

# Interstitial lung disease: silicosis, a case report

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## Abstract

A 51-year-old male had dry cough and chest pain for more than 10 years. He has a history of exposure to biomass. He worked as supervisor of tunnel construction. Twelve years ago he had hemoptysis, for which he received anti-tuberculosis therapy despite not having smear-positive. The physical examination was normal except that fine crackles were found in both bases. He had an obstructive pattern in spirometry. And, there was great interstitial involvement in the lung parenchyma in tomography studies. A biopsy was performed by video thoracoscopy, which confirmed the diagnosis of silicosis.

**Key words:** Construction of tunnels. Pneumoconiosis. Progressive massive fibrosis

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## Introduction

The diagnosis of interstitial lung diseases is usually a difficult challenge in medical practice, even for specialists who are familiar with these cases.

Interstitial lung diseases are a group of more than 200 entities and there are different classifications, constant revisions and updates. The causes can be categorized into: connective tissue diseases, organic exposure, inorganic exposure, due to tobacco use, drug use, granulomatous type, and, finally, idiopathic diseases<sup>1</sup>. In recent years the importance of multidisciplinary work for its diagnosis has been advocated and emphasized, with the participation of radiologists, pneumologists, pathologists, and, possibly, rheumatologists. The importance of an accurate diagnosis depends on the high percentage of mortality and rapid progression that a group of these entities<sup>2,3</sup>, can show.

Here we present a case, whose clinical and radiological presentation was a real challenge for the diagnosis.

## Case

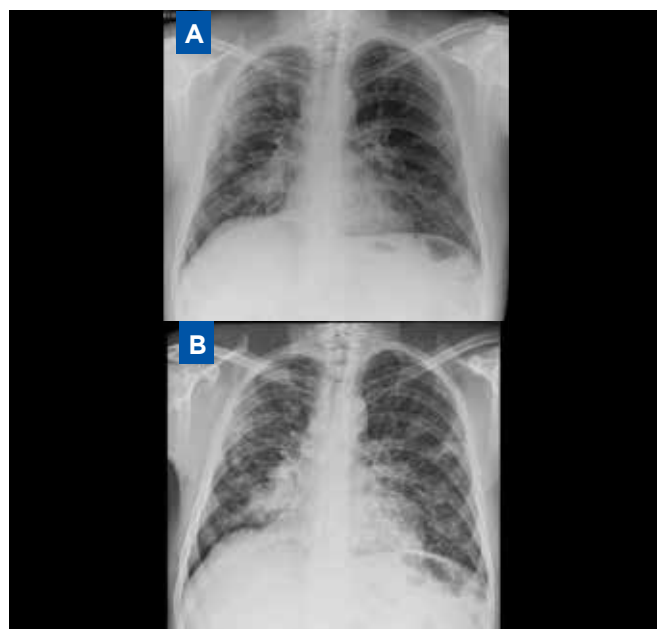
A 51-year-old male patient of mestizo race, born in Ayacucho, lives in Lima since he was 15 years old. Construction technician for more than 30 years and supervisor of tunnel construction for 15 years. He has a history of having been exposed to biomass (6 hours a day, during the first 15 years of his life), and being exposed to inhalation of dust particles, in the construction of tunnels. He refers that he always used protection. He presented a case of hemoptysis 12 years ago; he received complete anti-tuberculous therapy, even though the microscopic studies for acid-fastness bacilli were always negative.

He has been having dry cough and chest pain for more than 10 years, as well as, exacerbations of cough with increase in expectoration once a year. He has been examined several times in several health institutions, without showing any improvement.

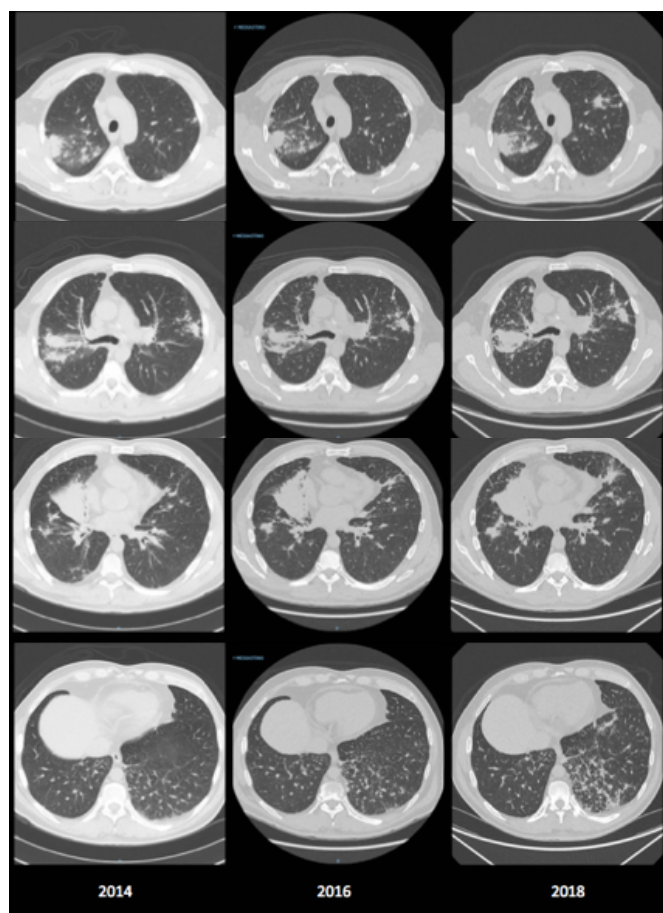
Among his examinations in pneumology, flexible bronchofibroscopy studies have been performed twice without significant findings.

Upon physical examination, his weight was 84 Kg, size 163 cm, and velcro-type fine crackles at the bases of both hemithorax were examined. The rest of the exam was normal. The laboratory analyzes showed no alterations. Figure 1 shows chest radiographic evolution. Figures 2 and 3 show sequential and evolutionary tomographic sections of the thorax. The patient showed an obstructive pattern in spirometry.

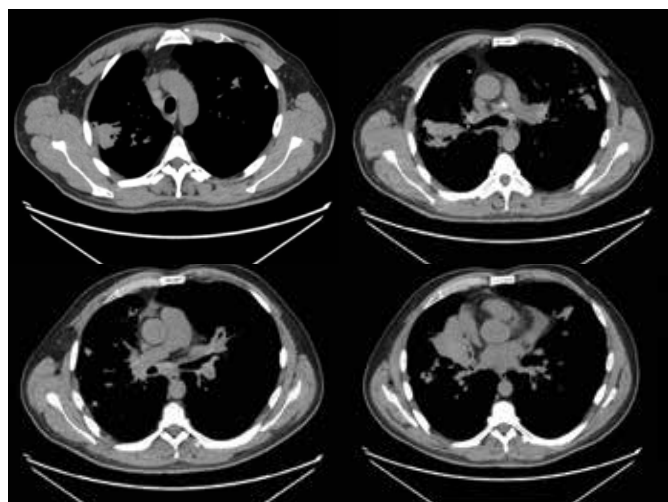
A video-thoracoscopy was performed as a diagnostic procedure, in which biopsies of the upper and lower right lobes were performed. Likewise, a study of polymerase chain reaction was carried out for *M. tuberculosis* on the samples of the biopsy, being negative. Finally, the readings of the histological sections (see Figure 4) were compatible with silicosis



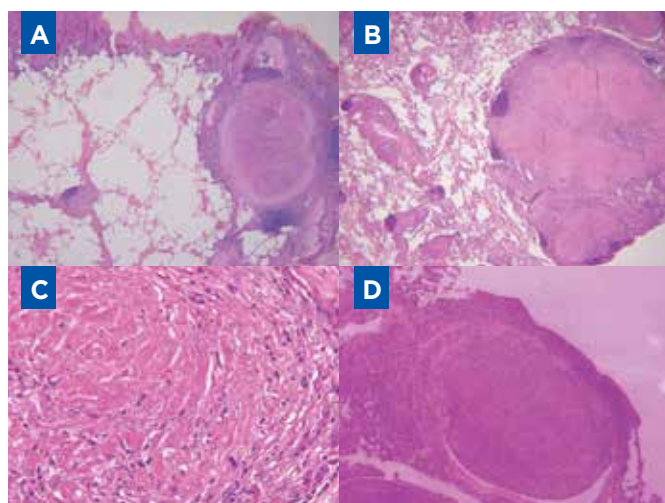
**Figure 1.** **A.** The chest radiograph shows a thin nodular interstitial pattern in both pulmonary fields, predominantly on the right. It is associated with nodular opacities and consolidation area in the right paracardiac region and decreased lung volume. **B.** Bilateral accentuation of the micronodular interstitial pattern. The area of consolidation and nodular opacities persist in both pulmonary fields, denoting chronicity in the findings. Three years of difference in one and another image.



**Figure 2.** Tomography studies of thorax show an interstitial pattern of micronodular type, with perilymphatic distribution that compromises both pulmonary fields, observing compromise of the peribronchovascular, centrilobular and subpleural interstitium. This is associated with nodular lesions and solid masses with irregular edges, which are distributed to the upper lobe predominance, suggestive of massive progressive fibrosis. Total atelectasis of the middle lobe, conditioned by proximal bronchial obliteration. Findings that have slowly and progressively increased as observed.



**Figure 3.** Presence of multiple partially calcified adenopathies in the different mediastinal compartments and at the level of the pulmonary hila



**Figure 4.** A. Anthracotic nodule with central fibrosis and pigment inside, conglomerates of lymphocytes which surround the nodule. B. Conglomerate of anthracotic nodules. C. Fibrinoid necrosis, with pigments inside, and peripheral macrophages. D. Microscopy with polarized light, bright particles inside the nodule confirm the diagnosis of silicosis.

## Discussion

Silicosis is the result of the accumulation of silica glass particles (silicon dioxide or silica) in the lung<sup>4,5</sup>. And, it is mostly reported in places where there is great mining activity<sup>6,7</sup>. The cumulative dose of silica is the most important factor for the development of silicosis<sup>8</sup>, and the presence of metals modulates toxicity<sup>9</sup>.

In this case, probably the history of having had hemoptysis was not due to tuberculosis, and the protection from dust particles during his work in tunnel construction was not enough, contrary to what the patient thought.

Radiologically, there are other forms of presentation, of a purely nodular type, including subpleural nodules<sup>10</sup>, with traction bronchiectasis<sup>11</sup>, with pleural effusion<sup>12</sup>, in “tree-in-bud” pattern<sup>13</sup>, presence of hilar lymph nodes with “eggshell-like” calcification<sup>14</sup>, with cavities (associated with tuberculosis)<sup>15</sup>, and others with signs of pulmonary hemorrhage<sup>16</sup>. There is also the radiological classification of the International Labor Organization, based on the comparison of standard images<sup>17</sup>.

In conclusion, the coordinated work among pulmonologist, radiologist and pathologist is, nowadays, the most valuable for an accurate diagnosis.

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## Conflict of interest

The authors report no conflicts of interest regarding this manuscript.

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