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Report Case: Alveolar Microlithiasis

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Abstract **Case Report**

Alveolar microlithiasis (AMP) is a rare genetic disease characterized by intra-alevolar phosphate and calcim deposition in the pulmonary parenchyma in a sparse bilateral manner with a predominance in the lower and middle regions. This disease results from a genetic dysfunction characterized by inactivating mutations in the SLC34A2 gene resulting in local intra-alveolar phosphate aggregation due to sodium-dependent phosphate co-transporter deficiency. Patients with this disease are usually seen in late stages with a chronic pulmonary heart and hypoxemia. High resolution chest CT scan with chest x-ray make it possible to diagnose this disease with a pathognomonic appearance in the form of diffuse calcified micronodules. Only lung transplantation has been shown to be effective as a treatment for the disease. We describe the case of a 58-year-old woman with a history of pulmonary tuberculosis treated in 1994 and siblings treated for undocumented pneumonia, referred to our department for a chest scan and presenting with NYHA stage III dyspnea and greenish sputum. Imaging was suggestive of extensive bilateral interstitial lung disease.

Keywords: Calcification, interstitial lung disease, microliths, pulmonary alveolar microlithiasis.

INTRODUCTION

Alveolar microlithiasis (AMP) is a rare genetic disease characterized by intra-alevolar phosphate and calcim deposition in the pulmonary parenchyma in a sparse bilateral manner with a predominance in the lower and middle regions.This disease results from a genetic dysfunction characterized by inactivating mutations in the SLC34A2 gene resulting in local intra-alveolar phosphate aggregation due to sodium-dependent phosphate co-transporter deficiency [1]. The disease has a slight female predominance in the familial form [2]. The majority of reported cases were from Europe and Asia [1]. Patients with this disease are usually seen in late stages with a chronic pulmonary heart and hypoxemia. High resolution chest CT scan with chest x-ray make it possible to diagnose this disease with a pathognomonic appearance in the form of diffuse calcified micronodules, generally there is no radiocilinic discordance [3].

CASE REPORT

A 58 year women, housewife, was referred to the radiology department for Chest CT, on clinical management of his progressive shortness of breath and stage III dyspnea of NYHA and greenish expectorations the last 12 months. In terms of medical history, she mentioned that she was treated for pulmonary tuberculosis in 1994 with no document, also occasional left-sided pleuritic chest pain with no other exercise related pain, no peripheral swelling, no weight loss and no night sweats. She is a non-smoker, with no exposure to birds or pets, she does not have any allergies and she has no history of tuberculosis. With reference to the family history, siblings treated for undocumented pneumopathy. On physical examination her heart rate was 90 bpm, blood pressure was 100/60 mmHg and a respiratory rate of 22 breaths/minute, there were marked discrete inspiratory crackles. Pulmonary examination findings are sounds like rhonchi at the bases, sand there was no edema, ascites or hepato splenomegalia. A high resolution computed tomography of the chest (Fig-1) was performed and revealed several calcifications throughout the parenchyma, partially calcified para pleural and para mediastinal line, sub-pleural cystic changes and calcified interlobular septa. Considering the findings on the CT scan and her history, her case was discussed and the patient was diagnosed with alveolar microlithiasis.

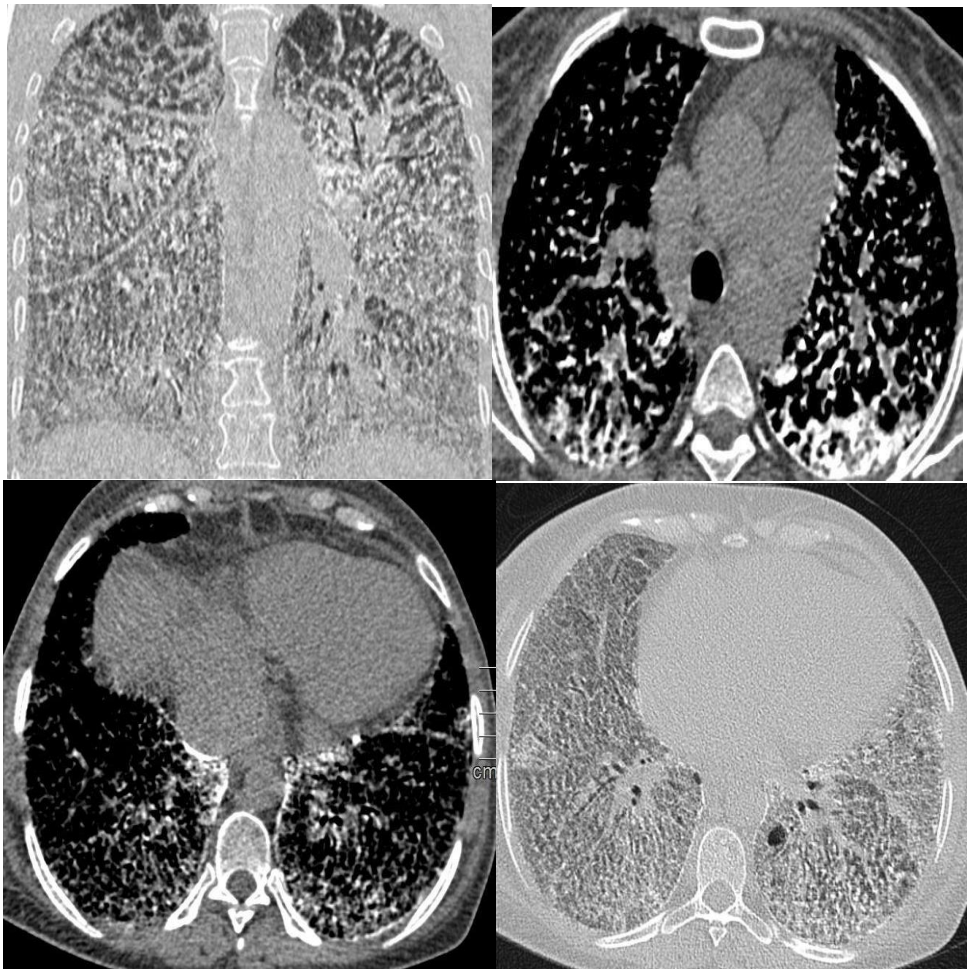

Fig-1: High resolution computed tomography (HRCT) of the chest revealing innumerable calcifications throughout the parenchyma, partially calcified para pleural and para mediastinal line, subpleural cystic changes and calcified interlobular septa

DISCUSSION

Alveolar microlithiasis (AMP) was first reported by the Norwegian Harbitz in 1918; he described a rare disease characterized by the deposit of microliths intra-alveolar [4]. As a result, the disease was for a long time called "Harbitz syndrome", it was not until 1933 that the Hungarian Puhr named it pulmonary alveolar microlithiasis, a disease which results from an autosomal recessive transmission, without predominance significant gender. The countries with the majority of cases were Turkey, India, Italy, Japan and China [5]. 88.2% of patients were diagnosed before age 50 compared to only 35.8% before age 20 according to the study by Mariotta et al., [6]. PAM is the result of several mutations involving the SLC34A2 gene [7]. This gene is also expressed in several extra-pulmonary organs (kidneys, small intestine, pancreas, mammary glands, liver, ovaries, placenta, prostate and testes) but the disease does not no extrapulmonary manifestations [8]. The sodium phosphate co-transporter type IIb is responsible for the clearance of phospholipids in the alveoli, a mutation involving the SLC34A2 gene will be responsible for a dysfunction of this co-transporter and therefore an intra-alveolar aggregation of the calcium phosphate [9]. The disease exhibits a significant clinical polymorphism ranging from asymptomatic to respiratory failure. There is not enough information on the course of the disease due to the few cases reported in the literature. In some cases, MAP remains stable clinically and radiologically [10-12]. The characteristic appearance on the chest X-ray is bilateral scattered calcified micronodular infiltrates more marked in the posterior middle and inferior regions giving the appearance of "sandstorm lung" hiding the mediastinal and diaphragmatic lines.During the course of the disease, on the chest CT scan, there is an accumulation of microliths in the pulmonary intestitum which gives the appearance of a calcified thickening of the subpleural space, of the peribronovascular space and the interlobular septa [13, 14-16].

The involvement on the chest CT scan is generally bilateral and symmetrical in the form of calcified micronodules more visible at the peripheral subpleural spaces, the mediastinal lines and interlobular septa giving the appearance of a stony lung. We can also assist with ground glass foci, consolidations

containing dense calcifications and microcystic lesions [13, 14].

The differential diagnosis can be, talc granulomatosis, stannosis, and calcified miliary histoplasmosis but the lesions in this gender of these pathologies are of different distribution, larger, with respect for the subpleural spaces [17]. The impotant distribution; at the level of the lower and posterior regions as well as at the subpleural level, of the mediastinal and diaphrgamatic lines and the peribronchovascular spaces, is characteristic of MAP. Subpleural cysts generally ranging from 5 to 10 mm with a lead wall appear on a chest X-ray with a black pleural line. In MRI, Hoshino et al., demonstrated the appearance of PAM as diffuse calcified micronodules with increased signal intensity on T1-weighted images more pronounced in the lower and posterior regions [18].

PAM is generally a slowly progressive disease, although certain factors can make it even worse, such as infection and smoking [19].The measurement of the serum concentration of protein surfactant D and A has recently been shown to be useful in the diagnosis and monitoring of the disease [20].

Oxygenation and vaccination against influenza and pneumococcus are part of the management of MAP [18].

The disease has a poor prognosis, no effective treatment available, lung transplantation remains the only option in the advanced stage of the disease without noticeable recurrence, bronchoalveolar lavage and corticosteroids have not been shown to be effective. Currently disodium etidronate has been shown to be useful but research needs to be done to demonstrate its benefit. Gene therapy is also found to be useful in the future [21-27].

CONCLUSION

Alveolar microlithiasis (AMP) is a rare genetic disease. High resolution chest CT scan with chest x-ray make it possible to diagnose this disease with a pathognomonic appearance in the form of diffuse calcified micronodules.

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