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### RESEARCH ARTICLE

## SPONTANEOUS PNEUMOTHORAX COMPLICATING PULMONARY SARCOIDOSIS: A CASE REPORT

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### Abstract

Sarcoidosis is a multisystem granulomatous disease predominantly affecting the lungs, which may progress to chronic fibrotic forms responsible for respiratory complications. Spontaneous pneumothorax is a rare but potentially serious complication of pulmonary sarcoidosis, occurring most often in advanced stages of the disease. We report the case of a 57-year-old nonsmoking man with stage IV fibrotic pulmonary sarcoidosis who presented with acute right-sided chest pain and severe respiratory distress. Chest radiography revealed a complete right-sided pneumothorax. Initial chest tube drainage resulted in incomplete lung re-expansion, requiring subsequent surgical management. Thoracic surgery revealed subpleural bullae, which were resected, allowing complete lung re-expansion. The postoperative course was favorable, and the patient remained clinically stable without pneumothorax recurrence during follow-up at 1, 2, and 3 months. Through this case, we discuss the proposed pathophysiological mechanisms of pneumothorax in sarcoidosis, management approaches, and the risk of recurrence. This complication should be considered in any patient with diffuse pulmonary involvement who develops respiratory distress, particularly in advanced fibrotic forms.

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### Introduction:-

Sarcoidosis is a multisystem granulomatous disease with a predilection for mediastinal and pulmonary involvement. Diagnosis is based on a combination of clinical, radiological, and histological findings after other granulomatous diseases have been excluded. Corticosteroid therapy is the first-line treatment, while immunosuppressive agents constitute second-line therapy. The course of the disease may be complicated by serious events, although these remain rare.

### Case Presentation:-

A 57-year-old nonsmoking man was admitted to the emergency department with right-sided, pleuritic chest pain that was exacerbated by deep inspiration and coughing, with no history of chest trauma. The patient had been followed

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for two years for diffuse interstitial lung disease progressing to fibrosis, with a history of occupational exposure to dust and mold. A diagnosis of sarcoidosis had been considered and established three months earlier in the setting of exertional dyspnea and dry cough, based on several findings: radiological evidence of an interstitial pattern predominantly involving the mid and upper lung zones, classified as stage IV; histological findings on bronchial biopsy showing epithelioid and giant-cell granulomatous inflammation without caseous necrosis; and bronchoalveolar lavage showing lymphocytosis of 25%.

The patient had been receiving systemic corticosteroid therapy for three months, with marked clinical improvement that was maintained after gradual dose reduction. Pulmonary function testing demonstrated a mixed obstructive and restrictive ventilatory defect, with a reduced FEV1/FVC ratio of 0.46, forced vital capacity (FVC) of 2.31 L (55% of predicted), forced expiratory volume in one second (FEV1) of 1.07 L (33% of predicted), total lung capacity (TLC) of 4.31 L (64% of predicted), and diffusing capacity for carbon monoxide (DLCO) of 63% of predicted. On admission, examination revealed tachypnea at 25 breaths/min, oxygen saturation of 75% on room air, and distension of the right hemithorax, with absent tactile vocal fremitus on palpation and reduced breath sounds over the right lung field. The patient was hemodynamically stable, with no signs of acute right heart failure. Chest radiography (Figure 1) showed a complete right-sided pneumothorax.



**Figure 1. Chest radiography (Figure 1) revealed a complete right-sided pneumothorax.**

A chest tube was inserted in the right fourth intercostal space. Follow-up chest radiography showed satisfactory lung re-expansion, with a small residual apical pneumothorax. Clinical and radiological improvement was slow. After a 14-day hospital stay, the patient was transferred to the thoracic surgery department for surgical management. Surgery consisted of resection of superficial bullae (Figure 2), allowing the lung to re-expand against the chest wall.



**Figure 2. Thoracoscopic views showing subpleural bullae (red arrows) in the lower lobe (A), interlobar fissure (B), and middle lobe (C).**

Immediate postoperative chest radiography (Figure 3) showed complete re-expansion of the right lung, with persistent bilateral interstitial changes related to underlying parenchymal fibrosis. At postoperative follow-up visits at 1, 2, and 3 months, the patient remained clinically stable, with no recurrence of pneumothorax.



**Figure 3. Postoperative frontal chest radiograph showing complete lung re-expansion and diffuse fibrotic changes.**

### **Discussion:-**

Spontaneous pneumothorax is a rare but well-described complication of pulmonary sarcoidosis, reported in approximately 1–2% of cases, and occurs most often in chronic fibrotic forms of the disease [1,2]. The present case illustrates this complication in a patient with advanced mediastinopulmonary sarcoidosis (stage IV) and severe impairment of respiratory function. Several pathophysiological mechanisms have been proposed to explain pneumothorax in sarcoidosis, including rupture of subpleural bullae, necrosis of subpleural granulomas, and weakening of fibrotic lung parenchyma leading to alveolar rupture [2,3]. These mechanisms are comparable to those described in other systemic diseases with diffuse and cystic pulmonary involvement, particularly neurofibromatosis type 1, in which the risk of pneumothorax is also elevated [4]. In such cases, slow recovery after chest tube drainage, as seen in our patient, often reflects poorly compliant diseased lung tissue resulting from chronic parenchymal remodeling.

Pneumothorax is generally regarded as a late complication of sarcoidosis, occurring preferentially in fibrotic or bullous forms [2]. However, it may occasionally be the presenting manifestation of the disease or the first sign of relapse [2,3]. In our patient, pneumothorax developed despite clinical improvement under corticosteroid therapy, highlighting that control of inflammation does not prevent mechanical complications arising from irreversible structural damage. Initial management of pneumothorax complicating sarcoidosis relies on chest tube drainage, in accordance with recommendations for secondary pneumothorax. Nevertheless, the possibility of recurrence and the risk of persistent air leakage may justify pleurodesis or surgical management in selected patients with an unfavorable clinical course [2,5]. The role of corticosteroid therapy in preventing pneumothorax recurrence remains controversial, as the available evidence is limited and does not establish a consistent protective effect [2]. Finally, this case emphasizes that sarcoidosis should be considered in patients presenting with spontaneous pneumothorax and diffuse pulmonary involvement, particularly when respiratory functional impairment is disproportionate or suggestive extrapulmonary signs are present. Early recognition of this association enables appropriate comprehensive management and improved assessment of respiratory prognosis.

### **Conclusion:-**

Spontaneous pneumothorax is a rare complication of pulmonary sarcoidosis, generally associated with advanced fibrotic forms. Its occurrence requires prompt management and comprehensive reassessment of the disease, given the potential for progression and recurrence.

**Declarations:-****Patient Consent for Publication:-**

Written informed consent for publication of this case report and the accompanying clinical images was obtained from the patient.

**Conflicts of Interest:-**

The authors declare no conflicts of interest.

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**Author Contributions:-**

All authors contributed to the clinical management, preparation, and critical revision of the manuscript. All authors read and approved the final version.

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