

International Journal of Molecular and Immuno Oncology

Case Report

Squamous cell carcinoma of lung presenting as “Sunray sign” in chest radiograph

Shital Patil¹, Shubham Choudhari², Jayashree Dahiphale², Sanika Narkar², Vipul Raka², Gajanan V Gondhali²

Departments of ¹Pulmonary Medicine and ²Internal Medicine, Maharashtra Institute of Medical Sciences and Research Medical College, Latur, Maharashtra, India.



*Corresponding author:

Shital Patil,
Department of Pulmonary
Medicine, Maharashtra
Institute of Medical Sciences
and Research Medical College,
Latur, Maharashtra, India.

dsvpatil1980@gmail.com

Received: 08 April 2023
Accepted: 09 May 2023
EPub Ahead of Print: 10 June 2023
Published: 07 October 2023

DOI

10.25259/IJMIO_6_2023

Quick Response Code:



ABSTRACT

Lung cancer is usually diagnosed at a late stage due to a lack of awareness of symptoms to the patient, absence of screening trends by performing chest imaging, and lack of sensitization to the most common radiological signs of lung malignancy to family physicians. Radiological signs will help in suspecting lung cancer earliest and important role in guiding for a protocolized workup to rule out underlying malignancy. “Sunray sign” in chest radiograph is the first time described in the literature and constitutes hilar mass or radiopacity with inhomogeneous linear opacities spreading toward peripheries like sunrays which is the marker of interstitial lymphatic involvement due to the malignant spread of disease. “Sunray sign” is an indicator of underlying lung malignancy with central airway or mainstem bronchus involvement with lymphatic dissemination in linear opacities. In this case report, we have reported a 51-year male presented with cough and hemoptysis with progressive worsening of shortness of breath. Chest X-ray documented round opacity occupying left hilum with linear opacities emerging toward peripheries in lung parenchyma showing typical “Sunray sign.” Bronchoscopy was done after clinical stabilization and showed endobronchial polypoidal growth in the left mainstem bronchus causing partial occlusion of the bronchial lumen. Endobronchial needle aspiration cytology and forceps-guided histopathology suggestive of “squamous cell” type of lung malignancy for “Sunray sign” in our case. A high index of suspicion is a must to rule out underlying malignancy and Bronchoscopy is a “gold standard” test in cases with Sunray signs to confirm the diagnosis.

Keywords: Sunray sign, Chest radiograph, Bronchoscopy, Endobronchial needle aspiration cytology, Squamous cell carcinoma

INTRODUCTION

Sunray signs in chest radiographs are not very frequently described in medical literature, especially in cases with lung cancer. Interestingly, the Sunray sign is easily picked up during routine chest radiology examinations. Hilar mass with peripheral linear opacities spreading from margins of opacity is a sunray sign. We have documented this unique sign in bronchogenic carcinoma of squamous cell histological type.

CASE REPORT

A 51-year-old male, farmer, smoker, normotensive, and non-diabetic, was referred to our center by a family physician for complaints of dry cough with hemoptysis, shortness of breath on routine work, and dull aching retrosternal pain. Family members said that he was treated with intravenous antibiotics for 7 days by a family physician and showed poor

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2023 Published by Scientific Scholar on behalf of International Journal of Molecular and Immuno Oncology

response to antibiotics and other supportive care during hospitalization. Chest X-ray done by the family physician documented left hilar opacity [Figure 1]. We have clearly noted the “Sunray sign” in chest radiograph, that is, left hilar mass or radiopacity with inhomogeneous linear opacities spreading toward peripheries like sunrays which is the marker of interstitial lymphatic involvement due to the spread of malignant lung disease [Figure 1].

Clinical examination documented

Well-nourished, moderately built, anxious male, no cyanosis or clubbing.

Heart rate – 98/min, Respiratory rate – 24/bpm, blood pressure – 110/60 mmHg.

PsO₂: 96% @ room air.

Respiratory system examination revealed – normal vesicular breathing and no adventitious breath sounds were heard in the bilateral lung field.

Other systemic examinations were normal.

We have performed contrast computed tomography (CT) Thorax and documented a homogeneous round mass with the left mainstem bronchus involvement suggestive of bronchogenic malignancy [Figure 2].

Laboratory workup revealed normal hematological, viral markers, and biochemistry analysis. Tropical workup is negative and sputum examination was inconclusive. We have decided to further investigate with bronchoscopy due to the absence of fever, minimal hemoptysis, negative procalcitonin and sepsis screen, and importantly “Sunray sign” in chest radiograph and mass lesion in the left upper lobe abutting and infiltrating left mainstem bronchus. Fiberoptic video-bronchoscopy documented polypoidal

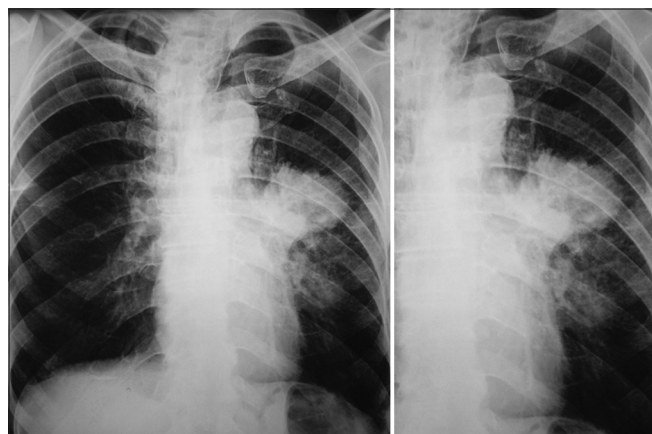


Figure 1: Chest X-ray posteroanterior view showing left hilar opacity with linear spreading margins and edges typical “Sunray sign.”

multinodular growth in the left mainstem bronchus causing near-total occlusion of the lumen. Bronchoscopy was unable to negotiate distal growth. Growth was fleshy and bleed on touch and showed a yellowish-white slough overlying it. We have performed endobronchial needle aspiration cytology (EBNA) as the first procedure during bronchoscopy due to the presence of slough overgrowth and chances of negative growth and forceps biopsy as the second technique during bronchoscopy. EBNA cytology documented squamous cell type of lung malignancy. Histopathology confirmed as non-small cell lung cancer most likely as squamous cell lung cancer. We have documented the role of undifferentiated non-small cell lung cancer on histopathology to confirm the exact histopathological type by performing immunohistochemistry for estimated glomerular filtration rate, anaplastic lymphoma kinase, and reactive oxygen species to rule out probable adenocarcinoma and finally squamous cell carcinoma (SCC) is the diagnosis made with negative thyroid transcription factor, and positive CK 5/6 and P63 in samples.

DISCUSSION

SCC of the lung usually arises from the epithelium of central or peripheral airways due to carcinogenesis pathophysiology after exposure to carcinogens in tobacco smoke. Squamous cells are thin and flat cells that are found lining many organs of the human body. Tobacco smoke contains 300 harmful agents and 40 known carcinogens which result in the transformation of mucosal linings of airways into altered squamous cells with keratinization and/or intercellular bridges and these structured cells often exhibit a high degree of mutation frequency.^[1]

Sunray sign

“Sunray sign” in chest radiograph is defined as “a mass lesion or radiopacity occupying hilum on any side of the chest with inhomogeneous linear opacities spreading toward peripheries like “sunrays” which is a marker of interstitial lymphatic involvement due to the malignant spread of disease.”

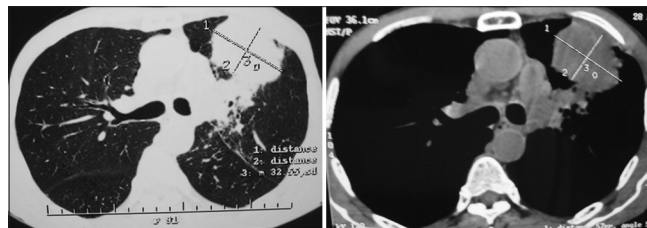


Figure 2: High-resolution computed tomography thorax showing mass lesion left lung upper lobe with the left main bronchus infiltration.

Other features:

1. This is a direct sign of lung malignancy
2. Indicatory of central airway tumor
3. Indication for bronchoscopy workup due to two reasons – one central tumor and second majority cases present with hemoptysis
4. Marker of lymphatic dissemination due to the malignant process
5. Indicator local spread and needs positron emission tomography scan to rule out distant metastasis
6. Sunray sign indicates positive yield during bronchoscopy due to the endobronchial nature of the disease
7. “Sunray sign” is documented in the two most common histological types such as squamous or small cell cancer tumors due to their propensity to involve central airways and labeled as central tumors
8. Practically inoperable due to central location and surgically unrespectable due to lymphatic involvement due to malignant process
9. Exclusively documented in lung malignancy only. There are no other causes such as benign lesions, infective, or inflammatory causes for Sunray sign.

We have performed EBNA as the first procedure during bronchoscopy due to the presence of slough overgrowth and chances of negative growth and forceps biopsy as the second technique during bronchoscopy. Thus, bronchoscopy is the best diagnostic method in cases with Sunray signs in chest radiographs.^[2-5]

CONCLUSION

In the present case report, we have documented constitutional symptoms such as cough, hemoptysis and shortness of breath with absence of fever with negative sepsis screening panel given clue to work for noninfective cause for Sunray sign. With the interventional pulmonology fibre optic videobronchoscopy technique has given diagnostic clue as lung malignancy. EBNA has been an important bronchoscopy guided method apart from forcep biopsy for confirming the diagnosis.

Key learning points from this case report are

1. “Sunray sign” in chest radiograph is hilar mass or radiopacity with inhomogeneous linear opacities spreading toward peripheries like sunrays which is the marker of interstitial lymphatic involvement due to the malignant spread of disease
2. “Sunray sign” is a direct sign of underlying lung malignancy and is documented in two most common histological types such as squamous or small cell cancer tumors due to their propensity to involve central airways and labeled as central tumors
3. The majority of cases with sunray signs present with hemoptysis which is the marker of central airway tumor with endobronchial involvement

4. Bronchoscopy is the gold standard test to diagnose endobronchial pathology than high-resolution CT thorax. It should be done to rule out the exact cause for the Sunray sign
5. Various bronchoscopy-guided techniques are available and the sequence of techniques usually depends on the choice and expertise of the operator during the procedure. EBNA is underutilized over forceps biopsy in endobronchial lesions due to lack of training, and fear of bronchoscope damage by EBNA during the procedure
6. Forceps biopsy is considered a gold standard test in endobronchial lesions due to the larger sample size and adequacy of specimens for further analysis such as immunohistochemistry. EBNA has overtaken these concepts and becomes the first test during bronchoscopy in endobronchial lesions with superficial necrosis or slough over the lesion, blood clot over the lesion, and or crush artifacts resulting during biopsy samplings, especially with serrated edges forceps during bronchoscopy
7. “Sunray sign” will be documented in squamous cell lung cancer or small cell lung cancer. In search of published literature, this will be our first case in the name of “Sunray sign” in lung malignancy
8. “Sunray sign” is easily picked up during routine chest radiology examinations. Family physicians and general physicians’ training are must for the most common radiological signs of lung malignancy including Sunray signs to prevent delay in diagnosis and have successful treatment outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Cancer Genome Atlas Research Network. Comprehensive genomic characterization of squamous cell lung cancers. *Nature* 2012;489:519-25.
2. Shital P, Rujuta A, Sanjay M. Transbronchial needle aspiration cytology (TBNA) in endobronchial lesions: A valuable technique during bronchoscopy in diagnosing lung cancer and it will decrease repeat bronchoscopy. *J Cancer Res Clin Oncol* 2014;140:809-15.

3. Shital P, Kailash A, Purohit G, Rao S, Deepu CC, Mohan J. Conventional TBNA - A underutilized but valuable technique during bronchoscopy in comparison with other conventional diagnostic techniques (CDTs) in diagnosing lung malignancies. *Eur Respir J* 2013;42:427.
4. Patil S, Rujuta A. Bronchoscopic characterization of lesions: Significant impact on lung cancer diagnosis with the use of transbronchial needle aspiration (TBNA) in comparison to conventional diagnostic techniques (CDTs). *Clin Cancer Investig J* 2017;6:239-46.
5. Patil S, Toshniwal S, Acharya A. Role of fiberoptic bronchoscopy-guided needle aspiration cytology (EBNA) in diagnosing lung cancer in endobronchial lesions: A single-center experience. *Int J Mol Immuno Oncol* 2023;8:15-22.

How to cite this article: Patil S, Choudhari S, Dahiphale J, Narkar S, Raka V, Gondhali GV. Squamous cell carcinoma of lung presenting as “Sunray sign” in chest radiograph. *Int J Mol Immuno Oncol* 2023;8:106-9.