Case Study

Three Cases of Pneumoconiosis with Misdiagnosis Corrected by Means of Lung Biopsy

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Today, the correct diagnosis of pneumoconiosis mainly relies on the patient's occupational history of dust exposure along with the results of a chest roentgenograph. For those patients whose occupational history is unclear or whose chest roentgenographs do not accord with the standard roentgen photos of pneumoconiosis, a correct clinical diagnosis could be difficult to make. For diffuse pulmonary diseases with unclear causes, lung biopsy has gradually become a reliable tool for correct diagnosis and differential diagnosis in China as well. Among many different biopsy methods, open lung biopsy has proven to be the most effective. In recent years, our hospital has effectively used open lung biopsy for localized lesions to correct misdiagnosis of three pneumoconiosis cases.

Case Report

1. Case No. 1 (hospital record No. 281457). A female, 50-year-old worker, without a history of smoking, did milling and casting of metal products as well as benchwork in a factory for eighteen years. Interim asthma and, coughing without sputum and fever lasted for eight years. The front view chest roentgenogram showed diffuse pulmonary changes with rounded tubercle focuses with irregular shapes which dominated the middle and outer zones, and coalesced in the right upper zone (Fig. 1). Tomography indicated swelling of lymph nodes in the right hilar region. Repeated smear checks for tuberculosis in sputum all appeared negative. Her initial diagnosis at another hospital was miliary tuberculosis. Anti-tuberculosis treatment with four conjoined medicines regularly for one year and interim anti-tuberculosis treatment for four years produced no good result, and there was still no improvement in her chest roentgenogram. Because of the impaired liver function and in-

Fig. 1. Left: The front view chest roentgenogram of Case No. 1 showing diffuse pulmonary changes with rounded tubercle focuses of irregular shapes, which coalesced in the right superior pulmonary lobe where, as indicated by the arrow, the biopsy was done. Right: The photomicrograph with magnification of $\times 40$ of the biopsy showing a typical silico-tubercle.

creasing hyperuricemia, the use of medicines was inhibited and she was admitted to our hospital. With open lung biopsy done in November, 1987, a typical silico tubercle was found (Fig. 1). The final pathological diagnosis was silicosis.

2. Case No. 2. (hospital record No. 302576). A male, 49-year-old worker was a government officer working in a desert area of Gansu Province. Besides this work history, he did not have any other occupational history of working with dust, and had smoked 10–20 cigarettes per day for 30 years. He suffered from progressive chest distress and asthma for three years without cough, sputum or fever. The front view chest roentgenogram (Fig. 2) showed small tubercle nodules distributed widely over both lungs, dominating the middle and lower lung fields, and masking vascular shadows, and there existed a huge bulla in the right costo-phrenic angle (Fig. 2). This man was initially diagnosed as having chronic bronchitis at a local hospital. Because anti-infection treatment had no noticeable effect, he was suspected of having hematogenous tuberculosis. Regular use of anti-tuberculosis medicines was continued for two years, but had no effect. The transbronchial lung biopsy with aspiration showed pulmonary interstitial fibrosis and carbon particles deposited in a fibrotic lesion. He was admitted to our hospital for suspicion of silicosis, and pneumoconiosis due to desert sand was the final clinical diagnosis made in November, 1990 by using open lung biopsy (Fig. 2).

3. Case No. 3 (hospital record No. 309506). A male, 46-year-old worker was a maintenance worker in a factory for 10 years. Prior to that, he had

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Fig. 2. Left: The front view chest roentgenogram of Case No. 2 showing small tubercular nodules distributed widely over the lungs, especially in the middle and lower fields, masking vascular shadows, and coalescing in the lingula pulmonis where the biopsy was done (arrow). Right: The photomicrograph of the biopsy with magnification of $\times 400$ showing the tubercle and the surrounding pneumoconiotic changes.

Fig. 3. Left: The chest roentgenogram of Case No. 3 displaying rounded tubercles with sharp edges and calcificated center of various sizes of which the largest one, 1.3×1.5 cm in diameter, is in the lingula pulmonis where the biopsy was done (arrow). Right: The photomicrograph of the biopsy with a magnification of $\times 200$ showing pathological pneumoconiotic changes with old tuberculosis.

done tunneling work in a coal mine for nine years. He did not have any history of smoking, and suffered from pulmonary tuberculosis in childhood. Because of coughing and asthma, his chest roentgenograph displayed rounded tubercle nodes of various size in the lungs. These tubercles had sharp edges with calcification in the center, and the largest node was up to 1.3×1.5 cm in diameter (Fig. 3). Smear checks of tuberculosis in sputum taken at many times appeared negative. His initial diagnosis at a local hospital was tuberculous pneumonia in lungs. Treatment with anti-tuberculosis drugs for regular intervals lasted for one year with no result. Suspected of having the rheumatoid pneumoconiosis, the patient moved to our hospital. His chest roentgenographs seemed to display chronic pulmonary histoplasmodic changes, but these radiographic findings were not consistent with his clinical symptoms. He was pathologically diagnosed as having pneumoconiosis with old tuberculosis by means of open lung biopsy done in 1991 (Fig. 3).

All three patients, whose thorax wounds from the biopsy soon healed, recovered nicely. The pathological diagnoses for these three patients were appraised by experts of the Chinese Institute of Preventive Medicine.

Discussion

Diffuse pulmonary disease has over two hundred causes, one of which is pneumoconiosis. Since the diagnosis of pneumoconiosis can not be made by means of a chest x-ray alone, making detailed in-

quiries about the patient's history of contact with various kinds of dust is very important. As in the case of No. 1, more than eight years had passed since he was misdiagnosed. The main reason for the misdiagnosis was negligence of her occupational history of contact with mixed dust including silicon, iron, aluminum and copper, etc. during milling and casting work. Case No. 2 did not work with dust, but there were geographic hazards such as sandstorms where he lived. Contact with dust in the daily living environment also may lead to pathological changes due to pneumoconiosis in the lungs⁽¹⁾, and it is worth paying attention to this.

Each patient's chest roentgenograph in this paper displayed individual characteristics of its own. In cases Nos. 1 and 2, failure to enquire about the patient's history of dust contact was due to chest roentgendgraphs which did not show typical pulmonary tuberculous changes. Their x-rays were different from standard chest radiographs of pneumoconiosis of various types and at various stages. Case No. 3 had a definite occupational history, but the chest roentgenograph findings were unusual and not compatible with pneumoconiosis changes of various types and at various stages. And no changes similar to pneumoconiosis were found when he had a history of active pulmonary tuberculosis. All three patients were under anti-tuberculosis treatment for a long period, and repeated smear checks for tuberculosis in sputum in local hospitals in cases Nos. 1 and 3 all appeared negative. Anti-tuberculosis treatment without improvement in the clinical course

should therefore be ended in order to avoid causing the patient unnecessary pain. A detailed study of chest roentgenographs combined with clinical assessment have to be done for any cases like the present ones.

When a clinical diagnosis for diffuse pulmonary pathological changes is very difficult to make, open lung biopsy, which is known to be safe and effective, if taken in time, can avoid other unnecessary examinations and ineffective treatments²⁾. All of the patients in the present study had mistaken diagnoses and mistaken treatments, and underwent various laboratory examinations. But fortunately all of these could finally obtain a correct diagnosis.

Although case No. 2 was suspected of being as pneumoconiosis by transbronchial lung biopsy and aspiration, limited specimens were not large enough to recognize silico-tuberculous lesions and also did not help in reaching a definite diagnosis. Open lung

biopsy has some advantages over transbronchial lung biopsy in that with the former it is possible to select a more accurate sampling location, with the anatomic relationship of the adjacent tissue structure being much clearer in direct sight, but with the latter a definitive diagnosis cannot always be reached owing to limitations in these points and the relatively small specimen. Weighing the disadvantages of lung biopsy procedures shows that open lung biopsy is undoubtedly necessary for some pneumoconiosis cases.

References

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