcinoma is a rare tumor, characterized by cells that exhibit properties of both epithelial and mesenchymal tumors. It can arise in various organs, including the skin, bone, thyroid, breast, liver, pancreas, urinary tract, and lungs.[1] Clinical manifestations can vary widely and may include chest pain, dyspnea, cough, and hemoptysis. Sarcomatoid carcinoma is notably aggressive, with an overall 5-year survival rate of approximately 20%. Most cases are diagnosed at advanced stages with local disease and metastasis, particularly in the lung, where pulmonary sarcomatoid carcinomas account for less than 1% of all lung cancers.[2] Most cases of sarcomatoid carcinomas occur with advanced local disease and metastasis. Histologically, pulmonary sarcomatoid carcinomas can present in several variants, including pleomorphic carcinoma, giant cell carcinoma, spindle cell carcinoma, carcinosarcoma, and pulmonary blastoma.[4] Here we present a rare case of lung mass with bone metastasis that exhibited histopathologic features consistent with sarcomatoid carcinoma. **Conclusion:** Aggressive nature, the morphological diversity and overlapping histological features of sarcomatoid carcinomas complicates diagnosis, especially with small biopsies. Thus a clinical, morphological and a panel of immunohistochemical stains are essential to obtained an accurate diagnosis.

KEYWORDS

PSC, Biphasic carcinoma, Spindle cell squamous carcinoma

INTRODUCTION

Pulmonary sarcomatoid carcinoma (PSC) is a rare and highly aggressive form of non-small cell lung cancer (NSCLC), representing only 0.1–0.4% of all lung malignancies.[1] PSC occurs typically in older males, often smokers, and they usually present with nonspecific symptoms that can vary based on tumor location.[1,2] Despite having a significant tumor burden, patients may report relatively few pulmonary symptoms. The tumor typically manifests as a large necrotic, and hemorrhagic mass, often found peripherally in the upper lobes and diagnosed at an advanced stage. PSC is known for its hematologic and lymphatic spread, with common metastasis to the brain, bone, liver, and adrenal glands, as well as less typical sites such as the esophagus and pancreas.[1] Histologically, Pulmonary Sarcomatoid carcinomas of the lung exhibit significant morphological variability, reflecting the overall histological diversity found in lung cancers these carcinomas are divided into five subtypes: pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, carcinosarcoma, and pulmonary blastoma.[4] Due to its propensity for frequent metastasis, PSC shows low response rates to traditional treatments, including chemotherapy, radiotherapy, and neoadjuvant therapy.[4]

CASE REPPORT

Clinical History :

A 75yr old male patient presented with acute pain in the right thigh following a fall. Two months back patient had come to our hospital with cough, hemoptysis for 2 weeks. CECT shows bronchogenic carcinoma with Ipsilateral Lower lobe and contralateral lower lobe lung metastasis. Lung biopsy shows poorly differentiated squamous cell carcinoma lung. Presently X-ray right lower limb showed distal 1/3rd femoral fracture. Patient was operated for same and soft tissue from fracture site was sent to our department for histopathological examination. Follow up CECT thorax was done in August -showed similar findings with adrenal and lymph node metastasis stageT4N2M1b.

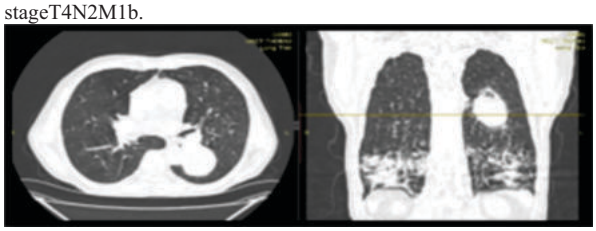

Fig 1: Axial And Coronal Section Of HRCT Thorax In Lung Window Showing A Well-defined Round Lesion In Superior Segment Of Left Lower Lobe Which Is Showing Bronchial Cutoff With No Air Bronchograms.

Gross Examination :

Received a Grey white to grey brown soft tissue in bits altogether measuring 6X3X1 cm.

Microscopic Examination :

Tumor cells arranged diffusely, composed of highly pleomorphic spindle to ovoid cells. Nuclei show irregular nuclear border, condensed chromatin with many showing prominent nucleoli. Cytoplasm is moderate and eosinophilic. Focal areas of necrosis and bony fragments noted.

Special Stains:

Reticulin stain was done- which came positive.

Immunohistochemistry:

Cytokeratins (AE1/AE3) – focal positivity. It is an intermediate filament and stains carcinoma cells and is used for identification of carcinomatous differentiation.

Vimentin- Diffuse positivity – stains cytoplasm.

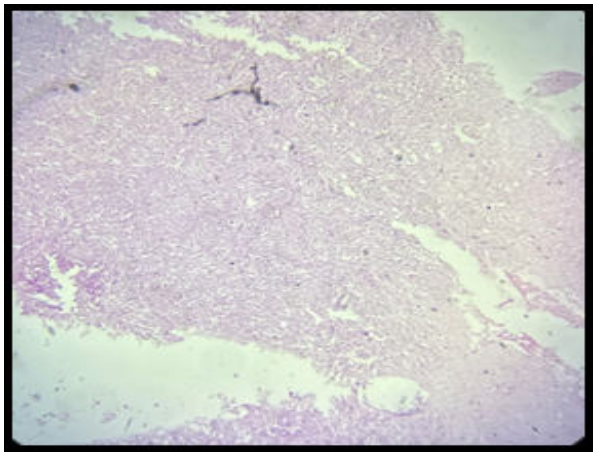

Fig 2: 4X- Diffusely arranged tumour cells Few area showing necrosis

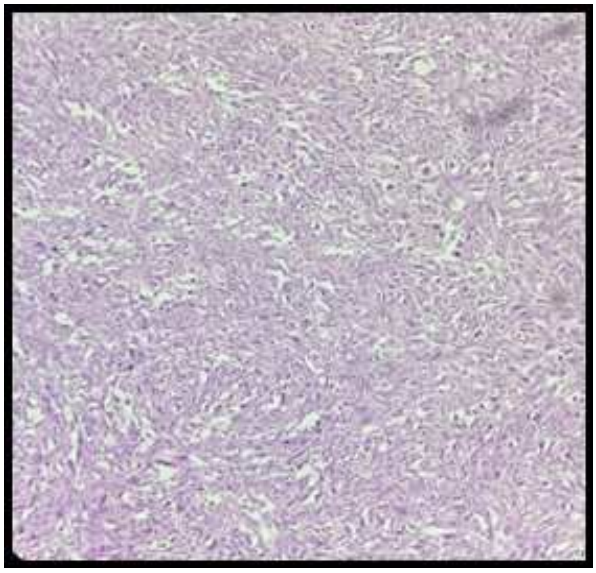

Fig 4: 10X- Pleomorphic Spindle to ovoid cells

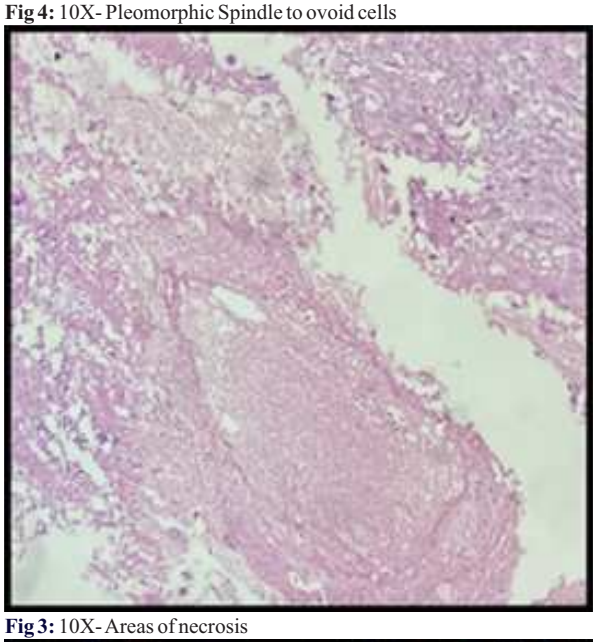

Fig 3: 10X- Areas of necrosis

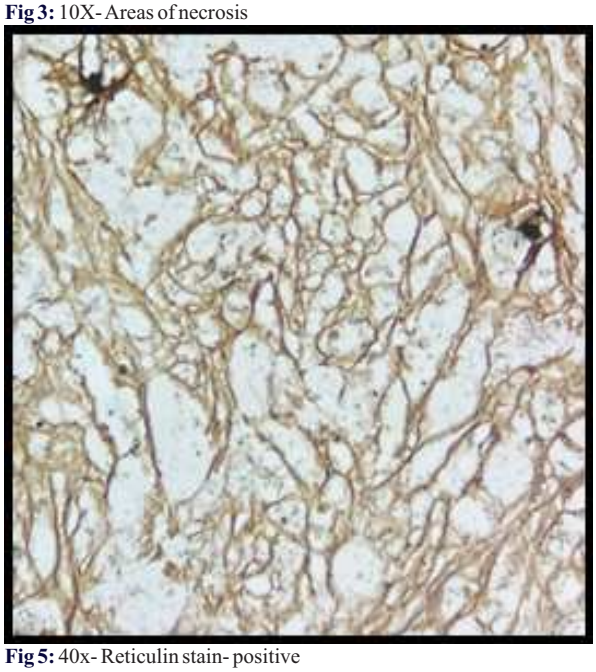

Fig 5: 40x- Reticulin stain- positive

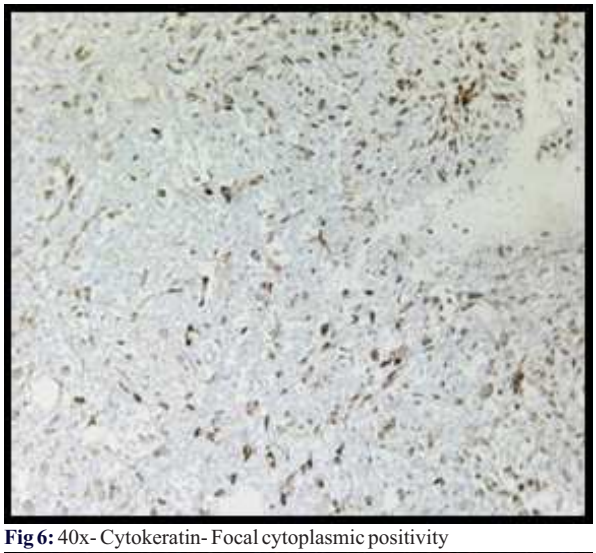

Fig 6: 40x- Cytokeratin- Focal cytoplasmic positivity

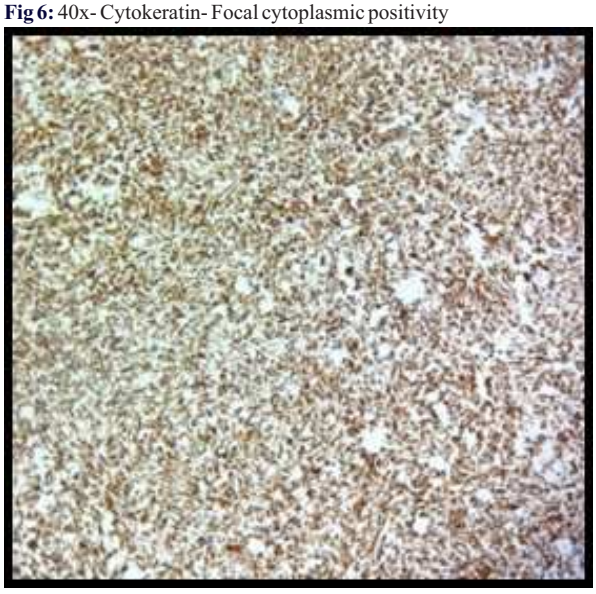

Fig 7: 40x- Vimentin – Diffuse cytoplasmic positivity

DISCUSSION

Pulmonary sarcomatoid carcinoma (PSC) is a rare subtype of non-small cell lung cancer (NSCLC), representing only 0.4% of all lung cancer cases.[1] Its prognosis is particularly poor compared to other forms of NSCLC, with a high recurrence rate contributing to its poor outcome.[1,2] Due to the rarity of PSC, most of the available data comes from case reports, making it challenging to conduct comprehensive studies.

PSC typically affects older males often smokers, with the majority being diagnosed after the age of 60. Histologically, PSC contains both a poorly differentiated NSCLC component (such as adenocarcinoma or squamous cell carcinoma) and a mesenchymal component, which consists of malignant spindle or giant cells. According to WHO criteria, the mesenchymal component must comprise at least 10% of the tumor in this case, it constituted over 90%. The pathogenesis of PSC is still under investigation, with epithelial-mesenchymal transition (EMT) being the most widely proposed mechanism. During EMT, epithelial cells undergo biochemical changes that grant them mesenchymal characteristics, enabling migration, invasion, and resistance to apoptosis.[1] This process likely contributes to the aggressive behaviour of PSC. Emerging genetic research has identified novel mutations, offering hope for future targeted therapies.[2] PSC demonstrates both hematologic and lymphatic spread.[3] Metastases have been reported in the typical locations to which NSCLCs metastasize: brain, bone, liver, and adrenal glands. However, metastasis to the oesophagus, jejunum, rectum, heart, kidney, and pancreas has also been reported.[3] The adrenal mass and lymphadenopathy was presumed to be a metastasis, giving this case two unique metastatic locations.

CONCLUSIONS

Aggressive nature, the morphological diversity and overlapping histological features of sarcomatoid carcinomas complicates diagnosis, especially with small biopsies. Thus a clinical, morphological and a panel of immunohistochemical stains are essential to obtain an accurate diagnosis. Ultimately, a meticulous approach to sampling and analysis is crucial for achieving an accurate diagnosis and guiding effective treatment strategies for patients with sarcomatoid carcinomas.

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