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Case Report

Lung Cancer Probably Related to Talc Exposure: a Case Report

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Abstract: Industrial talc has been widely circulated in the world for a long time. The pure talc has little effects on humans, but inhalation of talc contaminated with asbestos can causes severe asbestos-related diseases such as lung cancer and malignant mesothelioma. Herein, we represent a case of lung cancer after occupational exposure to industrial talc in the rubber manufacturing industry.

Key words: Asbestos, Exposure, Lung cancer, Talc

Introduction

Talc is a hydrated magnesium silicate that has been widely used in the chemical, ceramic, cosmetic, leather, paper, and building industries. Industrial talc can contain asbestos or quartz particles[1)], which have the potential to induce asbestos-related diseases, including malignancies, or silicosis. Herein we report a case of lung cancer after occupational exposure to talc in the rubber manufacturing industry.

Case Report

An 85 yr-old man presented to the Department of Internal Medicine of Kosin Medical Center with a three-month history of shortness of breath, cough, and bloody sputum. He had a history of tuberculosis 20 yr prior to presentation. He had worked in handicraft manufacturing for 20 yr until his retirement at his age of 60. Before starting this work he was a farmer since he was 20 yr old. He was self-employed for 20 yr at approximately 10m^2 sized workplace in which there was no ventilation system (closed system). The workplace was dusty in the air and floor and no protection equipment was used at that time. The patient's main task was to blow up the talc stained balloons through his mouth without the support of the air pumping equipment for 10 h per day. At that time he received no information about asbestos contamination, and he inhaled talc from the balloons. His smoking history was 30 pack-years. Physical and clinical examination at the local medical center revealed a cavitary lung lesion that was highly suspicious for cancer; therefore, he wanted to get a second opinion regarding whether the diagnosis was lung cancer or tuberculosis. On examination, his temperature was 37.8°, heart rate was 80 beats per minute, blood pressure was 98/60 mmHg, and oxygen saturation was 95%.

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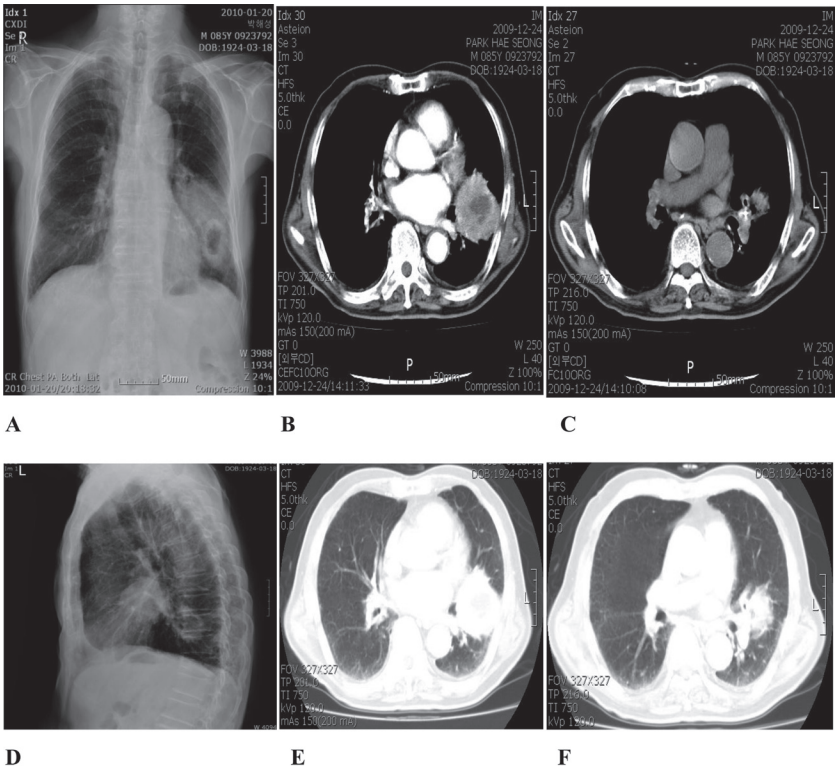

Fig. 1. (A, D) Chest X-ray on admission shows a cavitary lesion with irregular opacities in left lower lung. (B, E) High-resolution CT shows a large, cavitary mass in the left lower lung field. (C, F) Non-enhanced CT shows irregular calcified opacities around tumor.

The left lung sounds were decreased on auscultation and radiography revealed a cavitary lung mass in the left lower lobe (Fig. 1A). Several calcified opacities were also visualized around tumor on computed tomography (CT) (Figs. 1B, 1C, 1D, 1E and 1F). We could not detect the findings of pneumoconiosis, asbestosis, or talcosis. Moreover, multiple calcified plaques along the diaphragmatic pleura in the right lower lung and mediastinal pleura in the left lower lung were seen on chest CT (Figs. 2A, 2B, 2C and 2D). A complete blood count with differential counts and the results of serum chemical tests, including tests of liver function and renal function, were within normal limits. Fiberoptic bronchoscopy was performed under conscious anesthesia. Bronchoscopy revealed several anthracotic plaques and a nodular mass in the left lower bronchus. The pathologic diagnosis from the bronchoscopic biopsy was squamous cell carcinoma. The clinical stage was assessed as stage IIIa, but the patient refused curative treatment and wanted best supportive care. He died due to pneumonia four months after the first diagnosis. The publication of this case was conducted with the approval of the Kosin University Gospel Hospital Ethics Committee.

Discussion

Diseases related to talc exposure can be divided into four main categories: talco-silicosis due to inhalation of talc associated with free silica; talco-asbestosis due to inhalation of talc contaminated with asbestos; pure talcosis due to inhalation of talc in the absence of other minerals; and pulmonary disease secondary to the use of injected talc among intravenous drug users[2].

The term talc is applied to a heterogeneous group of hydrated magnesium silicates that are commonly found in mineral deposits containing varying quantities of other minerals including carbonates, quartz, amphiboles, and serpentines[3]. Occupational exposure can occur during the mining, milling, packaging, and distribution of talc and in secondary industries, such as ceramics and rubber, and from contact with the final product (cosmetic talc)[4]. Therefore, the talc likely contained asbestos. The pure form of talc has relatively fewer health effects on humans, but talc contaminated with asbestos, especially asbestos particulates that are longer than 5 μm with a length-to-width ratio of 3:1 or more, causes severe health problems[5]. Inhalation of asbestos can result in chronic

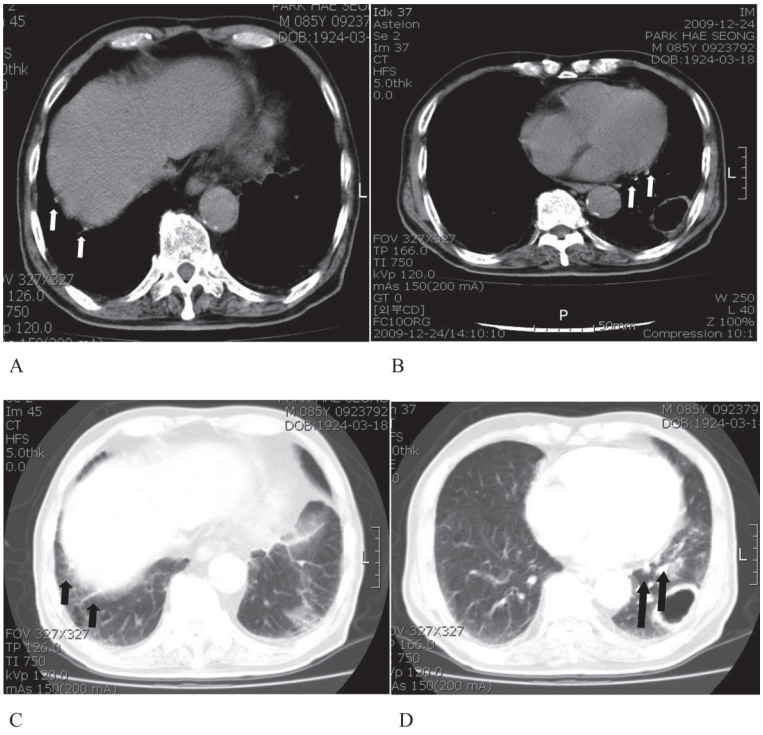

Fig. 2. Non-contrast CT shows (A, C) multiple plaques on the diaphragmatic pleura in the right lower lung (arrow heads) (B, D) on the mediastinal pleura in the left lower lung (arrow heads).

inflammatory pulmonary response. In the worst cases, asbestos inhalation can result in malignant neoplasms, such as mesothelioma and lung cancer, which generally occur some 20–40 yr after the onset of asbestos exposure; however, asbestosis can appear in 8–25 yr[6].

The recent report by Kim described an issue of talc contaminated by asbestos in Korea that the Korea Food and Drug Administration found that 11 talc powders for babies contained asbestos plus with 1,120 drugs and medical goods have been confirmed to contain talc contaminated with asbestos which resulted in a ban of circulation of more than 1% asbestos-containing industrial talc in 2010 which meant the industrial talc contaminated with asbestos had been used without government regulation for a long time[7]. In the present case, the talc was used in balloons to keep the latex from sticking to itself[8]. The length of exposure to talc in this case was 20 yr, which was a relatively long time for respiratory symptoms, radiological abnormalities, and diminished pulmonary function to develop due to exposure to mineral dust. In this case, the isolated finding of multiple diaphragmatic and mediastinal pleural plaques in both side lower lung is likely associated with past exposure to asbestos fibers, which are present in industrial talc. Pleural plaques are the most common asbestos-related disease[8], and their prevalence grows with increasing latency period. Twenty years after the initial exposure, around 10% of exposed individuals will develop plaques[9].

With regard to smoking, the mean pack-year index was 30, which was considered relatively high. There are reports in the literature regarding synergistic effects between smoking and lung cancer, especially among workers exposed to asbestos[10]. Without the occupational history of asbestos exposure in this case, most clinicians would suggest the patient's lung cancer was caused by smoking. However, primary physicians and consultants should consider the possibility of asbestos exposure as another potential cause of lung cancer.

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