OCCUPATIONAL LUNG DESEASE

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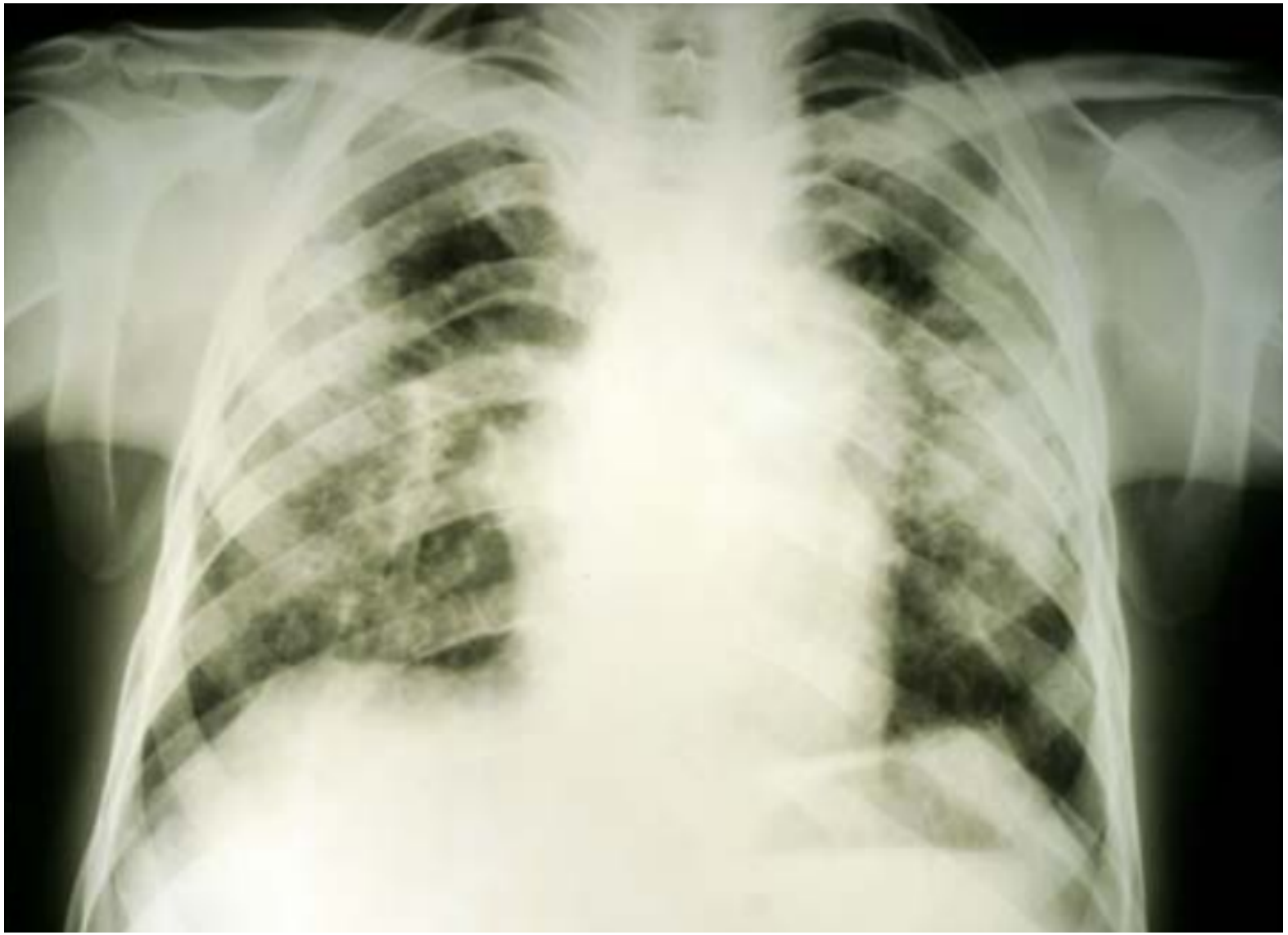
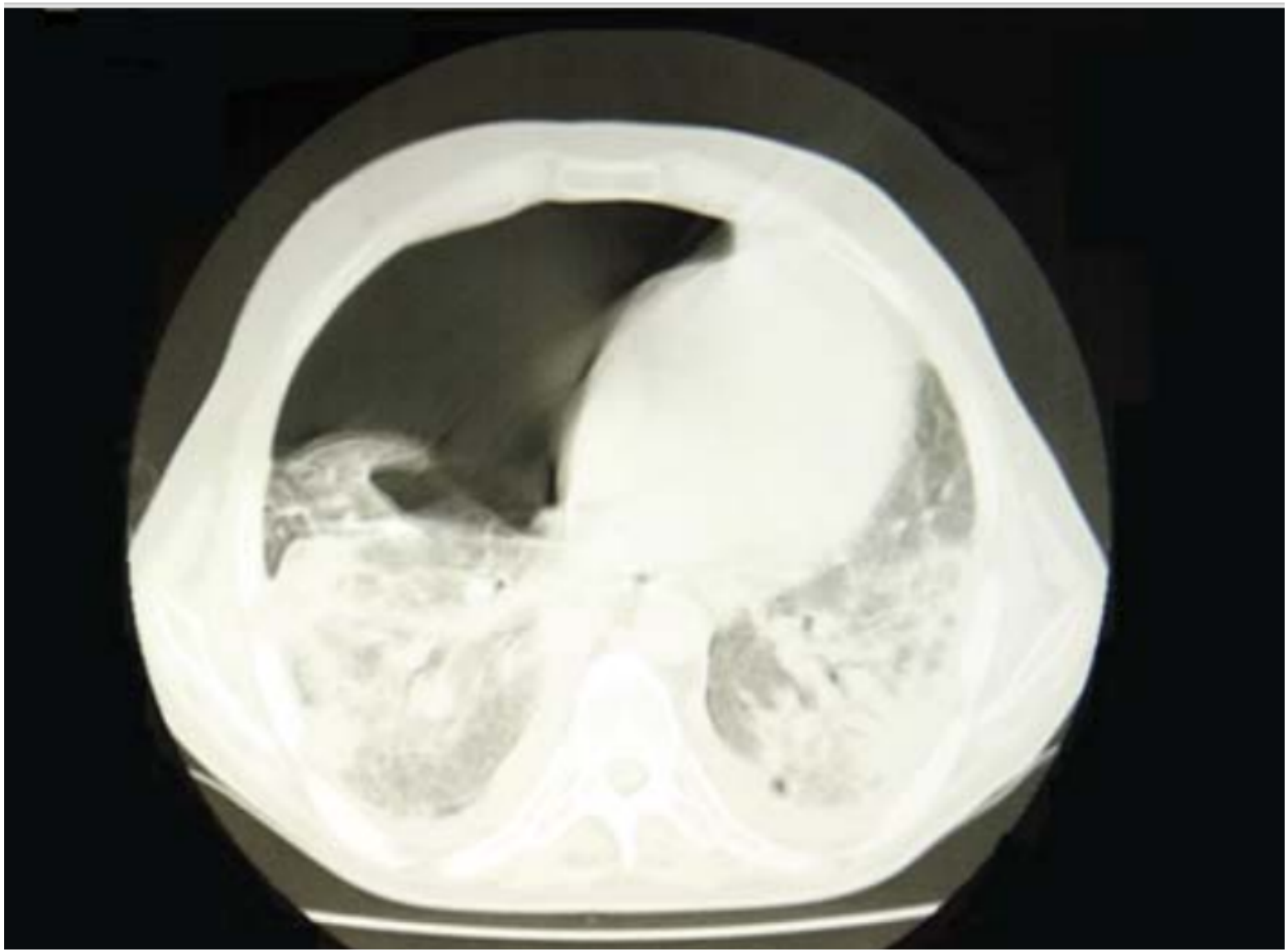
- A 27 year-old man was admitted to medical center with anorexia, weight loss, and exertional dyspnea.
- The patient had worked as a packer in a silica powder production workplace at the age of 24 for one year and, thereafter, in an agricultural farm for 2 years.
- The patient's complaints had begun one year after termination of silica dust exposure.
- He had no previous history of respiratory symptoms and had never smoked.
- The patient stated that the workplace had no ventilation.
- He became symptomatic at the age of 26 with complaints of dry cough and shortness of breath.





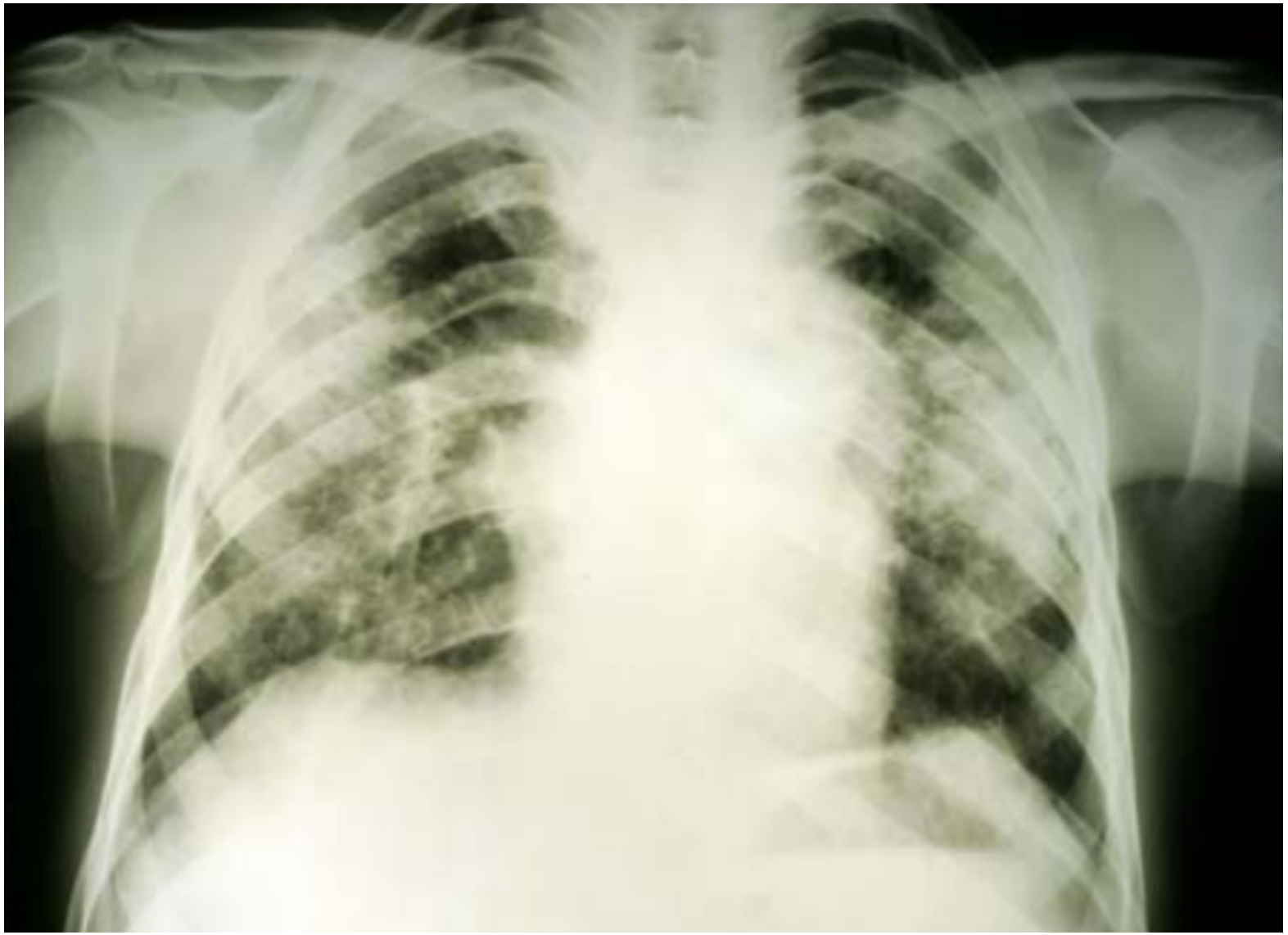
- Initial investigations showed normal complete blood count (CBC) and electrolytes.
- IgG level had been raised to 2019 mg/l, and c-reactive protein (CRP) was 7 mg/l (+++).
- Spirometry demonstrated a very severe restrictive pattern [FEV1= 1.56L (39% of predicted), FVC= 1.62L (34% of predicted), FEV1/ FVC = 96%].
- Transfer factor (TLCO) was 3.17 mmol/kp/m (29% of the predicted). Total lung capacity (TLC) was 3.32 L (51% of predicted)

What is diagnosis?

- TOXIC INHALETION INJERY
- ACCELERATED SILICOSIS
- ORGANIC DUST TOXIC SYNDROME
- CHRONIC SILICOSIS

Chest x-ray showed

- small opacities with radiological profusion category
- large opacity
- evidence of costophrenic angles blunting
- diffuse bilateral pleural thickening



- Two years later, the patient developed extensive spontaneous pneumothorax confirmed by CT-scan of the lung .
- He consequently died as a result of ARDS.
- The autopsy revealed collapsed lung , pleural thickening, pigmented masses and advanced fibrosis .
- Pathological investigation showed well developed silicotic nodules with central necrosis and hyalinization, surrounded by many concentrically arranged fibroblasts and histiocytes containing abundant silica particles revealed under polarized light microscopic examination.

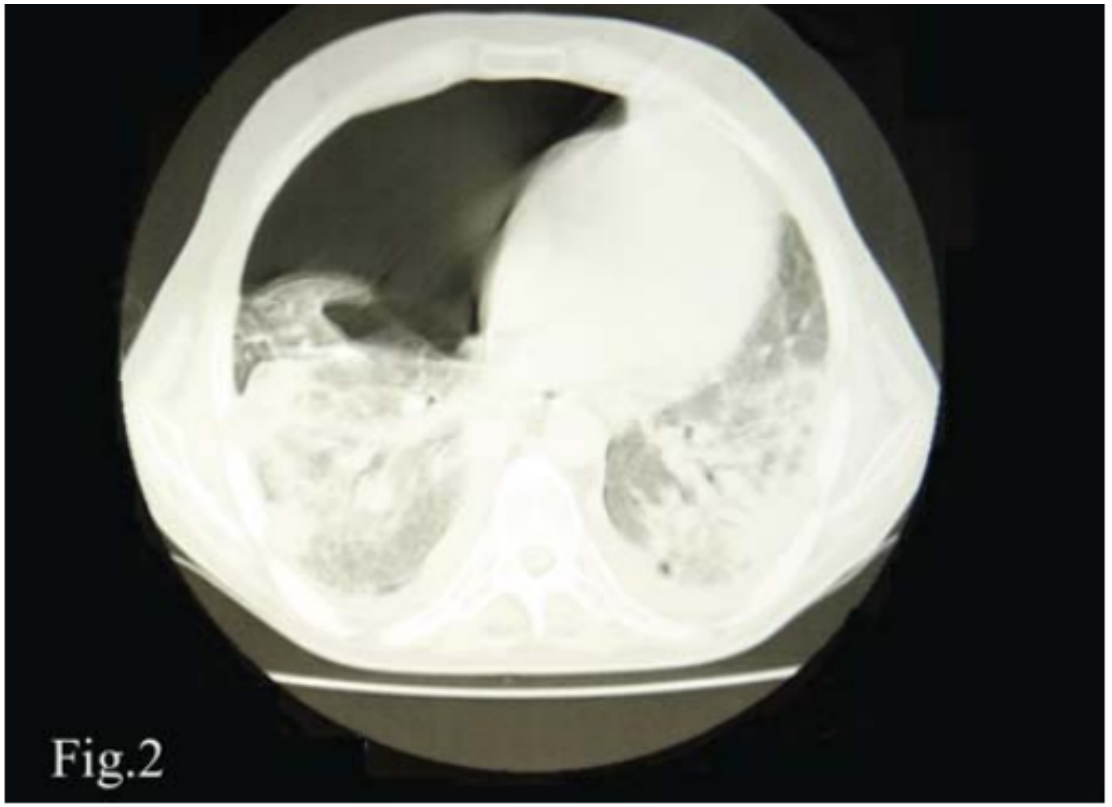


Figure 2. Lung CT illustrates 1) tension pneumothorax on the right, 2) bilateral alveolar shadowing with airbronchogram in both apical segments of lower lobes, 3) bilateral pleural thickening, 4) bilateral interstitial shadowing with reticulonodular pattern, 5) honey-combing pattern in the apical segment of left lower lobe.

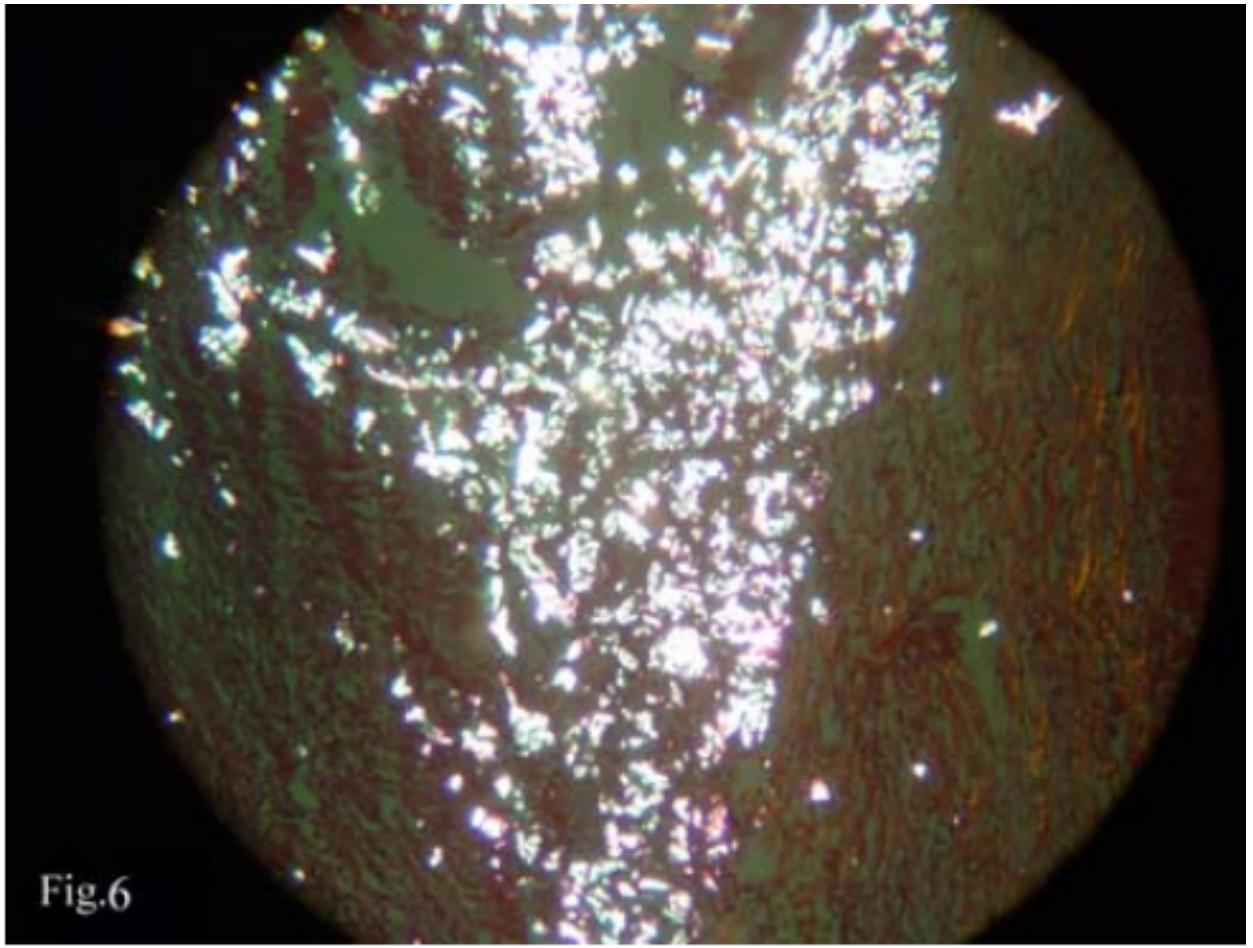
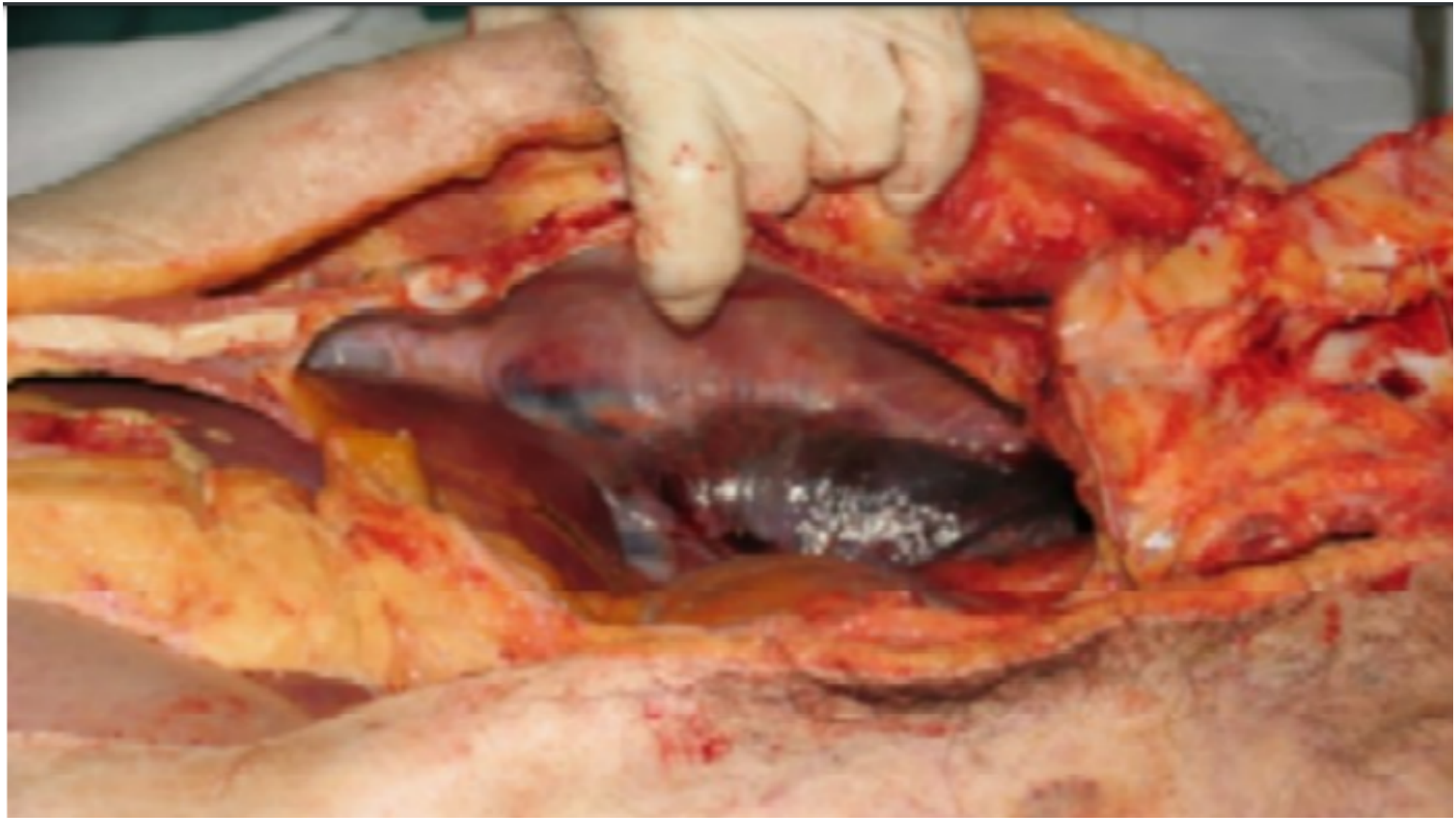
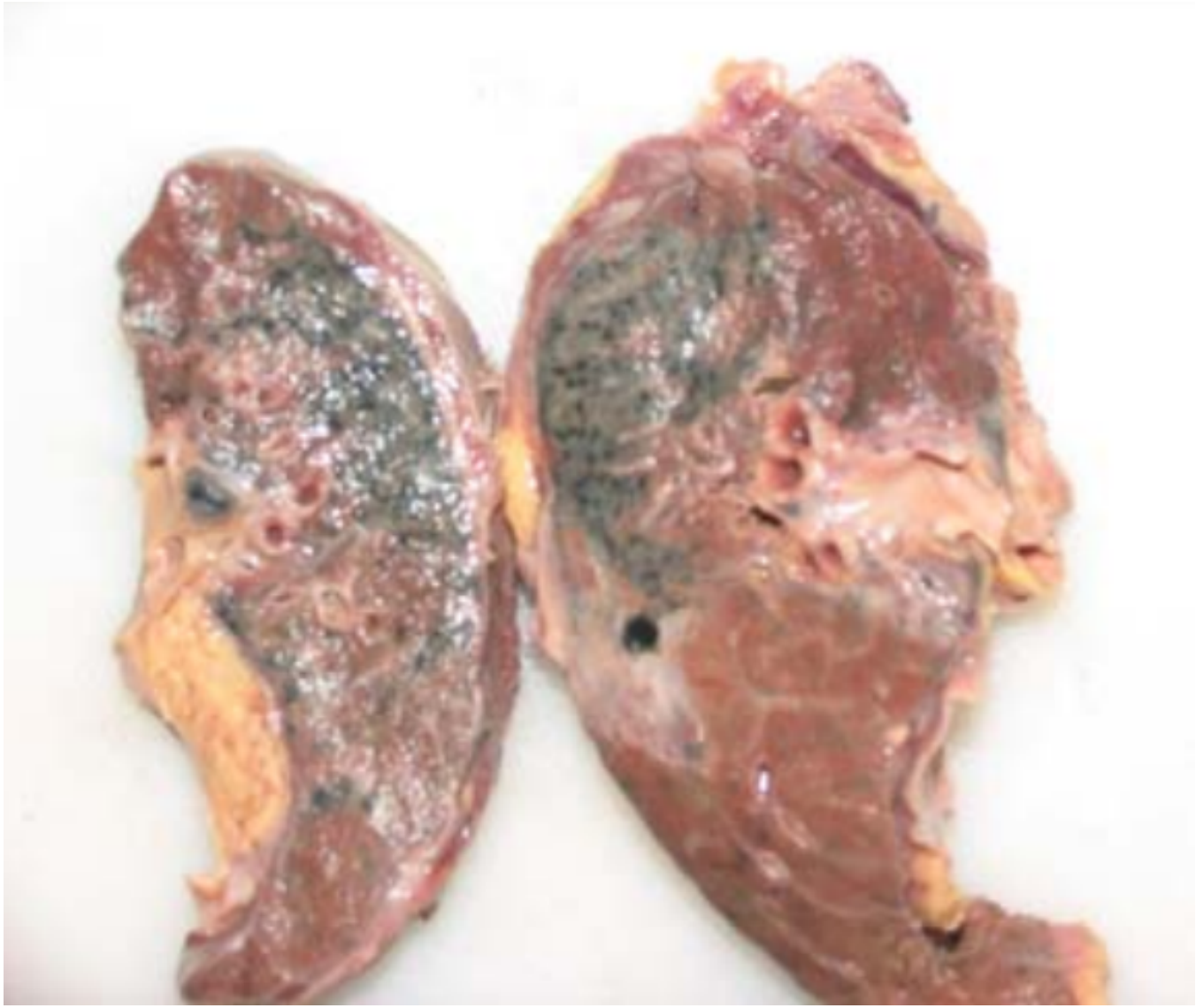


Figure 6. Lung specimen shows silica deposition revealed under polarized light.





How to treat or prevent its progress?

- corticosteroid
- Avoid exposure
- Lung transplant
- broncodilators

- acute silicosis was found to occur in a few weeks to years after exposure

- accelerated silicosis develops 3 to 10 years after exposure; however, this patient's occupational history, symptoms, chest x-rays, and pathological manifestations showed that after only one year of exposure to silica dust, rapidly progressive silicosis had occurred.
- This case shows that a brief, but intense exposure can cause significant fibrotic disease after a short latency period.

- Chronic silicosis more than 10 years

Which one of the following is more likely to occur with silicosis?

- Systemic sclerosis
- Mycobacterial infection
- Rheumatoid arthritis
- Fungal infections
- Lung cancer

How to prevent?

- Personal protective devices
- Isolation
- Substitution
- Corticosteroid
- Regular medical surveillance
- Chelating agents

- Historically, people exposed to silica are from lower-income backgrounds and have not had the advantage of regular medical surveillance or specialized care until their conditions become very advanced.
- Therefore, professional surveillance is important in implementing effective hygiene and ensuring the health of these workers.
- Stringent controls of occupational exposure to silica dust are imperative to prevent future mortalities of industrial workers.

Silicosis

- a form of pulmonary fibrosis, is a well-known occupational disease that results from acute or chronic exposure to silica or silica-containing dusts
- Pathologic diagnosis of pneumoconiosis is based on the identification of several exposure specific lesions, which include dust macules and nodules.
- Death or activation of macrophages and mediator release due to the toxic effects of silica consequently leads to nodule formation

- The current diagnostic criteria of pneumoconiosis are based on
- 1) exposure history
- 2) chest x-ray findings according to the ILO system . The sources of occupational exposure to silica dust are diverse and include many manufacturing industries in which silica is used, mining and processing of silica containing rocks. Silica can be harmful when inhaled as dust in the respirable range (< 5-µm particles)
- Death due to silicosis in young adults reflects relatively recent overexposures in a short period of time. It is well recognized that severe silicosis can cause significant lung function impairment

Any question?