Case 412

4. Silicosis

【Progress】

He had no symptoms of ischemic brain disorder, although severe stenosis of bilateral carotid artery was found. He stayed in watchful observation.

【Discussion】

Silicosis is one of the pneumoconiosis occurring in workers engaging in cracking, carrying stones. The typical images are small nodules distributed predominantly in the upper lobes, associated with egg-shell calcifications in bilateral hilum and mediastinum.

When particles with 5μm or greater are inhaled, bronchial villi capture and excrete them. Meanwhile, when particles with 5μm or greater are inhaled, they can reach to alveolar space, and then macrophages engulf them (1). Too many tiny silicon particles beyond clearance by macrophage are inhaled and retained that causes proliferation of fibrocytes, inducing granular nodules to form. Further, continuous silicon inhalation particles induce large nodules with parenchymal necrosis, calcification. The reason why nodules in silicosis are distributed predominantly in upper lobes is that clearance is assisted by respiratory movement of diaphragma (2). Then, the particles inflowed in lower lobes are more susceptible to clearance than in upper lobes.

Another clearance route is the drainage via lymphatic vessel route. Lymphatic networks are formed along with bronchial tress or visceral pleura. Lymphatic vessels along with bronchial trees flow out to hilum lymph nodes, mediastinal nodes and finally venous angle of left subclavian vein. Lymphatic vessel flow along with visceral pleura also finally reach hilum lymph nodes. Silicon particles enter lymph vessels and reach hilum, mediastinum lymph nodes. Accumulation of silicon to hilum node, mediastinum lymph nodes to swell and become high attenuation, as time advance, form calcification (2). It might be said that high attenuated swollen lymph nodes are in an earlier stage than the advanced stage of eggshell calcified swollen lymph nodes.

Asbestos are not particles but tiny fibers or tubes that are hard to pass out through lymph vessels (3, 4). They remain in margin along with pleura. The accumulated asbestos with fibrosis induces plural plaques to form.

In our case, bilateral relatively large nodules with fibrosis associated with miliary small nodules predominantly distribution in upper lobes are depicted on chest CT with pulmonary level. Further, high attenuation swollen lymph nodes are depicted on CT with mediastinal level. In Case 141 with silicosis, high attenuation swollen lymph node with calcification was previously described.

As differential diagnosis from silicosis, sarcoidosis, malignant lymphoma, small cell carcinoma and metastatic tumors are listed (5, 6), and reported on Case 141.

【Summary】

We presented a ninety-one-year-old male who had worked on cracking and carrying stones. Bilateral relatively large nodules associated with military small nodules in upper lobes on CT. It is borne in mind that pulmonary military small nodules predominantly distributed in upper lobes reflect silicon particles embraced by fibrosis and/or intrapulmonary lymph nodes, while large nodules with fibrosis reflect parenchymal fibro-necrotic granulation mass. Hilar attenuation swollen lymph nodes at hilum and mediastinum reflect that much silicon flow in lymph nodes and as ages advance they fall in eggshell calcification.

【References】

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