Silicon Dioxide Particles Deposited in Vessels and Cartilage of the Femoral Head

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Received: July 8, 2013
Revised: September 17, 2013
Accepted: October 30, 2013

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The authors have no financial conflicts of interest.

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INTRODUCTION

Silicosis had been considered for decades as an illness with manifestations of lung fibrosis due to inhalation of overconcentrated SiO2 dust. To the best of our knowledge, studies have yet to report SiO2 deposits in any other tissues and organs. In the present case, while performing bilateral artificial total hip arthroplasty for one patient, we found that the articular cartilage of the bilateral femoral head was black. Therefore, specimens thereof were sent for pathological examination. Pathological examination (immunohistochemistry) and polarized light microscopy revealed the presence of considerable brown, acicular, rhombic, and crumb-like crystals. The crystals were mainly composed of SiO2. SiO2 could deposit in vessels and femoral head cartilage via blood circulation.

Key Words: Silicon dioxide, vessels, cartilage, femoral head

CASE REPORT

A 50-year-old patient was admitted to the Department of Orthopedics at our hospital. He had complained of pain in the left hip for more than 3 years and in the right hip for more than 1 year. The symptoms had deteriorated with joint dysfunction for 2 months. He had no history of hypertension or diabetes mellitus and he did not smoke or drink. The patient had worked as a coal miner for more than 10 years.

Upon physical examination, we noted rachioscoliosis to the right. Intervertebral space had no tenderness or percussion pain. Spinal mobility was normal. His pelvis tilted to the right and the left hip joint was flexion deformed. Sensation, locomotion, and circulation of the four limbs were good. Routine blood test, liver and renal function, E6A, ESR, CRP, HLA-B27, ASO, and RHF were all in their nor-
larized light microscopy revealed chronic synovitis and proliferation of granuloma, as well as the presence of considerable brownish acicular, rhombic, and crumb-like crystals. At their edges, giant cell reactions of foreign-bodies were found. The crystals mainly comprised SiO$_2$ (Fig. 4).

DISCUSSION

In modern medicine, silicosis is considered an illness with main manifestations of lung fibrosis due to inhalation of overconcentrated SiO$_2$ dust. SiO$_2$ dust destroys alveolar macrophages, thus inducing pathological changes indicative of silicosis. So far, there has been no case report about SiO$_2$ deposits in vessels or cartilages. The anatomical factors of the femoral head and neck are beneficial to silica deposition. First, the femoral head is widely covered by articular cartilage, thus making its blood supply the end of the
were not confined only to the lungs, but also other tissues and organs through blood circulation, inducing pathological changes. It is, therefore, appropriate to consider silicosis as an occupational disease.

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