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Case Study

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# PLEOMORPHIC CARCINOMA OF LUNG: AN UNUSUAL MALIGNANCY DIAGNOSED ON SMALL BIOPSY

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## ABSTRACT

Pleomorphic carcinoma of the lung is a rare malignancy and it is classified as a subtype of sarcomatoid carcinomas of the lung. These tumors are highly aggressive and are composed of tumor cells with significant cytological aytpia and contain a variable proportion of spindle and giant cells. This malignancy shows a high degree of tumor heterogeneity and thus, diagnosing this lesion on cytology or small biopsy can be challenging.

**KEYWORDS:** sarcomatoid carcinomas, spindle and giant cells.

## INTRODUCTION

Pleomorphic carcinoma (PC) is a rare type of aggressive carcinomas of the lung. It is a subtype of sarcomatoid carcinoma of the lung which accounts for about 0.3% of all invasive lung malignancies.[1] PC is a poorly differentiated non- small cell lung carcinoma (NSCLC) and contains atleast 10% of spindle and/or giant cells or a carcinoma comprised predominantly of sarcomatoid component.[2] It is difficult to be diagnosed on cytology or biopsies because of the presence of great tumor heterogeneity.[3] We. herein, report such a case which we diagnosed on lung biopsy with the help of histomorphological features as well as immunohistochemistry (IHC).

## CASE REPORT

A 71-year-old male presented with complaints of cough and hemoptysis since 6 weeks which were associated with significant weight loss and reduced appetite. He was a chronic smoker and a known case of Chronic obstructive pulmonary disease (COPD). No palpable lymph node was found, however, bilateral inspiratory crackles could be heard on auscultation.

On Chest X-Ray, a homogenous opacity of 7.5 x 6.5 cm was found in the left lower lobe with central radiolucent areas (Figure 1A). An immediate radiological work – up was advised. High Resolution Computed Tomography (HRCT) and Contrast enhanced Computed Tomography (CECT) revealed a heterogeneously enhancing necrotic lesion measuring 7.8 x 6.6 x 4.2 cm in left lower lobe with surrounding consolidation (Figure 1B and C). Furthermore, bronchoscopy was done which showed a large friable polypoidal growth in the bronchus of the left lower lobe (Figure 1D) and sample was taken for bronchial aspirate. Simultaneously, imprint smears were prepared and biopsy from the mass was performed.

Cytology smears were highly cellular and revealed predominantly singly scattered large atypical malignant epithelial cells with frequent binucleation and bizarre nuclear forms (Figure 2A). With this kind of cytomorphological picture, a diagnosis of Poorly differentiated epithelial malignancy was made.

Bronchial biopsy was processed the same day and was stained with Hematoxylin and Eosin. Sections were examined and showed bronchial tissue lined by respiratory epithelium. Subepithelium revealed large polygonal tumor cells showing marked nuclear pleomorphism and hyperchromasia. Brisk mitoses and multinucleate tumor cells were noted alongwith few spindle shaped cells (Figure 2B).

Immunohistochemically, the malignant cells stained positive for Cytokeratin (CK) 7 and vimentin with negative CK 20 and 34 beta E- 12 (Figure 2C and D). Henceforth, a final diagnosis of Sarcomatoid carcinoma : pleomorphic type was rendered. Patient was advised lobectomy but he was not willing for further course of operative procedure. Moreover he succumbed to his illness just 1 month after the diagnosis.

**LEGENDS**

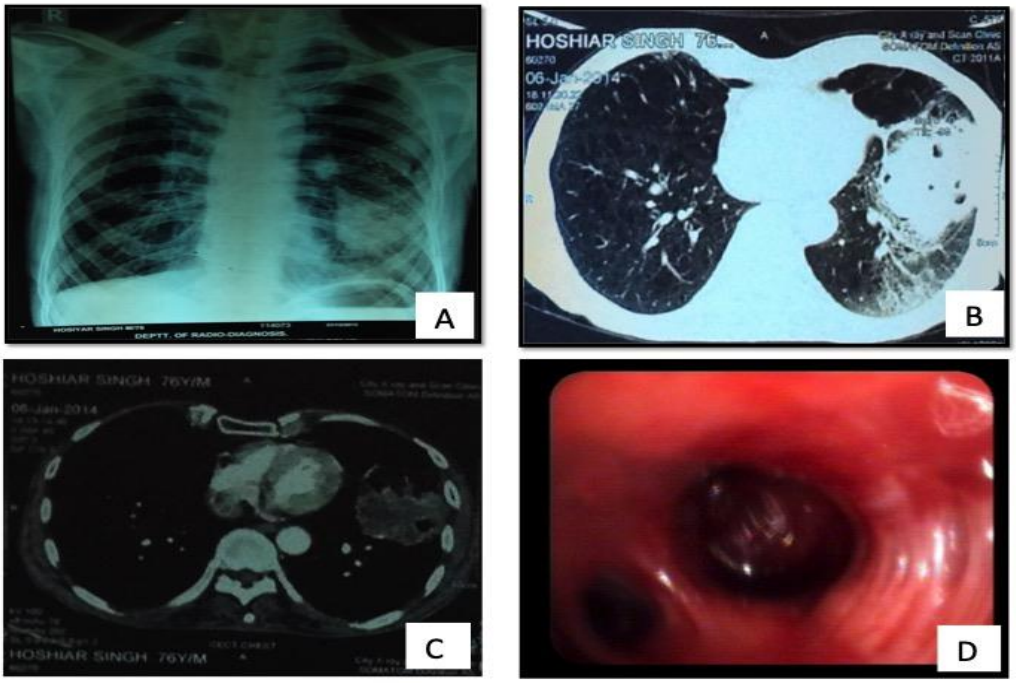


**Figure 1.**

A- Homogeneous opacity, 7.5 x 6.5 cm, in the left lower zone along with radioluscent areas
B- HRCT lung window shows irregular mass lesion with cavitation
C- Contrast enchanced CT shows heterogenously enhancing irregular mass lesion with necrotic foci and cavitation
D- Bronchoscopic image showing a large polypoidal growth in the left lower lobe bronchus.

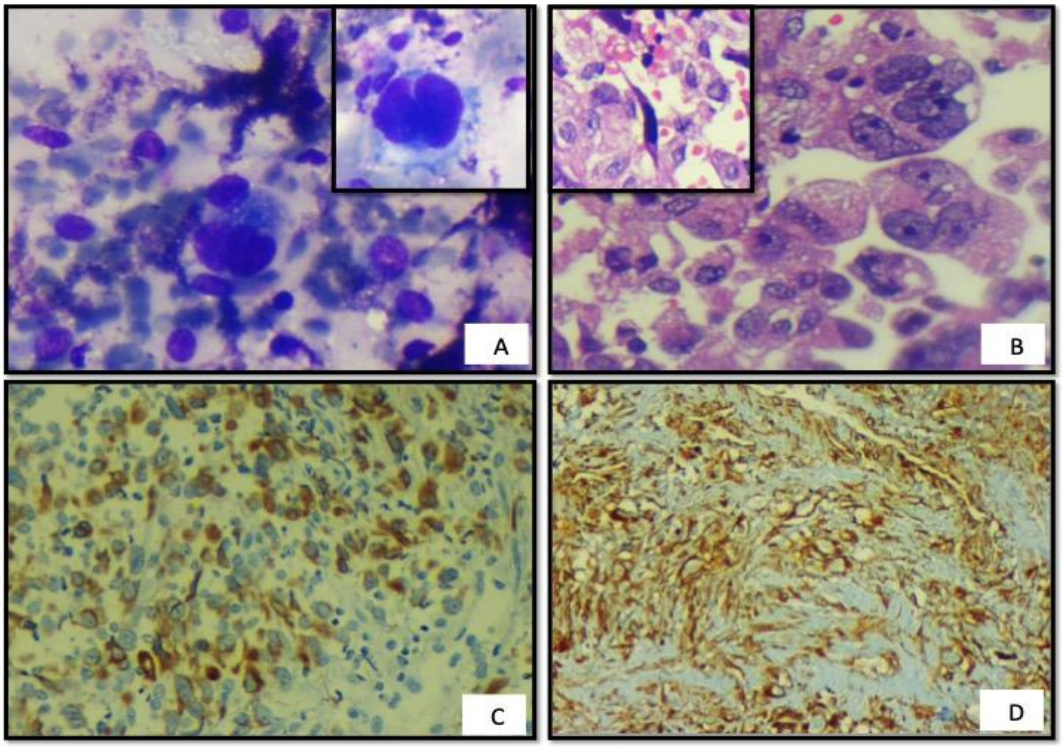


**Figure 2.**

A- Smear showing multinucleated tumor cells along with oval and spindle shaped cell, Inset shows a large bizzare cell, MGG stain, 400X.
B- Section showing multinucleated tumor cells, inset shows a malignant spindle cell, H&E stain,400X
C- Tumor cells are positive for CK 7, 400X.
D- Tumor cells showed diffuse positivity for vimentin, 400X.

## DISCUSSION

PC is a rare tumor of lung comprising < 1% of all the invasive malignancies of the lung.[1] According to World Health Organisation Classification of Lung Tumors, Sarcomatoid carcinomas of lung is subdivided into five distinct subtypes: pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, carcinosarcoma and pulmonary blastoma.[2] It has a predilection for males with a male : female ratio of 9.7:1.[4] The mean age at diagnosis is 60 years.[2] It has a strong association with smoking.[4] Our patient was male and had a history of chronic smoking. PC often tends to be located in the periphery of the upper lobes, however, in our case, tumor is located in the lower lobe.[5]

PC is difficult to be diagnosed with biopsies or cytology.[3] Oikawa *et al* compared preoperative diagnosis of 126 transbronchial lung biopsies with surgically resected lung cancer specimens. Five were diagnosed as pleomorphic carcinoma among nineteen non- corresponding cases.[3] It is explained by the fact that tumor heterogeneity may be responsibe for the missed diagnosis.

Mochizuki *et al* studied 70 cases of surgically resected lung tumors of PC. Sixty- eight tumors contained identifiable epithelial components and the other 2 consisted of spindle cells and giant cells alone.[6] An adenocarcinoma component was present in 34 cases, squamous cell carcinoma component in 13, and a large cell carcinoma in 40.[6] Expression of epithelial markers in PC is not mandatory as long as there is a component of squamous cell carcinoma, adenocarcinoma or large cell carcinoma.[2] But since, some are poorly differentiated tumors, markers like Epithelial membrane antigen (EMA) and CKs are essential to demonstrate epithelial differentiation in the sarcomatoid component. The tumor cells often co-express CKs, vimentin and smooth muscle markers.

PC has a worse prognosis than conventional NSCLC. Adjuvant chemotherapy and radiotherapy do no appear much helpful in these cases.[7] Complete surgical resection of the primary tumor as well as metastatic mass is suggested as the treatment option.[8] Unfortunately, since our patient died just 1 month after the diagnosis, resection could not be performed.

## CONCLUSION

We observed a pleomorphic carcinoma of lung composed of a variety of cells including spindle cells, giant cells, pleomorphic cells and malignant epithelial cells. The diagnosis is difficult on small biopsies and cytology due to the tumor heterogeneity. A careful and a thorough examination of the sections is required to identify the different cells and IHC may help in reaching a definite diagnosis.

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