




## CASE REPORT

# Case Report: Pulmonary sarcomatoid carcinoma in a female patient from Nepal [version 1; peer review: 2 approved, 1 approved with reservations]

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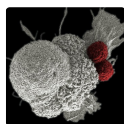
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## Abstract

Sarcomatoid carcinoma of the lung is an uncommon subtype of non-small-cell lung cancer (NSCLC). Even in the early stages, pulmonary sarcomatoid carcinoma (PSC) has a dismal prognosis when compared to other kinds of NSCLC with a mean survival of 9–12 months and a five-year survival rate of around 20%. We present the case of a 68-year-old woman with a two-month history of shortness of breath and cough. Initial computed tomography (CT) scan showed features of interstitial lung disease with chronic obstructive airway changes. After 34 months, the patient's condition worsened with newer complaints of sore throat and hemoptysis. A repeat CT scan showed a 49x38x59mm size lesion in the superior segment of the left lower lobe. A core needle biopsy was performed, which revealed tumor cells consisting of irregular tubules and sarcomatoid components. The patient was started on chemotherapy. Unfortunately, she succumbed to her disease. Our case highlights the aggressiveness of PSC.

## Keywords




aggressive, carcinoma, chemotherapy, diagnosis, pulmonary sarcomatoid.






This article is included in the [Oncology gateway](#).

## Open Peer Review

Approval Status   

	1	2	3
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1. **Alina Basnet** , SUNY Upstate Medical University, Syracuse, USA
2. **Jian-Hong Fang** , Sun Yat-sen University, Guangzhou, China  
**Yun Zhou**, Yat-sen University Cancer Center,, Guangzhou, China
3. **Ramila Shilpakar** , National Academy of Medical Sciences, Kathmandu, Nepal

Any reports and responses or comments on the article can be found at the end of the article.

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**Author roles:** **Devkota A:** Conceptualization, Investigation, Methodology, Resources, Writing – Original Draft Preparation, Writing – Review & Editing; **Paudel A:** Supervision, Validation, Writing – Review & Editing; **Sapkota S:** Investigation, Project Administration, Supervision; **Pandit S:** Project Administration, Supervision, Visualization; **Baniya A:** Writing – Original Draft Preparation

**Competing interests:** No competing interests were disclosed.

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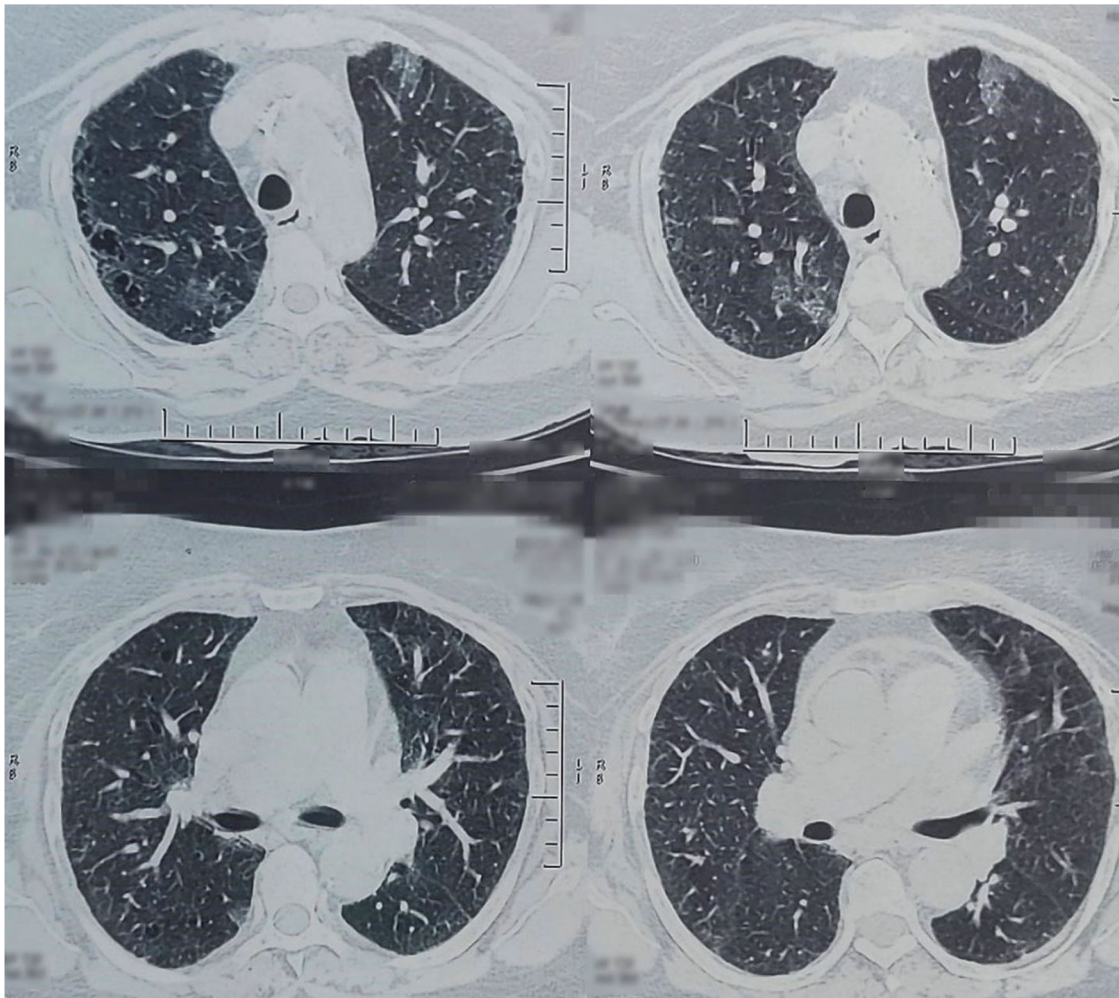
## Introduction

Sarcomatoid carcinoma (SC) is a rare primary malignant tumor consisting of both carcinomatous and sarcomatous components. It can affect various organs and body parts including skin, bone, urinary tract, breast, pancreas, liver, and glands (Shen et al., 2013). Pulmonary SC (PSC) accounts for less than 1% of all lung cancers and is known to behave aggressively (Szkorupa et al., 2015; Travis et al., 2015). It is classified as pleomorphic carcinoma, giant cell carcinoma, spindle cell carcinoma, carcinosarcoma, and pulmonary blastoma. The mean age of diagnosis is 65-75 years and is more common in males, with smoking being the most common risk factor. Here, we report a case of PSC in a 68-year-old woman.

## Case report

A 68-year-old Nepali housewife with a 30-cigarette pack per year smoking history presented initially with dyspnea and dry cough of two months. The patient also had a history of long-term exposure to bio-mass fuel. Physical examination revealed clubbing in bilateral fingernails. A chest X-ray was done, which showed bilateral basal region haziness and fibrosis. Computed tomography (CT) scan showed features of interstitial lung disease with chronic obstructive airway disease changes (Figure 1). A pulmonary function test (PFT) was also performed, which was within normal limits. Hence, the patient was treated for interstitial lung disease (ILD). This led to an improvement in her symptoms and her condition was stable for 34 months.

After 34 months, the patient again started having a dry cough with dyspnea. She also had a few episodes of hemoptysis. She was noted to be hypoxic with an oxygen saturation of 88%. Compared to the previous scan at initial assessment,



**Figure 1.** Axial section of computed tomography chest showing features of interstitial lung disease with chronic obstructive airway disease changes.

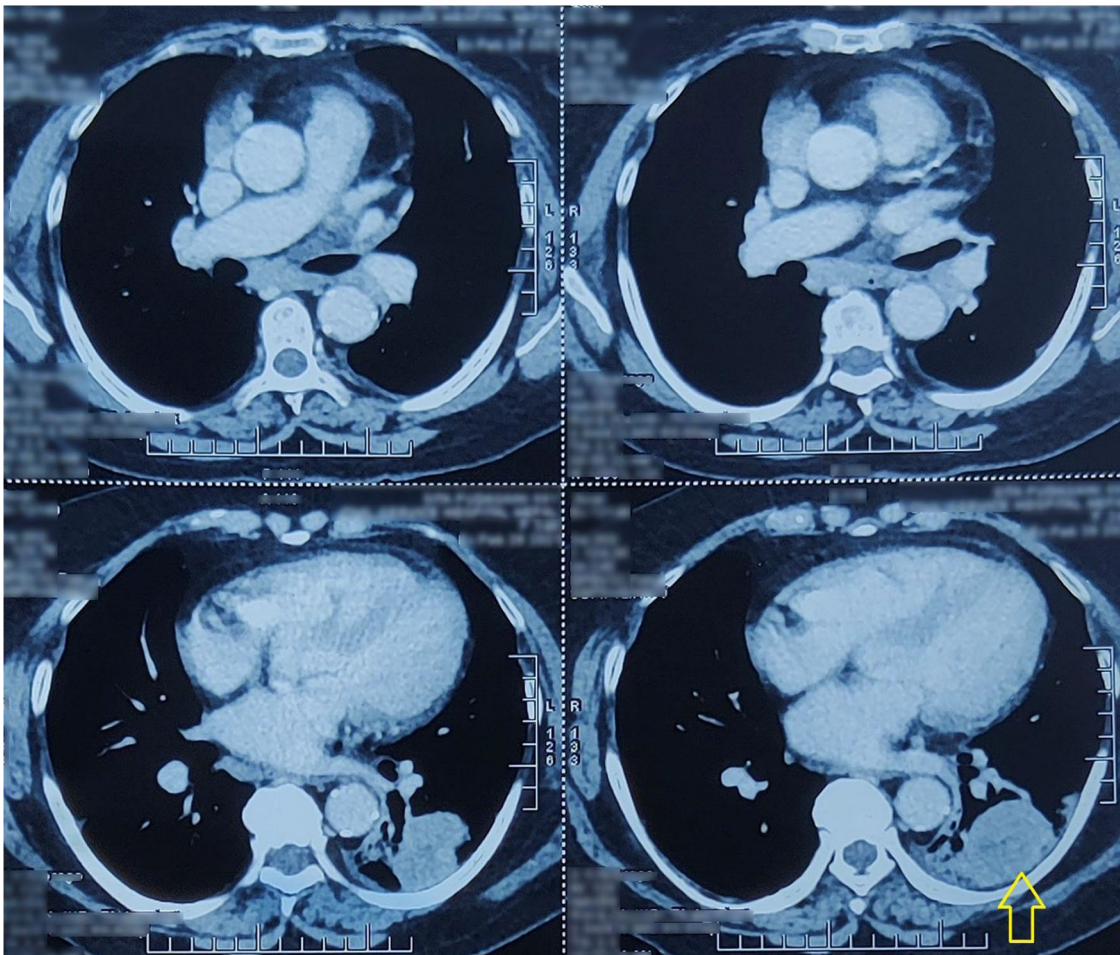
a contrast-enhanced CT scan of the chest revealed an approximately  $49 \times 38 \times 59$  mm size heterogeneously enhancing lesion in the superior segment of the left lower lobe (Figure 2), extending into posterior basal segment with cavitation and surrounding septal thickening, with consolidation and ground-glass opacity. Minimal left pleural effusion and multiple enlarged mediastinal and hilar lymph nodes were seen. Also, minimal pericardial effusion was revealed. A core needle biopsy of the left lower lobe mass was performed. Histopathological examination revealed moderately pleomorphic epithelial cells with an oval hyperchromatic nucleus; stroma consisted of highly pleomorphic oval to spindle-shaped cells along with multinucleated malignant cells (Figure 3). A diagnosis of PSC was made.

Epidermal growth factor receptor gene (EGFR) mutation and anaplastic lymphoma kinase (ALK) rearrangement testing was negative. Eastern Cooperative Oncology Group (ECOG) performance status of the patient was noted to be 2. The patient was not a candidate for surgical resection as it was stage IIIb (T2N3M0) disease along with multiple other comorbidities. She was started on weekly nab-paclitaxel ( $80 \text{ mg/m}^2$ ) and carboplatin (target area under the curve 2). The patient's programmed death ligand-1 (PDL-1) expression status was not known with the initial diagnosis.

The patient's condition quickly deteriorated within 72 hours of first cycle of chemotherapy with the development of massive pleural effusion. Therefore, the patient was started on immunotherapy with pembrolizumab 200mg intravenous, as her VENTANA PD-L1 (SP263) assay report revealed 85% tumor cells. A few days post-immunotherapy, the patient went into hypoxic respiratory failure requiring intubation. She died after two days of treatment in the intensive care unit.

### Discussion

SC of the lung is an extremely rare and poorly differentiated NSCLC, containing a sarcoma-like characteristic (malignant spindle or giant cells) or sarcomatous element (neoplastic bone, cartilage, or striated muscle) constituting of around 1% of all primary lung malignancies (Franks & Galvin, 2010; Rajdev et al., 2018).



**Figure 2.** Axial section of computed tomography chest showing heterogeneously enhancing mass in the superior segment of the left lower lobe (arrow) with cavitation and surrounding septal thickening.



**Figure 3. Hematoxylin and eosin-stained slide revealing tumor cells.** The circular inlet shows irregular tubules and arrow shows sarcomatoid component (20 $\times$ ).

PSC is seen predominantly in male smokers with a higher male-to-female ratio. It is usually observed in the age group between 56 to 74 with the average age of diagnosis being 66 years (Fishback et al., 1994; Ishida et al., 1990). The patient in our case also had a long history of smoking cigarettes and was diagnosed at the age of 68. SC of the lungs can manifest as a central or peripheral lesion, most often in the upper lobes. It grows by invading the bronchial tree, pulmonary parenchyma, and adjacent anatomical structures (mediastinum and chest wall) in the form of necrotic and hemorrhagic large masses that are round to bosselated, soft to solid, and often rubbery to stiff (Pelosi et al., 2010). In our case, the patient had a mass in the superior segment of left lower lobe extending into the posterior basal segment with cavitation and hemoptysis as presentation.

Symptoms like cough, hemoptysis, chest pain, shortness of breath, fever, and weight loss are common. Hemoptysis occurs in about half of all cases of proximal or central tumors, whereas peripheral tumors may be asymptomatic or may present with chest pain (Kim et al., 2002; Ouziane et al., 2014). Interstitial lung disease can co-exist, as in our case, where the patient was exposed to bio-mass fuel for a prolonged period. The tumor's morphology varies greatly on gross examination, ranging from soft to hard, or rubbery in consistency. The sliced surface ranges from whitish gray to tan-yellow, with patches of hemorrhage and necrosis (Rajdev et al., 2018). In our case, the tumor was hard in consistency, poorly circumscribed, light brown colored tissue with patches of hemorrhage.

There are no paraneoplastic syndromes identified in PSC, despite the fact that they exist in 15–20% of small cell lung cancers and 5–8% of NSCLCs (Jia et al., 2010). Metastasis to skin, stomach, pancreas, esophagus, jejunum, rectum, kidneys, bones and adrenal glands, brain, and mandibular gingiva have been reported with PSC (Fernandes De Oliveira et al., 2013; Park et al., 2006). The treatment of PSC is as difficult as the diagnosis. SC, though believed to evolve from the NSCLC, behaves aggressively and presents with locally advanced or metastatic disease (Rajdev et al., 2018). The mainstay of treatment, particularly for localized tumors, is still radical surgical resection. Radiotherapy and chemotherapy are being used as adjuvant treatment or in instances where the patient is a poor surgical candidate (Fernandes De Oliveira et al., 2013). Similarly, the patient in our case was a poor surgical candidate due to stage IIIB (T2N3M0) disease and compromised ECOG performance status with multiple co-morbidities like interstitial lung disease, hypertension, dyslipidemia, and type 2 diabetes mellitus. She was given chemotherapy with carboplatin and nab-paclitaxel. Studies have shown that EGFR mutations can be found in 8.8% (Li et al., 2020) and ALK rearrangement in 3.5% of SC of lung patients (Chen et al., 2017). Our patient reported negative for both. Previous studies have reported that patients with PSC have a high rate of PD-L1 expression (Maneenil et al., 2018). According to Velchet et al., 69.2% (9/13) of patients tested positive for PD-L1 (Velcheti et al., 2013). Likewise, our patient was tested for PD-L1 of 85%. PSC has a poorer outcome than conventional NSCLC. SC has a 5-year survival rate of around 20%, relative to NSCLCs, which has a 5-year survival rate of 50% and the median survival time is three months (Fernandes De Oliveira et al., 2013).

There are several limitations of our study; one of them being the lack of yearly CT scans after initial diagnosis of ILD, which hindered early diagnosis of the disease and curative treatment with local therapy like surgery. Comprehensive genomic analysis at diagnosis would have helped us to better deliver targeted therapy early on. This can be a problem in resource-limited countries like Nepal.

## Conclusion

PSC is an unusual biphasic malignant neoplasm of the lung that has a poor prognosis compared to other NSCLCs. A timely diagnosis is of vital importance to begin curative therapy, including surgery, chemotherapy, and radiotherapy. Our case highlights the aggressiveness of the disease and the importance of comprehensive investigations with a high index of suspicion. It might coexist sometimes with ILD like in our case, which should not be overlooked. Our case also highlights the timely resulting of comprehensive genomic profiling like PD-L1 which could have helped our patient. We believe that reporting this case with its overall clinical course can further add to the body of knowledge of this rare disease and aid in the development of successful treatment.

## Consent

Written informed consent for publication of their clinical details and/or clinical images was obtained from the patient's sister.

## Data availability

All data underlying the results are available as part of the article and no additional source data are required.

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Current Peer Review Status:   

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## Version 1

Reviewer Report 14 March 2022

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**Ramila Shilpakar** 

Bir Hospital, National Academy of Medical Sciences, Kathmandu, Nepal

It is a nice case report by Devkota *et al.* highlighting the rare case and difficult treating scenarios in resource-limited settings.

The patient had hemoptysis, so why was Radiotherapy not the first choice both for disease control as well as hemoptysis? If the authors could explain this it will be helpful for further reference.

The patient's condition quickly deteriorated within 72 hours of the first cycle of chemotherapy with the development of massive pleural effusion: What was done to improve the dyspnea due to massive effusion, this should be written in brief to give an idea to the readers. And why was immunotherapy started rather than other supportive methods to decrease effusion related deterioration in patient condition. Please make these points clear for the readers.

**Is the background of the case's history and progression described in sufficient detail?**

Yes

**Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?**

Yes

**Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?**

Yes

**Is the case presented with sufficient detail to be useful for other practitioners?**

Yes

**Competing Interests:** No competing interests were disclosed.



**Reviewer Expertise:** cost effective therapies

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Reviewer Report 15 September 2021

<https://doi.org/10.5256/f1000research.58744.r93529>

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**Jian-Hong Fang** 

MOE Key Laboratory of Gene Function and Regulation, School of Life Sciences, Sun Yat-sen University, Guangzhou, China

**Yun Zhou**

State Key Laboratory of Oncology in South China, Yat-sen University Cancer Center,, Guangzhou, China

This is an interesting report on an uncommon but aggressive variant of NSCLC. The authors have in detail described the clinical course of the patients, which will benefit patients with this uncommon disease. However, more information should be provided. Specifically, after receiving nab-paclitaxel and carboplatin, the patient's condition quickly deteriorated within 72 hours. And then, the patient was started on immunotherapy with pembrolizumab for a few days before her death. During these treatments, was any physical examination or diagnostic test conducted for this patient. If so, what were the results? This information will be helpful to reveal the cause for the rapid progress of the disease.

**Is the background of the case's history and progression described in sufficient detail?**

Yes

**Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?**

Partly

**Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?**

Yes

**Is the case presented with sufficient detail to be useful for other practitioners?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** The molecular mechanism underlying the tumor metastasis.

**We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.**

Reviewer Report 27 August 2021

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**Alina Basnet** 

Department of Hematology/Oncology, SUNY Upstate Medical University, Syracuse, NY, USA

This is an interesting case of an aggressive variant of NSCLC. This is unique due to the underlying history of ILD and the management in general in resource-limited countries like Nepal.

The clinical course has been summarised.

If they could specify if the patient received radiation or not at any time during the course of the treatment? if not, why was the low dose chemotherapy for carboplatin and paclitaxel chosen?

Can the authors elaborate on the staging scans that were performed? was any CT abdomen, bone scan, or PET scan done?

**Is the background of the case's history and progression described in sufficient detail?**

Yes

**Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?**

Yes

**Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?**

Yes

**Is the case presented with sufficient detail to be useful for other practitioners?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** lung cancer, prostate cancer, renal cell carcinoma, bladder cancer

**I confirm that I have read this submission and believe that I have an appropriate level of**

**expertise to confirm that it is of an acceptable scientific standard.**

Author Response 02 Sep 2021

**Anirudra Devkota**, Patan Hospital, Lalitpur, Nepal

Radiotherapy was planned but couldn't be performed as the patient rapidly deteriorated. Low dose chemotherapy was preferred because our patient was elderly, and also the general condition was poor. We couldn't perform the Bone scan and PET Scan as it was not available in our hospital. Diagnostic centers were also closed due to COVID lockdown. CT chest together with upper abdomen was done, but CT abdomen separately was not performed.

**Competing Interests:** No competing interests were disclosed.

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