# Complicated Silicosis

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## History

A 45-year-old male patient, complaining of progressive shortness of breath, coughing with sputum production and weight loss for the past two years, was referred to a chest physician for checkup. He had worked as a quarryman since the age of 20, without using respiratory protection. A chest CT scan was ordered upon the suspicion of an occupational lung disease.

## Diagnosis

CT images showed diffuse, small, well-defined nodules, mainly in a centrilobular distribution (Figs. 1 and 2). In the posterior segments of the upper lobes and superior segments of the lower lobes, the nodules were more confluent (Figs. 1 and 2), forming conglomerate masses, with some punctiform calcifications (Fig. 3). There were also enlarged calcified hilar and mediastinal lymph nodes along with pleural pseudoplaques (Fig. 3).

Taking into account the clinical context, the CT findings are compatible with complicated silicosis (progressive massive fibrosis).

## Comments

Silicosis is a fibrotic pneumoconiosis caused by the inhalation of fine particles of crystalline silicon dioxide (silica). It occurs in two clinical forms – acute or classic. The classic form is much more common than the acute form and can be classified as simple or complicated. The designation of complicated silicosis (also called progressive massive fibrosis) is used when conglomerate masses are larger than 1 cm in diameter. Occupations such as mining, quarrying and tunneling are associated with silicosis. Although chest radiography is the first line imaging method in the work-up of suspected occupational lung disease, CT is more sensitive and specific for the detection and characterization of this.[1] The concern regarding radiation dose of chest CT scans, has prevented the use in the screening of occupational lung disease. However, advanced technology development has made it possible to achieve a very high spatial resolution at an ultra-low radiation dose. In this case, the Tin Filter technique was implemented, which cuts out lower energies of the X-ray spectrum to reduce dose and reduces beam hardening artifacts as well as optimizing image quality. An exceptional low dose of CTDIvol 0.67 mGy was achieved without compromising image quality for diagnosis. ●

## Examination Protocol

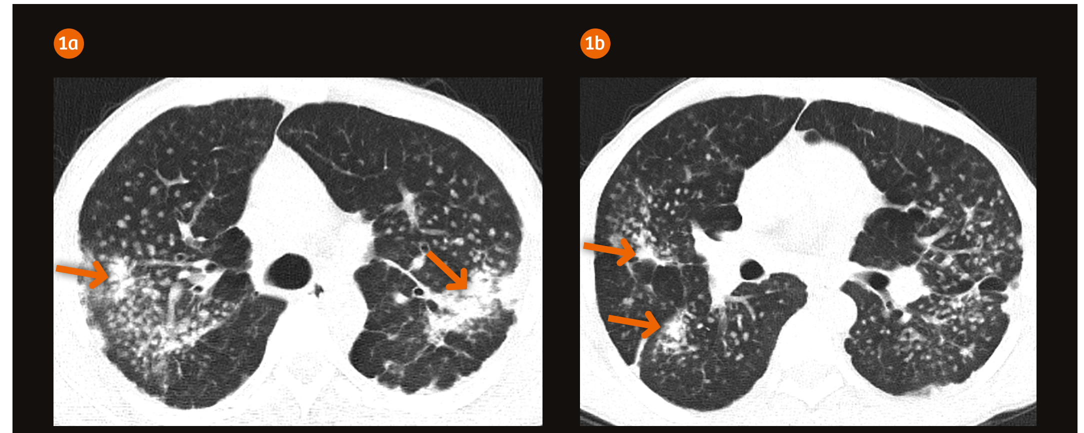
| **Scanner** | **SOMATOM go.Up** | | |
|---|---|---|---|
| **Scan area** | Thorax | **DLP** | 28 mGy cm |
| **Scan mode** | Spiral | **Effective dose** | 0.39 mSv |
| **Scan length** | 374.7 mm | **Rotation time** | 0.8 s |
| **Scan direction** | Cranio-caudal | **Pitch** | 1.5 |
| **Scan time** | 8.5 s | **Slice collimation** | 32 × 0.7 mm |
| **Tube voltage** | Sn110 kV | **Slice width** | 5 mm |
| **Effective mAs** | 47 mAs | **Reconstruction increment** | 5 mm |
| **Dose modulation** | CARE Dose4D™ | **Reconstruction kernel** | Br40 / Br60 |
| **CTDI$_{vol}$** | 0.67 mGy | | |

The outcomes by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

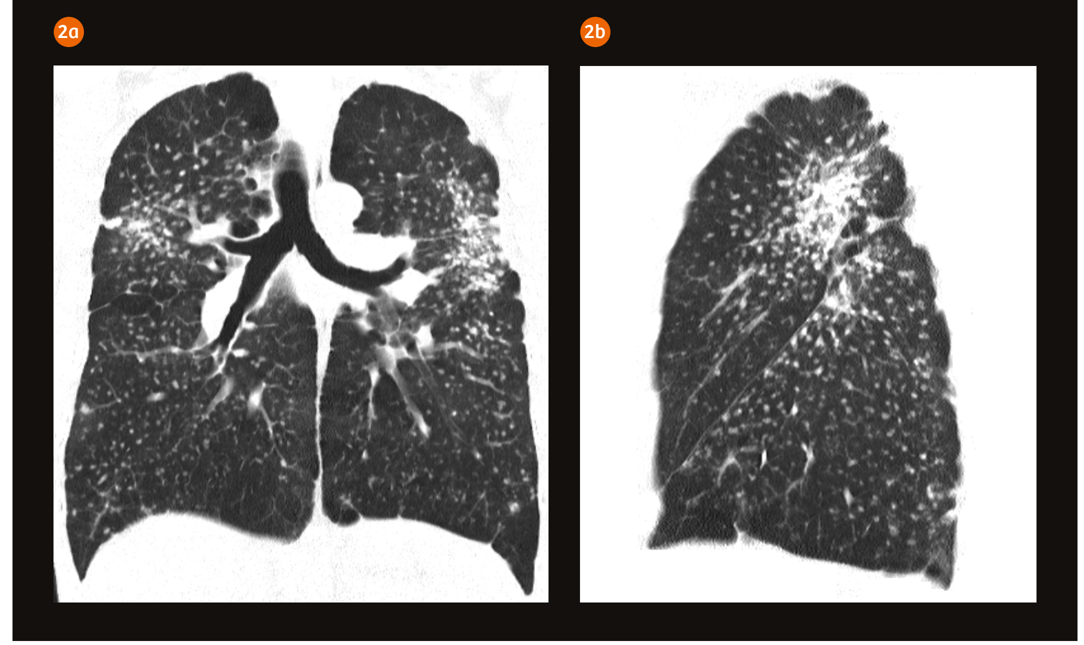
**References**
[1] Champlin, J., Edwards, R. and Pipavath, S. (2016). Imaging of Occupational Lung Disease. Radiologic Clinics of North America, 54(6), pp.1077-1096.



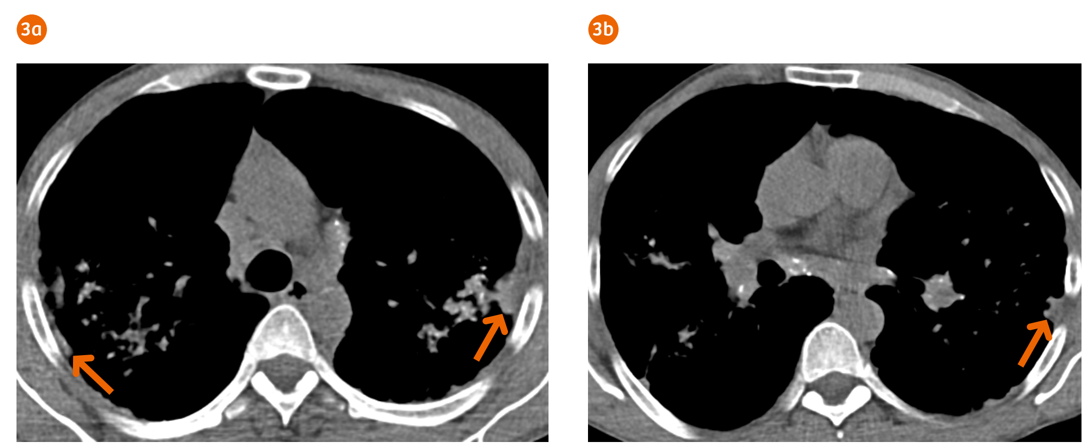





1 Axial images in lung window demonstrate diffuse pulmonary nodules in the upper (Fig. 1a) and lower (Fig. 1b) lobes, forming conglomerate masses (arrows).




2 Coronal (Fig. 2a) and sagittal (Fig. 2b) MPR images in lung window depict the predominance of nodules in the upper and posterior zones of lungs, coalescing to form masses.




3 Axial images in soft tissue window show pleural pseudoplaques (arrows) and speckled calcifications in the enlarged hilar and mediastinal lymph nodes as well as in the conglomerate masses.