



Mixed-Dust Pneumoconiosis - Differential Diagnosis Must Still be Considered in Post-COVID-19 Interstitial Lung Disease Era

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Abstract

Introduction: Post-COVID-19 pneumonia patients' reevaluations are increasing with the possibility of COVID-19 sequela, though environmental and occupational diseases should not be overlooked.

Case Report: We report a case of a 52-year-old male, who presented to a pulmonology appointment after COVID19, with persisting symptoms and radiological abnormalities. After a careful anamnesis, radiological and histological review, COVID19 sequela was ruled out and mixed-dust pneumoconiosis diagnosis was made.

Discussion: Presently, as we are faced with several COVID-19 pneumonia patients' reevaluations, it should be kept in mind that environmental and occupational diseases cannot be overlooked. Mixed-dust pneumoconiosis is associated with typical occupations such as metal miners, quarry, foundry, pottery and ceramics workers, as well as stonemasons. However, the diagnosis may well present as a challenge, and misdiagnosis is frequent because details of causative previous exposures may not be available and the clinical findings may vary considerably.

Conclusion: This case report is a reminder that detailed clinical and exposure-related history combined with specific imagological, analytical and histopathologic investigations is of most importance to reach the correct diagnosis, which is crucial for prognosis definition, appropriate preventive measures in the workplace and also for compensation issues.

Keywords: COVID-19; Mixed-dust pneumoconiosis; Occupational exposure; Interstitial lung disease

Introduction

Respiratory symptoms and/or imaging abnormalities owing to possible COVID-19 pneumonia sequela have been a frequent reason to search for a pulmonology appointment and there is a tendency to overlook the patient's exposure history. Mixed-Dust Pneumoconiosis (MDP) is rarely reported, although exposure to a multitude of different inorganic components is common in environmental and occupational settings and it ought to be considered as a differential diagnosis.

Case Presentation

We describe a 52-year-old man, former smoker (5 pack year), who presented to a pulmonology appointment to evaluate possible COVID-19 pneumonia sequela. He had a past medical history of hypertension, dyslipidemia and acute myocardial infarction in 2008. His daily medication included bisoprolol, rosuvastatine, enalapril and hydrochlorothiazide. He lived in an urban area, with no exposure to biomass burning and had no pets. He worked as stonemason, carving marble for 38 years and had also worked with wood and upholstery. He reported a 12-month history of dyspnea on exertion, worsened after SARS-CoV-2 infection (3 months earlier). Chest High Resolution Computed Tomography (HRCT) at the time of infection revealed diffuse Ground Glass Opacities (GGOs), subpleural reticulation and traction bronchiectasis with upper lobe predominance, and also mediastinal lymph nodes with "eggshell" calcification. Four months after the infection chest HRCT was repeated, which showed abnormalities' stability (Figure 1)?

On first examination, he had good peripheral saturations and normal breath sounds at chest

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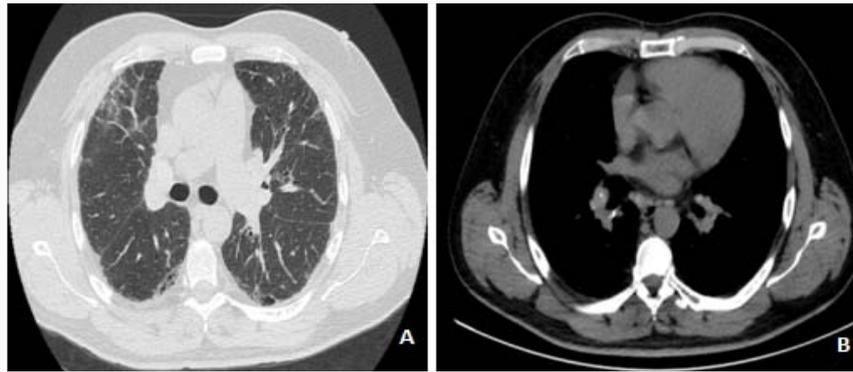


Figure 1: A) HRCT with GGOs, subpleural reticulation and traction bronchiectasis with upper lobe predominance; B) mediastinal lymph nodes with “eggshell” calcification.

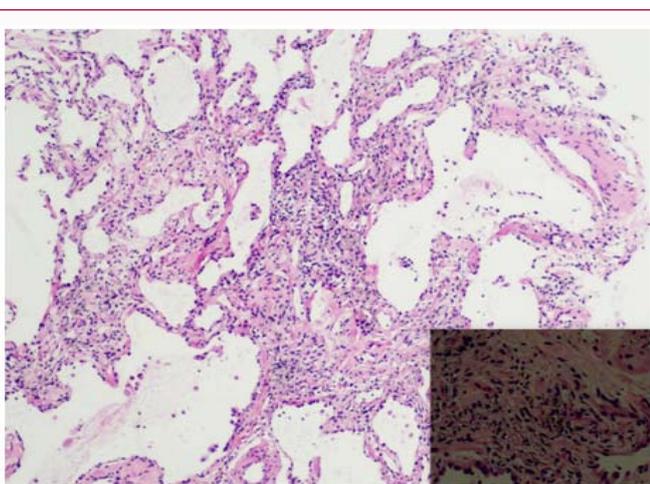


Figure 2: Pathological findings of lung cryobiopsy. On low power (H&E, original magnification 40x), interstitial, irregular, stellate-shaped foci composed of fibroblasts and histiocytes containing cytoplasmic pigment and birefringent crystals under polarized light (inset, 200x).

auscultation. There was no stigma of autoimmune diseases, but digital clubbing was present.

Blood workup showed no immunological changes. Pulmonary function test revealed moderate restrictive pattern (TLC 3.33 L; 56%, FVC 2.29 L; 58% e FEV1 2.01L; 64%) and reduced diffusion capacity for carbon monoxide (3.78; 44%); transthoracic echocardiogram was normal. Bronchoalveolar Lavage (BAL) showed no lymphocytosis, but lightly birefringent particles were seen under polarized light.

Given his exposure history, egg-shell calcification of mediastinal lymph nodes and lightly birefringent particles on BAL, differential diagnosis of COVID-19 pneumonia sequela was set aside and silicosis was the main differential diagnosis. However, the HRCT pattern was not consistent with silicosis. In face of a reasonable doubt pending on the definitive diagnosis, it was decided in multidisciplinary discussion to perform transbronchial lung cryobiopsy, which histology showed interstitial focal fibrosis with accumulations of dust-laden macrophages and a significant number of lightly birefringent particles seen under polarized light; no silicotic nodules were observed (Figure 2). These morphologic aspects were consistent with silica and other less fibrogenic dust exposure, such as iron and silicates (mixed dust fibrosis). In light with these findings and exposure history, MDP diagnosis was made.

Literature Review

MDP is associated with typical occupations such as metal miners, quarry, foundry, pottery and ceramics workers, as well as stonemasons. However, MDP has also been reported in hand grinding maize using large stones [1] and secondary biomass fuel burning [2]. Some studies have also reported overexposure to respirable quartz in farming [3], which can be responsible for MDP and other types of pneumoconiosis in farmers with no other exposure, reinforcing the importance of a thorough anamnesis and exposure history.

Symptoms are nonspecific, such as productive cough and dyspnea, which could be related to pneumoconiosis, smoking or associated emphysema. Pulmonary function tests can be normal or show an obstructive, restrictive or mixed pattern [4].

Chest radiographs may appear normal, have pure nodular opacities (which tend to have ill-defined contours), show early reticulation and irregular opacities only or show a pattern with progressive massive fibrosis. Chest HRCT findings include reticular, reticulonodular or nodular opacities in cases with MDP or may be normal in some cases with macular pneumoconiosis (considered an early stage of MDP). It may also show hilar lymphadenopathy and calcification in the late stages [1].

Histologically, MDP is defined as interstitial accumulations of dust-laden macrophages and Mixed Dust Fibrosis lesions (MDF), with or without silicotic nodules or massive fibrosis. If silicotic nodules are present, then MDF lesions should outnumber the former. In the absence of exposure history, mineralogic analyses showing a mixture of crystalline silica and silicates would support the diagnosis [4].

Although uncomplicated MDP is typically a benign disease, cases with fatal extensive diffuse interstitial fibrosis causing honeycombing may be encountered. It should be noted that some patients with typical MDF lesions have superimposed diffuse interstitial fibrosis indistinguishable from UIP [5]. It is of utmost importance that causative respirable dust exposure be identified, as the most important step is to remove the patient from further exposure [6].

Conclusion

Clinical diagnosis of MDP requires the exclusion of other well defined pneumoconiosis as well as non-exposure-related interstitial pulmonary disorders such as idiopathic pulmonary fibrosis or sarcoidosis. However, the diagnosis of MDP may well present as a

challenge, and misdiagnosis is frequent because details of causative previous exposures may not be available and the clinical findings may vary considerably. Presently, as we are faced with several COVID-19 pneumonia patients' reevaluations, it should be kept in mind that environmental and occupational diseases cannot be overlooked. One cannot forget a detailed clinical and exposure-related history, so it could be combined with specific imagological, analytical and histopathologic investigations in order to reach the correct diagnosis, which is crucial for prognosis definition, appropriate preventive measures in the workplace and also for compensation issues.

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