

Original Research Article

# Pulmonary Sarcoidosis - Radiological Evaluation

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## Abstract

**Background:** Sarcoidosis is a multisystem inflammatory disease of unknown etiology that predominantly affects the lungs and intrathoracic lymph nodes. Sarcoidosis is manifested by the presence of noncaseating granulomas (NCGs) in affected organ tissues. It is characterized by a seemingly exaggerated immune response against a difficult-to-discern antigen.

**Materials and methods:** All patients were known case of pulmonary sarcoidosis. All patients for this study had undergone X-ray and CT scan after taking informed consent.

**Results:** In our study, we found that 17 (68%) patients with sarcoidosis have a characteristic radiologic appearance consisting of enlarged hilar and paratracheal lymph nodes, 24% of cases shows nonspecific or atypical findings, and in 4% of patients the radiograph is normal.

**Conclusion:** Radiologists can play an essential role in the diagnosis and management of sarcoidosis. It is essential to recognize both the typical and the atypical manifestations of the disease and use information obtained from the correlation of imaging features with pathologic findings to help achieve an early diagnosis and reduce associated morbidity and mortality.

## Key words

Pulmonary, Sarcoidosis, Radiology, Evaluation.

## Introduction

Sarcoidosis is a multisystem granulomatous disease of unknown etiology, usually affecting young and middle-aged adults, commonly with

pulmonary, dermatological and ophthalmological involvement. Lungs are the most commonly involved organ (almost 90%) with chronic irreversible changes leading to pulmonary fibrosis as evident in 20% of the cases. In order

to prevent chronic changes, early diagnosis and institution of early therapy becomes essential. However, given that Pulmonary Sarcoidosis is labelled as 'the great mimic' in radiology, diagnosis becomes difficult on imaging alone owing to various forms of presentation and their simulation with metastatic or primary pulmonary malignancy or a myriad of infectious, inflammatory or vascular processes; The most common clinical features at presentation are respiratory symptoms (e.g., cough, dyspnea, bronchial hyper reactivity), fatigue, night sweats, weight loss, and erythema nodosum. However, as many as 50% of cases of sarcoidosis are asymptomatic, with abnormalities detected incidentally at chest radiography [2, 3]. On subsequent biopsies, these were diagnosed as rarely presenting nodular forms of sarcoidosis and were treated successfully with corticosteroids.

### **Aim and objectives**

- To evaluate and diagnose the pulmonary sarcoidosis by conventional radiography and CT scan.
- To correlate the findings of X-ray and the CT scan for early diagnosis and treatment

### **Materials and methods**

#### **Study area**

The study was carried out in the Department of Radiodiagnosis, S.B.K.S. Medical Institute and Research Centre, Waghodia, Vadodara.

#### **Study design**

Type of the study: An Observational, Prospective Hospital Based Study.

Sample size: 25 patients.

#### **Selection of subject**

##### **Inclusion criteria**

- Only those patients who were willing to participate in study were included.
- Already diagnosed cases of pulmonary sarcoidosis which need follow up radiological investigations and are

referred to our radiology department were included in study.

- Patients came for investigations for other diseases, and were accidentally found to have pulmonary sarcoidosis, were included in this study.

##### **Exclusion criteria**

- All patients unwilling were excluded from this study.

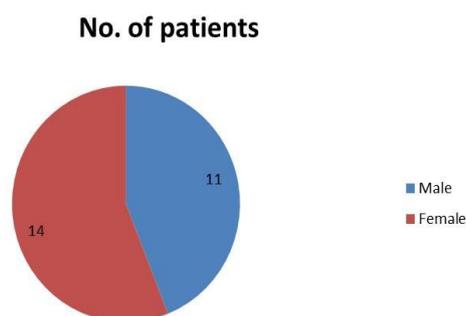
##### **Study protocol**

25 patients with known case of pulmonary sarcoidosis or in whom accidental diagnosis of pulmonary sarcoidosis was made eventually were evaluated, where the patients had presented with respiratory symptoms (e.g., cough, dyspnea, bronchial hyper reactivity), fatigue, night sweats, weight loss, and erythema nodosum. All patients for this study had undergone with X-ray AGFA and CT scan Siemens (16 slice) after taking informed consent.

### **Results and Discussion**

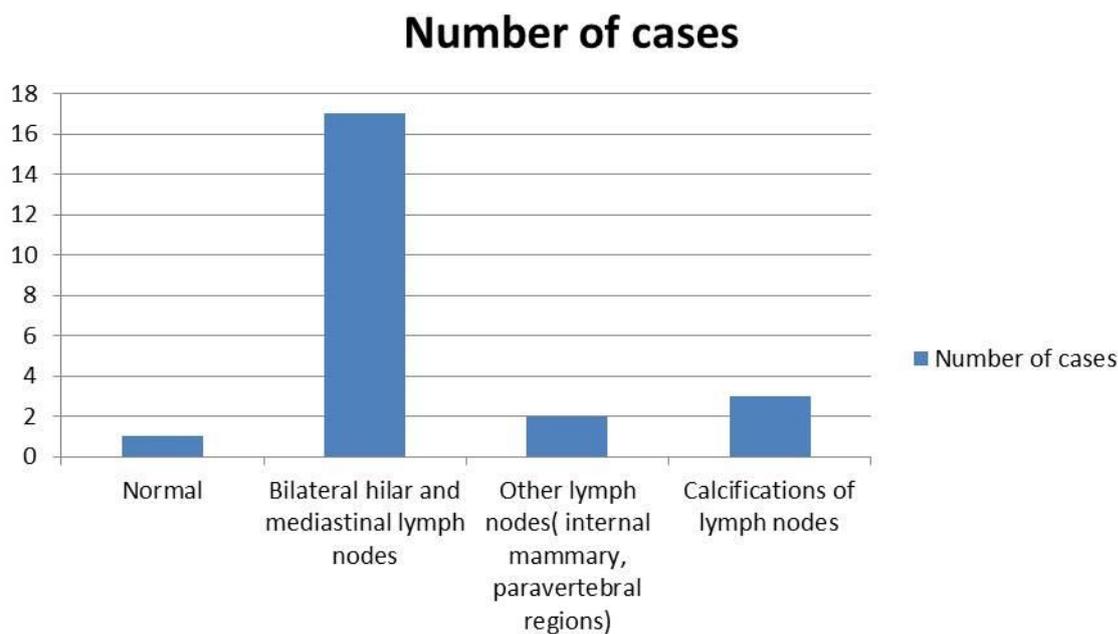
**Figure - 1** showed 11 (44%) patients were male and 14 (56%) patients were female. The overall sex ratio was M: F = 1:1.2

**Figure – 1:** Sex distribution.

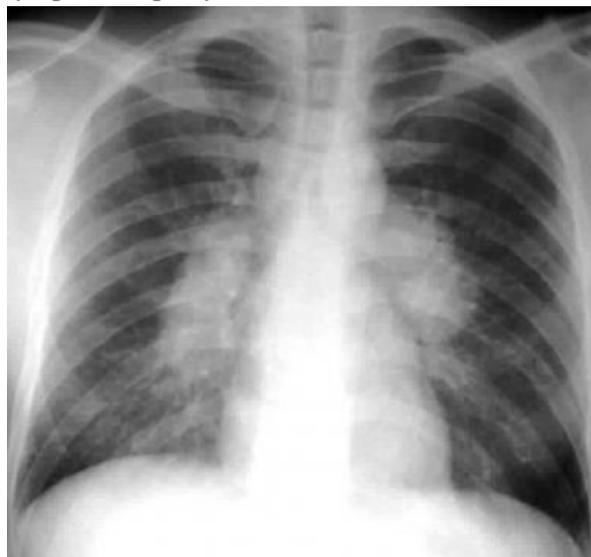


**Figure - 2** showed approximately 68% of patients with sarcoidosis have a characteristic radiologic appearance consisting of enlarged hilar and paratracheal lymph nodes with or without concomitant parenchymal changes. In 24% of cases, however, the radiologic findings were nonspecific or atypical, and in 4% of patients the radiograph was normal.

**Figure – 2:** Radiographic appearance in sarcoidosis.



**Figure – 3:** X-ray showing bilateral and symmetric hilar and paratracheal lymphadenopathy.



In the plain radiograph, the most common manifestation is bilateral hilar and mediastinal nodal enlargement, which is seen at some stage during the illness [1]. Involvement of right paratracheal nodes is not 'magical' but rather reflects the ease with which these nodes are identified on plain radiography. Left paratracheal and aortopulmonary nodes are also frequently enlarged, but harder to identify.

**Figure – 4:** X-ray showing bilateral and symmetric hilar lymphadenopathy.

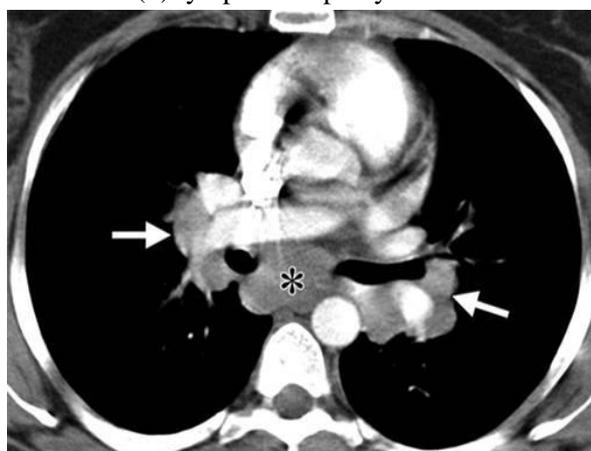


Occasionally, radiologic findings of lymph node enlargement may be asymmetric or seen in unusual locations (e.g., internal mammary, paravertebral, and retrocrural regions). Such findings should lead to the inclusion of entities such as lymphoma or tuberculosis in the differential diagnosis. Enlargement of mediastinal lymph nodes without hilar lymph node enlargement is even less common [4, 5].

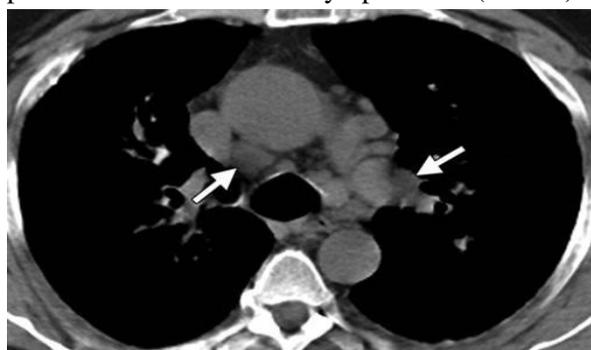
CT, and especially HRCT is better able to define parenchymal involvement as well as nodal enlargement and thus is especially useful in

patients with normal chest X-rays (stage 0) or those with apparently nodal involvement only (stage I). They vary from patient to patient and according to the stage of involvement. Parenchymal findings include: irregular nodular thickening in a perilymphatic distribution, small nodules may dominate and appear similar to miliary opacities, ground glass opacities, fibrosis (linear bands of fibrosis, distortion of lung architecture), honeycombing, pulmonary cysts.

**Figure – 5:** Axial contrast material-enhanced CT scan (mediastinal window) shows typical bilateral and symmetric hilar (arrows) and subcarinal (\*) lymphadenopathy.



**Figure – 6:** Axial unenhanced CT scan (mediastinal window) obtained at the level of the left pulmonary artery shows enlargement of right paratracheal and left hilar lymph nodes (arrows).



The variable and often nonspecific radiographic findings are surprising given the characteristic pathologic appearance and distribution of sarcoidosis. Sarcoid granulomas, the hallmark of the disease, are distributed along the lymphatics

in the bronchovascular sheath and, to a lesser extent, in the interlobar septa and pleura. This distribution is one of the most helpful features in recognizing sarcoidosis pathologically. This distribution is difficult to appreciate on the radiograph because of the superimposition of the parenchymal shadows, but often it can be seen on CT (**Figure – 3 to 8**).

**Figure – 7:** Axial unenhanced CT scan (mediastinal window) shows punctate calcifications of hilar lymph nodes (arrows), a pattern that also occurs in other chronic granulomatous diseases.



**Figure – 8:** Axial contrast-enhanced CT scan shows bilateral eggshell-like calcifications of hilar and mediastinal lymph nodes (arrows), findings that warrant the inclusion of silicosis in the differential diagnosis in this case.



## Conclusion

Thoracic sarcoidosis has been called “the great mimic”; it manifests with various patterns at

radiologic imaging, necessitating an initially broad differential diagnosis that includes lymphoma, tuberculosis, and many other causes of chronic pulmonary infiltrates. Severe thoracic sarcoidosis causes significant clinical and functional impairment and is associated with high morbidity and mortality.

CT has proved superior to radiography for identifying and managing pulmonary sarcoidosis. High-resolution CT helps improve the detection and characterization of subtle parenchymal abnormalities. Radiologists can play an essential role in the diagnosis and management of sarcoidosis. It is essential to recognize both the typical and the atypical manifestations of the disease, take note of those that also may occur in diseases other than sarcoidosis, and use information obtained from the correlation of imaging features with pathologic findings to help achieve an early diagnosis and reduce associated morbidity and mortality.

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