Pulmonary Alveolar Microlithiasis

Subjects: Genetics & Heredity

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Pulmonary alveolar microlithiasis is a disorder in which many tiny fragments (microliths) of a compound called calcium phosphate gradually accumulate in the small air sacs (alveoli) located throughout the lungs.

genetic conditions

1. Introduction

These deposits eventually cause widespread damage to the alveoli and surrounding lung tissue (interstitial lung disease) that leads to breathing problems. People with this disorder can develop a persistent cough and difficulty breathing (dyspnea), especially during physical exertion. Affected individuals may also experience chest pain that worsens when coughing, sneezing, or taking deep breaths.

Pulmonary alveolar microlithiasis is usually diagnosed before age 40. Often the disorder is discovered before symptoms develop, when medical imaging is done for other reasons. The condition typically worsens slowly over many years, although some affected individuals have signs and symptoms that remain stable for long periods of time.

People with pulmonary alveolar microlithiasis can also develop calcium phosphate deposits in other organs and tissues of the body, including the kidneys, gallbladder, testes, and the valve that connects a large blood vessel called the aorta with the heart (the aortic valve). In rare cases, affected individuals have complications related to accumulation of these deposits, such as a narrowing (stenosis) of the aortic valve that can impede normal blood flow.

2. Frequency

Pulmonary alveolar microlithiasis is a rare disorder; its prevalence is unknown. More than 1,000 affected individuals have been described in the medical literature, of whom more than half are from Turkey, China, Japan, India, or Italy. The remainder come from populations worldwide.

3. Causes

Pulmonary alveolar microlithiasis is caused by mutations in the *SLC34A2* gene. This gene provides instructions for making a protein called the type IIb sodium-phosphate cotransporter, which plays a role in the regulation of

phosphate levels (phosphate homeostasis). Although this protein can be found in several organs and tissues in the body, it is located mainly in the lungs, specifically in cells in the alveoli called alveolar type II cells. These cells produce and recycle surfactant, which is a mixture of certain phosphate-containing fats (called phospholipids) and proteins that lines the lung tissue and makes breathing easy.

The recycling of surfactant releases phosphate into the alveoli. Research suggests that the type IIb sodium-phosphate cotransporter normally helps clear this phosphate. *SLC34A2* gene mutations are thought to impair the activity of the type IIb sodium-phosphate cotransporter, resulting in the accumulation of phosphate in the alveoli. The accumulated phosphate forms the microliths that cause the signs and symptoms of pulmonary alveolar microlithiasis.

The Gene Associated with Pulmonary Alveolar Microlithiasis

- SLC34A2

4. Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

5. Other Names for This Condition

- PAM

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