Rassegna di Patologia dell'Apparato Respiratorio **2023**;38:49-52
doi: 10.36166/2531-4920-663

Caso clinico / *Case report*

Silicosis in a marble worker diagnosed by transbronchial lung cryobiopsy

Silicosi in un lavoratore del marmo diagnosticata mediante criobiopsia transbronchiale

Rachele Vallara[1], Claudia Ravaglia[1], Sara Piciucchi[2], Alessandra Dubini[3], Venerino Poletti[4]

[1] Department of Medical and Surgical Sciences (DIMEC), University of Bologna, Bologna (Italy), Respiratory Medicine Complex Unit, GB Morgagni-Pierantoni Hospital, Forlì (Italy); [2] Radiology Unit, GB Morgagni-Pierantoni Hospital, Forlì (Italy); [3] Patology Unit, GB Morgagni-Pierantoni Hospital, Forlì (Italy); [4] Department of Medical Specialities, GB Morgagni-Pierantoni Hospital/University of Bologna-Forlì (Italy), Department of Medical and Surgical Sciences (DIMEC), University of Bologna/Forlì (Italy), Department of Respiratory Diseases & Allergy, Aarhus University, Aarhus, Denmark

Summary
In this case report an histopathologic diagnosis of nodular chronic silicosis was achieved in a exposed worker, with suggestive radiological fidings, by performing a transbrochial lung cryobiopsy.

Key words: silicosis, cryobiopsy

Riassunto
In questo caso clinico viene riportato l'ottenimento di una diagnosi istopatologica di silicosi nodulare cronica in un lavoratore esposto, con radiologia suggestiva, mediante criobiopsia transbronchiale.

***Parole chiave**: silicosi, criobiopsia*

Introduction

Silicosis is a pneumoconiosis due to inhalation of silica (SiO2) over time, mainly observed in occupational settings. It is a fibrotic lung disease that has a long latency period and may clinically present as an acute, accelerated, or chronic form [1,2].

Case report

A 63-yr-old male, non-smoker marble worker for the past 45 year, presented with a screening Chest X-Ray (CXR) (prescribed by occupational medicine), showing small nodular opacities. Subsequently a Thorax CT scan was carried out (Figs. 1-5): solid and sub-solid nodular lesions were detected, mainly distributed in upper lobes, around 3-6mm in size, some of which were confluent (particularly in the upper segment of the lower right lobe) reaching 10-12 mm diameter; pleural thickening in the upper lobes; and ilo-mediastinal calcified lymphadenopathies were shown.
His comorbidities were: type2 diabetes treated with gliclazide, hypercholesterolemia treated with pravastatin and hyperuricemia treated with allopurinol. He was also on preventive treatment with acetylsalicylic acid (ASA).

Received/Ricevuto: 14/02/2023
Accepted/Accettato: 14/04/2023

Correspondence
Rachele Vallara
Department of Medical and Surgical Sciences (DIMEC)University of Bologna, via Zamboni 33, 40126 Bologna (Italy)
rachele.vallara@studio.unibo.it

Conflict of interest
The authors declare no conflict of interest.

How to cite this article: Vallara R, Ravaglia C, Piciucchi S, et al. Silicosis in a marble worker diagnosed by transbronchial lung cryobiopsy. Rassegna di Patologia dell'Apparato Respiratorio 2023;38:49-52. https://doi.org/10.36166/2531-4920-663

Figure 1. Upper lobes rounded defined nodules.

Figure 2. Confluent nodules in the right upper lobe.

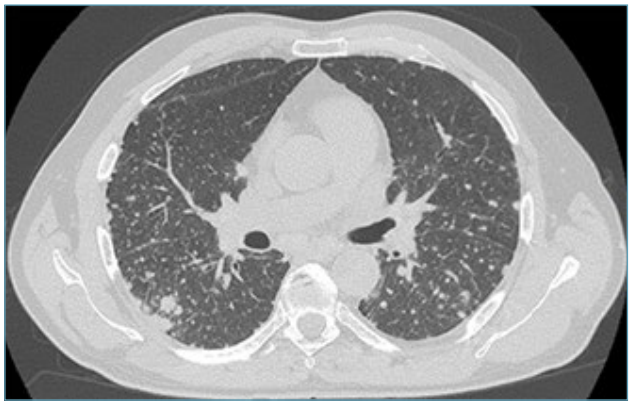

Figure 3. Nodules and hilo-medistinal adenopathies.

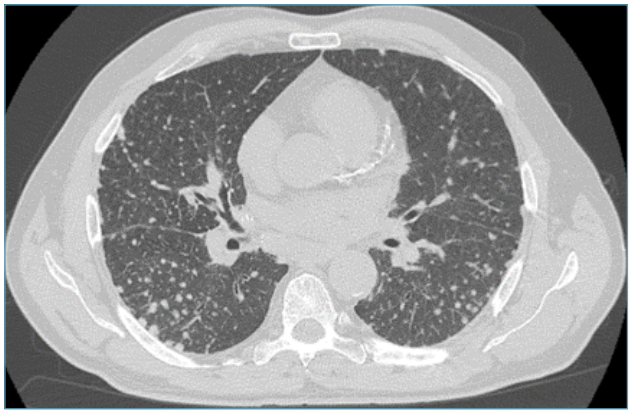

Figure 4. Hilar adenopathies and rounded nodules.

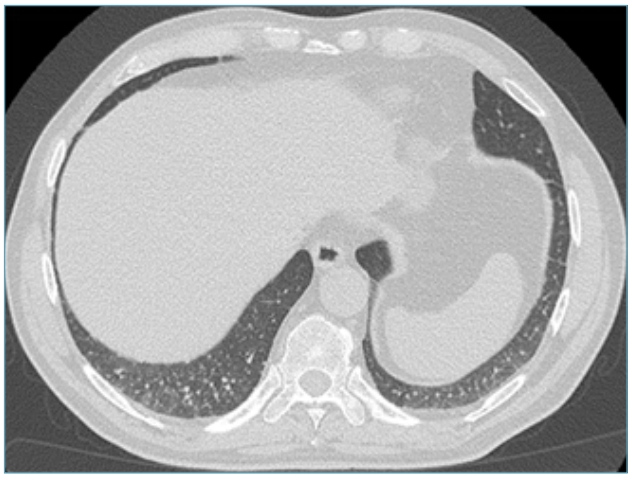

Figure 5. Bases are almost spared.

In March 2022 he had paucisymptomatic SARS-CoV-2 infection, against which he was vaccinated with 3 doses. No respiratory symptoms or sign were present. Pulmonary Function Tests were normal (FVC 3.88 L 107%, FEV_1 3.33L 116%, FEV_1/FVC 82, DL_{CO} 86%) and Arterial Blood Gas (ABG) test showed a normal gas exchanges (PaO_2 78.8 mmHg, $PaCO_2$ 39.4 mmHg, pH 7.43).
Complete laboratory examination revealed slight positivity for anti-ASMA antibodies (1:80) and lactate dehydrogenase (LDH) just above the normal upper limit (226 U/L).
A rigid bronchoscopy was performed with Bronchoalveolar Lavage (BAL) and Transbronchial Cryo Biopsies (TBB cryo) carried out. The cytofluorimetric analysis of BAL showed an increased number of cells with normal cytological profile, except for macrophages with cytoplasmatic brownish granules. Lung biopsies were retrieved from the anterior and the posterior segments of the right lower lobe. Histopathologic aspects were typical silicosis nodules with onion-like collagen deposition and histiocytes containing brownish pigment. Birefringent particles were documented inside the silicotic nodules and in the histiocytic aggregates (Figs. 6, 7).
The final multidisciplinary diagnosis was Classic Nodular Chronic Silicosis and ceasing silica dust exposure was recommended. The patient will be followed with regular imaging, PFT and respiratory examination to state the clinical course of the disease.

Discussion

TBB lung cryobiopsy in interstitial disease has a diagnostic yield that may be close to 90% in very well trained Centers [3]. This diagnostic yield is reached with a significantly lower rate of serious side effects compared to surgical lung biopsy [3]. In this case report it has been performed to achieve a histopathologic diagnosis of nodular chronic silicosis.

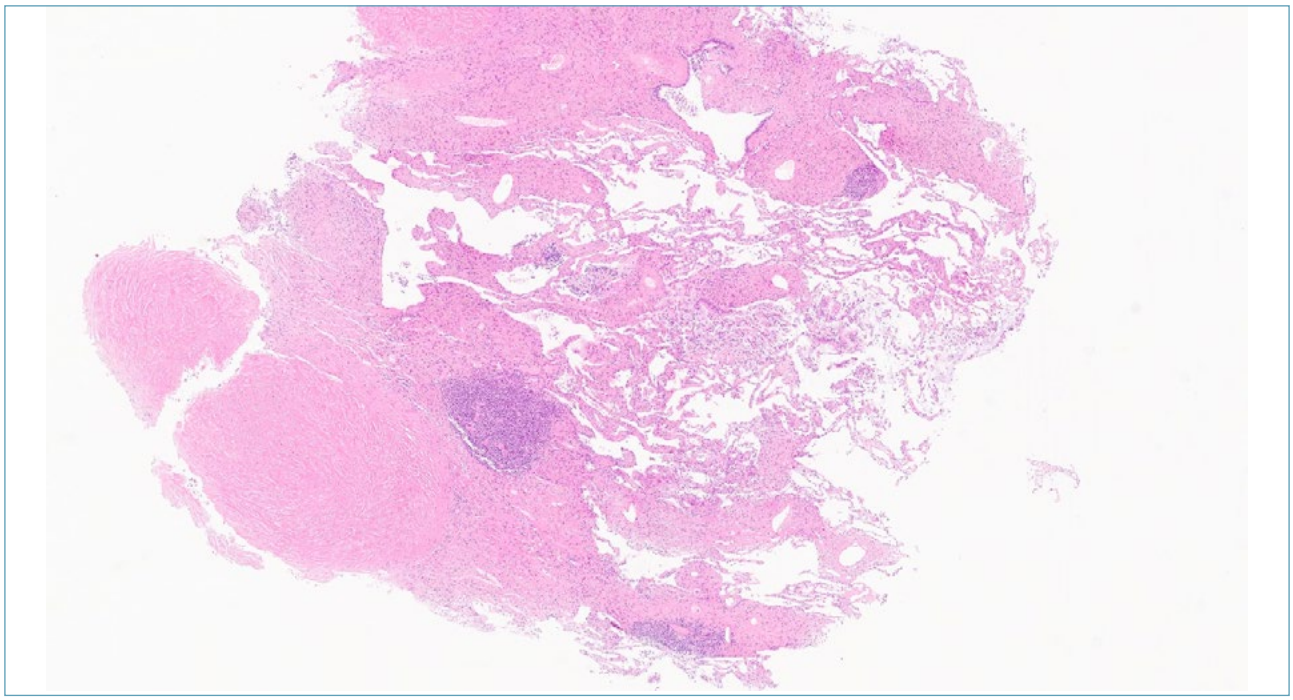

Figure 6. Transbronchial cryobiopsy sample. Nodules characterized by concentric, acellular, whorled bundles of dense hyalinized collagen fibers. These nodules are located around a small bronchiole or along a lymphatic route (H&E, mid-power).

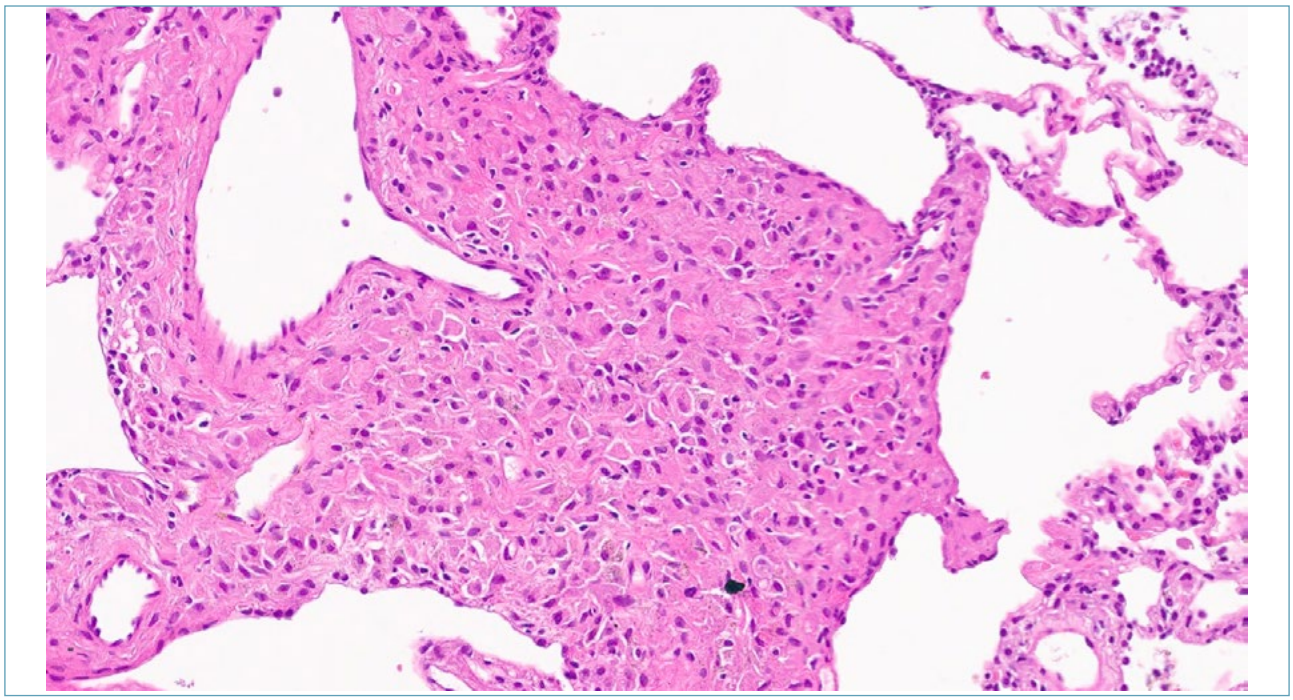

Figure 7. Transbronchial cryobiopsy sample. A cluster of macrophages around a postcapillary venule containing intracytoplasmic tiny brown particles (H&E, high-power).

Nowadays, in Italy, there's a more diffuse knowledge about the prevention in exposed workers, both primary with the use of DPI, water spray and dry air filtering, and secondary with screening CXR and periodical respiratory examination. Therefore the incidence of this pneumoconiosis has significantly reduced over the last decades [4,5]. The case here reported underlines that a chronic exposure in settings not well identified as at risk may be a clinical challenge and that biopsy is still useful to reach e definite diagnosis [6].

References

1 Greenberg MI, Waksman J, Curtis J. Silicosis: a review. Dis Mon 2007;53:394-416. https://doi.org/10.1016/j.disamonth.2007.09.020

2 Leung CC, Yu ITS, Chen W. Silicosis. Lancet 2012;379:2008-2018. https://doi.org/10.1016/S0140-6736(12)60235-9

3 Ravaglia C, Wells AU, Tomassetti S. at al. Diagnostic yield and risk/benefit analysis of trans-bronchial lung cryobiopsy in diffuse parenchymal lung diseases: a large cohort of 699 patients. BMC Pulm Med 2019;19:16. https://doi.org/10.1186/s12890-019-0780-3

4 Pesci A, Harari S, et al. Silicosi. In: Malattie Interstiziali Polmonari. Pesci A, Harari S, eds. Milano: Springer Healthcare Education 2018, p. 173-180.

5 Li T, Yang X, Xu H, Liu H. Early identification, accurate diagnosis, and treatment of silicosis. Can Respir J 2022;2022:3769134. https://doi.org/10.1155/2022/3769134

6 Canessa PA, Torraca A, Lavecchia MA, et al. Pneumoconiosis (silicosis) in the confectionery industry. Sarcoidosis 1990;7:75-77.