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Case Report

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A case of desquamative interstitial pneumonia with unidentified etiology

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ABSTRACT

Desquamative interstitial pneumonia (DIP) is a rare form of interstitial lung disease, most commonly associated with cigarette smoking. However, in certain cases, environmental, occupational, or immunological factors may play a predominant role. Histopathologically, DIP is characterized by a diffuse and uniform inflammatory process involving the alveolar lumen and interstitium, with the presence of numerous large, mononuclear macrophages in the alveolar spaces and septa. It typically exhibits minimal or moderate septal thickening due to limited collagen deposition and contains few inflammatory cells. Compared to other interstitial pneumonias, DIP generally has a more favorable prognosis. Smoking cessation and corticosteroid therapy have been reported to yield excellent outcomes. Herein, we present a rare case of DIP in a young adult patient with no history of smoking or identifiable environmental exposure, who demonstrated resistance to standard therapy.

Keywords: Desquamative interstitial pneumonia, idiopathic interstitial pneumonias, nonsmoking

INTRODUCTION

Desquamative interstitial pneumonia (DIP) is a rare subtype of idiopathic interstitial pneumonia (IIP), typically associated with cigarette smoking. First described by Liebow[1] in 1965, DIP is pathologically defined by the accumulation of pigment-laden macrophages in the alveolar spaces, mild chronic inflammation in the interalveolar septa, and varying degrees of fibrosis. According to the American Thoracic Society (ATS) and the European Respiratory Society (ERS), DIP is classified under the category of "smoking-related interstitial lung diseases", along with respiratory bronchiolitis-associated interstitial lung disease (RB-ILD).[2] While both conditions are linked to smoking, DIP is distinguished by more extensive alveolar involvement and a more severe clinical course.

The exact prevalence of DIP remains unknown. Owing to its rarity, most epidemiological data are derived from studies of idiopathic pulmonary fibrosis (IPF), where the estimated prevalence ranges from 3 to 6 per 100.000.[3] Although historically associated with tobacco use, up to 40% of DIP cases have been reported in lifelong non-smokers, suggesting alternative etiological factors. Environmental exposures and autoimmune disorders have also been implicated.[4] In this report, we present a rare case of biopsy-proven DIP in a young, non-smoking adult with no apparent environmental exposure or occupational risk, who failed to respond to corticosteroid therapy.

CASE

A 35-year-old male police officer presented to our clinic with a one-week history of dry cough and progressive shortness of breath. Initial chest radiography revealed bilateral basal non-homogeneous opacities, suggestive of pneumonia. Thoracic computed tomography (TCT) showed bilateral basal consolidations, and empirical antibiotic therapy was initiated.

His medical history included rheumatic fever at age 12, and a family history of Behçet's disease in two older sisters. He denied smoking, alcohol use, recreational drug use, or any known environmental/occupational exposures. Physical examination revealed diffuse bilateral inspiratory crackles; no clubbing or systemic signs were observed.

High-resolution computed tomography (HRCT) demonstrated fibrotic changes in the apical regions and diffuse ground-glass opacities predominantly in the basal segments of both lower lobes, as well as the medial segment of the middle lobe and the inferior lingular segment (**Figure**). Quantiferon-TB Gold test was negative. Bronchoalveolar lavage (BAL) revealed active inflammation but no malignant cells or acid-fast bacilli.

Pulmonary function tests (PFTs) showed: Forced expiratory volume in 1 second (FEV1)/forced vital capacity (FVC): 105%, FEV1: 98%, FVC: 96%, carbon monoxide diffusing

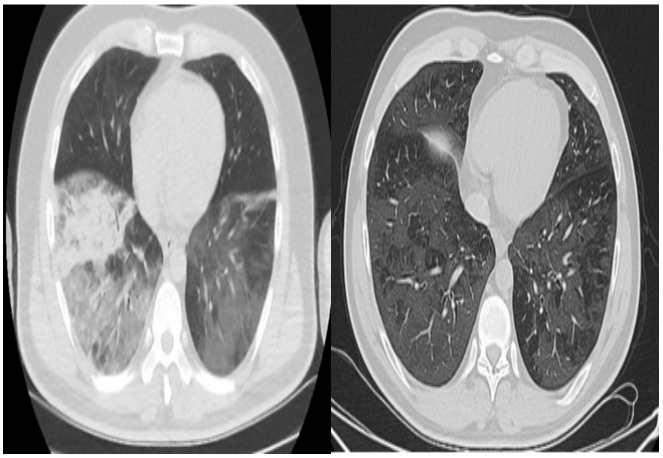

Figure. Diffuse ground-glass opacities predominantly in the basal segments of both lower lobes

capacity (DLCO): 66%. Immunologic screening including antinuclear antibody (ANA), anti-neutrophil cytoplasmic antibodies (ANCA), and extractable nuclear antigens (ENA) panels were negative. Due to lack of clinical and radiological improvement, oral prednisolone was initiated. However, no significant radiological regression was observed at 3-and 6-month follow-up HRCTs. Subsequently, video-assisted thoracoscopic surgery (VATS) was performed.

Histopathological analysis revealed extensive intra-alveolar and focal intrabronchial accumulation of macrophages, some of which contained intracytoplasmic pigment. Mild interstitial inflammation and small lymphoid aggregates in bronchovascular areas were noted, consistent with a diagnosis of DIP.

Due to further decline in DLCO and PFT values, the patient was considered steroid-resistant, and azathioprine therapy was added. Given the patient's young age and progressive course, he was referred for lung transplantation evaluation.

DISCUSSION

IIPs encompass a heterogeneous group of diffuse parenchymal lung diseases characterized by variable degrees of inflammation and fibrosis with no known cause. DIP predominantly affects males between 30 and 50 years of age, with over 90% of reported cases occurring in smokers. However, non-smoking-related cases have increasingly been documented in association with environmental exposures (e.g. textile dust, metal fumes, paint sprays), certain medications (e.g., nitrofurantoin, sirolimus), autoimmune diseases (especially connective tissue disorders), and genetic mutations such as those involving surfactant proteins.[5]

Histologically, DIP is characterized by the accumulation of pigmented macrophages in the alveolar spaces, minimal interstitial fibrosis, and mild chronic inflammation.[6] Our patient's biopsy demonstrated these features, despite the absence of common risk factors such as smoking or occupational exposure.

Clinically, patients present with non-specific symptoms such as subacute onset of dyspnea and persistent dry cough. Fever and systemic symptoms are typically absent. Hemoptysis is extremely rare. On auscultation, fine bilateral crackles may be heard, while clubbing is uncommon.[7]

Radiologically, HRCT typically shows bilateral, lower-lobe predominant ground-glass opacities in a diffuse and homogeneous pattern, without honeycombing—helping to differentiate DIP from usual interstitial pneumonia (UIP) or IPF. In progressive stages, cyst formation and traction bronchiectasis may appear. Compared to NSIP or UIP, fibrosis is less pronounced in DIP.[8] In our patient, bilateral basal ground-glass opacities were present, without radiological signs of fibrosis.

The diagnosis of DIP is established based on clinical suspicion, radiologic findings, BAL analysis, and histopathology. BAL fluid often demonstrates macrophage predominance. In recent years, transbronchial cryobiopsy has emerged as a promising alternative diagnostic method, offering larger sample size with a less invasive approach.[9] However, when transbronchial biopsy is inconclusive, surgical lung biopsy remains the gold standard.[10] In our case, due to the lack of clinical response and the atypical radiologic appearance, definitive diagnosis was achieved via VATS biopsy.

DIP is generally a treatable condition. Smoking cessation remains the cornerstone of management. In mild cases, remission may occur with cessation alone. Systemic corticosteroids are recommended for symptomatic or progressive cases. In refractory cases, immunosuppressive agents such as azathioprine or mycophenolate mofetil may be required. Macrolide therapy has also been proposed as an adjunct in certain cases. Lung transplantation should be considered for patients with progressive disease despite optimal medical therapy.[5] In our case, azathioprine was initiated due to steroid unresponsiveness, and the patient was referred for transplantation.

CONCLUSION

This case highlights the diagnosis of DIP in a young adult male without a history of smoking or known environmental exposure, who presented with progressive symptoms and was unresponsive to corticosteroid therapy. The case underscores the heterogeneity of DIP and the importance of considering non-smoking-related etiologies in the differential diagnosis of interstitial lung diseases. Histopathological confirmation remains crucial in atypical presentations to ensure accurate diagnosis and appropriate management.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure
The authors declared that this study has received no financial support.

Author Contributions
All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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