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Pulmonary Alveolar Microlithiasis and Osteopetrosis

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ABSTRACT

Pulmonary alveolar microlithiasis is a rare condition caused by deposition in the alveoli of the lungs by calcific consolidation called calcospherites. Its etiology and pathogenesis are obscure. Osteopetrosis is a heterogeneous group of inheritable conditions with a defect in bone resorption by osteoclasts.

We report a case of pulmonary alveolar microlithiasis associated with osteopetrosis, which was diagnosed incidentally by bone high density and generalized osteosclerosis on chest x-ray.

Association of these two diseases has not been reported before. ***(Tanaffos 2008; 7(4): 60-63)***

Key words*: Alveolar microlithiasis, Osteopetrosis, Hypercalcemia*

INTRODUCTION

Pulmonary alveolar microlithiasis is a rare idiopathic disease characterized by microliths or calcium deposits in the alveoli (1). It was first described by Harbitz in 1918 (2). Its etiology and pathogenesis remains unknown, and no effective treatment is available. Autosomal recessive inheritance has been shown and 50% of the cases are familial (3-5).

Osteopetrosis is a rare dysplasia of bone characterized by a defect in bone resorption by osteoclasts described by Albers- Schonberg. It occurs in two forms: The more severe autosomal recessive or infantile pattern which is life-threatening in childhood and the more benign autosomal dominant form with little or no symptoms, and normal life expectancy (6-8).

Also, some intermediate or atypical forms by autosomal recessive inheritance have been reported. Radiological presentation includes generalized osteosclerosis.

We report a case of alveolar microlithiasis associated with osteopetrosis. Etiology of both diseases is obscure but genetic factors have been described in this regard. Presence of hypercalcemia, as an etiologic or predisposing factor may expedite the pathologic process of these conditions.

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CASE SUMMARIES

An 8 year-old boy of consanguineous parents was admitted to the hospital for the first time due to nonproductive cough and progressive dyspnea of 2 months duration.

He was ill and cachectic with mild respiratory distress and tachycardia (PR=110/min).Temperature was 38.5ºC. Diffuse crackles were present all over the lungs especially at the bases. A systolic murmur was detected near the apex of the heart. Neurological examination was normal. Blood indices were within the normal limit. Urinalysis and renal function tests were normal. Serum calcium level was higher than normal in repeated examinations but no hypercalciuria was detected. Tuberculin skin test was negative. Arterial blood gas showed respiratory alkalosis due to tachypnea. In spirometry, pulmonary diffusion capacity was reduced. Acid-fast stain, culture of gastric contents and bronchoalveolar lavage for *Mycobacterium tuberculosis* were negative. Chest radiography revealed the presence of innumerable, widespread small nodules, diffusely involving both lungs, especially at the bases. Also, high density bones of the ribs and vertebrae were compatible with the diagnosis of osteopetrosis .Skull and vertebral column x-rays showed increased bone density and generalized osteosclerosis. On bone marrow biopsy, the medullary cavity was abnormally filled with primary spongiosa and fibrosis which confirmed the diagnosis. The paraffin sections of bronchoscopic lung biopsy stained by hematoxylin and eosin showed spherical calcified laminated bodies in the lumina of the alveoli. Brain CT-scan with and without contrast showed diffuse calcification in the petroclinoid ligament and around the tentorium hiatus. Echocardiography revealed mild mitral and tricuspid regurgitation and calcification of the anterior leaflet of mitral valve. There was conductive hearing loss on audiometry due to otitis media with effusion. The patient was treated by conservative treatment for pulmonary infection, as well as oxygen therapy and low calcium diet.

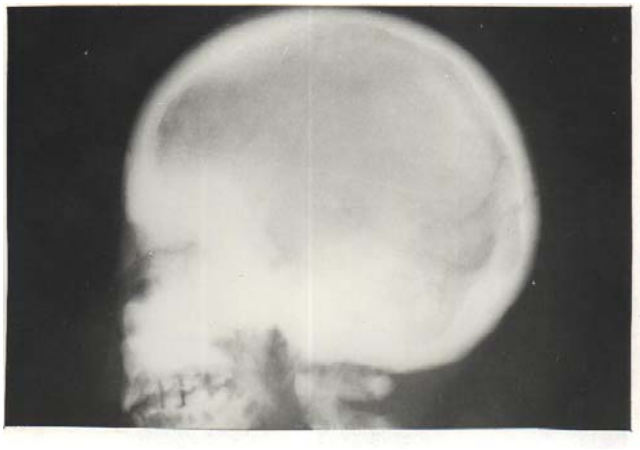

Figure 1. Skull x-ray shows diffuse sclerosis of the skull base and mastoid process.

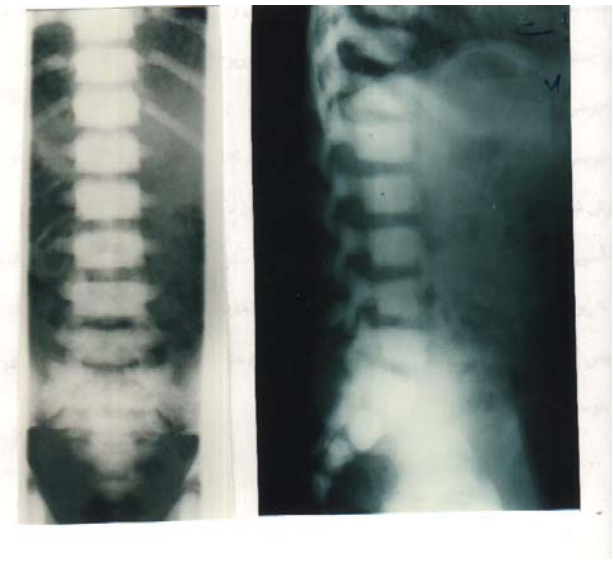

Figure 2.Generalized sclerosis is seen in the vertebrae.

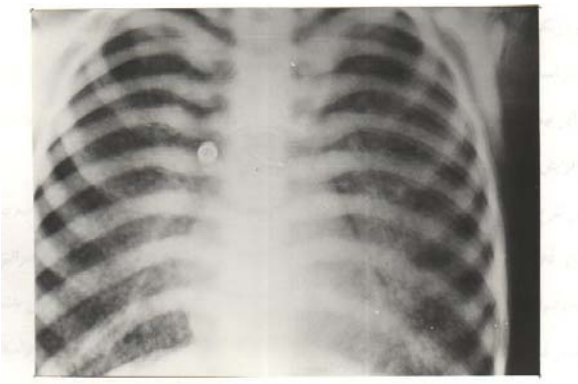

Figure 3. Chest x-ray shows bilateral diffuse micronodular calcified densities and high density ribs.

DISCUSSION

Our case had characteristics of both pulmonary alveolar microlithiasis and osteopetrosis.

Pulmonary alveolar microlithiasis is a rare condition with unknown etiology and pathogenesis characterized by calcifications within the alveoli and a paucity of symptoms in contrast to the imaging findings. Hypothetical mechanisms that have been proposed include an inborn error of metabolism, an unusual response to unspecified pulmonary insult, an immune reaction to various irritants or acquired abnormality in calcium and phosphorus metabolism (9, 10). Autosomal recessive inheritance has been seen and 50% of cases are familial (3-5).About half the patients are asymptomatic. Non-productive cough and dyspnea are the most common presenting symptoms and usually occur late in the course of the disease. The chest radiograph shows bilateral, sand-like, micronodular calcified densities known as microliths or calcospherites (1, 11). The diagnosis is almost always made by the classic radiographic findings (12). Average age of patients is between 30 and 40 years old, but our patient was 8 years old and admitted with progressive pulmonary symptoms. Presence of hypercalcemia may precipitate the symptoms or can be an etiologic factor. Histopathology shows intra-alveolar calcospherites, which represent laminated calcium phosphate concretions (13, 14).

Osteopetrosis is a heterogeneous group of heritable conditions with a defect in bone resorption by osteoclasts. The clinical expression is variable and affected children usually have severe manifestations of abnormal bone remodeling, cranial nerve palsy, extramedullary hematopoiesis, susceptibility to infections, neurological impairment and hearing loss. Mildly affected patients may be asymptomatic (7,11,15,16,17) . The disease is classified as malignant, benign and intermediate. Our patient had the intermediate form of the disease which is autosomal recessive and lacks severe signs such as bone marrow involvement, pancytopenia and hepatosplenomegaly.

There is no effective treatment for alveolar microlithiasis. Chelating agents and steroids are of no therapeutic value in this condition. Various therapies have been used in the treatment of osteopetrosis.

In our patient, the main problem was respiratory distress due to pulmonary alveolar microlithiasis, and unfortunately no effective treatments other than conservative treatments including control of infection, oxygen therapy and low calcium diet were administered.

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