

## Unusual radiological manifestation of hypersensitivity pneumonia

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World Journal of Advanced Research and Reviews, 2024, 21(01), 2096–2099

Publication history: Received on 13 December 2023; revised on 20 January 2024; accepted on 22 January 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.1.0267>

### Abstract

Hypersensitivity pneumonia is suspected in a suggestive clinical context and in the presence of specific exposure to an allergen. It can be characterized on chest CT by diffuse interstitial involvement. However, the diagnosis is not always so simple. We report a case of hypersensitivity pneumonia with scan pattern of organizing pneumonia.

**Keywords:** Hypersensitivity pneumonia; Chest CT; Organizing pneumonia; Avian precipitin; Granuloma

### 1. Introduction

Hypersensitivity pneumonia is one of the most common diffuse interstitial pneumonias. It corresponds to inflammatory interstitial lung damage following an immunological reaction due to the inhalation of very small diameter antigens to which a subject is sensitized [1]. The diagnostic approach remains difficult, based on exposure to the allergen, clinic, imaging and compatible histopathology. Chest CT scan shows in its typical form the presence of centrilobular ground glass opacities observed diffusely on both pulmonary fields. In the chronic phase, fibrous changes can be observed. The presence of a scan pattern of organized pneumonia during hypersensitivity pneumonia constitutes an unusual situation. We describe a case of unusual radiological presentation of hypersensitivity pneumonia with pattern of organizing pneumonia.

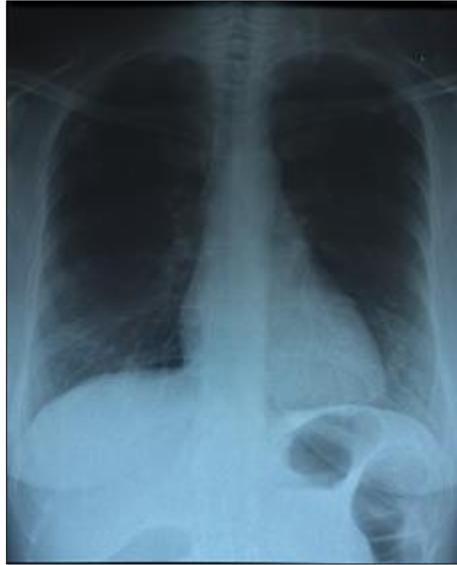
### 2. Case report

This is a 64-year-old woman, housewife, without toxic habits, exposed to pigeons for 40 years, known as chronic dyspneic stage II of Sadoul for 2 years. Her pathological history includes depression and high blood pressure on beta blockers. The patient presented to the consultation due to worsening of her dyspnea associated with a dry cough in a context of apyrexia and preservation of general condition.

Physical examination revealed a decent saturation of 98% on room air, respiratory rate of 24cpm, heart rate of 88bpm, and blood pressure of 160/80mmhg. Pulmonary examination revealed crackling rales. The biology at admission does not show any inflammatory syndrome. The blood count is normal as is the leukocyte count (leukocytes 9,010/mm<sup>3</sup> including 730/mm<sup>3</sup> lymphocytes, 380/mm<sup>3</sup> monocytes, 00/mm<sup>3</sup> eosinophils and 7840/mm<sup>3</sup> neutrophils). The blood phosphocalcium balance was normal. The immunological assessment including anti-native DNA AC, anti-CCP AC, anti-SSA AC, anti-SSB AC and rheumatoid factor were negative. Gene Xpert in sputum was negative. The avian preceptin assay was positive.

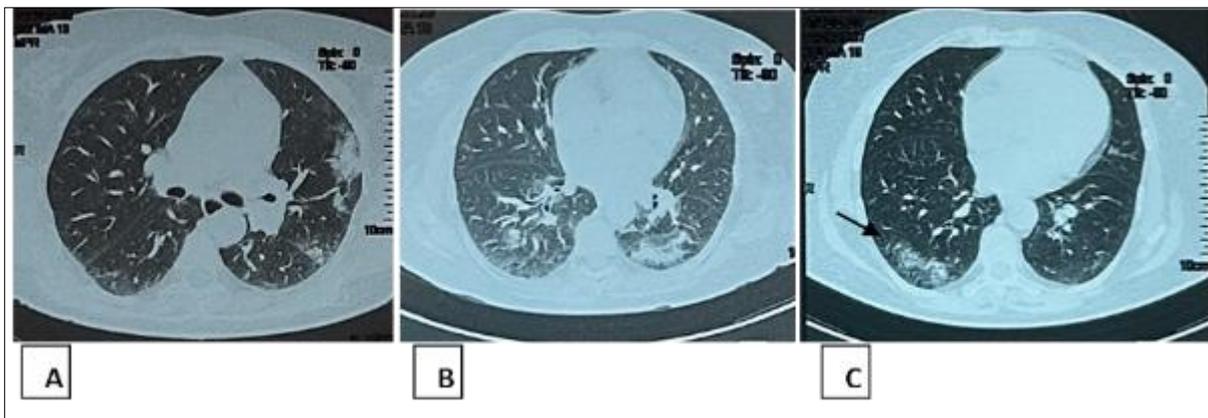
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Standard radiograph showing reticular infiltrates and bilateral basithoracic micronodular with thoracic distension (Figure 1). A chest CT scan was done, revealing the presence of ground glass and nodular foci in the process of bilateral condensations of probable infectious origin (Figure 2 A). After a course of antibiotic therapy, a follow-up chest CT scan was done with persistently the same radiological appearance (Figure 2 B).



**Figure 1** Standard radiograph showing reticular infiltrates and bilateral basithoracic micronodular with thoracic distension

During his hospitalization, a chest CT scan highlighted the regression of the nodular and beach ground glass foci, bilateral and asymmetrical previously described with the appearance of other foci of different locations, we speak of a migratory character creating a pattern of organized pneumonia (Figure 2 C).



**Figure 2** (A) Frosted beach and nodular glass hearths in the process of condensation, (B) Frosted beach and nodular glass hearths, some of which are in the process of condensation, (C) Regression of bilateral and asymmetrical frosted nodular and beach glass hearths with appearance of an arcuate condensation surrounded by a ground glass in the right posterobasal (Arrow) and thickening of the non-septal lines

Bronchoscopy was done with bronchoalveolar lavage as well as staged biopsies. The bronchoalveolar lavage fluid of the right upper lobe is polymorphic inflammatory, predominantly lympho-histiocytic with a CD4/CD8 ratio estimated at 0.66, without malignant cells. Culture of fluid samples did not include bacteria, fungi or mycobacteria. Staged biopsies revealed nonspecific chronic inflammation. A supplement by transparietal biopsy guided scan was carried out highlighting the presence of granulomatous lesions epithelial - giganto -cellular interstitial lungs with absence of histological sign of malignancy.

Due to the clinical, radiographic, and bronchoscopic observations, the diagnosis was hypersensitivity pneumonia, most likely caused by the patient's exposure to pigeons. We started oral corticosteroid therapy at a rate of 60 mg per day with supplementation of vitamin and calcium. He was advised to avoid the allergen. The patient was followed up on an outpatient basis after a few weeks, and resolution of her symptoms was almost complete.

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### 3. Discussion

Hypersensitivity pneumonia (formerly extrinsic allergic alveolitis) is an inflammatory and granulomatous pulmonary attack with an immunoallergic mechanism, corresponding to an exacerbated response to the inhalation of an antigen, most often organic (mold, bacteria, fungi, avian protein. . . ) 2. The presence of circulating antibodies to the presumed antigen and lymphocytosis in bronchoalveolar washing help guide the diagnosis. It is important to distinguish acute or subacute hypersensitivity pneumonia from chronic hypersensitivity pneumonia, whose clinical, radiological and prognostic characteristics differ considerably. Survival is estimated at 80% in 4 years, but it is lower (72%) in the presence of a fibrotic component 3.

In the acute or subacute phase, the radiological presentation is made of centrilobular micronodular lesions (reflecting cellular bronchiolitis lesions) associated with bilateral ground glass predominating in the middle regions (alveolitis lesions). A mosaic appearance or expiratory lobular entrapment is inconsistent at this stage but very evocative producing the cheese head sign (clear lung regions containing air, uneven ground glass opacities and normal lung). In the chronic phase, the CT appearance includes irregular reticulations, traction bronchiectasis, honeycomb appearance with a heterogeneous, predominantly basal distribution 4.

The radiological presentation of hypersensitivity pneumonia can be unusual as in the case of our patient with a pattern of organizing pneumonia.

Organized pneumonia corresponds to an inflammatory reaction of the distal air spaces to an attack. It only became a clinical entity in the 1980s with the description by different groups of a well-characterized and easily recognizable radioclinical syndrome 5. It is characterized on CT by the presence of pulmonary condensations with bronchogram, sometimes associated with glass frosted (like the case of our patient). These condensations are most often multiple, bilateral, subpleural, asymmetrical, predominantly basal, readily labile or migratory. Linear condensations, in bands, of perilobular distribution, with inverted halo sign (atoll sign) are also very suggestive, as is a peribronchovascular distribution.

This radiological pattern can also be present in other pathological entities, notably connective tissue disease (distinct lupus erythematosus, rheumatoid arthritis, Gougerot syndrome), medicinal, post-infectious, post-radiation 6. In an oncological context, it is observed in hematological diseases and solid tumors.

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### 4. Conclusion

The features recognized on CT scan of hypersensitivity pneumonia include reticulations, ground glass, centrilobular nodules, lobular hyperlucency with heterogeneous distribution, honeycombing is possible. The pattern of organized pneumonia in the context of hypersensitivity pneumonia is a radiological determination described in the literature 7, but remains unusual as our case illustrates.

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### Compliance with ethical standards

#### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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