



## CASE REPORT

# Pulmonary Carcinosarcoma Diagnosed on CryoProbe® Biopsy

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## Introduction

Pulmonary sarcomatoid carcinomas (PSC) are an uncommon form of non-small cell lung cancer and are found in 0.4% of all lung malignancies. The five histologic variants include: Pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, carcinosarcoma and pulmonary blastoma [1]. It is most prevalent in male smokers, with an average age of presentation 65.7 years [2]. PSC usually presents as a central or peripheral lesion in the upper lobes that invades the bronchial tree, pulmonary parenchyma and adjacent anatomical structures as it grows. PSC can also metastasize via lymph and blood vessel routes to brain, bone, adrenal gland and liver [3]. Because of the heterogeneity of carcinosarcomas, they are difficult to diagnose preoperatively and usually require lung biopsy. The following discusses a case of pulmonary carcinosarcoma diagnosed preoperatively with interventional bronchoscopy using CryoProbe®.

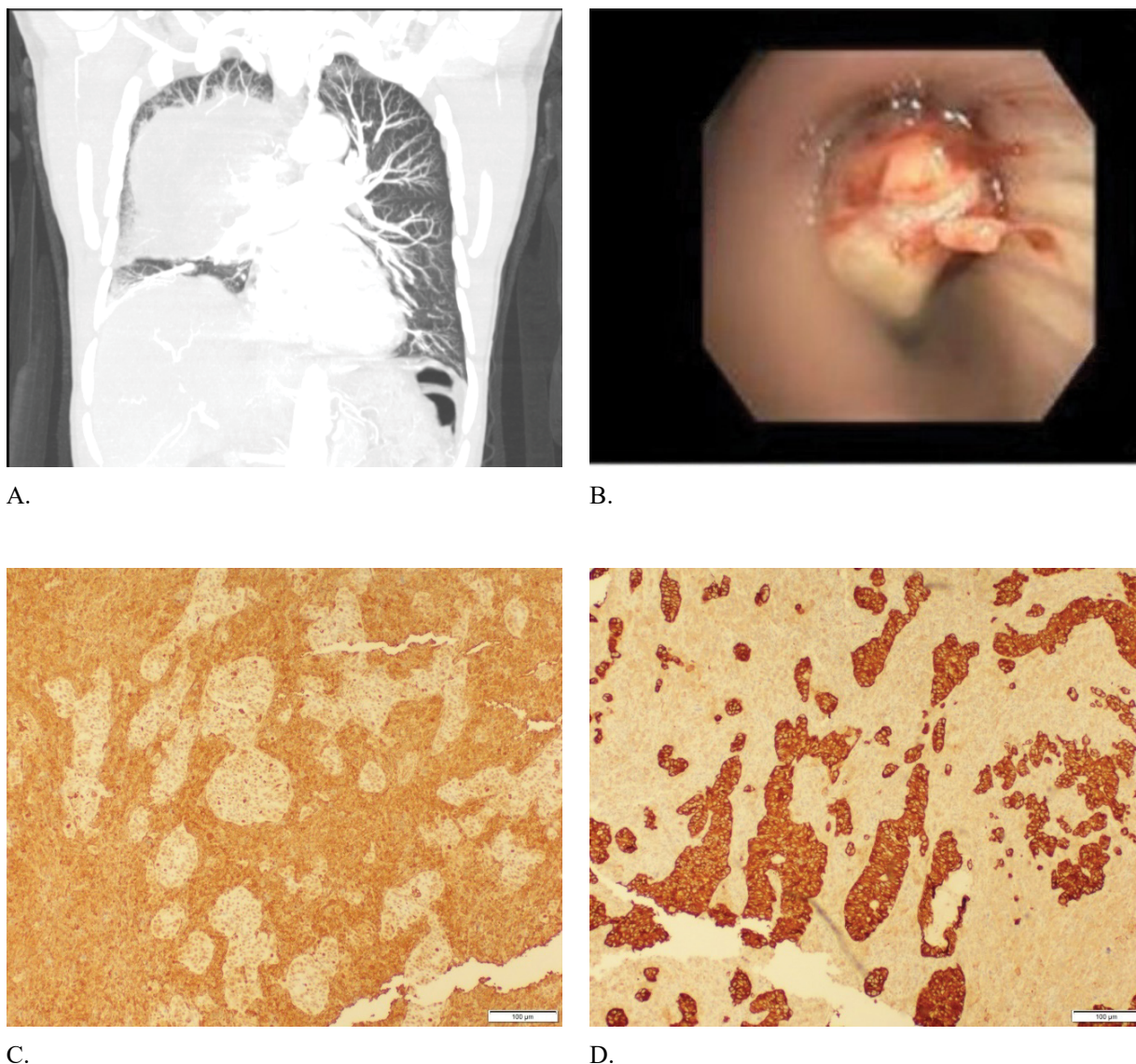
## Case

A 57-year-old female with a 43-year pack-a-day smoking history presented to the hospital with cough, right sided pleuritic chest pain, three episodes of hemoptysis each less than a quarter size and unplanned 20 lb. weight loss in the last month. On admission, CT Chest demonstrated an 11 cm right upper lobe (RUL) heterogeneous mass with severe central necrosis and complete obliteration of the right upper lobe bronchus as well as encasement of the RUL pulmonary artery, invasion of the lateral wall of the SVC and invasion into the mediastinum. Bronchoscopy revealed a polypoid heterogeneous mass emanating out of the right upper lobe

orifice with complete obstruction of the RUL. Mild clots were noted but the mass appeared to be non-bleeding. Cryoablation of the mass was performed using a 2.4 mm CryoProbe® back to the opening of the orifice of the RUL and multiple biopsies were taken using the CryoProbe®. Argon plasma coagulation (APC) probe was then used to cauterize and further debulk the tumor back into the orifice. The obstructing lesion was worked back into the opening of the RUL during a second round of cryoablation. The patient had no further episodes of hemoptysis and was discharged that day. Pathology was significant for a poorly differentiated malignant tumor with components of epithelial/carcinoma and sarcoma consistent with carcinosarcoma of the lung. The epithelioid component was poorly differentiated and showed no morphologically squamous or adenocarcinoma features. Immunohistochemical stains were focally positive for p40, which would indicate squamous cell differentiation. The sarcoma component was focally positive for S100, indicating pleomorphic liposarcoma or fibrosarcoma. Patient had a PET CT completed as an outpatient which was significant for the FDG RUL mass with an SUV of 54 as well as a mildly FDG avid focus in the upper aspect of the sternum and multiple vertebral bodies concerning for metastatic disease. The final diagnosis was Stage IV Pulmonary Carcinosarcoma. The patient is currently following up with Hematology/Oncology and receiving chemotherapy consisting of Carboplatin/Taxol as well as weekly external beam radiation treatment (Figure 1).

## Discussion

Pulmonary carcinosarcoma, a subclass of PSC, com-



**Figure 1:** (A) CT Chest on Admission with RUL opacification; (B) Right Upper lobe mass with complete obliteration of the right upper lobe bronchus; (C) Vimentin Stain for Sarcoma component; (D) AE1-3 stain for carcinoma component.

prises 0.05% of all lung tumors [2]. According to 2015 WHO classification of lung tumors, carcinosarcoma consists of an admixture of malignant epithelial and mesenchymal elements [4]. One study of 66 cases found the epithelial component to be 46% squamous cell carcinoma, 31% adenocarcinoma and 19% adenosquamous carcinoma. The sarcoma component most frequently features rhabdomyosarcoma, osteosarcoma, chondrosarcoma and liposarcoma [5].

Complete surgical resection is the first choice for standard treatment. Most cases of pulmonary carcinosarcoma are diagnosed at a late stage [3]. In a review of 114 cases of PSC, distant metastasis was present in 65.8% of the cases [6]. Effective systemic chemotherapy in patients with inoperable carcinosarcoma has not yet been developed. Multi-agent chemotherapy consisting of cyclophosphamide, doxorubicin and cisplatin can be considered in metastatic disease [3]. The five-year sur-

vival rate for patients with pulmonary carcinosarcoma was 21.3% [5].

Carcinosarcoma is difficult to diagnose preoperatively due to its heterogeneity. In one case review, 63 of the 66 cases required open lung biopsy [5]. Diagnostic testing including sputum cytology, percutaneous fine needle biopsy and traditional bronchoscopy have a low yield in detecting pulmonary carcinosarcoma. Traditional transbronchial lung biopsy (TBLB) of the tumor, especially when centrally located, usually shows a single component of the tumor [7]. A CryoProbe® biopsy of lung mass allowed us to obtain multiple fragments of tissue ranging from 0.1 cm up to  $1.4 \times 1.3 \times 0.3$  cm. CryoProbe-TBLB provides larger biopsies with no or fewer crush artifacts than TBLB, enabling the pathologist to provide diagnosis with greater confidence. Biopsy size using CryoProbe® may be up to three or four times larger than that obtained with conventional TBLB

[8]. A published review of 55 cases of visible endoluminal tumor revealed a significantly higher diagnostic yield for cryobiopsy compared with forceps biopsy (89.1% vs. 65.5%) [9].

## Conclusion

In this patient, CryoProbe® biopsies yielded a sufficient sample to provide an accurate diagnosis using a minimally invasive procedure. We were able to provide large enough tissue samples for clinical morphological evaluation and immunohistochemical for accurate identification of this rare and difficult-to-diagnose lung cancer. CryoProbe® should be considered as a non-surgical option for obtaining an ample biopsy via bronchoscopy.

## Conflict of Interest

None.

## Source of Funding

None.

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