Case Report

Mushroom worker's lung: A case of acute occupational hypersensitivity pneumonitis in a young female

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ABSTRACT

Hypersensitivity pneumonitis (HP) is an interstitial lung disease triggered by an exaggerated immune response to inhaled environmental antigens. Occupational exposure plays a major role in disease etiology. A 26-year-old female presented with a 7-day history of fever, productive cough, breathlessness, and weight loss. Clinical and radiologic findings were suggestive of HP. A detailed occupational history revealed exposure to organic antigens in a mushroom factory without protective measures. She showed marked clinical improvement with corticosteroid therapy. HP remains an underdiagnosed condition. Detailed occupational history and early recognition are a key to appropriate management and prevention of chronic sequelae.

Key words: Environmental antigens, Hypersensitivity pneumonitis, Interstitial lung disease, Mushroom worker's lung

Hypersensitivity pneumonitis (HP) is an immune-mediated inflammatory lung disease resulting from repetitive inhalation of environmental antigens [1]. For workers dealing with organic substances, as well as chemicals, HP is an important occupational lung disease. Common culprits include molds, spores, animal proteins, and various occupational exposures [2]. Timely diagnosis is crucial to prevent irreversible lung damage.

This case highlights an acute episode of HP in a young female employed in a mushroom factory. The rationale for reporting this case is that, although occupational lung diseases are typically associated with chronic exposure, acute HP should also be considered in the differential diagnosis of acute respiratory illness.

CASE PRESENTATION

A 26-year-old previously healthy female presented with complaints of fever, productive cough, and breathlessness for 7 days. There was no history of prior respiratory illness.

On examination, the patient was febrile and tachypneic. Arterial oxygen saturation was 85% on room air, improving to 95% with 4L of supplemental oxygen, pulse rate was 135/min, respiratory rate was 30/min, and blood pressure was 110/70 mmHg. On chest auscultation, bilateral fine crackles were audible in both lungs. Examination of other systems was unremarkable. The patient was provisionally diagnosed with viral pneumonia.

Routine investigations and a chest X-ray were performed. Chest X-ray shows bilateral diffuse, nodular, patchy opacities. Complete blood count (CBC), arterial blood gas analysis (ABG), renal function tests, liver function test, and nasal swab were taken for reverse transcription polymerase chain reaction for COVID-19 and influenza. Other laboratory investigations were mentioned in Table 1. On interpreting the results, CBC shows that neutrophilic leukocytosis with elevated C-reactive protein, serum lactate dehydrogenase, and serum ferritin were suggestive of acute inflammation. ABG shows normal pH with mild hypoxemia corrected with nasal oxygen. However, the nasal swab for COVID-19 and influenza was found to be negative. Hence, a computed tomography (CT) thorax was done, which was suggestive of HP (Fig. 1).

Based on the CT findings, bronchoalveolar lavage was planned. The bronchoalveolar lavage fluid showed lymphocytosis (90%), and the culture showed no growth of microorganisms. Upon detailed history, the patient revealed her occupation in a mushroom farm where she was involved in inspecting processing units without the use of personal protective equipment. Given the strong correlation with exposure, a working diagnosis of HP – mushroom worker's lung was made.

Access this article online

Received - 23 July 2025
Initial Review - 15 August 2025
Accepted - 22 September 2025

DOI: 10.32677/ijcr.v11i10.7761

Quick Response code

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Table 1: Laboratory investigations of the patient

Total WBC count	**15100/µL (10≥/µL)**
Blood investigations	
Neutrophils	86.4%
Lymphocytes	9.4%
Eosinophils	0.9%
Monocytes	2.3%
Basophils	10%
RBC count	4.6×10^6/µL
Hemoglobin	13.5g/dL
Hematocrit	41.4%
MCV	89 fL
MCH	29 pg
MCHC	32.6 g/dL
Platelet count	380×10^3/µL
Other investigations	
CRP	14.2 mg/L
Serum ferritin	403 ng/mL
Serum LDH	479 U/L
Serum glucose	132 mg/dL
Liver function tests	
Total bilirubin	1.1 mg/dL
Indirect bilirubin	1.0 mg/dL
Direct bilirubin	0.1 mg/dL
Serum glutamic-oxaloacetic transaminase U/L	56 U/L
Serum glutamic pyruvic transaminase U/L	50 U/L
Alkaline phosphatase U/L	188 U/L
Renal function tests	
Total protein g/dL	7.5 g/dL
Albumin g/dL	4.0 g/dL
Globulin g/dL	3.5 g/dL
Serum creatinine	0.63 mg/dL
Blood urea	12.3 mg/dL

RBC: Red blood cell, WBC: White blood cell, CRP: C-reactive protein, LDH: Lactate dehydrogenase, MCV: Mean corpuscular volume, MCH: Mean corpuscular hemoglobin, MCHC: Mean corpuscular hemoglobin concentration

The patient was started on intravenous corticosteroid injection methylprednisolone 80 mg. Following steroid therapy, there was a marked symptomatic improvement within 48 h. Oxygen supplementation was discontinued, and she was transitioned to oral steroids tablet prednisolone 1 mg/kg, which was tapered over 2–4 weeks. The patient was advised to rest at home for 2 weeks and asked to change her job to reduce her exposure and prevent chronic HP. The symptoms improved, and the mosaic attenuation on the CT image also improved.

DISCUSSION

HP, formerly known as extrinsic allergic alveolitis, involves both alveolar and bronchiolar inflammation, typically due to a combination of type III and type IV hypersensitivity reactions [1-3]. Conventionally, it has been classified into acute, subacute, and chronic forms based on the time course and the presentation [4]. However, the recent clinical practice guidelines of the American Thoracic Society (ATS)/Japanese Respiratory Society/Latin American Thoracic Society on the diagnosis of HP only refer to non-fibrotic (nfHP) and fibrotic HP which have been proposed based on clinical, radiologic, and pathologic characteristics [5-7].

HP due to exposure to mushroom cultivation, also known as mushroom workers' lung, and thermophilic actinomycetes that grow in the compost are thought to cause this condition. During indoor cultivation of mushrooms, a large number of spores, 4–8 µm in size, are suspended in the air. Some mushroom cultivators are sensitized by repeated inhalation of high concentrations of mushroom spores [3,4].

Diagnosis is typically based on clinical presentation, imaging, a detailed history of antigen exposure, and response to treatment. In a diagnosis, it is necessary to listen to the medical history in detail, keeping in mind the causative antigen. It is important to confirm that exacerbation of symptoms occurs after work related to mushroom cultivation [5]. According to the ATS guideline, ground-glass opacities, poorly defined centrilobular nodules, mosaic attenuation on inspiratory CT images, and air trapping on expiratory CT images are typical patterns of nfHP [6,7]. Pulmonary function testing and the sedimentation antibody test against the offending antigen can help provide useful information for diagnosing the condition. The treatment primarily involves the avoidance of identified antigens. In some patients, steroids, immunosuppressive drugs, and anti-fibrotic may be used to control the allergic inflammation and prevent lung fibrosis [8,9]. The CT findings in this case, ground-glass opacities with centrilobular distribution, are classic for acute HP. However, given the non-specific symptoms, a wide variety of respiratory disorders may present similarly, so differential diagnosis includes interstitial lung diseases (ILDs) (idiopathic pulmonary fibrosis, non-specific interstitial pneumonia, cryptogenic organizing pneumonia), granulomatous lung diseases (sarcoidosis, tuberculosis, and non-tuberculous mycobacterial infection, fungal infections), airway-centered diseases, eosinophilic lung diseases, connective tissue disease-associated ILD (rheumatoid arthritis-associated ILD, systemic sclerosis-associated ILD), and drug- or radiation-induced lung injury, neoplastic/infiltrative conditions, pneumoconiosis (silicosis, asbestosis, coal workers' pneumoconiosis).

A detailed environmental history and prompt corticosteroid therapy can significantly improve prognosis and prevent chronic fibrosis. Two case reports done by Tsushima *et al*., and Tanaka *et al*., show hypersensitive pneumonitis following exposure to mushroom/spores; history and physical examination were similar. Antigen test and radiological investigation help in the diagnosis of this condition [10,11].

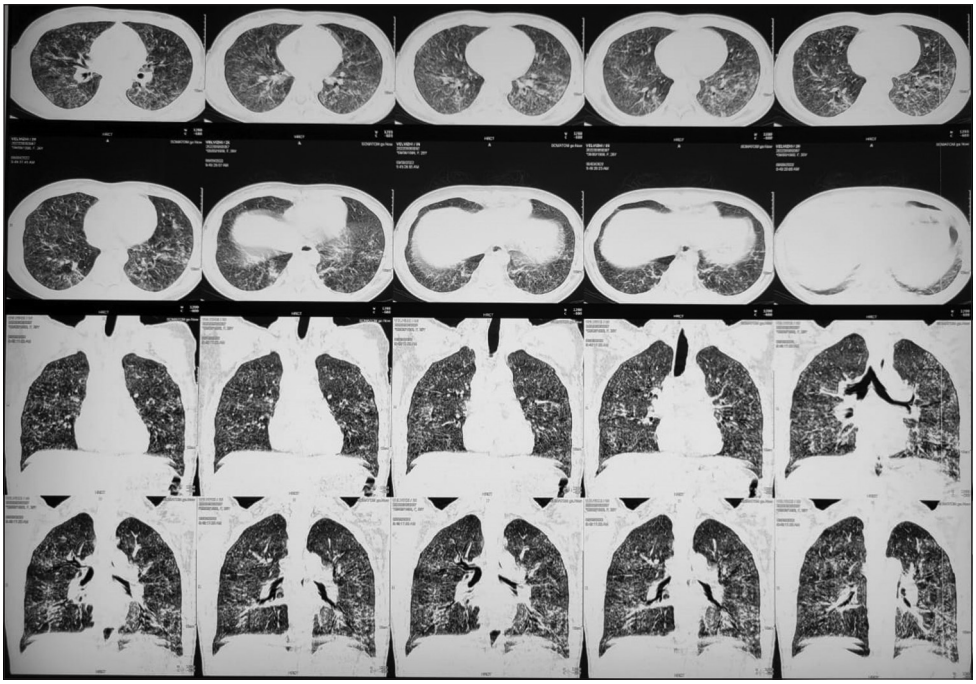

Figure 1: Computed tomography thorax shows bilateral ground-glass opacities in a centrilobular distribution with basal consolidation

CONCLUSION

This case underscores the importance of considering hypersensitive pneumonitis in patients with acute respiratory symptoms and relevant occupational exposure. Timely diagnosis and intervention, along with preventive occupational measures (like mask usage), are essential in improving outcomes and avoiding chronic complications. With the increasing prevalence of mushroom cultivation worldwide, workers involved in the cultivation and distribution of edible mushrooms are at risk of developing HP. Although still relatively rare, healthcare professionals should consider this diagnosis when examining a patient with persistent respiratory symptoms.

ACKNOWLEDGMENT

We are grateful to the patient who gave consent for this study. We would like to thank the Department of Medicine and our Institute for their constant support.

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Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Rebayudeen SM, Prakasam PK, Sivaranjani T. Mushroom worker's lung: A case of acute occupational hypersensitivity pneumonitis in a young female. Indian J Case Reports. 2025; 11(10):537-539.